The Design of Dialogue

Using Soft Systems Methodology to examine the
'health' of stakeholder discourse around the development
of biofuels in New Zealand whilst assessing how this approach
could contribute to the improvement of decision-making processes.

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Attestation of Authorship

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person, nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.

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Abstract

With the first commitment period of the Kyoto Protocol commencing in 2008, many signatory governments have identified biofuels as a favoured response to the problem of fulfilling their countries' pledges to reduce total greenhouse gas emissions to 1990 levels. Despite the tendency for pressure over climate change to expedite the commercialisation process, detailed evaluation of the claimed benefits, likely efficacy or environmental impact of biofuels production remains an indispensable stage of the decision making process concerning any such intervention. This project consequently examines the public discourse surrounding the adoption of biofuels in New Zealand in the form of the Biofuels Sales Obligation policy (BSO): a mandate placed on the Oil Companies to supply a percentage of biofuel.

Systems thinking propounds the notion of complex interrelatedness: a pivotal concept in our current understanding of the cumulative effects of greenhouse gas emissions and their relationship to climate change. It also recognizes that the multiple ways in which different stakeholders perceive a contentious question are an integral feature of any problematical situation. By applying systems concepts to qualitative research, Soft Systems Methodology (SSM) is therefore particularly suitable for the analysis of multiple stakeholder discourse in this situation. The present study employs SSM to examine stakeholder opinion through the construction of conceptual models in the form of rich pictures and root definitions. The researcher invited diverse stakeholders to 'see what they were thinking' and reflect upon the beliefs and assumptions that informed their views with respect to New Zealand biofuels development.

With reference to official documentation arising from the policy development process and through a series of interviews and a focus group, the research examines perceptions of the consultation process on biofuels development and its contribution to informed decision-making. The study data indicates that the scope of enquiry tended to be restricted by early presuppositions regarding the consultation process and its desired outcomes, which consequently shifted the focus of consultation the enquiry from an assessment of the desirability of biofuels to an appraisal of the feasibility of government policy. However inadvertently, communication was distorted. The research examines the basic assumptions that shaped the discourse and enabled already established opinions to prevail.

Furthermore, the thesis explores how using SSM to surface tacit assumptions and challenge proposed models of intervention can help improve the reflexivity of discourse and decision-making. By ensuring open communication remains at the centre of discourse, SSM could provide a means of establishing productive conditions for learning and co-creative dialogue. Consequently the study has important implications for how the 'health' of public discourse in New Zealand might be sustained when addressing other similarly complex issues.

Chapter 1: Introduction

> "*Conversation about the weather is the last refuge of the unimaginative.*"
>
> Oscar Wilde

1.1 Introduction

Conversations about the weather continue all over the world, however the import of those conversations has changed significantly since Wilde's day. At the time of writing (December 2007) conversations of global consequence were taking place in Bali between the representatives of over 180 countries at the United Nations Climate Change Conference. The weather, and how its patterns are changing as a result of human exploitation of the planet's resources, is now a globally recognized problem (IPCC, 2007). Figuring out how the world will respond to this crisis has been described as "*the defining challenge of our time*" (Secretary-General Ban Ki-moon quoted on UN website, United Nations, 2008). Perhaps today, the last refuge of the unimaginative is in *not* talking about the weather.

In their responses to the challenge of climate change, the world's governments have seized upon biofuels as one of very few near-available substitutes for the petroleum-based fuels that currently provide more than 95% of the world's transportation energy (Worldwatch Institute, 2006). Unlike petroleum-based fuels, biofuels have the potential to be carbon neutral over their lifecycles by emitting only as much carbon as absorbed by their feedstocks (Worldwatch Institute, 2006). As these feedstocks are products or biproducts of agriculture, biofuels assert a considerable appeal to an agrarian economy like New Zealand. In New Zealand this has resulted in the introduction of the Biofuels Sales Obligation (BSO): a mandate that directs the country's major oil companies to deliver a proportion of their total fuel supply as biofuel.

While the implications of a substantial shift to biofuels are still emerging, production has grown exponentially in recent years, with fuel ethanol increasing worldwide by 22% in 2006 alone (Worldwatch Institute, 2006). Such is the pace of implementation that decisions made now will undoubtedly have a considerable bearing on whether the impact of biofuels adoption is ultimately positive or if it merely creates additional environmental and social problems.

Transparency around how these decisions are made, and which arguments get considered, is therefore crucial if biofuels are to be produced and used responsibly. For this reason, this study focuses on the conversations taking place around the New Zealand Government's decision to encourage biofuels development via its BSO mandate.

These conversations are important since any action taken collectively is accomplished through on-going conversations in which people negotiate what they are doing and how they are making sense of what they are doing (Stacey, 2007). Thus public discourse establishes the basis of authority for any action taken by a group or society since organization of these

entities is realized through conversation (Habermas, 1989; Stacey, 2007). Not only do we understand one another through talking, but that conversation also adds to the store of knowledge that structures how we come to understand one another in all conversations. As Stacey (2007) maintains:

> The form of such conversations is thus of central importance, because in establishing what is acceptable to talk about in a community, and how it is acceptable to talk, the conversational form, or discourse, establishes people's relative power positions and therefore who they are and what they do together (p. 2).

Forms of discourse, claims to knowledge and how these are used to establish power relations represent important themes in this research. Specifically, it is concerned with the ways in which conversations surrounding the introduction of the BSO are conducted, whose voices contribute to them and how they serve the conditions of democratic engagement within society. However, in examining the particulars of this debate the research also touches on more general questions concerning the criteria by which one contribution may be judged against another and how this is played out in public discourse.

The thesis unfolds as a series of comparisons by which ostensible solutions are examined against the logical defensibility and cultural feasibility of their claims. Adopting Checkland's (1999) Soft Systems Methodology (SSM) as its framework of enquiry, the study is concerned with exploring the basis of the discourse and the presuppositions that sustain received points of view. To this end, visual representation in the form of 'rich picture building' and conceptual modelling are used as 'conceptual tools' to surface diverse stakeholder viewpoints and examine conflicting statements contributing to the debate on biofuels development in New Zealand.

Instead of attempting to assert a definitive 'truth' on a particular issue, SSM, and hence this thesis, proposes a cycle of learning through action in which conceptual tools are generated to structure open discussion, explore diverse viewpoints and generate insights.

1.2 Thesis of the research

Following Habermas (1989) and Bohm (1996), the premise of this study is that the sincere engagement of willing participants in a shared process of enquiry will create conditions in which they are able to listen to the viewpoints of others without prejudice, and reflect, and possibly reframe, their own points of view. Such discursive conditions would encourage co-creative learning and contribute to a more tolerant and innovative society. However, for these conditions to occur it would be necessary to bring about a radical shift in the normative thinking towards problem solving underlying public discourse.

For Bohm, this shift requires that we gain a reflexive awareness of the way in which we think about the world. The Cartesian-Newtonian scientific approach with its underlying mechanistic metaphors and tendency to reduce phenomena into smaller and smaller parts in order to study and understand them, represents a way of thinking that is no longer adequate

in helping us make sense of the information we are receiving about the world and our place within it (Bohm, 1996; Capra, 1988; Meadows, 2002; Senge, 1990, among others). Analysis purely by conventional, reductivist means is no longer sufficient to explain large scale and highly complex phenomena such as purposeful social enquiry or climate change (Ackoff, 1998; Capra, 1988; Gharajedaghi, 1999; Stacey, 2007). Capra (1988) insists furthermore that such narrowly focused thinking, by denying interrelatedness and developing technology without consideration of its ecological consequences, has led to degradation of the environment and widespread pollution of the atmosphere.

In a worldwide context, these separative perspectives are becoming progressively less supportable. On 2 February 2007, the Fourth Assessment Report of the Intergovernmental Panel on Climate Change accepted the evidence linking climate change to human activity (IPCC, 2007). Whether in the fields of meteorology or economics, agriculture or politics, what we increasingly have to acknowledge is a context that assumes, rather than denies, interrelatedness. As Senge (1990) asserts: "*We tend to blame outside circumstance for our problems. Systems thinking shows us that there is no outside; that you and the cause of your problems are part of a single system*" (p. 67).

Systems thinking rejects reductionist formulations that focus on the parts themselves in favour of a more holistic explanation of phenomena (Ackoff, 1996). It encourages one to consider interconnections and the relationships between parts that comprise the whole. Consequently, a whole system is recognized as being more than the sum of its parts.

Drawing on the concepts of systems theory, SSM helps participant enquirers formulate and structure thinking in situations involving complexity and multiple stakeholders (Rose & Haynes, 1999). At the methodology's core is the construction of conceptual models of purposeful human activity based on ideas of interrelatedness and the comparison of those models with unstructured perceptions of the real world (Rose, 1997). Since a person's understanding of a problem derives from his or her own worldview, Checkland (1999) insists, "*the problem solver's perceptions and attitudes are an integral part of the problem situation and of learning one's way towards a solution*" (p. 239).

Surfacing assumptions through visual representation, Checkland (1999) argues, can help problem solvers make sense of the forms of conversation conducted in pursuit of a solution. Accordingly, the thesis examines whether the act of visual representation can help uncover stakeholders' basic beliefs and opinions and, by providing insights into different perspectives, contribute to the means of improving discourse in the shaping of public policy.

Moreover, Bohm (1996) maintains it is our attachment to our own perceptions and attitudes that limits our creative ability to tackle our most serious problems. By focusing on dialogue as a primary mode of 'systemic negotiations', this thesis examines how discourse could take account of multiple perspectives, needs and levels of knowledge through a mediated, holistic, mode of communication.

1.3 Aims of the research project

The two main aims that framed the research initially were to:

- Engage with major stakeholders in the debate surrounding the development of biofuels in New Zealand;
- Apply SSM, incorporating the development and use of rich pictures in order to:
  - Identify the major issues that divide the debate
  - Map relationships between espoused viewpoints and underlying values
  - Examine power relationships between key interest groups within the public discourse on this topic
  - Provide an exemplar for stakeholder engagement

From an appraisal of these aims it emerged that the study needed to engage with the problem situation at four distinct, but interrelated systemic levels. Rose and Haynes (1999) assert the first law of systems modelling is that where a system is dependent upon another system it should not be modelled until the system on which it is dependent has first been modelled. In other words, in order to evaluate anything, the researcher first needed to understand what he was evaluating. Without a point of Cartesian certainty, thinking about systems requires the researcher to establish the context of an enquiry. For Checkland (1999) that involves conceiving models of activity as a system while Midgely (1996) proposes setting boundaries. In either case, the subject of enquiry is determined in relation to other systems, subsystems or levels of activity.

In this case that meant the researcher had to understand the application of SSM in the context of the study before he could use it to evaluate the discourse. While the primary focus of the study remained on the discourse, the methodological approach necessitated an enquiry that was conducted on three other levels: the BSO, the application of SSM and the knowledge gained. Consequently, four questions emerged from the study, which enabled the researcher to address each of these levels and structure the research. These questions are:

- Is the introduction of the BSO mandate a viable and appropriate intervention according its own criteria?
- How 'healthy' was the discourse conducted in this case?
- How, and to what extent, might the use of SSM facilitate co-creative dialogue in public discourse?
- What has the researcher learned from his participation in this process and to what degree is this learning generalizable and transferable?

The first question concerns the content of the discourse. It examines the defensibility of claims made for and against the BSO and the introduction of biofuels according to the criteria cited in support of its adoption. Engagement with this level was necessary in that no discourse is content-less and the BSO debate provided information on the social and political context of New Zealand in which the discourse was conducted.

The discourse itself is addressed by the second question and refers to the form and quality of the conversations conducted between stakeholders during the BSO consultation process and on the introduction of biofuels to New Zealand. In this study 'healthy' public discourse is understood to be undistorted, open, and sincere social interaction in support of decision-making (Deetz, 1992).

The third question denotes an investigation of SSM, the methodology used in this study. This was concerned with the efficacy of the research methods used to implement the methodology, and also the validity and outcomes provided by the methodology.

The final question addresses knowledge and learning. It concerns the researcher's own self-reflection and sensemaking, and the degree to which his own theories-in-use were challenged or confirmed during the course of the research. It is also concerned with the academic evaluation of the research by attempting to examine whether knowledge generated from the study was generalizable and transferable.

1.4 Structure of the document

This research investigates the public discourse concerning an initiative largely viewed as a response to concerns over New Zealand's greenhouse gas emissions. The thesis is organized over eight chapters and, beyond the specifics of the BSO, is concerned with an examination of public discourse. An outline of the structure of the next seven chapters follows.

Chapter two locates the initiative within the wider context of international discourse on climate change and explores the background to the topic of biofuels in New Zealand. It presents the context of the debate around the use of biofuels in NZ, and provides a brief chronology of biofuels development and the consultation process surrounding their introduction. The chapter outlines what constitutes biofuel and explains how claims for its environmental sustainability seem to rest on how, and from what organic source, it is produced. The chapter will conclude by considering some of the social consequences of policy.

A review of the major literature relevant to this study is presented in the third chapter. It provides an overview of dominant models of problem solving which are critiqued via Habermas's theory of communicative rationality. The chapter also discusses conceptions of discourse and power, and considers what bearing these have on the current discourse on the development of biofuels in New Zealand. It examines the potential for open, sincere and ethical communication and assesses whether dialogue could provide such a form of discourse.

The fourth chapter introduces Checkland's SSM as the framework adopted to undertake this research. This chapter focuses on the third of the research questions listed above and, in considering the value of SSM as a research tool, it also addresses the final question. The chapter attempts to establish the means of evaluating the study by locating the philosophical position of SSM and that of this particular study. It outlines the general framework of SSM and also considers the specific approach taken from an Action Research (AR) perspective.

Whereas the first three chapters examine the context of the four research questions, the fifth chapter describes the specific research methods used in the study and how they were developed to address these four key questions. This chapter outlines the design of the study and explains how SSM frameworks were adapted to the investigation of the discourse around New Zealand biofuels development.

Chapter six presents an analysis of the data accumulated from the interviews in stage one, and the focus group in stage two of the study. It uses conceptual models and critical reflection to garner insights from the research and examine any general patterns that emerge.

The seventh chapter includes a discussion of findings. It reviews the findings emerging from the analysis of the data and what questions these raised with regard to the public discourse in this particular case, as well as considering issues that might have a bearing for discourse about other contentious issues. The chapter also considers the limitations of the research and attempts to evaluate the study and research methods against the research questions and aims.

The final chapter provides a short summary of the conclusions of the research project and indicates possible areas of future study.

1.5 Summary of chapter 1

This chapter began by presenting the subject of enquiry of this thesis within the wider context of international events. It described how the governments of the world have met to discuss their responses to climate change and how a number advocate biofuels as a means of meeting the challenge of lowering their greenhouse gas emissions. It also began to consider the role of these conversations in instituting claims to knowledge and power relations with regard to decisions on tackling such complex problems as climate change.

The next section of the chapter introduced the premise of the research, in which the researcher postulates significant links between notions of dialogue, reason, and co-creative problem solving. The themes of power, communication and social integration will be explored in greater detail in the coming chapters.

This chapter also considered the aims of the research project and introduced the four levels of enquiry the study will address. Four questions emerged from these levels and these enabled the researcher to structure the investigation of the problem situation and also the presentation of the research. These questions inform the structure of the thesis and the final section provided a brief overview of the content of the whole document.

The next chapter considers the background to the discourse on New Zealand biofuels and how the biofuels debate has been officially presented.

Chapter 2: Background to the discourse on New Zealand biofuels

> *"It was impossible to get a conversation going; everybody was talking too much."* Yogi Berra

2.1 Introduction

Despite being hailed by some proponents as the technological panacea to global warming, the use of biofuels is not new. Biofuels share a history concurrent with the development of the internal combustion engine and have been used in automobiles for almost two centuries (Worldwatch Institute, 2006).

Rudolph Diesel originally ran a compression-ignition engine on peanut oil, while Henry Ford designed his famed Model T to be fuelled by ethyl alcohol, which he hailed as "*the fuel of the future*" (Bozbas, 2008; Kovarik, 1998). These pioneers had a vision of transportation made accessible by the use of biofuels that they anticipated would provide smaller industries, particularly farming, with the means to compete with the larger industries monopolizing energy production at the time (Kovarik, 1998; Yokayo Biofuels, 2007).

Nonetheless, the prominent role envisaged by Diesel and Ford for biofuels was surpassed at the beginning of the last century by the widespread availability of cheap fossil fuels and the growing economic and political might of the oil industry (Worldwatch Institute, 2006). Advocacy for biomass as an alternative energy source returned during World War II and again with the price hikes and fears over fuel shortages brought about by the oil crises of the 1970s, but once again interest waned with the return of a seemingly inexhaustible supply of cheap mineral fuel in the 1980s (Kovarik, 1998).

With the prospect of US$100-a-barrel, peak oil and climate change, biofuels are once again on the political agenda, this time internationally. Biofuels and biofuel blends are used in many countries including Brazil, Colombia, Canada, Japan, Thailand, European Union member states and the USA, with a total of thirty-eight billion litres of biofuels produced worldwide in 2006 (Worldwatch Institute, 2006). As a plant or animal-based alternative to petroleum, biofuels are increasingly perceived as a significant means of cutting the carbon emissions from transport.

In New Zealand, the government has identified the transport sector as one of the largest contributors to the country's growing emissions of greenhouse gases (EECA, 2007; Ministry of Transport, 2006b). It is committed to the adoption of biofuels as a source of renewable energy that, while reducing carbon dioxide emissions, also contributes to security of supply and diversity of transport fuels (Ministry of Transport, 2006b). It intends to encourage the uptake of biofuels in New Zealand through the Biofuels Sales Obligation (BSO) mandate.

The adoption of biofuels has developed in response to increasing concerns regarding the unsustainable use of non-renewable resources for food and power (Worldwatch

Institute, 2006). Mounting alarm over climate change has tended to expedite the commercialisation process. Yet some say that by disregarding the overall environmental impact or 'footprint' caused by biofuels production, the 'solution' may be more damaging than the 'problem' it was designed to improve (Anslow, 2007; Anthrop, 2007; Boswell, 2007; Zah & Hagmann, 2007, among others).

The present chapter provides a brief overview of the biofuels debate and examines the process leading to the decision to develop biofuels in New Zealand. It briefly outlines the public discourse accompanying the consultation process and considers the potential impacts of the BSO.

2.2 Drivers for a biofuel production policy

2.2.1 What are biofuels?

Biofuels are combustible materials produced from biomass in the form of alcohols, esters, ethers and other chemicals (UN-Energy, 2007). The two forms of biofuel proposed for adoption in New Zealand are biodiesel and bioethanol (Ministry of Transport, 2006b). Biodiesel refers to a processed fuel consisting of short chain alkyl (methyl or ethyl) esters, made either by transesterification or hydrogenation of fatty acids such as animal fats and vegetable oils (Bozbas, 2008). Bioethanol is an ethyl alcohol fermented and distilled from sugar crops, such as cane, beet and sweet sorghum, or starch crops, for example grain or beans (Worldwatch Institute, 2006).

The government has identified tallow and whey as the two major sources of biomass feedstock for the proposed 'first-generation' biofuels industry (Ministry of Transport, 2006b). The Hale & Twomey report 'Enabling Biofuels: Biofuels Supply Options', insists there is enough tallow from the meat industry to make between five and six petajoules of biodiesel (130 to 160,000 tonnes of tallow converted to more than 140 million litres) and enough whey to yield between 0.05 and 0.095 petajoules (or two to four million litres) of bioethanol (Hale, West, Giltrap, Denne, & Hole, 2006). Of the estimated 150,000 tonnes of tallow produced, currently approximately 30,000 tonnes is sold domestically and 120,000 is traded offshore, where it is bought by Asia soapmakers (Flagler, 2007; Macfie, 2007)

2.2.1.1 Second-generation biofuels

Whereas so called 'first-generation' biofuels are made largely from food crops, 'second-generation' biofuels utilize non-comestible biomass, such as agricultural, forestry or municipal solid waste (Worldwatch Institute, 2006). Potentially one of the most abundant and therefore sustainable sources are biofuels made through the conversion of the lignocellulosic residues of grasses and waste plant matter to ethanol (von Blottnitz & Curran, 2007). Similarly promising is research being conducted into oil production from algae, which also has the potential to produce considerable yields. However, it is likely to be five to ten years before these second-generation biofuels are commercially available in significant quantities (Worldwatch Institute, 2006).

2.2.2 Claims for biofuels environmental benefits

Biofuels assert a considerable appeal to an agrarian economy like New Zealand. Unlike fossil fuels, which contain carbon stored for millennia beneath the Earth's surface, biofuels have the potential to be carbon neutral over their lifecycles by emitting only as much as the feedstocks absorb (Worldwatch Institute, 2006). Aside from their combustion, the primary sources of GHGs occur in the production of these fuels.

EECA contends that running vehicles on bioethanol-blended petrol helps reduce overall emissions of greenhouse gases (EECA, 2007). The New Zealand Institute of Economic Research (Stephenson & Davies, 2005) contend that for every 10% of ethanol in an ethanol/petrol blend, carbon dioxide tailpipe emissions are reduced by 1.0%. High-level ethanol blends are more efficacious than low-level blends and can reduce nitrogen oxide emissions by up to 20% (Worldwatch Institute, 2006).

The adoption of biofuels may also contribute to air quality by reducing emissions of harmful chemicals and particulate matter (EECA, 2007). According to research from the US Environmental Protection Agency, bioethanol-blended petrol burns more cleanly (Worldwatch Institute, 2006). Biofuel combustion reduces the output of noxious by-products such as carbon monoxide (Charles, Ryan, Ryan, & Oloruntoba, 2007). Also by providing high octane as a low cost alternative to harmful fuel additives like lead or benzene (Ministry of Transport, 2006b).

Biodiesel is safe for use in unmodified diesel-engine vehicles and offers the same performance and engine durability as petroleum diesel fuel. It is non-flammable and non-toxic, reduces tailpipe emissions, visible smoke, and noxious fumes and odours (Bozbas, 2008). Subject to how it is produced, including changes to land use, research suggests that tallow can reduce life-cycle GHG emissions by 55% (Worldwatch Institute, 2006).

Biodiesel and bioethanol are also biodegradable, water-soluble and less toxic than petroleum fuels (Worldwatch Institute, 2006).

2.2.3 The Kyoto Protocol

As early as June 1992, the National Government under Jim Bolger signed the United Nations Framework Convention on Climate Change (UNFCCC) at the Rio Earth Summit (Ministry for the Environment, 2007c). The UNFCCC set up voluntary commitments for reducing GHGs. A protocol to the UNFCCC, 'the Kyoto Protocol', that sought to set legally binding limits on GHG emissions was agreed in December 1997 at the third conference of the parties to the treaty when they met in Kyoto (The Secretariat of the United Nations Framework Convention on Climate Change, 2007).

In September 2001, Helen Clark's Labour Government decided that further consultation and development of domestic policy options was needed before making the decision to formally ratify the Kyoto Protocol (Ministry for the Environment, 2007c). The subsequent consultation and policy options development process took place between October and December 2001 (Ministry of Transport, 2006b).

On 19 December 2002, New Zealand became the 101st country to formally ratify the Kyoto Protocol (Ministry for the Environment, 2006). In the first commitment period of the Kyoto Protocol (CP1), which runs from 2008 to 2012, New Zealand is obliged to reduce GHG emissions to 1990 levels (Ministry for the Environment, 2002).

At the time of ratification, New Zealand believed the post-1990 increase in forestry development would be to its advantage, and anticipated it would be a net seller of carbon (Ministry for the Environment, 2002). However, subsequent reviews conducted in 2006 and 2007 revealed quite a different picture. The Net Position Report shows that in 2005, total GHG emissions were equivalent to 77.2 million tonnes of carbon dioxide (Ministry for the Environment, 2007c)[1]. This equated to a 24.7% rise in GHG emissions since 1990 (Ministry for the Environment, 2007c). As of May 2007, a deficit of 45.5 million units is projected for New Zealand for the first commitment period. This is an increase of 4.3 million tonnes over the 2006-estimated deficit of 41.2 million tonnes of carbon dioxide equivalent (Ministry for the Environment, 2007c).

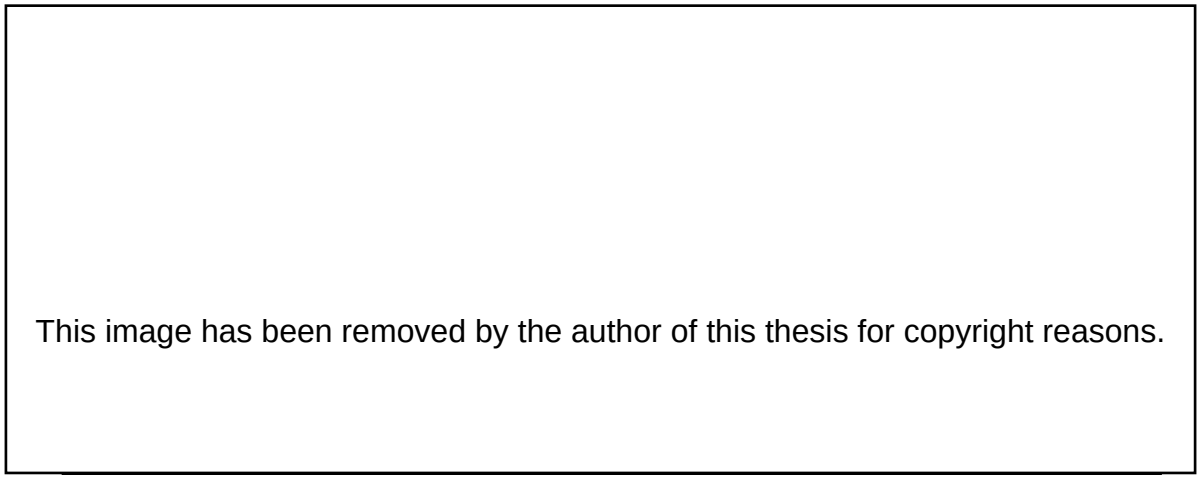


Figure 2.1 New Zealand's greenhouse gas emissions in 2005 – by sector (percentage of carbon dioxide equivalent, adapted from Ministry for the Environment, 2007a).

It is still unclear what the final balance of units or net position will be over the course of the CP1. Uncertainty continues due to the difficulty of modelling the complex relationships of the energy sector, projecting agricultural markets and animal productivity, and assessing deductions from forest sinks (Ministry for the Environment, 2007c). Nonetheless, deforestation continues to rise and, based on the upper value calculated for deforestation emissions, the projected net deficit could be equivalent to 65.5 million tonnes of carbon dioxide (Ministry for the Environment, 2007c).

Despite promoting its 'clean and green' image abroad, today New Zealand produces 25% more greenhouse gases than it did in 1990 (EECA, 2006a). Current estimates suggest New Zealanders emit nearly twice as much in GHGs per head of population than the British and almost five times as much as the Chinese (Ministry for the Environment, 2007a). The five sectors contributing most to carbon emissions are

[1] An emissions unit is equivalent to one tonne of carbon dioxide gas (Ministry for the Environment, 2007b).

agriculture, energy (including transport), industrial processes, waste and solvents (see Figure 2.1 above). The government cites carbon dioxide from the energy sector (mainly transport and electricity generation) as the major source of growth in emissions (43%), 19% of which is produced by transport (Ministry for the Environment, 2007b).

All this points to an immediate need to tackle New Zealand's GHG emissions domestically through policy. The government avows that despite the country's remoteness, New Zealanders will not be immune to the effects of global climate change with the latest forecasts predicting rising sea levels and less predictable rainfall patterns, more frequent droughts and floods (Ministry for the Environment, 2007a). Subsequent to ratification of the Kyoto protocol, a white paper 'National Interest Analysis' was published to explain the challenges of climate change: the following sentence was included in its Executive Summary: "*More than any other developed nation, New Zealand depends for its prosperity on an equable and stable climate*" (Ministry for the Environment, 2002, p. 5). The country's largest export earners: agriculture, horticulture, forestry and tourism, remain dependent on a stable, predictable climate (Ministry for the Environment, 2007a). It appears increasingly likely that the weather will determine New Zealanders' future prosperity and quality of life.

2.2.4 'The path to sustainability'

Under the title '*The path to sustainability*', the government has introduced a range of programmes and policies to reduce emissions (EECA, 2007). These programmes include increasing the energy efficiency of homes, businesses and the public sector; investing in public transport infrastructure, improving sustainable land management and afforestation, and promoting energy efficient technologies in industry and agriculture through research funding and business grants (Ministry for the Environment, 2007a).

While carbon dioxide is the most ubiquitous greenhouse gas, nitrous oxide is also released through the burning of petroleum-based fuels (EECA, 2007). The transport sector has been identified as one of the largest and fastest-growing contributors to New Zealand GHG emissions. As a consequence, the government has proposed cutting carbon emissions by improving the fuel efficiency of the NZ vehicle fleet via new emissions standards and the increased adoption of biofuels (Ministry of Transport, 2006b).

2.3 The BioFuels Sales Obligation (BSO)

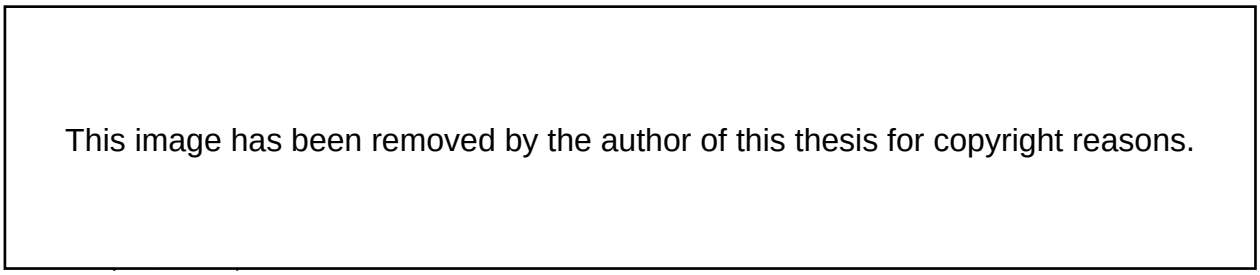
2005 represented a turning point in biofuels policies around the world when several countries dramatically stepped up their biofuel targets and policies, with new biofuels mandates being proposed in Germany, Italy, Brazil, Canada, Colombia, Malaysia, and Thailand. (REN21, 2006). The result of recent policy activity is that biofuels blending mandates now exist at a national level in at least eight countries and over 30 states and provinces.

The transport sector is responsible for approximately 19% of the total GHGs produced

in New Zealand (Ministry for the Environment, 2007a). Together with other government agencies, the Ministry of Transport intends to reduce transport emissions with the BSO signaled as "*the proposed policy for achieving this*" (Ministry of Transport, 2006b, p. 4).

2.3.1 What is the BSO?

The New Zealand Government announced the introduction of a Biofuels Sales Obligation on 13 February 2007. The sales obligation will require 3.4 per cent of the total fuel sold by oil companies to be biofuel by 2012. Due to commence in April 2008, the obligation is set as a percentage of the total combined sales of petrol and diesel fuels per year to be met through the sale of varying mixes of bioethanol and biodiesel (Ministry of Transport, 2006b). Based on the volumetric energy content of each fuel, these sales are measured in petajoules, as outlined below:



The government views the uptake of biofuels in New Zealand as a key plank in its sustainable energy platform and believes the use of renewable fuels will help to reduce the country's net carbon dioxide emissions, contribute to the security of supply and diversity of transport fuels (Ministry of Transport, 2006b).

2.3.2 Who will be affected by the BSO?

The Biofuels Sales Obligation specifically targets the five largest oil companies in New Zealand, namely Shell, BP, Mobil, Caltex, and Gull. The first four are multinational companies that share refinery facilities at Marsden Point (Ministry of Transport, 2006b). Gull, however imports refined fuel direct from Australia. The BSO does not currently apply to other distributors and retailers such as Challenge, or independents like Gasoline Alley (Ministry of Transport, 2006b).

Non-compliance of the BSO will incur a penalty of $60 million per petajoule of biofuels for which an oil company is short of their obligation. This penalty will apply from 2010 onward (Ministry of Transport, 2006b).

From a technical point of view meanwhile, pilot studies have proved successful, with commercial transport companies reporting no significant difficulties in adapting their fleets to use biofuels (Transport Engineering Research New Zealand Ltd (TERNZ), 2006). However New Zealand also has a high proportion of older, used and imported vehicles in its fleet. One and a quarter million or 53% of all registered vehicles are used imports and 14% are 1986 or older models (Transport Engineering Research New Zealand Ltd (TERNZ), 2006). As a result, the vehicle manufacturers for a large number of makes and models have not endorsed the use of 5% (E5) or 10% (E10) blends of

bioethanol-blended petroleum. Only 1 million of the total 2.74 million registered light petrol vehicles have been specifically approved for E10 (Transport Engineering Research New Zealand Ltd (TERNZ), 2006).

The major governmental organizations responsible for coordinating the preparation of the BSO were the Ministry of Transport (MOT), Ministry of Economic Development (MED), Ministry for the Environment, Energy Efficiency and Conservation Authority (EECA) and Environmental Risk Management Authority (ERMA). As a new industry, the Government has acknowledged that the supply of biofuels may be practically difficult in the early years of the obligation (Ministry of Transport, 2006b). Nonetheless, the BSO is still due to come into effect on 1 April 2008.

Those officially recognized as affected by the introduction of the BSO include the Oil Companies, the Government and its agencies, the Biofuels Industry and the Motor Industry. However, if we accept the form of interrelatedness represented by climate change then the implications of this policy extend far beyond these acknowledged stakeholders.

2.4 Policy development

While an in-depth analysis of the literature supplied in support of the consultation process is beyond the scope of this document, the following brief overview is intended to provide an introduction to the genesis of the BSO policy.

2.4.1 Steps leading to the BSO mandate

In 2001, the government indicated in the National Energy Efficiency and Conservation Strategy (NEECS), its intention to promote greater energy efficiency and use of renewable energy across the economy. The strategy included a target for renewable transport fuels of two petajoules, or approximately 1% of current annual use of petrol and diesel by 2012 (Ministry of Transport, 2006b).

On 21 April 2005, EECA promoted its strategy on biofuels with a conference in Wellington attended by over 130 delegates. Attendees included those involved in the production of biofuels and representatives from car companies, government officials and oil companies (EECA, 2007). Speakers were drawn from those same stakeholder groups and included Minister for Transport and Climate Change the Hon. Pete Hodgson together with representatives from EECA, biofuels producer Argent Energy, Shell, BP, MIA and Fonterra Ethanol.

By August 2005, despite the voluntary target set out in NEECS, biofuel blends were still not commercially available in New Zealand so the government consequently "*considered its options*" and agreed in principle to the introduction of a Biofuels Sales Obligation (Ministry of Transport, 2006b). In December 2005, government laid out the required policy investigations for the BSO from a report compiled by the NZIER (Ministry of Transport, 2006b).

On 21 April 2006, EECA held another one-day conference in Wellington, this time focusing on the place of biofuels in New Zealand's transport energy future (EECA, 2007).

In 2005 and 2006, the Ministry of Transport and the Energy Efficiency Conservation Authority (EECA) commissioned a consortium of consultants to conduct the policy investigations for the BSO. The consultants investigated the areas of biofuels supply, distribution, vehicle risks, and the economics of bringing biofuels to the market in New Zealand (Ministry of Transport, 2006b). On 12 September 2006, a discussion document was released outlining the proposal for the BSO to coincide with a call for submissions.

2.4.2 Submission process

As earlier stated, the public submission process began with a series of presentations to key stakeholders in September 2006, these groups and the public at large then had until Friday 20 October 2006 to make their submissions to the Ministry of Transport (Ministry of Transport, 2006a).

In total, there were forty-three submissions made in response to the discussion document with ten coming from the biofuels industry, specifically producers and suppliers. Six submissions came from the oil industry, namely Gull, BP Oil New Zealand, Chevron New Zealand, Shell NZ and Mobil, plus one from the NZ Refining Company at Marsden Point.

Other submissions came from various groups and individuals, including seven from motor vehicle and transport industries and associations, six from NGOs, four from councils and territorial local authorities (TLAs), three from consultants, three from 'interested individuals', and two from universities.

A register of the total submissions received by the Ministry of Transport is included in Appendix I.

2.5 The accompanying debate on biofuels

An in-depth evaluation of the literature on the arguments for and against biofuels production is once again beyond the scope of this document, however some of the major issues are outlined below.

2.5.1 Public discourse

Since 2005, public discourse in New Zealand has tended to focus on the beneficial aspects of introducing biofuels. The NZ government has been the main source of information on the subject, with the Department of Trade and Industry collating data and expert opinion from the Ministry for Economic Development, Ministry of Transport and Crown Research Institutes (Flagler, 2007). The production of bio-ethanol and bio-diesel has been presented largely as a renewable fuel source that will reduce New Zealand's reliance on overseas oil producers and respond to the commitments of the Kyoto Protocol to reduce carbon emissions.

The debate moved into the public domain with the publication of a special supplement in a national newspaper, in which local developments (Macfie, 2007; Tindall, 2007) were located within the broader context of international media reports ("Europe's dilemma," 2007; Mukherjee, 2007; Robison, 2007). The newspaper section was set out as an adversarial debate around matters such as the accrual of economic and environmental benefit or detriment arising out of biofuels development. As such, the debate was dominated by positivist devices for forecasting and measuring technological development, underpinned by statistical evidence from either side.

Since that report, conflicting views have begun to emerge as the complexity of this issue becomes apparent. The UN for example, raised concerns in May 2007 over the environmental impact of developing biofuels (Vidal, 2007) while in December *The Economist* ("The end of cheap food," 2007) reported that filling up an SUV used enough maize to feed someone for a year. As well as expressing alarm over the impact of diverted food crops on poorer countries, an FAO report argued that any reduction in emissions due to the production and use of biofuels could be more than counteracted by accompanying deforestation containing centuries of carbon (FAO Economic and Social Department, 2007).

In New Zealand, the national press has featured views ranging from enthusiastic to alarmist, with the following selection providing a representational sample. On 1 August 2007, Gull launched the first commercially available bioethanol-blended petrol in New Zealand (EECA, 2007). The *New Zealand Herald* featured a photograph of the Prime Minister filling up an SUV with 'Force 10': a blend of 10 percent bioethanol produced by Fonterra subsidiary Anchor Ethanol (NZPA, 2007a). The following day, the same paper ran an article carrying a warning from the Motor Industry Association of the fire risks posed by biofuels to older imported Japanese vehicles (Gregory, 2007). One 'lobbyist for sustainable business' was reported as extolling the economic benefits of the BSO policy (Atkinson, 2007). However, other articles emphasized the inflationary effects of the shift to biofuels from rising fuel prices (Dearnaley, 2007) to the increased cost of eggs (NZPA, 2007b) and dairy (NZPA and NZ Herald staff, 2007). The *Herald* also featured the views of readers responding to the question "*Should some car owners pay more for petrol?"* with the majority expressing predictably negative reactions ("Should some car owners pay more for petrol?," 2007).

The public discourse conducted through the press has thus far drawn on statistical data and expert opinion as a basis for sensationalism and political point scoring. Hence it has not proved an appropriate forum for more considered reflection on an issue that clearly has far-reaching consequences both globally and locally.

2.5.2 Practical limitations of biofuels

Although bioethanol and biodiesel are seen as providing a source of renewable energy, there are a number of practical limitations to their adoption. Von Blottnitz & Curran (2007) conclude from comparative studies of lifecycle analyses that the use of bioethanol as an additive or in place of conventional fuels ultimately does deliver more

energy than is used making and distributing the fuel, however, they also argue it is difficult to judge whether biofuels represent a successful strategy for sustainability as major factors affecting the industry's profitability, such as feedstock costs, regulation, and technologies, are in flux.

Biofuels still represent a relatively expensive means of reducing GHG emissions compared with other means of mitigation. Within the transport sector there are several more cost-effective intervention options for reducing carbon emissions, including investment in and promotion of public transport, use of bicycles and other non-motorized vehicles, improvements in vehicle efficiency and changes in urban planning and land use (Worldwatch Institute, 2006). If the focus of renewable fuels is shifted away from transport, using biomass to produce heat and power is a much more cost-effective way to reduce GHG emissions than converting it to biofuels (Worldwatch Institute, 2006). Nevertheless EECA contend that it is currently uneconomical to generate power from biomass in New Zealand (EECA, 2006b).

While the climate determines what crops can be grown effectively and consequently the energy content of specific sources of biomass, there is energy used in the processing and distribution of the resultant biofuel. Thus claims for biofuels' climatic and economic sustainability rest chiefly on how, and from which organic source and in what environment, they are produced. (Worldwatch Institute, 2006). Von Blottnitz and Curran (2007) contend that the focus on climate protection and fossil fuel conservation risks shifting the burden by ignoring the social and environmental impacts of biomass production for biofuels. Concerns over biofuels include diverted food crops and rising price rises, changes in land-use, the large amounts of water and oil-based fertilizers required to produce biomass, and deforestation, such as that occurring in Malaysia and Indonesia to allow for plantations of oil palm (Worldwatch Institute, 2006).

Charles *et al.* (2007) maintains that these concerns argue the case for a long-term deliberative approach to the development of policy regarding the development of biofuels. Moreover, they contend that by drawing investment away from the development of more sustainable technologies, adoption of first generation might prevent second-generation biofuels, and even inhibit the replacement of biofuels with more efficient and environmentally less damaging fuel types (Charles et al., 2007).

2.5.2.1 Bioethanol

The water solubility of ethanol makes its storage potentially problematic, particularly in older ferrous, single skin tanks, and suggests it could leach out into aquifers (Twomey & West, 2006). Ethanol's rapid breakdown in water and soil can actually slow the breakdown of petrol, which increases the impact of petroleum spills on the environment by ensuring harmful chemicals persist and travel further, thereby affecting a greater area (Worldwatch Institute, 2006).

Bioethanol has the potential to emit higher amounts of nitrogen oxides than conventional fuels in low-level blends (Worldwatch Institute, 2006). Its tailpipe emissions also contribute to acidification (when sulphur dioxide and nitrogen oxides in

the atmosphere react with water vapour to form 'acid rain') (von Blottnitz & Curran, 2007).

Ethanol contains only 67% of the energy content of conventional motor spirit (Bourne, 2007). Its affinity for water makes bioethanol blends more likely to suspend moisture which could be potentially damaging to engines especially in lower percentage blend (Twomey & West, 2006). Furthermore, as a powerful solvent, ethanol requires equipment such as seals, glands and tubing to be purposefully designed to withstand its corrosive action (Twomey & West, 2006).

Depending on how the biomass is harvested and processed, bioethanol can have a toxic impact both on humans and the environment (von Blottnitz & Curran, 2007). The production of the biomass also presents issues of deforestation, eutrophication (contamination of water sources by fertilizer run-off) and damage to biodiversity (von Blottnitz & Curran, 2007).

2.5.2.2 Biodiesel

Biodiesel has only 86% of the energy content of conventional diesel (Bourne, 2007). When made from animal fats, it has a propensity to solidify at low temperatures (Bozbas, 2008). Biodiesel's low cloud point and cold flow properties therefore present potential challenges for the fuel's storage and vehicle use (Worldwatch Institute, 2006).

2.6 Issues of the biofuels discourse

It is gradually becoming apparent that the decision to introduce biofuels via the BSO will affect a large number of people either directly or indirectly, people who are reliant on an open and informative debate in order to understand the issues associated with biofuels and fully comprehend the basis on which decisions are reached. However it is not so evident how the conditions for open discourse have been secured.

While the government has made available a high volume of data from white papers to ministerial websites, the information provided remains restricted to the way in which this debate has already been framed. Meanwhile, the press coverage remains largely committed to political point scoring and stirring up emotive reaction. This also appears to be the approach of discussion forums in other media, such as talkback radio or internet opinion sites. The question is what suitable channels exist in which to conduct a public discourse on a significant public issue in an informed and reasonable way.

Without provision for such a discourse, the public is prevented from knowing the basis of a policy decisions such as the introduction of biofuels, who made the decision and what other alternative options were considered.

2.7 Summary of chapter 2

The Government prompted by New Zealand's obligation to reduce GHG emissions under the Kyoto Protocol have identified the use of biofuels as a way of reducing transport emissions thereby responding to its obligations within the first period of the

Protocol. It decided on the form of a mandate as the preferred means of encouraging biofuels production and announced its plans for the BSO in September 2006. In February 2007, the BSO was announced.

In this chapter we examined the background to the BSO mandate, the drivers for a policy on biofuel production and the steps that preceded the decision to implement biofuels though the BSO. It also explored what the mandate entails, what biofuels are and their declared benefits and limitations. It has considered the development of the policy, those it will affect and the nature of the public discourse surrounding this decision.

The next chapter presents a review of the literature concerned with communication, participatory democracy and how discourse is conducted. It examines models of problem solving and stakeholder engagement and considers how they relate to the subject of the present study.

Chapter 3: Review of Literature

> *"The true spirit of conversation consists in building on another man's observation, not overturning it"* Edward G. Bulwer-Lytton

3.1 Introduction

As stated in the introduction, the focus of this research is the discourse surrounding the decision to introduce biofuels to New Zealand through the legislation of the Biofuels Sales Obligation. The research is particularly concerned with the enquiry that preceded implementation of the mandate and how this served to support the building of a political consensus. Thus in addressing these concerns, the chapter speaks to the second systemic level stated in the introductory chapter and addresses the second question: How 'healthy' was the discourse conducted in this case? It therefore seeks to establish a basis for evaluating the 'health' of the debate conducted around the introduction of the BSO by deliberating on the role of discourse in decision-making and presenting a review of the relevant literature.

In the course of its discursive investigation, the chapter explores ways in which people's relative power positions are established with recourse to problem solving and communication. It considers theories of communication, knowledge and discourse and their relation to issues of representation, legitimation and identity. Drawing principally from the works of Deetz (S. Chambers, 1995; Deetz, 1992) Gadamer (1975) Habermas (1989) Mumby (1988) and Rorty (1980) the chapter examines what constitutes discourse and the conditions necessary for sincere communication to occur.

The chapter is divided into four sections, with the first reflecting on issues of problem solving and the value-loaded choice of policy decisions. It begins by examining prescriptive forms of problem solving and the underlying assumptions on which they are based, before exploring Habermas's (1989) conception of communicative rationality with regard to the way collective understandings of what is reasonable are established within organizations and society. Public discourse is also examined insofar as it represents the voices of multiple stakeholders affected and informed by political consultation. The first section ends by considering discursive enquiry with respect to notions of legitimation and law within a pluralist democracy.

The second section reflects on the interrelationship of power and language. It examines political power structures, claims to knowledge and expertise, disciplinary power, the dominance of positivist language and economic language, and barriers to participation. This section also explores how power can distort communication to the extent that the dominance of normative models of reality becomes 'pathological'.

The third section considers dialectal models of collaborative interaction and explores the ethical basis of undistorted communication. The way in which language becomes reflective of power relations is examined with reference to Bakhtin's

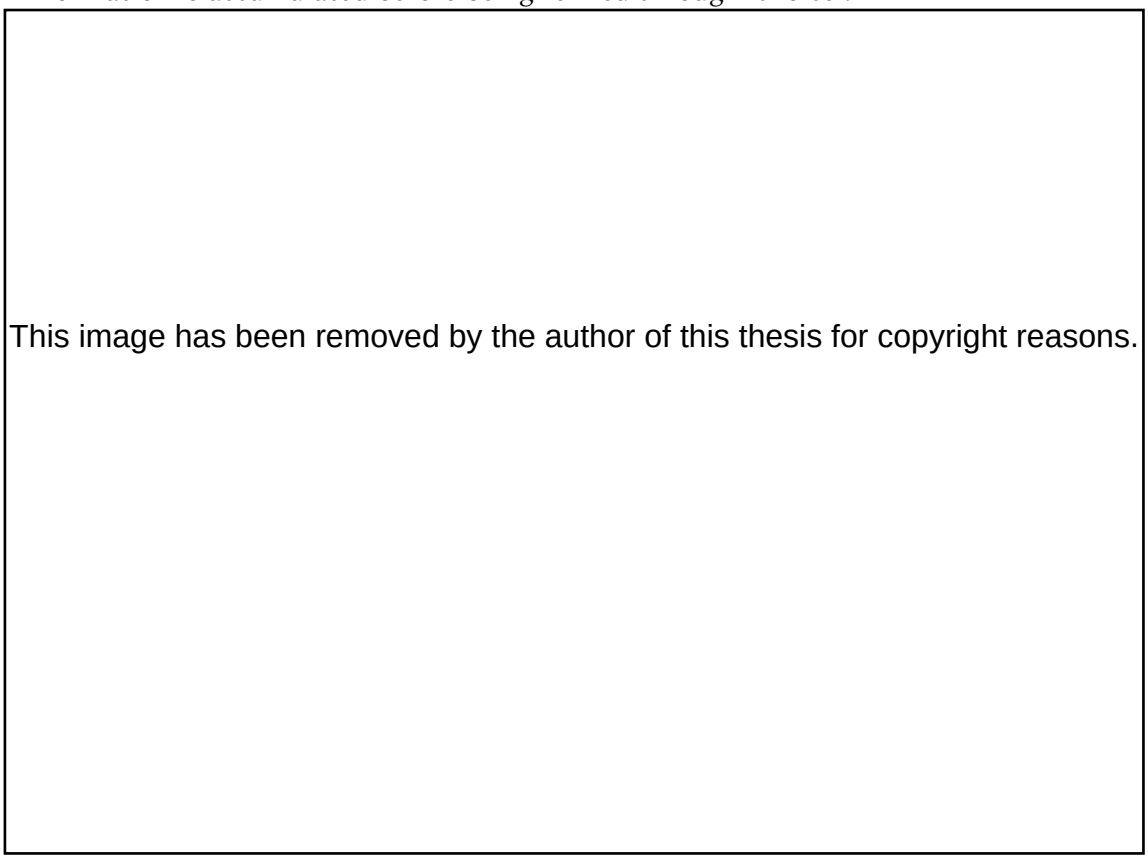
centripetal/centrifugal model of discourse (Holquist, 1981). This section also assesses Bohm's (1996) ideas on the potential of dialogue as a means of learning and co-creation in relation to Soft Systems Methodology (SSM). Stacey (2007) draws on the work of Mead (1934) in examining the organising power of everyday conversation.

The final section considers analogically mediated discourse. It examines whether visual representation and analogy might mediate the conditions for dialogue and facilitate co-creative enquiry.

3.2 Discourse and problem solving

3.2.1 Techno-rationalist and systems approaches

Figure 3.1 below shows the conventional approach to problem solving predominant in management practice. This textbook model (Cooke & Slack, 1991) shows an eight-step, cyclical process charting the orderly progress from problem recognition through to the implementation of a solution, with the increasing width of the arrows indicating how information is accumulated before being refined through 'choice'.



However this model reveals significant limitations on closer inspection. First, the model is misnamed as it is foremost a procedure for decision-making. Second, it implies that 'setting objectives' will inevitably form an interim step between recognizing a problem and solving it, but gives no indication of how one might 'engage' with a problem in this way. Third, objectives, once set appear to be fixed, as the model does not explain how

they might be altered to include new information encountered during any investigation into the nature of a problem.

These issues are characteristic of a positivist approach to management: one prescribing an ostensibly rational process of formulating and implementing strategies and that regards problem solving as synonymous with decision-making. In the words of Zwass (1992):

> The fundamental activity in problem solving is decision-making. Decision-making is the process of identifying a problem, identifying alternative solutions and choosing and implementing one of them. (p. 491)

Such an approach views human and organizational behaviour as being decision-making in pursuit of goals. Hence Zwass's (1992) claim that organizations are "*formal units devoted to the attainment of certain goals*" (p. 16). Simon (1960) another key proponent of this way of thinking, maintains problem solving proceeds by erecting goals, detecting differences between the existing situation and those goals and then finding a relevant solution (i.e. a tool or process) to reduce these differences (cited in Checkland & Howell, 1998).

Such purposive, or goal-seeking, rationalist conceptions of problem solving are especially unsatisfactory when faced with complex situations such as implementing change in organizations or the realm of public policy (Ackoff, 1996, 1999; Checkland, 1999). By focusing on the control of independent variables, these reductionist perspectives fail to take into account the interrelatedness of phenomena and do not consequently encourage decision-makers to question the parameters of the problem situation as it is initially presented (Gharajedaghi, 1999). Instead, 'solutions' are frequently implemented according to their technical feasibility and on the assumption that variables can be predicted and controlled (Stacey, 2007). However, action taken on this basis, Ackoff (1999) warns, often has unpredictable and undesirable consequences.

In categorizing various approaches to strategic management in the literature, Stacey (2007) distinguishes between those that regard problem solving as a more or less straightforward process of choice, the rationalist goal-seeking view outlined above, and those that regard it as arising in some form of purposeful organizational learning. This latter view is more consistent with systems thinking and action research (AR) approaches to organizational dynamics (Argyris & Schön, 1996; Checkland, 1999; Stacey, 2007).

Systems thinking takes a largely holistic view of problem solving, looking to understand interconnecting relationships to make sense of complex or unstructured problems involving the purposeful activity of many differentiated individuals (Ackoff, 1999; Stacey, 2007). Kim (1995) argues that underlying what appear to be unrelated events are discernible patterns of behaviour, patterns that are structured by an individual's worldview or mental models which in turn are aligned with his or her values. Checkland (2006) maintains that people's perceptions of a situation contribute to the problem and therefore it is through learning, ideally at a worldview or values level, that a

problematical situation can be improved. Argyris (1996) writing in the field of AR, similarly contends that levels of individual reflexivity and the critical delineation of actual and espoused values can contribute to organizational learning.

Those taking an organizational learning approach to problem solving are further distinguished by whether they take a macro or micro level approach (Stacey, 2007). The macro view focuses at the level of strategic decisions and tends to treat organizations as singular entities. For instance, Senge (1990) is chiefly concerned with the organizational structures that make learning possible. The micro level on the other hand is concerned with what people actually do on an ordinary daily basis when they problem solve. This leads to a concern with conversations, ways of sense making, politics, emotion and identity (Stacey, 2007).

The present study is interested in exploring the discourse accompanying the decision to impose the BSO mandate and assessing the problem solving approaches employed in tackling the complex situation of New Zealand's greenhouse gas emissions. It takes a micro level approach to consideration of these issues and looks to the worldviews and conversations of those involved in making sense of the problem situation.

3.2.2 Communicative rationality

The dialectical relationship between worldviews and communication is a central aspect of Habermas's critical theory. Critical theory was developed as a counter-position to positivism's pre-eminence as the foundation for explanations of social phenomena (Checkland, 1999; Deetz, 1992). Habermas (1989) believed that an adequate social theory must perceive society as a set of processes that is open to change by individuals who are free to act (Checkland, 1999). Consequently, his critique of Western society contrasts purposive-rational action, that is action 'governed by technical rules based on empirical knowledge', with communicative action 'governed by binding consensual norms which define reciprocal expectations about behaviour' (Habermas, 1970). These equate to the criteria of logical defensibility and cultural feasibility employed in SSM.

The dominance of 'scientific' thinking in Western culture has led to the largely uncritical application of techno-rationalist approaches to the management of social phenomena. However scientific and technological cannot be assumed to pursue the same interest. Whereas science is concerned with the question 'how does this contribute to knowledge?' technology asks 'how does this contribute to knowledge that is useful?' (Checkland & Howell, 1998).

By attaching this value-laden qualification, technical rationalists co-opt theoretically value-free science to legitimize the economic, political activity of individual and organizational self-interest and domination (S. Chambers, 1995). As a result, Checkland (1999) insists technical feasibility becomes the overriding criterion within society, and compliance with technical recommendations the only 'rational' way to behave. Habermas was concerned that the unifying power of science would allow those holding dominant positions to systematically exclude competition from resources leading to the technologically-driven colonization of the 'lifeworld': the lived realm of culturally-

grounded understandings and mutual accommodations we all share (Deetz, 1992; M. E. Warren, 1995; White, 1995). Hence Habermas's initial distrust of systems thinking, which he feared would further legitimize the political power of experts and lead to a social science which took the form of social technology (Bausch, 1997; Checkland, 1999).

Yet as Deetz (1992) argues, the dominance of social technology can be prevented only if cultural restrictions on communication are removed to allow open and sincere public discussion of the suitability and desirability of action-orientating principles and norms. This is not simply a matter of replacing techno-rationalism with another more 'liberal' ideology, but bringing a level of reflexivity to the process of discourse to ensure that it remains unrestricted and free from domination. Hence communicative rationality does not attempt to provide a definitive rendering of what reason is, instead it describes a dialectical approach where sense making is constantly renegotiated (Habermas, 1989).

Habermas (1989) postulates that rationality consists not so much in the possession of knowledge, but rather in "*how speaking and acting subjects acquire and use knowledge*" (p. 11). He claims that there are implicit validity statements inherent in any sentence intended for communication. Giddens (1985) encapsulates these validity statements in the following phrase:

> When I say something to someone else, I implicitly make the following claims: that what I say is intelligible; that its propositional content is true; that I am justified in saying it; and that I speak sincerely, without intent to deceive (p. 99).

Communication then isn't simply a matter of convincing someone that one is 'right', rather rational argument is based on the supposition that any act of communication can be challenged on its propositional content, its normative acceptability or the sincerity of the speaker (Midgely, 1996). The implication here is that whenever an understanding is reached, one is prepared to provide evidence in support of one's claims and that one recognizes the other as someone who is free to agree or disagree with respect to those claims (Baynes, 1995). These conditions are inherent within the ideal of rational communicative action.

Habermas (1989) explains human rationality as the necessary outcome of an ideal epistemic situation that yields successful communication. Communicative action and reason establish societally what we are doing, how we make sense of what we are doing and the authority needed to act on behalf of others (Stacey, 2007). Thus it is with reference to this ideal that communicative rationality offers the means by which a democratic process can effectively facilitate discursive participation and the co-creation of meaning while also providing for dissent.

This idealization does not only apply at the level of a shared ideal, but must also be manifest in what Rawls (1989) calls an 'overlapping consensus' within the public political culture. Communicative theory accommodates forms of universal morality on the level of cultural transformation whereby the emphasis is less on a deliberatively achieved consensus which transcends culture than on reflexive cultural understanding

(Delanty, 1997). In a sense it is the idea that "*in a democracy you don't really need to agree – except perhaps on how you will disagree*" (Tharoor, 2007, p. 17).

As Habermas asserts, societal norms are only morally just insofar as they meet with the considered approval of all those who will be affected by them. While one function of democratic public discourse is to gather and disseminate knowledge to societal stakeholders, it also works to prevent any body of knowledge from becoming solidified and/or reified. Hence as an information system, the efficacy of public consultation must be assessed according to how well it supports the decision-making process, while also safeguarding its ethical own claims to legitimacy (Crowe, Nolan, & Varey, 2007).

Rational decision-making in society is reliant on modes of communication if it is to provide a legitimate, stable but also effective foundation for collective action. Habermas considers how the tension between stability and conditions of justification 'might be bridged by law' and proposes legislation as the means by which communicative reasons generated in a process of discursive opinion formation and will formation are transformed into collectively binding decisions (Baynes, 1995). As Baynes (1995) argues, in highly differentiated and pluralist societies "*the task of social coordination and integration falls to institutional procedures of legitimate lawmaking that transform into binding decisions the more diffuse public opinions initially produced via the anonymous communication network of a loosely organized and largely autonomous public sphere*" (p. 205). Accordingly, the legitimacy of a policy such as the BSO must be evaluated in relation to the culturally negotiated principles of 'reason and rationality' of the democratic society in which it becomes law.

3.2.3 Stakeholder engagement

According to Habermasian theory, a rational basis for collective life can only be achieved when social relations are organized "*according to the principles that the validity of every norm of political consequence be made dependent on a consensus arrived at in communication free from domination*" (White, 1995, p. 6). Hence, by rooting political theory in notions of inter-subjectivity, communicative rationality extends the notion of stakeholder to include all those affected by any deviation from these principles (White, 1995). In other words, whatever action hinders open communication, cultural representation or societal reflexivity has an impact ultimately on the 'lifeworld' and hence the emancipatory interests of the citizens of a liberal democracy in which it occurs.

As the action that constitutes the lifeworld, communication is how we understand our identity and express who we are. Habermas identifies three activities as functioning as transmitters of the lifeworld: cultural reproduction, by which traditions and cultural meanings are imparted; social integration, through which norms of reciprocal integrative action are established; and socialization, through which we gain our individual and collective identities (S. Chambers, 1995). Not only do these transmitters emphasize the significance of communication and its role in comprehending what is 'reasonable', but they also remind us of our 'stakeholding' in ensuring the political actions of the

democratic society through which we are identified remain moral, legitimate and 'healthy' (S. Chambers, 1995).

Management definitions of who constitutes a stakeholder are substantially narrower however. Freeman (1984) defines a stakeholder as "*any group or individual who can affect, or is affected by, the achievement of a corporation's purpose*" (p. vi). A central assumption here is the manager's ability to manage stakeholder relationships. As Stacey (2007) argues, this is reliant on further suppositions regarding an objective world, the identity of linguistic meaning, the mutual accountability of actors and the context transcending validity of claims to truth and rightness. Conversely, Grimble and Wellard (1996) maintain the usefulness of stakeholder analysis is in understanding complexity and compatibility problems between objectives and those affected by those decisions: a view more in line with Habermasian theory and systems theory.

Contemporary uses of the term 'stakeholder' refer not only to persons or individuals, but also denote groups and organizations that have an interest or are active players in a social system. The question here however is whether group or individual interests are given equal weight. Ramírez (1999) argues that contemporary definitions broaden the term to include any "*person with an interest or concern in something*" (p. 1), although other colloquial terms carrying slightly different connotations, such as actor' (Munch, 1975) 'social actor' (Checkland, 1999) or 'concerned actor' (Ledington, 1988), are often used interchangeably with 'stakeholder'.

'Stakeholder' is used in the present study to denote those that are affected, either negatively or positively, by the introduction of biofuels to New Zealand. Thus, the study will be attempting to establish on what grounds is one considered a stakeholder and under what circumstances the opinions or knowledge of stakeholders count in the context of the BSO public consultation process. Such questions are common to both the action research and management literatures; in both instances, power is described as a central attribute of knowledge and hence informs claims to inclusion in public forums of discursive problem solving (R. Chambers, 1997).

3.3 Language and power

Power shapes and is constituted by language, it therefore has an effect on what views are expressed and in what ways those views reflect the dominant value system (Deetz, 1992). The following section explores the relationship between power and communication.

3.3.1 Dominant discourse

Within the literatures, the 'dominant' discourse is determined by (among others) political power structures (Bourdieu, 1988) authority relations – i.e. claims to knowledge and expertise (Bråten, 1983; Deetz, 1992) disciplinary power (Foucault, 1986) a dominant language of positivism (Habermas, 1989; Kuhn, 1970) a dominant language of capitalism (Illich, 1973) and barriers to participation (Clegg, 1989).

Figures of authority may exercise greater influence in negotiation by being more effective in expressing their own models of reality. Rorty (1980) maintains that within any debate certain values, or ways of expressing those values, will be more persuasive than others. Knowledge inevitably represents the articulation of a particular standpoint and frequently this can be at the expense of other perspectives: a phenomenon Bråten (1981; 1983) identifies in his conception of 'model monopoly'.

Bråten (1981) also argues that fringe, minority or alternative viewpoints become less intelligible by being less explicit, and hence more difficult to articulate, a view that supports Stacey's (2007) contention that simplistic models of action tend to predominate. As a result, issues such as social values, identity or cultural representation become subjugated to the dominant techno-rationalist paradigm, hence systemically distorting decision-making and public consultation (Gaventa & Cornwall, 2001).

The provision of societal information may even increase the knowledge gap when a group or organization does not have resources available to adequately deal with it. While Bråten (1973) accentuates discursive disadvantage, Lukes (Power: A Radical View, 1974, cited in Gaventa & Cornwall, 2001) contends that "*the most effective use of power may be to inhibit conflict from emerging in the first place*" (p. 24). This is achieved by impeding awareness to the extent that certain issues are rendered 'unthinkable' simply because they do not exist in public consciousness.

3.3.2 Power and organizations

Power is pervasive within and between organizations and within society itself, with two opposing conceptualisations: sovereign power and strategic power. The first of these, Hobbes' notion of 'sovereign power', implies that power is something owned or possessed by a unitary entity, e.g. monarch, politician or government (Introna, 1997). It would be facile to suggest here that the government uses its 'sovereign' power to create policies of its own volition. However, whilst sovereign power exists as such, it is the mechanisms implicit within Machiavelli's 'strategic' conceptualisation that are more relevant to this study. Machiavelli considered alliances, strategies and networks as central to his conception of power. Power develops out of local, contingent actions from within networks, which when linked together create the 'illusion of grand design' (Introna, 1997, p. 128).

Foucault (1986) also uses the term sovereign power to describe the authority wielded by states and organizations. Far more pervasive however is what he calls 'disciplinary' power, by which the influence of normative ideology is invisibly dispersed in every act and judgment (Deetz, 1992). As Deetz, Habermas and Rorty have avowed, knowledge and language are major channels for power, but as power has no locatable form, Foucault argues, it should not be considered a 'thing' separating those who possess it from those who do not (Deetz, 1992; Gaventa & Cornwall, 2001). Instead, power is a productive force applied in action through discursively regulated social interactions. By way of such discursive practices social actors constitute their identities and lives, consequently all individuals and groups are agents of power without necessarily

possessing it or being privileged by it (Foucault, 1987, cited in Gaventa & Cornwall, 2001).

Each institution of society has its 'regime of truth' or ideology constituted through a set of discursive practices, which legitimises claims to knowledge and is itself dependent on the legitimacy of those claims. As a result, Foucault (1986) argues, any attempt to separate power and knowledge is futile, as it is impossible to separate statements of 'fact' from the values and mechanisms that constitute them as such.

In this sense, ideology does not simply constitute the perceptions and beliefs that guide individual action, it includes the process by which social actors are addressed and the means by which their sense of consciousness of the social world is constituted (Mumby, 1988). Power then is exercised through ideology when the interests of dominant groups are perceived as universal interests and hence actively supported, even by oppressed groups (Mumby, 1988).

Exclusion of members of subjugated groups from participating in the decision-making process can be ideologically justified on the basis that few people have the necessary technical expertise or access to information to contribute effectively. As described earlier, this is often achieved in organizations with reference to the principles of techno-rationalism. Thus Mumby (1988) argues that "*managers maintain power by articulating everything within a techno-rationalist context and systematically excluding other perspectives*" Moreover Weick (1979) contends that rationality is 'in the eye of the beholder' when applied in traditional managerial contexts.

As a result, a commonly identified outcome of dominant discourse is its tendency to become self-producing and self-referential (Deetz, 1992). Both these traits are redolent of 'autopoietic systems', a theory adopted to draw attention to how social systems can become distorted in their self-production (Maturana & Varela, 1980; Mingers, 1989). A core systemic idea is that of an adaptive system; an entity able to survive by adapting to changes in its environment. It therefore requires communication processes to know what is going on and control processes to respond to these environmental changes.

Morgan (1997) explains the 'egocentric' tendency for organizations to resist adapting to their surroundings by conversely expanding to dominate their external environments. The resulting systemic reification of normative views suggests communication in and around an organization will in turn be distorted, as the system becomes increasingly disconnected from anything that it does not itself produce (Deetz, 1992). Operating in such an 'autobiographic' environment, such a system is likely to remain receptive principally to views that conform to the organizational system's own views and set of imaginary relations, and move to subordinate any views that do not.

Habermas uses the term 'communication pathologies' to describe the discursive manifestation of this systemic distortion (cited in Deetz, 1992). His notion of 'systemically distorted communication' becomes pathological when it a) endangers the survival of human and other species by limiting the adaptation of the system to its changing environment, b) violates normative standards already shared by community

members, and c) imposes arbitrary limits on the development of individualization and the realization of the collective good (Deetz, 1992). This conception of pathologies becomes particularly cogent when considered in the context of climate change.

Pathologically distorted communication then works to silence critical voices even when that action is against the best interests of the community in which it occurs. Checkland (2006) insists that since individuals hold different worldviews, differences of opinion are inevitable. Therefore wherever consensus occurs it is either around issues people do not feel particularly strongly about or over which they do not feel powerful enough to challenge the prevailing view (Checkland & Poulter, 2006). Hence consensus may be indicative of issues of orthodoxy or dominant conditions of discourse and may even contribute to the closing down of dissent (Deetz, 1992). On this point, Deetz (1992) is critical of Habermas for emphasising consensus formation over the equally important task of reclaiming dissent and conflict as essential actions in preventing any consensus, no matter how legitimate its basis, from becoming dominant and suppressing emerging conflict.

Where conditions of an assumed consensus exist, discursive closure is bound to follow with the phenomenon of autopoeisis leading organizations and social systems to operate as closed systems to the extent that institutional arrangements are taken as self-evident. The effect on communication is that, "*The conditions of discourse in pursuit of a legitimate consensus cannot proceed since an unknown false consensus is already in place*" (Deetz, 1992, p. 176). Working in tandem with policy makers and procedures of public governance, corporate systems may be autonomously structured towards discursive closure with both division, and apparently legitimate consensus, used to channel dissent within the broader social environment.

Systemic distortion, or what Habermas calls "communication pathologies", may be due to confusion over communicative action, in which actions are orientated to reach an understanding, and strategic action, in which actions are orientated to purposive success (Deetz, 1992). This confusion is ripe for exploitation. In situations where a party is not deceiving him or herself, manipulation can occur when strategic action is concealed under the appearance of communicative action. Hence, where the goal of a consultation process is merely to gain legitimation, public discourse can be similarly distorted. Even within research using SSM, distortions can be created by the dominant conditions of discourse, which either inadvertently or deliberately confuse distinctions of strategic and communicative action.

In contrast to Habermasian speech 'distortions', Rorty favours 'normal and abnormal forms of discourse' by which conversation takes the place of theories and thereby epistemologies. Normal discourses are judged according to agreed conventions, whereas abnormal discourses open up possibilities in which the world can be conceptualised. Rorty's (1980, p. 132) 'main purpose' is to destroy the illusion that a particular vocabulary – a way of conceptualising the world – is a description of 'the way things are'. In adopting hermeneutics, he suggests a pragmatic mechanism for coping whereby the real issue concerns ways we wish to talk about humans and the world we live in (p.

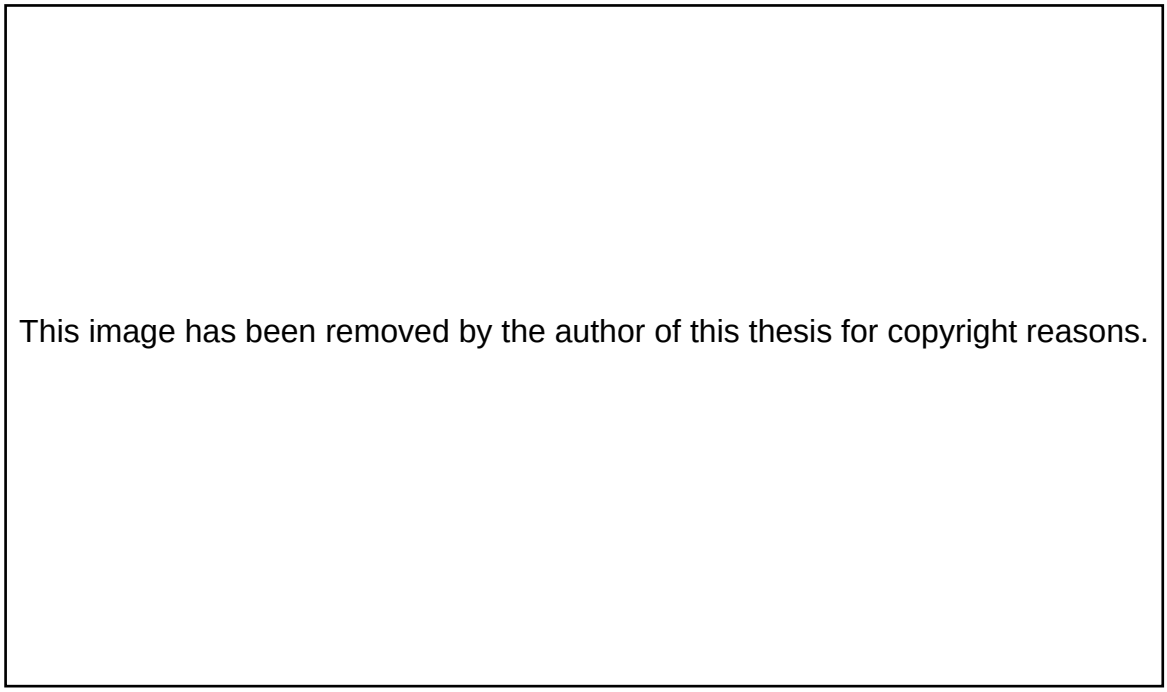
130). Rorty's stance is widely criticized for failing to locate discourse within a particular socio-political milieu in which power is inevitably present, leading to certain voices becoming privileged because of their ability to frame perceptions of the world in their own terms (p. 136). The problem, according to Mumby (1988, p. 132) is how to prevent the open-ended nature of Rorty's dialogue from "*degenerating into empty rhetoric or idle chatter*" (p. 132).

3.4 Models of collaborative discourse

While one can empathize with the aims of Rorty's project, Mumby's critique suggests that even dialogue requires some evaluative structure. However, having considered the interdependence of language and power, we return to the notion of an ideal form of discourse in order to meet the emancipatory interests of the individual while also providing a basis for legitimate collective action. The following section explores the practical implications of this ideal by exploring models of collaborative discourse. It reaffirms the need for open, sincere and ethical conditions of communication and examines the potential of dialogue for providing such conditions.

3.4.1 Dialogue

Writing during the Stalinist purges, Bakhtin's concern was that controls on discourse through the insistence on 'acceptable' forms of language restricted expression and located power with the centralized authority asserting those standards (Holquist, 1981). Accordingly, Bakhtin developed a metaphor of centripetal and centrifugal force to describe texts that implied a normalized worldview (monologic) and those which included the diversity of multiple voices and dialectal expression (dialogic).



Bakhtin introduced the term 'heteroglossia' to describe the multi-layered nature of language, thereby countering the notion of language as a normalized and controllable

medium for the transmission of meaning (Holquist, 1981). Heteroglossia conceives language as a verbal-ideological medium charged with the voices and thoughts of the many it passes through. As Chilton (2004, p. p48) argues, a single word may carry many different connotations, hence its meaning cannot be plausibly entertained independent of the context and experiences of those who speak it.

The inter-subjective nature of conversation then suggests that meaning is created in the interactive exchange of talking together and that its validity as a basis for collective action depends on the degree to which this is mutually created. As Habermas contends, a conversation is more or less discursive to the extent that it approximates the *ideal* conditions of discourse (S. Chambers, 1995). Deetz (1992) asserts that a 'healthy' discourse is one that is individually differentiating, systemically co-creative and a learning experience for its participants.

Bohm's (1996) conception of dialogue is as "a flow of meaning" and he, with Senge (1990), argues for dialogue to be seen as a special type of collaborative conversation where space is created in a group to examine opinions and beliefs, thereby allowing the participants to become observers of their own ways of thinking. The word dialogue is derived from the Greek words *logos*, translated as 'meaning', and *dia*, 'through'. Bohm's ideas on dialogue have been criticized for the difficulties they present in arranging the special conditions whereby individual learning is facilitated within a group (Bathurst, 2004; Stacey, 2007). However, this objection may be based on the principle of Bohmian dialogue being content-less, that is to say it occurs without any preset agenda.

Instead, dialogue may be understood as being shared exploration towards greater understanding, connection, or possibility and is then a reciprocal conversation between two or more people. Rather than a communicative process by which people 'make common' certain ideas already previously known to them, Bohm (1996) argues that people in dialogue create meaning 'in common'. That is, dialogue is a co-creative process of reciprocal learning. Discussion, in contrast, derived from the Latin *discutere*, to strike or shake apart, is a combative form of communicative exchange in which each party seeks to destroy the other's position (Partridge, 1978).

For Bohm, problems of social fragmentation, conflict and environmental degradation stem from our intractable patterns of thinking that block us from listening effectively to one another. The very nature of these 'blocks' is a kind of insensitivity or anaesthesia to the confrontation of contradictions in the ideas that we hold most dear. Simply allowing multiple viewpoints to stand is an approach that our defensiveness precludes. However, examining these patterns of thought, or what Bohm calls our 'representations', could enable us to discover our collective fellowship through dialogue, thus improving the quality of our problem solving and decision-making.

Dialogue then affects our thinking as a self-reflexive method of examining our own assumptions or representations. Bohmian dialogue establishes conditions of mutual respect where one is able to reflect upon one's emancipatory interests with regard to the suppositions of disciplinary power. That is, by 'suspending' one's way of thinking

distinct from the understanding of one's personal identity, one is able to consider one's reactions aside from the content of the interaction and thereby gain insights into the ideological assumptions one makes about another and oneself in relation to that other (Bohm, 1996). Hence dialogue works as a process by which one learns to distinguish one's 'conflict with an idea' as aside from the assumption that one's conflict is with the other person.

Due to the need for open and sincere exchange, Bohm asserts that dialogue cannot be effective in organizations where power is at play. However Senge (1990) and Isaacs (1999) have adapted Bohm's ideas and taken them inside the organization in the form of 'strategic dialogue'. Strategic dialogue aims to provide managers with the skills to enable them to create the conditions in which learning can take place (Isaacs, 1993). Wheatley (2002) also advocates dialogue as a form of sincere and mutually respectful conversation. She emphasizes the reciprocal quality of deep listening in a conversation even when one strongly disagrees with what is being said.

3.4.2 Co-creation of meaning

An important attribute of dialogue is the reciprocal co-creation of meaning. Co-creation refers to a form of creativity where more than one person is involved and hence relates to the meaning making attributed to communicative action. What distinguishes this activity is that the product of an interaction is something none of the creators could or would have achieved working alone. Whereas Deetz (1992) contends that most commonly adopted theories of communication emphasize effective transmission and persuasive effectiveness. Stacey (2007) insists that "*meaning does not arise first in each individual to be subsequently expressed as action, nor is it transmitted from one individual to another, but rather it arises during the interaction between them*" (p. 271). In this, he makes reference to a co-creative process of interaction.

It is out of the unconscious conversation of gestures that language, or conscious communication, emerges. Mead (1934) considers meaning to be created when one body, in expressing a 'significant symbol', evokes a response from another body. In the co-creative interaction of conversation, a significant symbol is a gesture (typically a vocal gesture) that calls out in the individual making the gesture, the same (i.e. functionally identical) response that is evoked in others to whom the gesture is directed (Stacey, 2007, p. p271).

Co-creation is a term that is also applied to management theories developed from improvisational theatre where the performance is created in the interaction between two or more people. Stacey (2006) sees this form of co-creation as emerging from both Mead's theories of communication and the application of complexity theory. Friis (2006) advocates presence and spontaneity in co-creative interactive dialogue in place of an over-dependence on theoretical frameworks that can be interposed between an individual enquirer from his experience of events unfolding in real-time. Similarly Walker (2006) writes of 'leading in the moment'.

Insofar as one can 'relinquish' one's prejudices and prior assumptions to allow meaning to emerge in the moment of shared interaction, this project is also concerned with the co-creation of meaning in public discourse and co-learning between researcher and participants through dialogue towards a shared approach to problem solving (Elden & Leven, 1991).

3.5 Analogically mediated discourse

As explained in the Introduction, the indeterminate complexities of social design are at the heart of this project; particularly how stakeholder interaction and dialogue might be facilitated. In this regard, SSM proposes the development of visual representation in the form of 'rich pictures' and conceptual modelling. Hence the following section considers analogically mediated discourse and how this might apply to the research of discourse and the specific methods of the study.

3.5.1 Cultural metaphor

The way we think about something affects how we approach it. Therefore to think about anything requires an image and a concept of it (Gharajedaghi, 1999). Monin (2004) proposes that metaphor represents a particular set of linguistic and visual processes whereby aspects of one object are 'carried over' or transferred to another object, so that the second is spoken of as though it were the first. Similarly, organisational symbolism refers to the ability of a sign of some kind, whether verbal, visual, behavioural or material, to refer to something other than itself (Mumby, 1988).

Metaphors move us to form perceptions of the subjects shaped by these linkages and the emotive responses they evoke. In this way, Chilton (2004, p. p48) maintains they direct us to images in the mind to make a visual reference or inference. As forms of organisational symbolism, metaphors serve both as models *of* the situation and models *for* the situation (Pondy, 1983, cited in Mumby, 1988, p. 19). Hence, they become part of the cultural 'store' or lifeworld with which we understand one another and make sense of each situation.

Using metaphors helps to organise the shared interpretations of a situation in the minds of those involved, while the very creation of the 'objective facts' of an organization is guided moreover by its underlying root metaphors. Morgan (1997) shows how metaphors are able to convey a variety of perceptions of what an organization is, but also that a particular metaphor's habitual use can eventually lead to the institutionalising of the perspective represented by the metaphor.

Mumby (1988) argues the continued currency of such metaphors indicates the presence of organisational constructs or theories-in-use. Therefore an analysis of the metaphoric structure and organisational symbolism used in pictures and models could therefore enable stakeholders to examine the beliefs and values that inform the discourse through reflective examination.

3.5.2 Visual representation

In surfacing these opinions and assumptions, SSM advocates analogically mediated discourse through rich picture building and conceptual modelling. The premise of this research is that discourse prompted by visual representation could create the necessary conditions to encourage stakeholders to examine the consequences of their opinions and assumptions. Barry (1994) asserts the use of non-lingual analogues is well-recognized within the field of organizational development with people frequently being encouraged to draw their organizations or create group sculptures. In this way, visual representation and the use of metaphor can provide for analogically mediated dialogue for examining diverse and conflicting ways of thinking.

Analogically mediated enquiry uses drawings, collages or psychodramas to help uncover unconscious processes and has been successfully employed in the fields of depth psychology and art therapy. Barry (1994) suggests that organisational members might similarly create analogues to represent their own internal mental maps and use them to surface unconscious organisational patterns. It is similarly anticipated that rich pictures could mediate the process of participatory enquiry by enabling people to reflect on 'root definitions' as provisional theories-in-use.

The use of visual representation to structure enquiry into organisational issues has many precedents, particularly in the form of mind-maps, cognitive modelling and the development of IS ontologies (Colli, 2004; Garcia, 2005; Novak, 2001). Horn (2000; 2004) also uses visualization to map debate and structure discourse around what he calls 'complex social messes'. He adopts the term to describe the ill-structured or 'wicked' problems of dealing with diverse viewpoints around contentious public issues (Rittel & Webber, 1972).

Dalley (1987) contends that the creative process is sufficiently 'non-threateningly different' from a person's everyday activities to temporarily disengage their resistance mechanisms, thereby enabling participants to surface their unconscious presuppositions. This can encourage participants to be more open, playful and reflective by temporarily suspending their usual ways of thinking (Barry, 1994). Such visual analogues are used to provide the discursive conditions for people, if not to ultimately shift their presuppositions, at least to reflect on them in the light of the communicative process.

Whereas Bohm (1996) writes of creating conditions of awareness where it's safe to reflect on one's own thinking, visual representation can similarly provide the space and means for someone to be able to 'see' their ideas or in Senge's (2004) phrase "*In dialogue people become observers of their own thinking*" (p. 242). Analogically mediated dialogue then can prompt participants to move to new frames of understanding by focusing their enquiry on the unusual and different, and hence generating transformative meanings (Barry, 1994; Furth, 1988).

The use of visual representation thereby shifts the form of the conversation from the combative voicing of contrasting views to one where meaning is co-created through interaction. It allows an exchange of views to become dialectic rather than remaining at

the level of the propositional, a form that suggests the battle for assertion and therefore a struggle for dominance (Bohm, 1996). Consequently, the communicative process can become one of shared and integrative meaning instead of an enactment of power-relations through the differentiation of individual views (Follett, 1941).

3.6 Summary of chapter 3

This chapter began by examining the difference between problem solving and decision-making: decision-making denotes the propositional choice between identified options whereas problem solving entails a dialectical exploration of a situation perceived as problematic. The first section compared these distinctions to techno-rationalist and systemic approaches. The former assumes an external world submitting to prediction and control whereas the latter supposes an ill-defined and complex system of socially constructed meaning making involving the discursive negotiation of action among differentiated individuals engaged in purposeful action. The section also examined Habermas's theory of communicative rationality in respect to the discursive conditions necessary for open and sincere public discourse. It considered different conceptions of the role of 'stakeholder' and applied concepts in the literature to the specific case of the public consultation on the discourse preceding the decision to implement the BSO mandate.

The second section explored the literature on language and power with particular reference to ideas of dominant discourse. This second section examined mechanisms of discursive disadvantage, ideologies of power and organizational 'egocentricity'.

The third section looked at models of collaborative discourse, particularly Bohmian conceptions of dialogue and its potential for co-creative communication. The final section explored ideas of analogically mediated discourse with respect to dialogue and the practices of SSM.

The next chapter explores the philosophical basis of the research by evaluating the theoretical and methodological foundations of SSM before outlining the general principles of this systemic form of enquiry.

Chapter 4: Methodology

> *"A conversation is a dialogue, not a monologue. That's why there are so few good conversations: due to scarcity, two intelligent talkers seldom meet."*
>
> Truman Capote

4.1 Introduction

This chapter begins by addressing the third of the research questions listed in the Introduction: 'how, and to what extent, might the use of SSM facilitate co-creative dialogue in public discourse?' In attempting to answer this question the researcher has also to consider how the study could be evaluated and consequently also addresses the fourth question: 'what has the researcher learned from his participation in this process and to what degree is this learning generalizable and transferable?' Rose (1997) argues evaluation should be made with reference to the theoretical consistency between the research practice and the worldview evinced by SSM. That is, the knowledge originated in the research can be evaluated only once the philosophical position of SSM has been established. Therefore the chapter will begin by examining the philosophical position of the research.

Once the philosophic foundation of the research has been ascertained, the chapter will assess the approach to Action Research (AR) taken in this study and outline the general framework of SSM. At the core of SSM is a comparison between the world as it is perceived and models of the world as it might be. From this semi-structured comparison arises a better understanding of the world ('research'), and some ideas for improvement ('action') (Checkland & Poulter, 2006). This process of learning through action enables SSM to be a method of simultaneous enquiry and transformation.

Action, reflection and questioning are mutually interrelated strands in AR and SSM (Ellis & Kiely, 2000). By surfacing tacit assumptions SSM challenges the reflective enquirer to consider his view of the world. In such a situation, the value of any insight is in its potential to occasion improvement, either in operation, strategy, or patterns of thinking (Stacey, 2007).

Since we use patterns to make sense of the world, new suppositions or theories-in-use may be subject in turn to further investigation, particularly when they are identifiable as the basis of another problem situation (Argyris & Schön, 1996). Hence levels of learning and criticality are implicit in an evolving process of change. This cycle of understanding and critique, enquiry and transformation is fundamental to the learning and construction of new knowledge.

Within this cycle, the researcher of social phenomena will inevitably influence the subject under investigation. Recognition of this interrelatedness is one of the defining characteristics of AR (Reason & Bradbury, 2001). However where the aim is to instigate social improvements, the extent to which the process of participatory enquiry is

positively transformative is dependent on the position of the enquirer in relation to what is being investigated. In other words, unless the researcher can ensure the free and equal participation of those involved in social change he is likely to distort the process (Freire, 1970).

As the previous chapter explained, distortion is highly likely when strategic action becomes confused with communicative action (Deetz, 1992). Hence the consultation process around the introduction of the BSO raises specific concerns about the processes of discourse since government consultation or public policy analysis demand especial vigilance and reflexivity if an enquiry is not to be purely 'autobiographical' (Morgan, 1997). That is to say, if it is not simply to be limited to merely reinforcing the normative ideological conceptions of the dominant worldview. Habermas (1989) argues that critical comparison with an idealized speech situation allows one to see whether discourse meets the conditions for democratic engagement or whether it is being systematically distorted. It is consequently more important in public discourse to think in terms of facilitating a 'healthier discourse' about issues and interests rather than merely managing 'a solution to a problem' (Ledington, 1988).

Deetz (1992) contends that the role of public discourse in a pluralist, liberal democracy is to provide information, social membership and policy justification. However, that justification is conditional on the discourse being undistorted. Dialogue was proposed in the previous chapter as a form of open and undistorted communication, although as we have seen, the effectiveness of any dialogue is reliant on both a high level of shared understanding and reflexivity (Bohm, 1996; Senge, 1990). The ability, rigour and willingness of participant enquirers to contextually engage with their situation and investigate their interpretations of it together give rise to conditions of dialogic problem solving.

This study seeks to understand the discursive conditions surrounding the BSO mandate through an enquiry conducted using SSM and validated according to its efficacy in facilitating co-creative learning. An aim that includes all four levels of enquiry and the four questions posed in the introductory chapter. As stated above, the fourth question concerns claims to knowledge and their philosophical foundation.

Accordingly, the following section is concerned with establishing the philosophical, theoretical and, to employ Rose's (1997) term, basic 'reasoning strategies' that situate the practice of SSM within the field of social science. It involves an examination of SSM's fundamental ontological and epistemological positions in order to ascertain the foundations of the framework and considers its relationship to AR.

4.2 Philosophical location of SSM

Rose (1997) suggests that in order to assess the viability of SSM as a social science research tool one needs to first establish the methodology's philosophical position and associated theoretical strategies. Accordingly, the following section examines the

'enquiry paradigm' of the project with reference to Guba and Lincoln's (2000) typology and strives to locate the ontology, epistemology and methodology of the research.

A paradigm defines a view of the nature of the world, an individual's place in it, and the relationships between the individual, the world and its parts (Guba & Lincoln, 2000). Alternative paradigms include positivism, post-positivism, critical theory and constructivism. However, no paradigm can be considered incontrovertibly true, as each worldview constitutes what is essentially a theoretically consistent act of faith. As Guba and Lincoln (2000) maintain "*advocates of any particular construction must rely on persuasiveness and utility rather than proof in arguing their position*" (p. 108).

While Guba and Lincoln's (2000) paradigm typology is useful in broad terms, it doesn't yield an obvious category in which to neatly consign SSM. What is more, Klein and Myers (1999) conclude AR's underlying epistemological assumptions may be positivist, interpretivist or critical in nature, therefore, classifying SSM as AR does nothing to simplify matters. Tellingly, Checkland (1999) claims compatibility for SSM both in the model of social reality developed by Weber and the critical theory of Habermas; whereas Oliga (1988) argues for its accordance with Gadamer's historical hermeneutic approaches and Rose (1997) for its realist stance. As these four positions engender conflicting theoretical applications of SSM, establishing a sound foundation for the research necessitates a more thorough excavation into the practice's philosophical basis.

4.2.1 Ontology

Derived from the Greek 'ontos' (being) and 'logos' (theory or knowledge), ontology is a branch of philosophy concerned with the form or nature of reality and what it is that can be known (2000). In framing these concerns, Cohen and Manion (1994) ask: "*Is reality external to individuals – imposing itself on their consciousness from without – or is it the product of individual consciousness*?" (p. 6). Intrinsic to this question is a choice between the presumption of an external reality or an internal reality, or alternatively one negotiating the two, with each ontological position implying a distinct path of enquiry involving different reasoning strategies.

Taking a *realist* position supposes that a single independent reality, immutable and conforming to natural laws, exists outside the reference frame of the observer (Boyd, 1994). A *relativist* standpoint, in contrast, posits that there is no external reality and the categories into which people classify their experiences exist only in their minds (Stacey, 2007).

Other ontological positions indicate paths that attempt to navigate between these two extremes. The *idealist* position articulated by Kant avoids the extremes of realism and relativism by asserting that while the pattern of our experience is determined by the way we think, as human beings we inherit mental categories to make sense of our perceptions (Stacey, 2007). Hegel also expresses an *idealist* stance but assumes that our sense making is socially negotiated (Stacey, 2007).

Both constructivists and social constructionists broadly hold the view of a socially negotiated reality and hence their ontological positions may be considered *idealist*. Constructivists believe that humans are capable of perceiving the world in one way rather than another due to limitations imposed by human evolution (Stacey, 2007). Hence, a constructivist position accepts the inevitability of both an encapsulating reality and a hermeneutic circle (Salner, 1999).

Social constructionists on the other hand, believe our reality is not the product of an *a priori* propensity that determines our explanation, but rather that our explanations of the world are socially constructed in our encounters with one another (Stacey, 2007). Whereas constructivists emphasize the selective nature of the individual human being, social constructionists point to social interaction, particularly discourse, as the process of selection. Consequently every explanation of phenomena is a socially constructed account, not a straightforward description of reality. Social constructionists do not therefore believe there can be any such thing as an independent objective observer when attempting to explain phenomena (Stacey, 2007).

Checkland's (1999) soft system thinking also breaks with the idea of a concrete social world comprised of real, empirically verifiable social systems (Flood, 2001). Instead, he recognizes systems as cognitively constructed entities that do not necessarily correspond to any 'real', externally observed phenomena (Checkland, 1999). While other explanations are no doubt feasible, this view strongly suggests either a constructivist or social constructionist ontological standpoint for SSM.

4.2.2 Epistemology

The term epistemology derives from the two Greek words, 'episteme' meaning knowledge and 'logos' meaning logic or rationale. Epistemology then has come to mean the study of knowledge and is therefore concerned with the nature and limits of experience, belief and what can be known. Guba and Lincoln (2000) contend that epistemological enquiry seeks an answer to the question, "*how can we be sure we know what we know*?" (p. 83).

Checkland (1999) articulates his epistemological view when he asserts that systems are unknowable. Instead his form of systemic thinking evokes Kant's *idealist* view of the regulative 'as if' nature of systems. Thus SSM employs systems thinking to engage with a problem situation as though it might be a system, while acknowledging that one cannot ever be entirely certain (Stacey, 2007). This is also significant in recognizing that a systems model cannot ever represent a system itself, but is merely one heuristic tool for generating insight: a point that effectively counters Rose's (1997) earlier claim for a *realist* position for SSM.

The value of systemic thinking, Checkland (1999) claims, is in providing a way of thinking about the world while accepting that it cannot accurately describe the world in those terms. In this he makes the epistemologically significant distinction between systems thinking and systemic thinking (Flood, 2001). Under the former, systems are conceived as something that can be objectively described and improved, whereas the

latter understands them purely as personal constructions. Thus Checkland (1999) insists that what he terms a 'holon' or systems concept is an arbitrary, subjective hypothesis, and systemic models are therefore merely devices for structuring thinking. This suggests an interpretivist epistemological interpretation in line with social constructionism.

Checkland (1999) and Bohm (1996) both argue for the use of discourse as a means of participatory change. They maintain whole human systems are far too complex and pervasive for enquirers to adequately comprehend, and even attempting to do so is to adopt the reductionist thinking that systemic thinking seeks to avoid (Bohm, 1996; Checkland, 1999). Instead SSM offers a potentially rigorous approach to exploring such theories hermeneutically (i.e. self-reflexively) through discourse while simultaneously accepting that these interpretations are not 'descriptions' of systems or the world, and as such are provisional theories liable to be superseded at some point in the future.

Moreover, in interpreting our apprehension and understanding of systems concepts, the historicized cultural aspect of social reality must also be included. As Blaikie (1993) explains social reality is not some 'thing' that may be interpreted in different ways; it is these interpretations. Thus interpretivism conceives human experience as being characterised by a process of interpretation-based historically-evolved ways of understanding and sense making (Stacey, 2007). In addition, Nuyen (1995) asserts that the movement from tradition to particular experiences corresponds to a hermeneutic circle moving from the whole to the parts and back again. Consequently one cannot be understood without reference to the other and thus social reality is discursively pre-interpreted through traditions of sense making.

Social constructionists and constructivists accept that an interpretivist epistemological stance inevitably follows from their respective ontological positions, since an enquirer's epistemological position is closely related to his view of reality and *vice versa* (Stacey, 2007). Accordingly, this research engages interpretive/hermeneutic epistemological approaches to understand rather than explain contemporary discourses around the adoption of biofuels in New Zealand.

4.2.3 Methodology

Since SSM is so deeply grounded in practice, it might be more appropriate to think of it as a method or set of methods rather than as a methodology: a study or theory of method. Oliga (1988) reasons that, unlike empiricist investigations of social phenomena where the question of methodology refers merely to the choice of an appropriate method of verification or falsification, the validity of interpretive and critical methodologies is dependent on the philosophical consistency between a position taken ontologically and epistemologically and the research methods employed. It is with reference to this philosophical foundation that the validity of different modes of enquiry (Oliga, 1988). These higher order criteria might presumably be provided by the theoretical approaches already attributed to SSM: namely Weber's sociological model, or what Oliga (1988) refers to as 'hermeneutics by method'; the 'historical hermeneutics' developed by Heidegger and Gadamer; and Habermas's 'critique'.

Although earlier iterations of SSM such as the seven stage model (see Figure 4.1 below) come close to representing a realist view, this is not a position that appears supported by the elaborate interpretivist conceptions espoused in Checkland's (1999) more recent writings, and he is similarly alert to claims to 'objective' validity. This also contrasts with hermeneutics by method approaches since Oliga (1988) contends Weber's concern is to provide causal explanations of social phenomena by avoiding the subjective meaning of social action. While SSM employs processes of interpretation directed towards recovering and reconciling participants' diverse perceptions of systems problems, the 'historical situatedness' of the participants is accepted as an integral aspect of all problem situations (Checkland & Poulter, 2006; Oliga, 1988). Hence hermeneutics by method can be eliminated since its structuralist claims to scientific validation sit outside the concerns of this study.

This narrows the choice of suitable methodological approaches to two: Gadamer's historical hermeneutics and Habermas's critical theory. Although SSM's emphasis on the joint participation and dialogical processes of understanding developed between client and researcher makes a compelling case for historical hermeneutics, its focus on positive improvement might likewise argue the case for critical theory (Oliga, 1988).

While Guba and Lincoln (2000) treat interpretivist and critical approaches as discrete paradigms, Mendelson (1979) argues that the positions taken by Habermas and Gadamer are however not as irreconcilable as they first appear. For Gadamer (1975) all thought including critique is possible only on the condition of participation within a culturally-situated tradition. He argues understanding arises through the dialectic of questioning by parties already situated within a shared culture of historically constituted conditions (Nuyen, 1995). However, Habermas and Apel (cited in Nuyen, 1995) criticize Gadamer for being exclusively concerned with the self-understanding of social agents and ignoring possibilities of self-misunderstanding, ideology, embedded power and domination (see also Poupeau, 2000). Habermas argues that without an independent reference point from which to evaluate tradition, hermeneutics will fail to reveal pathologies within the tradition itself (Nuyen, 1995).

Gadamer insists it is impossible for critique to 'stand outside' of hermeneutical understanding and in turn accuses Habermas of illusory transcendentalism. Yet Mendelson (1979) maintains Habermas does not deny the presence of 'effective-historical consciousness'. Indeed his theory of communicative action presupposes culturally contextualized and historicized meaning as the basis for critical evaluation (Nuyen, 1995). As Warren (1984) explains:

> In order that critical theory not undermine its own claim to a relative rationality, it must criticize a form of consciousness "immanently". That is, criticism gains its right to impute ideological meanings to a text insofar as the text is irrational with regard to its own criteria of adequacy. (p. 542)

Hence the criteria of understanding by which social participants assess their own endeavours can provide the basis for critique. Whereas Gadamer stresses understanding

and Habermas evaluation, the defence of either hermeneutics or critique relies on an understanding of their dialectical natures. Both Habermas (1989) and Gadamer (1975) emphasize open dialogical discourse as a means of establishing agreements on meaning and truth. Both advocate self-reflection in the quest for establishing foundations for critical evaluation: their difference is largely one of emphasis (Nuyen, 1995).

While the reasoning strategies for SSM could plausibly be drawn from either historical or critical hermeneutics, it is Habermas's theory of communicative rationality that is particularly germane to the current study of discourse on biofuels development. Hence it is with regard to communicative and social constructionist thinking that SSM is employed and this study's specific research methods are applied (Nuyen, 1995).

4.3 Theory and practice

The following section examines the links between action research, systems thinking and SSM in relation to the present study. It identifies different forms of action research and examines the advantages and challenges of a systemic approach to qualitative research.

4.3.1 Action Research

Action Research is characterised by cycles in which participant enquirers seek to revise and improve action though reflective learning. Carr and Kemmis (1986) describe AR as 'spirals of cycles', a phrase that highlights that the process is non-linear and unlikely to conform to a sequence of predetermined stages. Consequently, a reflective cycle can be of practically any speed or duration (Dick, 2006). While the longest cycles might occupy months or years, such as with the integration of a large-scale information system, the shortest cycles might occupy only a few seconds. These theoretical cycles within cycles within cycles provide the enquirer with a dynamic frame within which to construct and test new knowledge (Ellis & Kiely, 2000).

Davison *et al.* (2004) identify more than a dozen forms of action enquiry from which Ellis and Kiely (2000) categorise four main strands: Action Research, Participatory Action Research (PAR), Action Science and Action Learning. Confusingly, the term Action Research refers both to a specific form of action enquiry emphasizing organisational efficiency and social psychology, as well as to the broader field (which Ellis & Kiely, 2000 therefore label Action Inquiry). The theoretical area of interest for PAR is self-empowerment and emancipation. Action Science strives to make reasoning visible so that it can be examined and where necessary improved. Whereas the strand of Action Learning is concerned with personal awareness and reflexivity, while also assessing improvements in practice and the integration of theory and practice.

While its affinity to critical theory would ordinarily presuppose PAR as the most appropriate strand of AR, the scope of the present study and the consequent limits to probable transformation suggest it as unsuitable. Instead, the present study's interest in uncovering assumptions and shifting thinking place it more in line with the theoretical approaches of Action Science and Action Learning.

Checkland (1999) categorizes the methodology of AR as a *learning system*. All forms of AR recognize learning as a continual process of understanding and evaluation through which the enquirer discovers meaning and enables change (Ellis & Kiely, 2000). Organizational or personal change can be adaptive or transformational. The level of adaptive change, conceptualized by Argyris (1996) as single-loop learning, involves incremental adjustments to strategies or actions while the underlying values on which they're based remain untouched. However, in transformational change or double-loop learning, the critical reflection of participant enquirers changes underlying assumptions, which can then result in different ways of thinking and affect future strategizing leading to systemic change (Ellis & Kiely, 2000). In this way self-reflexivity provides the means for critical evaluation.

AR strategies challenge the dichotomy of external theoretical expertise and local practical knowledge (Ellis & Kiely, 2000). Consequently, most AR strategies seek to encourage genuine collaboration, co-generative learning and the co-creation of new theories between researchers and participants in the shared desire to address local problems (Elden & Leven, 1991). In the application of AR, there is no separation of researcher from what is known.

4.3.2 Systems thinking

Systems theory encompasses a large body of methods concerned with exploring the interrelatedness of phenomena. Broadly speaking it includes fields as diverse as systems engineering, living systems theory, cybernetics, gestalt therapy, socio-ecology, software and computing, systems dynamics, chaos theory and quantum physics. These disparate approaches share the common idea that the behaviour of all systems follows certain common principles (Senge, Kleiner, Roberts, Ross, & Smith, 1994).

Systems thinking came to the fore when research into living things encountered limitations in the concepts and principles of reductionism (Flood, 2001). By providing a holistic framework for contemplating complex purposeful activity, systems thinking enables one to look beyond seemingly arbitrary events to examine the underlying structure and patterns of behaviour (Checkland & Poulter, 2006; Kim, 1995; Meadows, 2002; Senge, 1990).

A system is a perceived whole whose elements are interconnected and consequently interact with and influence one another. Systems thinking therefore rejects reductionist formulations that focus on the parts themselves in favour of a more holistic explanation of phenomena (Gharajedaghi, 1999; Stacey, 2007). Rather then seeking to comprehend phenomena by reducing them into smaller and smaller components, systems thinking attempts to gain an understanding of the properties of the whole as patterns of behaviour that emerge from the complex interactions of multiple entities (Ackoff, 1999).

4.3.3 'Hard' and 'soft' systems

The field of systems is divided into 'hard' and 'soft' approaches. 'Hard' systems presuppose a world that is systemic and can be studied systematically, via systems

engineering for example, whereas 'soft' systems assume a world that admits to many different interpretations and can be studied systemically (Ackoff, 1996).

The hard systems view is an approach developed from theoretical extrapolations of engineering practice (Checkland, 1999). This perspective underpins traditional definitions of projects where systems are assumed to be singular and rational, and decision-making based on assumptions that the objectives of a project, and the methods of achieving them, are clear (Stacey, 2007). The functions of hard systems, or first order systems, are assumed be quantifiable, predictable and subject to control. The assumption is that they can therefore be made more efficient in more streamlined organizations populated by essentially predictable and interchangeable, machine-like people (Stacey, 2007).

As argued in the previous chapter, the reductionist approaches of hard systems have often proved inadequate in practice for initiating changes in individual and organizational behaviour. Indeed, Checkland (1999) maintains it was the experience of applying these hard engineering frameworks to human purposeful activity that prompted him to develop SSM. Checkland (1988) has even argued against the use of the term 'system', because of its hard, systems engineering connotations, and suggested the adoption of the word 'holon' in its place.

Soft systems involve much complexity and uncertainty, even as to what circumstances constitute a problem. This is because problematical social situations are never static and contain multiple interacting perceptions of reality (Checkland & Poulter, 2006). Soft systems thinking holds reality to be the creative construction of human beings; thus its approaches search for ways to address the additional complexity of designing a social intervention from the perspective of those affected. In this regard systemic thinking and action research share a close developmental and theoretical heritage (Flood, 2001).

4.3.4 Critical Systems Thinking

Writers including Flood (1997) Jackson (2000) Midgely (1996) and Mingers (2000) have accused soft systems thinkers of replicating rather than challenging dominant power relations and ideologies, using a similar line of critique to that levelled at Gadamer by Habermas (Flood & Romm, 1997). While CST is not defined by any single approach or set of principles, it is characterised by a number of core principles, including commitments to systems thinking, social and critical awareness, human emancipation, and plurality of theory and methods (Flood, 2001).

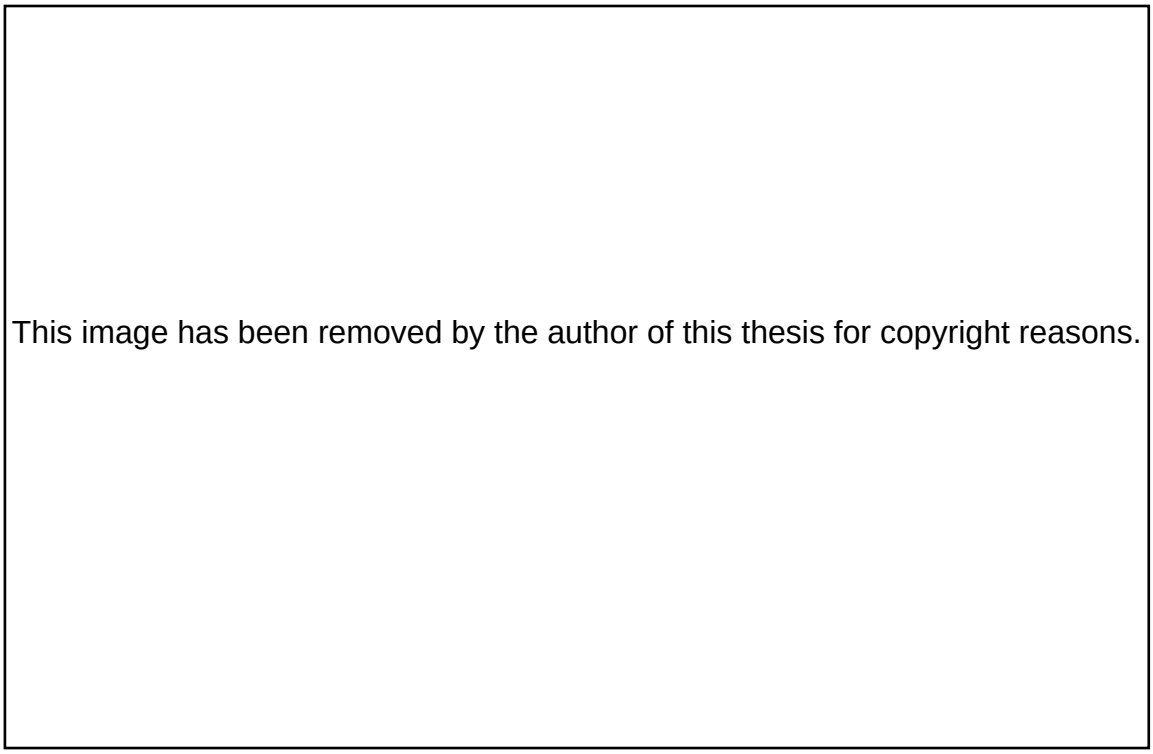
For critical systems thinkers such as Midgely (1996) boundary judgments represent the core of systems thinking. The social and personal constructs of boundaries define the limit of the knowledge to be taken as pertinent and the people who may legitimately be considered as decision makers or stakeholders (Stacey, 2007). This definition of pertinent knowledge refers to the proposition of rational solutions at the level of single-loop learning, whereas claims to knowledge and legitimacy based on reflexive processes suggest second-order systems or double-loop learning, in which consideration of the context of the research is an integral aspect of any enquiry (Argyris & Schön, 1996;

Stacey, 2007). Expressed more succinctly, while first order systems might question the efficacy of a solution, second order systems question the bases of such seemingly 'rational' judgments.

Although understanding can never be comprehensive, CST challenges systems thinkers to broaden their boundaries of investigation to include more disparate sources of information and ensure that systemic enquiries are more representative and reflexive. These and similar inducements encourage the researcher to reflect on the limitations of the consultation process under investigation, SSM and the boundaries the current study.

4.4 Soft Systems Methodology

Developed by Checkland in the 1960s and refined over the intervening decades, SSM seeks to examine a problematical situation through a cycle of learning. This cycle provides a model for designing interventions when faced with soft, ill-defined problems.

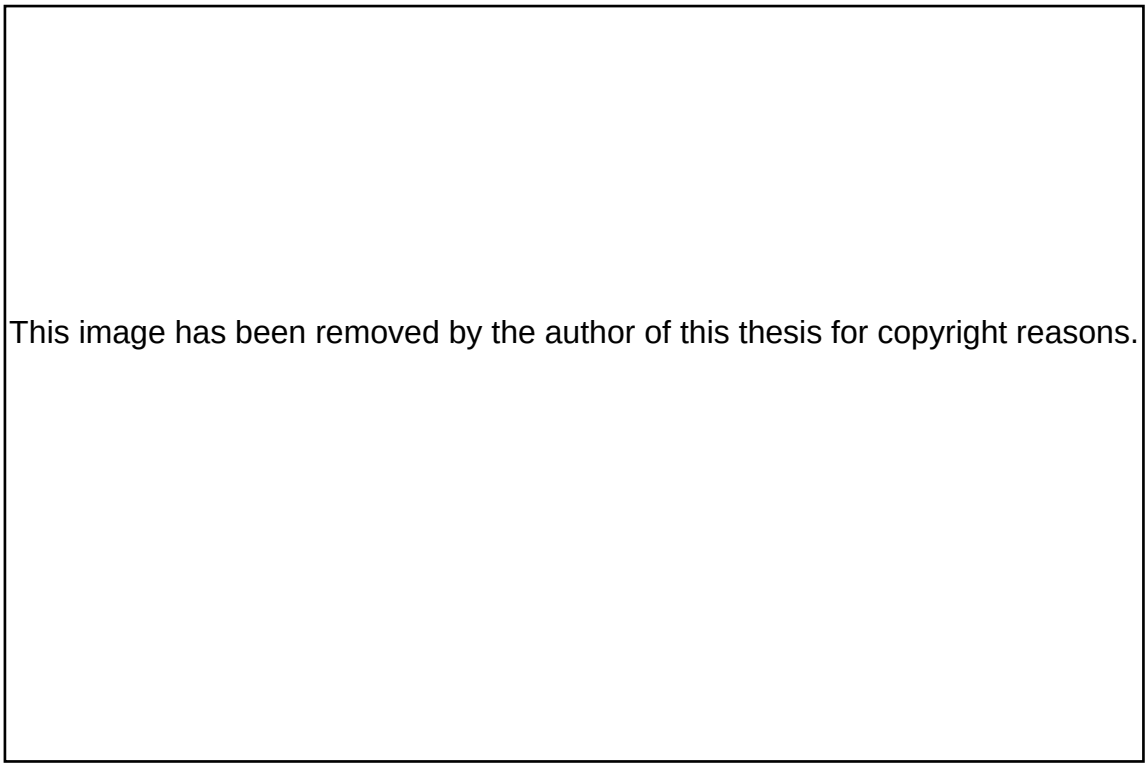


There are however at least two versions of what constitutes SSM. The earlier literature offered a seven-stage method that emphasised the action aspect of the methodology (Checkland, 1999). This focus on first order systems thinking over reflexive action appears to have prompted many prescriptive styles of application. What subsequently became categorized as 'SSM Mode 1' has frequently been applied mechanically to 'solve' rather than address problematical situations (Mingers, 2000). Indeed, Checkland's major publications chronicle the struggle of SSM to move from thinking about 'problem-solution' to facilitating 'healthy discourse' i.e. *Systems thinking, systems practice* (1999) depicts the classic rethinking of hard systems approaches, *SSM in action* (1989) represents the development from Mode 1 to Mode 2, while *Information, systems and information systems* (1998) begins to create a language of the context of 'discourse'.

The later development from problem to process, solution/outcome to discourse, is particularly apposite to the framing of the present research using SSM developmentally rather than purely diagnostically.

The initial seven-stage model (Figure 4.1 above) included two stages (stage 3 and 4) occurring 'below the line' denoting a distinction between the 'real world' and 'systems thinking-about-the-real world'. While Checkland (1997) argued this line was 'more heuristic than theoretical', the division eventually came to be seen as implying a 'false dualism' and therefore dropped. Despite its erasure, negotiation of this line is still significant to meaningful comparison of espoused theories and theories-in-use in SSM (Argyris, Putnam, & McLain Smith, 1985) although Ledington & Ledington (1999) claim this aspect of the methodology remains underdeveloped.

Ledington and Ledington (2007, personal correspondence) also point out how many in the literature begin with an opening statement on how they will examine different perspectives and then proceed to ignore the idea. Many SSM researchers implicitly seek the 'right/best solution' or act on the belief that if there is at least some debate then a fresh consensus (solution) will emerge. Mode 2, however, advocates reflexivity, or second-order systems thinking, by asserting the need to consider the assumptions of participants and the assumptions underlying the process of enquiry itself (Stacey, 2007). Importantly, Mode 2 emphasizes reflective learning as an essential element of this epistemological approach to problematical situations (Gold, 2001).

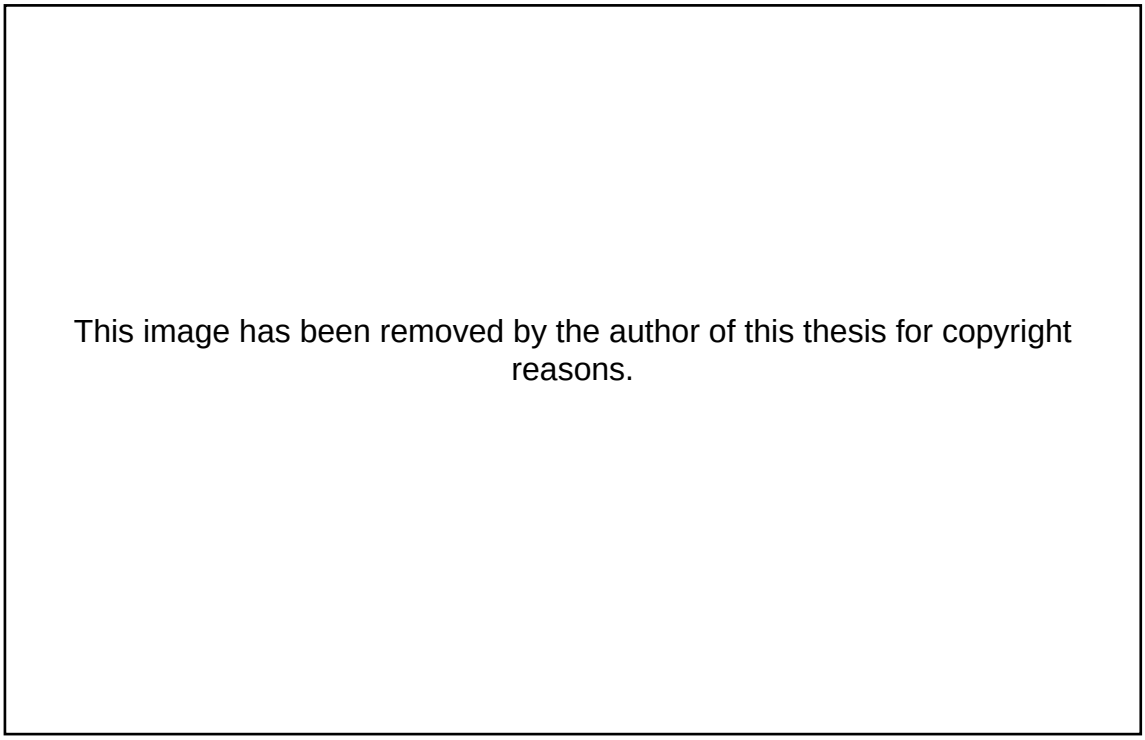


A more responsive, less formulaic approach of SSM, Mode 2, was subsequently developed that applied soft systems concepts to participatory action research. Mode 2 SSM involves dissolving real-world problems by encouraging participants to think systemically about the concerns, issues, problems and aspirations contained in an area of

their own and others' worldview. In this way SSM Mode 2 can serve as a process of both enquiry and transformation, in that social actors are encouraged to participate in researching the problem while concurrently developing the learning required to transform themselves, their organization and/or society. SSM's cycle of learning for action is shown in Figure 4.2 above.

However internal and external constraints inevitably limit the form of such a transformation. Hence Checkland (2006) advocates assessing the compatibility and desirability of proposed solutions: aspects that address their cultural fit. He emphasizes the need to engage with the unique context of a problem situation by stipulating feasible and desirable change. As well as consideration of technical feasibility and logical defensibility, Checkland (2006) proposes including reflection on the cultural feasibility of an intervention given the political conditions and the roles, norms and values active in the problem situation at the time.

Provided these political aspects do not distort the process, Rose and Haynes (1999) maintain that SSM is potentially well-suited for the evaluation of complex interventions in the public sector, citing examples of its use in assessing change in the UK's National Health Service. SSM provides a rigorous method for deconstructing prevailing ideologies and hence provides an effective way of talking about how to interact with complex problem situations involving multiple perspectives and problem-owners.



4.4.1 Activities of SSM

Once a problematical situation has been identified, a SSM enquiry takes the form of a cycle that entails four kinds of activity. The following four activities correspond to the numbers shown in Figure 4.3 (above):

1. Exploring the initial situation, which is perceived to be problematical.
2. Developing relevant models of purposeful activity representing the differing worldviews of stakeholders.
3. Using the various models to structure a conversation about the situation with the aim of originating and identifying changes that are arguably desirable and culturally feasible in this situation.
4. Defining and/or taking action to that will eventuate positive transformation.

Properly applied, these activities form a cycle of learning that lead the participant enquirers from investigating the 'messy' characteristics and substance of a problematical situation to the point where they can define or take action to improve that situation (Ackoff, 1996). Within this cycle, SSM employs three distinct forms of modelling: rich picture building, textual modelling, and conceptual modelling. These three forms, together with the structured conversations developing from the modelling, are described in more detail in the following section.

4.4.2 Rich pictures

'Rich picture building' is a specific term for the form of unstructured modelling used to investigate a situation and uncover features of the problem domain. It is an activity that is deliberately unstructured in order to resist the simple reproduction of existing organizational structures and the temptation of jumping to conclusions about the problem situation's systemic nature. Rich pictures offer a more tentative, dialogic engagement with problem solving.

As knowledge of a problematical situation grows, it becomes valuable to draw pictures of the situation. Such knowledge is accumulated from diverse sources of information, from official reports to informal conversations, however as the conversations progress the pictures become richer (i.e. detailed, nuanced and complex). Yet their form allows participant enquirers to discern relationships and recognize patterns at a glance.

Although richness is an evaluative term, the value of the pictures chiefly lies in stimulating and structuring a dialectical form of learning. They provide participants with opportunities to reflect on 'what they are thinking'. Such pictures also provide a record, a snapshot of a situation that is constantly in flux and hence will not remain static for long (Checkland & Poulter, 2006).

Checkland (1999, p. A 16) explains his preference for visual representation with reference to the multiple interacting relationships that constitute the complexity of human affairs: "*Pictures are a better medium than linear prose for expressing relationships. Pictures can be taken as a whole and help to encourage holistic rather than reductionist thinking about a situation*" (p. A16). The theoretical framework behind Checkland's form of systemic thinking recognizes the evolving complexity of human situations and that this complexity determines the discursive interactions of purposeful individuals.

4.4.3 Textual modelling

In addition to rich picture building, formal textual models are also developed to help define the problem situation. This includes 'root definitions' – the 'what?' 'how?' and 'why?' of transforming the problem which is analysed according to the mnemonically derived 'CATWOE": Customers, Actors Transformation, *Weltanschauung* or Worldview, Owners, and Environmental constraints (Checkland & Poulter, 2006).

The 'root definition' takes the form of a statement of the purposeful activity from the standpoint of a particular worldview. In apprehending the problem situation and assembling a CATWOE analysis of it, it is presumed that the activity will:

- affect people 'C' who will be either its beneficiaries or its victims
- require people 'A' to do the activities which make up 'T'
- include taken for granted constraints from the external environment 'E', such as time, accessible technology, resources currently available, laws, etc.
- be shaped by whatever individual or individuals who have the power to stop or change the transformation 'T'

4.4.4 Conceptual modelling

Whether textually or pictorially generated, SSM constructs conceptual models of purposeful activity. These can then be compared with unstructured perceptions of the real world (Rose & Haynes, 1999). Such conceptual models are not intended as representations of the real world; they are merely theoretical constructs used to help formulate and structure *thinking* about 'problems' (Rose & Haynes, 1999). Each model is used like a 'pair of spectacles' through which one can interpret and reflect on reality (Checkland & Howell, 1998).

This process of reflection often takes the form of conversations, prompted by questions generated by the models that explore desirable and feasible improvements to the situation. Hence the essential form of problem situation addressed by Mode 2 SSM is, to adopt Ledington's (1988) term, with *'designing conversations'*.

Each situation involves the interaction of multiple actors using multiple perceptions of social phenomena, consequently no 'problem' can be anticipated or its character presumed. The models help participants to interpret people's lives as an emergent whole by uncovering what is meaningful for them according to social practices, rules and underlying constitutive meaning (Stacey, 2007). The emphasis then is away from modelling the system and informing decision-makers process, toward facilitating the exchange and interactive understanding involved in a complex communication process.

Rather than describing the world, the value of these models is in providing concepts for learning, or to adopt Argyris's (1985) term, 'theories-in-use'. Each model or root definition is therefore unquestionably provisional as it can only be seen as being appropriate for the context in which it was produced, now, today; otherwise the notion of systemic 'holon' becomes just another ideology to defend.

4.4.5 Structured conversations to find actions to improve

The co-creative, dialectic and learning communication process of dialogue is at the heart of SSM. By facilitating dialogue through visual representation, SSM provides discourse with the possibility of people, if not shifting their opinions, at least reflecting on them in the light of the communicative process of the research. Even if this is no more than the acknowledgment of another person's point of view, the use of visual analogues can help participants to engage with uncertainty and broaden the boundaries of their understanding.

In seeking to facilitate dialogic engagement and reflection rather than consensus between participants, the researcher adheres to Bohm *et al's* (1991) view that dialogue should be considered dynamic rather than as an outcome. "*Dialogue is a way of observing, collectively, how hidden values and intentions can control our behavior, and how unnoticed cultural differences can clash without our realizing what is occurring*" (p. 1).

4.5 Summary of chapter 4

The current chapter explored the philosophical location of SSM and hence this study, consistent with the ontological, epistemological and methodological positions adopted. It examined the basic reasoning strategies employed in the research and used these to place the study among the four strands of AR identified by Ellis and Kiely (2000). Habermas's ideas of communicative rationality offer a congruent philosophical basis for local systemic action research, and consequently provide the basis of the theoretical framework of this research project (Checkland, 1999).

The chapter next examined the distinction between hard and soft systems. It assessed SSM according to the broad principles of systems thinking and the critique of the approach offered by CST. It then introduced SSM and outlined the four main activities that characterize this form of systemic enquiry. Having expounded the general theoretical foundation and stages of SSM, the following chapter will describe the specific research methods employed to address the four key questions stated in the Introduction.

Chapter 5: Research Methods

> *"Method is not less requisite in ordinary conversation than in writing, provided a man would talk to make himself understood."* Joseph Addison

5.1 Introduction

Systemic enquiry is concerned with exploring problems that are by their nature messy and ill defined. This meant that in order to carry out an enquiry purposefully, the researcher first needed to establish what he was intending to investigate, before selecting appropriate methods of investigation and finally evaluating the effectiveness of those methods against the knowledge revealed in their application.

The first subject of enquiry then was how to locate the current project's purpose and area of concern. This specifically involved identifying the relevant interactions and boundaries of the problem situation the researcher was intending to explore, thereby presenting him with a further subject of enquiry. In the present case, the research necessarily involved engagement with at least two systemic levels of investigation: first the discourse surrounding biofuels development, and second, how to explore this discourse using suitable research methods.

Determining the purpose of an enquiry is conceptually challenging due to the interrelatedness of phenomena and the stacked nature of systems and subsystems. It can be akin to looking out over an expanse of water in the rain and attempting to fix in one's mind the exact spot where a raindrop just fell. Since rain rarely if ever falls in the same place, the challenge comes in discerning the concentric circles spreading out from the centre of one's particular centre of attention while resisting being distracted by the ripples and overlapping rings forming continuously around it.

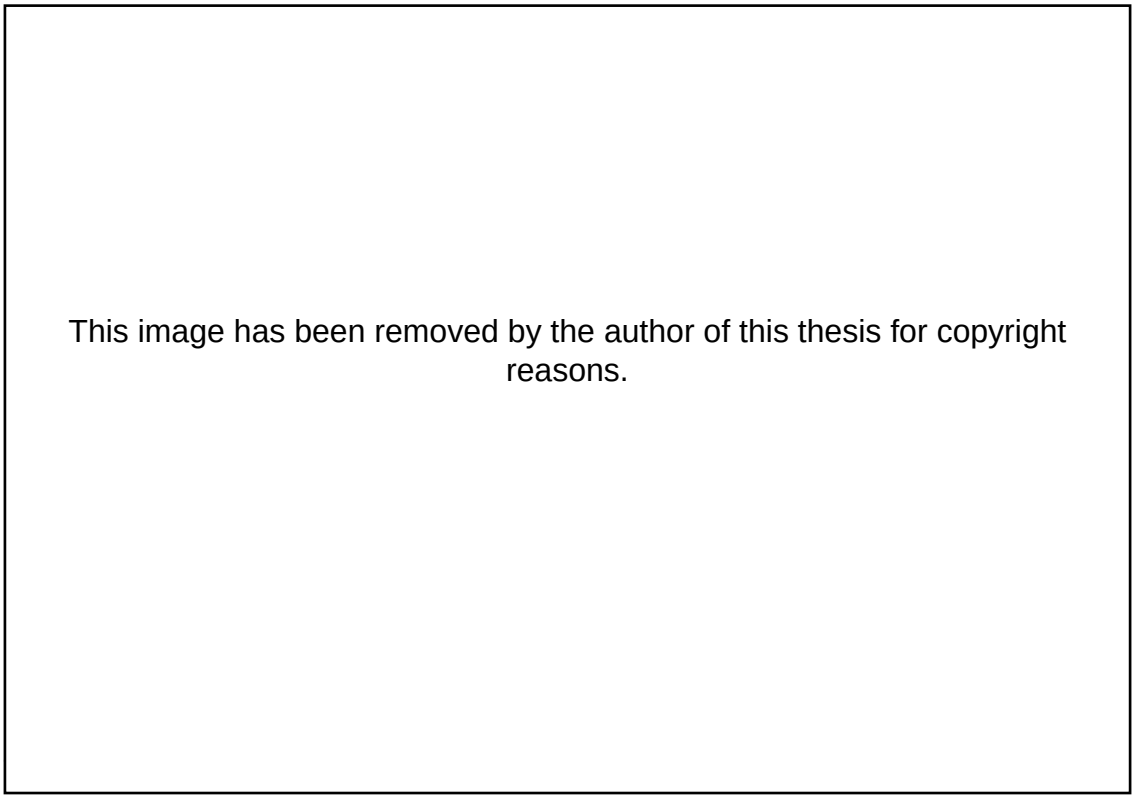
Salner (1999) recognizes the challenges inherent in systemic research and argues that navigating confusion over what an SSM enquiry is actually attempting to explore requires that the enquirer distinguish between research 'using SSM' and 'research on SSM'. The multidimensionality of a problem situation, or what Checkland (2006) terms 'richness', is central to soft systems approaches, and thus any SSM enquiry also becomes, at least in part, an examination of the methodology itself.

Rose (1997) and Salner (1999) maintain furthermore that additional demands arise when research is presented in the context of an academic thesis, which means it must also make rigorous and defensible additions to understanding or knowledge. Hence further levels of enquiry are added that also need to be addressed and accommodated. From a systemic investigation of the problem situation of the discourse surrounding New Zealand biofuels development, and the juxtaposition of the project's context and methodology, the following four questions emerged:

1. Is the introduction of the BSO mandate a viable and appropriate intervention according to its own criteria?

2. How 'healthy' was the discourse conducted in this case?
3. How, and to what extent, might the use of SSM facilitate co-creative dialogue in public discourse?
4. What has the researcher learned from his participation in this process and to what degree is this learning generalizable and transferable?

These questions have been examined over the course of the previous three chapters with regard to the relevant literature and documentation. The current chapter describes the specific research methods adopted in the study and how they were developed to address these key questions. It sets out the four distinct stages to the study: first the identification of participants, second a series of interviews, third the process of holding a focus group, and finally the development of conceptual models. The chapter begins by outlining how the researcher designed the initial research study using SSM frameworks.



5.2 Research study design

Figure 5.1 (above) features Checkland and Poulter's (2006) model illustrating how SSM may be used according to two kinds of enquiry, one addressing the content and the other relating to the design of the study. Whereas SSM(c) is concerned with the problematical content of the situation, SSM(p) is concerned with the process of using SSM to study that content (Checkland & Poulter, 2006). Thus, SSM can be used to assist with decisions on how one might conduct the study even before beginning an investigation of the content of the problematical situation. Accordingly, the researcher used SSM(p) to explore the research situation and design the study prior to exploring the specific content of the area of enquiry, SSM(c).

The research study was designed in the form of a qualitative study of discourse involving diverse stakeholders based on the principles of SSM Mode 2, and was intended to investigate two related aspects of the discourse. It initially sought to identify different views of the action taken to introduce biofuels to New Zealand, but also to surface insights into the discourse from an analysis of the ways in which diverse stakeholders actually discussed this issue. The participatory research was consequently conducted in two stages.

Stage one focused on the activity intended to instigate the development of biofuels, and garnered perceptions on the consultation process preceding the BSO legislation. This stage involved a series of interviews in which people affected by the issue were asked to represent, in pictorial form, their perceptions of the situation. Stage two employed textual models developed in the first stage to examine notions of stakeholder engagement and discursive legitimation.

In total, fourteen participants representing various key interest groups were involved in the research, with the interviews conducted in Wellington, Palmerston North and Auckland from mid-August to early October 2007. Participants were drawn from six stakeholder groups: policymakers, scientists, commercial organizations, NGOs, environmentalists and consumers. Each interview lasted approximately one hour and was held at a location convenient to the participant.

In addition, six of the interview participants were asked to further contribute to a group interview of a similar duration held in Auckland in October. The participants included in this second stage were decided largely by proximity and availability.

5.2.1 The focus of the study

Figure 5.1 (above) illustrates the original conception for SSM(c) which is concerned with the problematical *content* depicted as an epistemological approach for 'solving' content relating to 'x' (i.e. the issue of biofuels development). However, the researcher considered the taken-for-granted assumptions and cultural properties governing *discourses* about 'x' to warrant their own examination and therefore adopted SSM(p) as the research approach which is concerned with the *process* of using SSM to conduct the study. Figure 5.2 (below) contains an adaptation of Checkland's (2006) model (featured in Figure 5.1) to explain how the discourse occurred in support of 'x'.

Although the researcher accepted that much of the conversation would inevitably centre on the content of the issue (i.e. biofuels and the BSO) it was important to emphasize before each interview began that the specific focus of the research was the process and quality of discourse, namely the consultation process surrounding the introduction of biofuels to New Zealand via the BSO mandate. The boundaries of enquiry were thereby established by the decision to place discourse at the centre of the research *about* the biofuels issue.

Consequently the investigation was identified as relating to four distinct levels, with the 'what' or SSM(c) of biofuels conducted by the 'how' of discourse, SSM(d). This was then investigated by the 'how' of SSM(p), which was in turn assessed by the 'meaning making' of the researcher's understanding. Accordingly, the numbers 1 – 4 featured in Figure 5.2 correspond to the four distinct levels of enquiry expressed in the key research questions. At level 1, biofuels become the content addressed by level 2, the process of discourse, studied at level 3 using SSM and evaluated at level 4 according to learning in the form of defensible and transferable knowledge.

The study began by identifying and engaging with major stakeholders in the debate surrounding the development of biofuels in New Zealand.

5.2.2 Identification of stakeholder groups

Following the steps for SSM outlined by Checkland and Poulter (2006) the researcher began by compiling a comprehensive list of all those affected by the development of biofuels in New Zealand, including those with a specific interest in the introduction of the BSO.

From the total stakeholder list, the researcher was able to identify distinct sets of stakeholders according to the following six categories: Policymakers, Scientists, Commercial Organizations, NGOs, Environmentalists and Consumers. The Policymaker group included individuals in national or local government, or others working directly on their behalf. The Scientists group represented developers of new technology and researchers into the effects of carbon emissions. The Commercial Organizations group included the representatives of oil companies, agribusinesses and the commercial developers of biofuels. NGOs were identified as organizations and associations

representing the concerns of a specific community of interest, such as car dealers or motorists. Individuals and organizations declaring a primarily 'environmental' focus however were included in the separate category of Environmentalists. The final group, Consumers, contained those expected to purchase biofuels once they became widely available.

A shorter list of contacts was developed and refined over the weeks leading up to the study. Organizations and individuals from the total list were contacted with the intention of obtaining the participation of representatives from each of the categories identified. Finally, fourteen participants representing key stakeholders drawn variously from the six groups agreed to take part in the research.

5.3 Stage one – the interview process

Prior to the study's commencement, the researcher contacted prospective participants by telephone or electronic mail and invited them to participate in a one-on-one interview on the issues of biofuels. The participants received a cover letter where it was explained that the specific focus of the research was on the discourse surrounding this subject of biofuels, and a participants' information sheet (see appendices 1 & 2). If the prospective stakeholder agreed to take part in the research, the researcher followed up the letter by contacting him or her directly to arrange an appointment at a convenient place and time.

An initial interview was conducted with participants in which 'rich pictures' were developed concurrently with an informal conversation between researcher and participant. Participants were asked a succession of open questions structured around the introduction of biofuels to New Zealand and asked to represent their understanding of the issue in a rich picture. He or she was then encouraged to use the picture to explore issues of the biofuels debate, participant perceptions and views of the environment in which that discourse operated.

An interview began with the researcher arriving at the participant's workplace or a mutually agreed venue. After introductions, each participant was reminded of the aims of the research, informed of the procedure of the research and asked if they had questions. The interview was digitally recorded as an MP3. Each interview was scheduled to last approximately one hour and once the conversation was brought to an end, the researcher collected all rich pictures.

At the start of each interview, the participant was asked to list any key players who in his or her opinion were affected by the development of biofuels in New Zealand. He or she was then given a sheet of A3 paper and coloured pens and asked to develop a rich picture by depicting the various players and mapping the relationships between them.

Once participants had developed a visual representation of the relative positions of the key stakeholders in the debate on biofuels development, they were asked to reflect on the rich picture and prompted by questions to reflect on their drawings. The mnemonic CATWOE was used to analyse the activity depicted in the picture. This approach was

designed to allow each participant real-time reflection on what was said compared with what was represented visually: a process comparable to Schön's (1983) reflection-in-action in which a practitioner engages in a 'conversation' with his or her drawing.

The enquiry moved from the concrete, such as being asked to list specific stakeholders, to more reflective concerns: 'What would you say was the general purpose of this activity?' In this way, the participant was directed to identify key relationships between component parts, such as communication flows or how stakeholders were depicted, before considering the overall qualities of their rich picture. The researcher sought to provide a line of questions that helped the participant reach progressively deeper layers of understanding; however the participant was responsible for the interpretive process and deriving his or her own insights.

While the picture making was undoubtedly an important aspect of the interview process, it was the conversation was of primary significance. The researcher merely used the rich picture to facilitate and/or challenge the 'expressions', in this case ideas, values, worldviews, embedded within the discourse.

Each conversation culminated in the generation of a 'root definition' of the activity represented on the paper. Initially a description of the activity surrounding the development of biofuels production in New Zealand was elicited, moreover, where time allowed, participants were also asked to define the problematic situation concerning the discourse around the biofuels issue.

5.3.1 Interview model

The interview began with the researcher asking the participant to represent the area of concern, specifically New Zealand biofuels development, in an unstructured way. The participant first identified the customers, actors and owners, then positioned these in relation to one another to create a 'rich picture' of the problematical situation.

The resulting rich pictures were used to generate root definitions of the transforming activity, and analysed according to the mnemonic 'CATWOE": Customers, Actors Transformation, *Weltanschauung*, Owners, and Environmental constraints (Checkland & Poulter, 2006). This root definition was constructed according to the equation (PQR): 'Do P by Q to contribute to achieving R', where PQR answer the questions of What? 'How? and Why? The PQR formula allows the enquirer to write out the root definition as a statement of purposeful activity.

The data of the CATWOE analysis were obtained using the following questions:

1. Who in your opinion will be affected, either positively or negatively, by the development of NZ biofuels? (Customers)
2. Who in your opinion are the key individuals and groups engaged with the process of developing NZ biofuels? (Actors)
3. What is it that the actors will do? How would you describe their intervention (Transformation)?

4. Who is in a position to stop or change the development process? (Owners)
5. What are some of things that would restrict how the situation could be changed, such as budget, regulatory environment or law? (Environmental constraints)

Additional information specific to the discourse was gained from a further two questions:

6. What do you know about the issues being voiced by the different groups?
7. How would you describe the conversations between these parties?

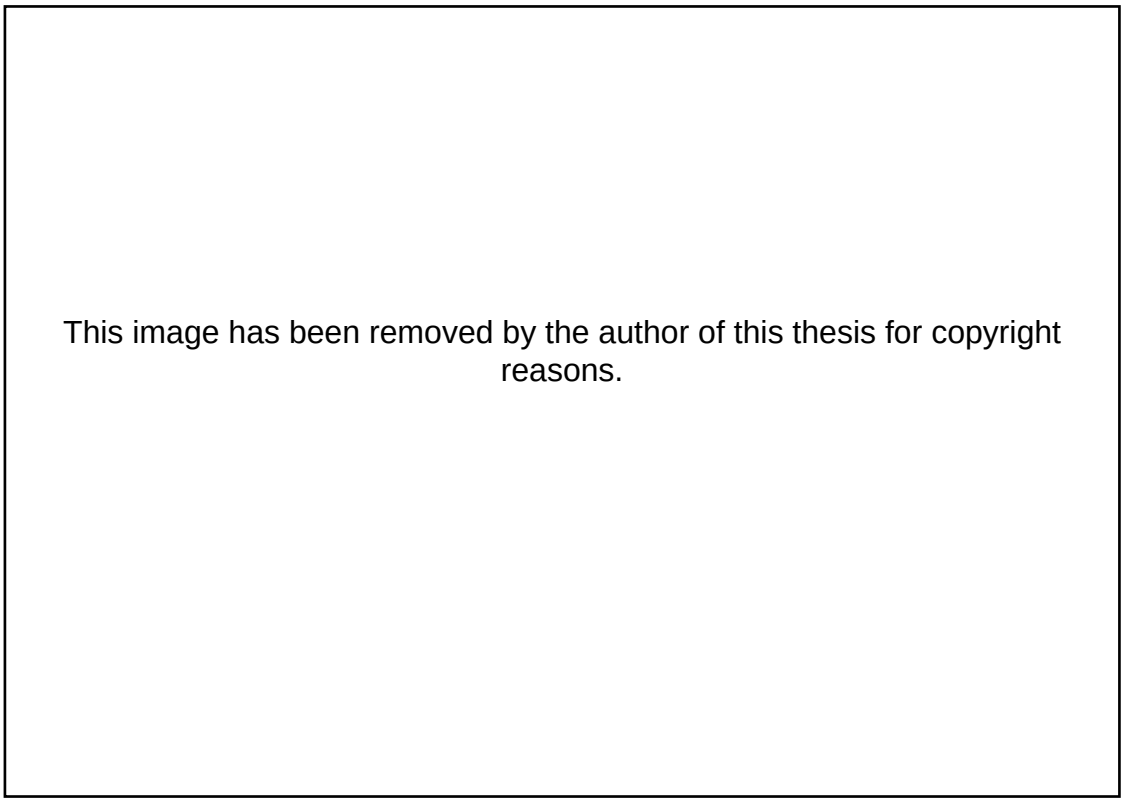
The conversation that developed from these questions and others was used to establish the participant's worldview or *Weltanschauung* as well to canvas his or her specific views on the problem situation and possible interventions to improve it.

In assessing the logical defensibility and cultural feasibility of the transformation, the participant's specific criteria of feasible and desirable change, or what Checkland (2006) refers to as E_1, E_2 and E_3, were examined in relation to his or her worldview and then used to evaluate its likely success (stages 1 to 4 in Figure 5.3 below).

- E_1 refers to efficacy: the criteria with which to evaluate whether the transformation (T) is working, in the sense of producing its intended outcome.
- E_2 refers to efficiency: the criteria to tell whether the transformation (T) is being achieved with a minimum of resources.
- E_3 refers to effectiveness: the criteria to tell whether this transformation (T) is helping to achieve some higher-level or longer-term aim.

Checkland (2006) also suggests further evaluative criteria might also be considered where appropriate, such as E_4 (ethicality) and E_5 (elegance). The criteria are also used in determining how an intervention is monitored and controlled.

The underlying structure of the interview process is shown in Figure 5.3 (below). This indicates how a conception of the problematical situation is first developed from the flux of everyday life in an unstructured way in the form of a rich picture. People will naturally perceive any problematical situation differently, therefore the rich pictures of those interviewed presented different worldviews; however it was possible to analyse these using CATWOE, from which a textual model or 'root definition' was produced. The root definition was then compared with the problematical situation depicted in the interviewee's original rich picture as a means of prompting questions about his or her perceptions of the situation and structure a discussion about feasible and desirable change.



5.3.2 Pilot study and modifications to the interview process

The first interview was conducted as a pilot study in order to trial the interview structure and test the researcher's interview techniques. The experience provided for a degree of reflexivity by allowing the researcher a chance to consider the process and modify his approach in subsequent interviews. From this initial interview, the researcher felt it particularly important to consider the safety of participants, the ability of participants to express themselves and the effectiveness of the interview in surfacing tacit assumptions.

The safety of participants was significant both ethically and in creating conditions where a participant felt safe enough to reflect on his or her process of thinking. This aspect therefore related to issues of confidentiality, the participants' confidence in the researcher and conducting the interview in an environment in which a participant felt comfortable but was also able to talk freely. Hence interviews were conducted either at a participant's place of work or at a mutually agreed venue. As regards the issue of confidentiality, conversations were audio and videotaped with the strict understanding that the recordings were to be used solely for the purpose of academic research.

The ability of participants to express themselves decided the choice of venue and the conditions of the interview. The researcher was assiduous in listening actively and building rapport with the participant while also careful to allow enough space in the conversation for the interviewee to pause and reflect on his or her own answers. This prompted the researcher to consider his own level of interaction and input to the conversation. While it was critical that participants felt the researcher was interested and engaged, it was also important that he did not dominate the conversation.

The effectiveness of the interview in surfacing tacit assumptions depended on conditions of safety and researcher engagement. Again this was reliant on the researcher assigning enough space in the exchange, and, rather than asserting his own interpretations, allowing the participant to gain insights and make connections for him or herself.

Furthermore, the researcher aimed for the interview process to be internally and externally successful; that is as well as productively contributing to the research, the participant considered his experience of the interview to be constructive and enjoyable. Consequently, he was careful to manage participants' expectations and that they were given the opportunity to negotiate the parameters of the encounter.

Practically, it was also imperative the researcher was clear on the context of the research in order that he might manage the interview structure effectively within the allotted time. Although the study was intended to study discourse around the introduction of biofuels, it was likely that participants would wish to address the content of the biofuels issue and this needed to be carefully accommodated. While the structure remained consistent, the interview cycle was an iterative process, which was set up to allow modifications as the researcher learned from each interaction and gained more experience in the research techniques.

5.4 Stage two – the focus group

In addition to one-on-one sessions, the researcher arranged to meet with six participants in a small group session to specifically examine the debate around biofuels and public discourse of similar contentious issues. The root definitions were used to facilitate dialogue around models of public discourse and challenge participants to develop their own descriptions of an ideal structure of public discourse and consultation.

Drawn from the six stakeholder groups, focus group participants already had some familiarity with the researcher and the area of study from the first stage interview process. They therefore had some experience of the basic structure of SSM, particularly the development of root definitions.

The focus group was held in a meeting room at the Business School at Auckland University of Technology. The group was presented with textual models in the form of the root definitions created during the first stage interviews printed out onto separate strips of paper. They were then asked to evaluate the root definitions as submissions from the perspective of someone given the task of making sense of them all. The participants initially took on the role of the 'faceless bureaucrat' and explored the various ways in which they perceived the submission process might be distorted and voices excluded.

The researcher then asked participants to reflect on how they would ideally like to see submissions evaluated, which instigated a discussion exploring the quality of relationships between stakeholders within public discourse and suggestions on how they could be improved. In the course of the discussion, the group identified various conditions that they felt such a public discourse process should meet, with various

participants deliberating on how these might be established. While contemplating the political purpose of public discourse, the researcher encouraged participants to also consider the qualities of dialogue generally.

5.5 Stage three – the development of conceptual models

After stage one and two had been completed, conceptual models were developed based on participants' root definitions and CATWOE analyses to explore the activity according to the different worldviews of those involved. These conceptual models were not representations of the real world nor representations of participants' 'holons', they are merely theoretical constructs used to help formulate and structure *thinking* in the analysis of the research data (Rose & Haynes, 1999). As the scope of the study did not include a further round of participant research exploration of these models did not involve stakeholders, but was conducted through a process of critical reflection.

Prior to beginning the research, the researcher also developed several conceptual models to assist in the study's design. Earlier models were concerned with designing a means of engaging with the subject and involved identifying stakeholders and setting boundaries around the project in order to define a manageable study area, while later models explored the logical defensibility and cultural feasibility of conducting the research study.

As earlier explained, an initial stakeholder analysis was first completed which was subsequently reduced to a list of prospective participants. The researcher contacted those on this list via letter and the respondents become the final sample of stakeholders participating in this study. A final model of the study design is included as Figure 5.4 and an analysis of the model outlined below.

5.5.1 Conceptual modelling

5.4.1.1 CATWOE analysis

A CATWOE analysis was developed in order to help identify those stakeholders affected by the research process and their roles.

Customers – researcher, participants, supervisors, participants' organizations, FoRST, AUT University.

Actors – participants, researcher and supervisors.

Transformation – from an ill-defined problem situation to a situation investigated using SSM from which research data has been gathered.

Worldview or *Weltanschauung* – that one can make sense of the world inter-subjectively and interpretively.

Owners – participants, researcher, supervisor and funders.

Environmental criteria – time, funding budget, ethics, participants' goodwill, researcher's energy.

5.4.1.2 Root Definition

From the CATWOE analysis a root definition of the research was developed to help clarify the purpose of the study's activity using Checkland's (2006) formula 'Do P by Q to contribute to achieving R':

> To examine the discursive engagement of stakeholders in the decision to develop biofuels in New Zealand via the BSO mandate by conducting an enquiry using SSM to uncover insights into dialogic approaches to problem solving facilitated by visual representation.

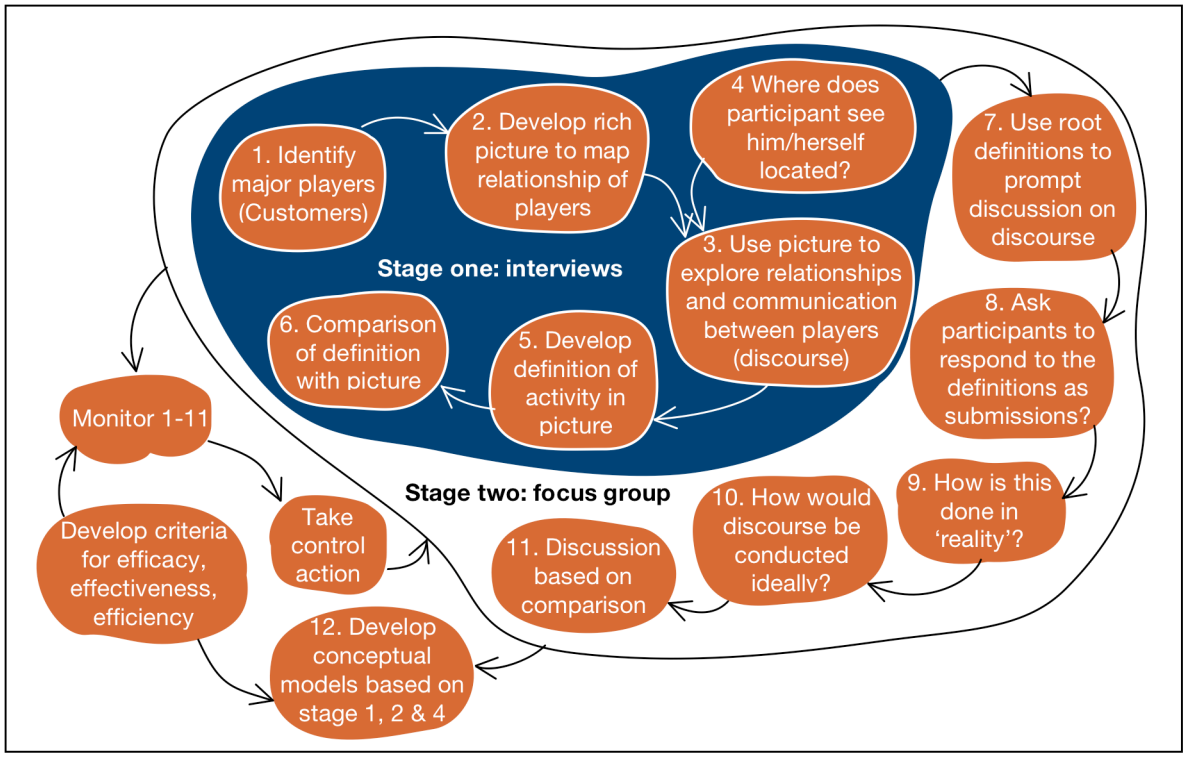


Figure 5.4. Conceptual model of research study design.

5.4.1.3 Evaluative criteria

The logical defensibility and cultural feasibility of the model of the interview process was assessed by comparing the activity depicted with the specific criteria of feasible and desirable change, E_1 E_2 E_3 and E_4, included below:

E_1 (efficacy) – is the research an insightful, dialogic learning process, which is internally and externally successful for both researcher and participants.

E_2 (efficiency) – are the issues of discourse addressed in a comprehensible and meaningful way.

E_3 (effectiveness) – are stakeholders are encouraged to deliberate reflexively on their own opinions and assumptions.

E_4 (ethicality) – that the interaction is open and sincere and participants are treated with respect in accordance with the principles of the research's ethics approval.

Evaluation of the model in relation to the above criteria was used to assess the success of the model and prompt insights into ways in which the model of the study could be improved.

5.6 Summary of chapter 5

This chapter outlined over four sections the specific methods employed in the present study. By summarizing the process of designing the study and its different aspects, the first section described the problem solving involved in engaging with the research topic. This included identifying participants through an analysis of stakeholder groups and distinguishing the study's focus in relation to the four key research questions. The second section explained the interview process used in stage one of the participatory study and the third described stage two in the form of a focus group. The final section examined the reflective process of developing conceptual models and by way of example, featured a model that examined the stages of research activity. The next chapter presents an analysis of the data gathered through the implementation of these research methods.

Chapter 6: Analysis

> *"How strange talking is – what mists rise and fall – how one loses the other & then thinks to have found the other."* Katherine Mansfield

6.1 Introduction

The focus of the present chapter is the data that emerged from the two stages of the research study. It begins by analysing the rich picture building developed during the interview process then examines the different stakeholder perspectives surfaced by the root definitions and CATWOE analysis, before exploring some of these worldviews in more depth via five conceptual models.

Checkland (1999) has described such models as "*intellectual devices whose role is to help structure an exploration of the problem situation being addressed*" (p. A21). Therefore, the intention in this chapter is to garner insights through models and critical reflection rather than present the data in long passages of detailed description. While the writing contains accounts of what emerged from the research study, their inclusion is principally in order to examine general patterns that come to light.

Four questions have been used to structure the context of this research project, however these questions refer to various related conversations or aspects of discourse. As defined in the previous chapter, the purpose of this study is:

> to examine the discursive engagement of stakeholders in the decision to develop biofuels in New Zealand via the BSO mandate by conducting an enquiry using SSM to uncover insights into dialogic approaches to problem solving facilitated by visual representation.

Accordingly, conversation was the primary method of data gathering used to examine the diverse viewpoints contributing to the discourse on this issue. Soft Systems Methodology Mode 2 provided the principal methodology, which in addition to helping the researcher make sense of these conversations, was applied to surface participants' assumptions and structure cycles of action and reflection. SSM employs rich pictures and conceptual models as 'tools for thinking' in order that stakeholders' theories-in-use may be uncovered and, where deemed desirable, transformed (Checkland & Poulter, 2006)

The research study was designed to investigate two associated aspects of the discourse. First to explore diverse views of the action taken to introduce biofuels to New Zealand, and second to discover insights into the surrounding discourse by examining the ways in which it was actually conducted. It was consequently conducted in two stages.

Stage one focused on the activity intended to instigate the development of biofuels, and garnered perceptions on the consultation process preceding the BSO legislation; it involved a series of interviews in which stakeholders were asked to represent, in pictorial form, their perceptions of the situation.

Stage two was concerned with examining notions of stakeholder engagement with reference to findings from stage one and the New Zealand debate on biofuels. In this stage a focus group consisting of five participants, drawn from those who had already contributed to the previous stage, was expressly asked to consider the issues of public discourse.

6.2 Stage one – stakeholder engagement

6.2.1 Rich picture building

From their initial reluctance, it appeared few of the participants were accustomed to using visual representation as a way of structuring their thinking, especially around complex issues involving numerous and diverse protagonists. However, participants were requested to approach the task lightly and use the activity of drawing as the means to explore unfamiliar ways of thinking.

Participants were first asked to identify key players and establish the roles of those stakeholders in shaping the problematic situation through a series of lists. During this process the researcher employed the CATWOE mnemonic as form of a mental checklist to gather information on the major protagonists, their connections and influence.

Once a participant had established the major stakeholders, he or she began to construct a rich picture. As well as the position of stakeholders relative to one another, participants also described lines of communication, and considered the quality of those interactions. Often at this point on the audio recordings there would be a pause in the conversation as the participant's attention focused on the development of their picture: a pause that was intermittently punctuated with a comment by the participant on his or her work. In general then, rich pictures were not strictly created concurrent with the conversation, but occurred during breaks in the to-and-fro interaction between participant and researcher.

After mapping out the protagonists on paper, participants were encouraged to examine their own perceptions of the problematical situation and identify where they themselves fitted in. The interview culminated in participants being requested to define the purpose of the activity represented in the rich picture. This involved identifying 'What' was being done, 'How', and towards what aim, and a root definition developed using Checkland's (2006) PQR formula.

The rich picture was compared with the definition to ascertain whether the activity portrayed met the conditions of the action described. Further questioning extended the enquiry to examine implicit contradictions in the comparison and consider the quality of the communication between stakeholders. In this way, each participant was encouraged to reflect on the basis of his or her perceptions by questioning specific presuppositions underlying their conception of the problem.

All participants' rich pictures are included in Appendix III.

6.2.1.1 Visual structure

In most participants' rich pictures the Government and the oil industry featured prominently. In all but two, these were the first stakeholder interests represented, with the relationship between them forming an axis around which all other activity revolved. One or both of these stakeholders were placed either centrally, with the other actors encircling them, or to the left, with all other parties appearing to their right consistent with Western left-to-right reading conventions.

The prominence given to the Government and the oil industry was unsurprising considering the form of the BSO initiative was a directive from one to the other. Nonetheless this emphasis reflected participants' confidence in the central role of these organizations in developing biofuels in New Zealand.

The two pictures that were not dominated by an oil industry-Government axis were structured around a bifurcation of the biofuels issue. *Consumer 3* expressed contrasting visions of an idealized and actual New Zealand, while *Consumer 4* separated those likely to lose out from those who would benefit from the intervention.

Consumer 2 and *NGO 1* also split their pictures in two. *Consumer 2* along lines of public or private interest, although she struggled to place those who straddled this partition such as the "*quasi-private sector power companies*" or the Green Party's ambivalent non-coalition partnership with government. Conversely, *NGO 1* divided his paper with an authoritative black line. The 'official' channels were depicted in the body of the page while the left margin contained what he called "*tinkerers*": those enterprising New Zealanders who might develop innovative technologies through 'unofficial' channels.

6.2.1.2 Use of colour

The application of colour considerably increased the potential for richness, but also added the challenge of further complexity: a challenge that few participants were not even aware of. Two participants limited their representation to a single colour while another four used restricted colour. In contrast, another participant was so exacting in her matching of the most appropriate colour to a particular stakeholder that she was unable to complete her rich picture within the time allowed for the interview.

The colour choices of those twelve participants who did venture beyond the monochromatic were relatively arbitrary. That is to say, most frequently additional colours were applied solely to differentiate components rather than to imply new meaning. In the few cases where the colour selection was recognisably meaningful, it was significant chiefly by association, such as the use of the blue of the agency's graphic livery to represent EECA or red for the dominant political party in government. However, the specific khaki selected to denote the Green Party was noteworthy because it was suggestive of "*composting leaves*", at least that is, in the mind of *Consumer 2*.

6.2.1.3 Use of visual symbolism and metaphor

The majority of the pictures were diagrammatic with only a small minority taking advantage of the available expressive potential. Given the possibilities for 'richness', that is structured complexity, almost all the pictures could have been significantly more exploratory. However, with the exception of *Environmentalist 2* and *Consumer 3*, all participants confessed a lack of ability with the manipulation of visual materials. Most were quick to point out their own shortcomings and were anxious not to appear foolish or incompetent. Hence, the disinclination of the majority to draw was attributable in the main to inexperience and a perceived lack of skill.

Although it was repeatedly stressed that drawing proficiency was not the focus of the research, participants were largely dismissive of their own representational abilities. Nonetheless, eight, or just over half the participants, endeavoured beyond boxes or amorphous 'cloud' shapes to distinguish the respective stakeholder groups symbolically or use metaphor to illuminate the nature of the relationships between them.

Of those eight, six included oil wells, tankers, drums or petrol pumps in their rich pictures to symbolize the oil companies; five depicted motor vehicles; three featured cows and other livestock; and one displayed a power station. Although this represented a direct and literal use of symbolism, nonetheless it shifted the pictures appreciably in terms of richness and their sense making potential.

Three participants included a beehive in their pictures to characterize the common moniker of the New Zealand parliament building. One participant, *Commercial organization 2* even added bees. This might have been to suggest the frenetic activity of government or simply irritation. In either case, it could also be interpreted as a possibly facetious response to being asked to represent things visually.

Five participants included symbols and metaphors with multiple readings. A number of these not only signified stakeholders by association, such as the depiction of an iconic TV with 'bunny-ears' antennae to denote the media, but also provided for further allegorical interpretation. For example, *Consumer 2* chose to draw an 'ivory tower' in purple to signify researchers with "*one small little window on the world*": an image suggestive of a fairly unflattering view of researchers as closeted and out-of-touch. However, she immediately distanced herself from this portrayal by implying it characterized the view of an anonymous third party of 'others' to which she herself did not ascribe. This assertion could also be attributed to a subtle teasing of the researcher, though this form of rhetorical stratagem was not apparent elsewhere in that particular interview.

Nevertheless, paradox characterised much of the interview with *Consumer 2* who described her worldview as an "*interpretivist-relativist core with a functionalist training*" or alternatively "*post-modernist cynic*". Although *Consumer 2* crafted some effective symbols, her picture was perhaps weaker at expressing the relationships between these as a consequence. Her choice of colours was explained with reference to the chakra system, with purple signifying the 'mind' chakra, and orange, the colour of the blazing sun used

to portray entrepreneurs, the sacral chakra associated with 'emotions' and the 'unconscious'.

Commercial organization 2 fulminated at the exclusion of consumers from the discourse concerning biofuels, specifically regarding information on fuel compatibility. Accordingly, he drew a brick wall in front of two stick figures to express the exclusion of this group. The wall was a powerful metaphor of separation evoking the Berlin Wall or perhaps the Warsaw ghetto. *"Really these poor people* [consumers] *are really out in the cold, because throughout this whole process I don't think anyone has actually even gone along to Joe Public and asked 'do you want this – what do you know about this?'"* In this and similar statements, *Commercial organization 2* expresses an almost Dickensian philanthropy towards consumers.

Coincidentally, *Consumer 3*'s rich picture alluded to Blake's *"dark satanic mills"*. He divided the page by a dark distorting 'mirror' line, as New Zealand as environmental paradise was contrasted with its industrialised 'reality'. On one side of this line, the "*fantasy goal*" of a "*pristine environment*" was depicted, while on the other, a scene of toxicity and "*privilege*" was seen colonising the landscape. From the top right-hand corner the apocalyptic "*mad dogs of panic*" are shown racing across the page, an apparent allusion to Anthony's speech from Shakespeare's *Julius Caesar*. The dogs are shown charging towards a group of stereotypically top-hatted capitalists who gather around a board table. These "*old and wrinkly*" industrialists oversee the rapacious development of biofuels by enslaving a bearded technician who looms over a mountain range on which skiers play. On the hills below, a farmer musters sheep on his quad-bike by the side of a pine forest that is being gradually felled by a forestry worker. Below the mountains, the urban sprawl of an "*exploitative*" world descends to the sea. While *Consumer 3* admitted that both this and the vision of an idealized New Zealand represent fantasies, he argued that the history of one has always been at the expense of the other and therefore these conflicting ideologies are not positions that can be held onto indefinitely.

On the whole then, participants' use of metaphor was sophisticated and provided important material for constructive examination. Explanations of the design decisions made and the emphasis given to those choices contributed to the richness of the conversation between participant and researcher. As a result significant insights and attitudes emerged in the course of the researcher asking participants to explain why they had depicted things in the way that they had.

6.2.2 Root definitions of BSO initiative

While many described the transformation in comparable terms, participants' root definitions expressed a variety of different views on biofuels development. Some appeared largely in favour of the initiative, in particular emphasizing how it addressed issues of fossil fuels and sustainability, whereas others were more sceptical about its intended objective. As a result, the definitions represented a broad range of standpoints and offered diverse positions as to where the 'problem' might be located.

Ten of those interviewed defined the activity in accordance with the MOT documentation, which indicated that participants either willingly accepted the aims of the BSO at face value, agreed with the problem and solution as it was framed, or had not questioned the assumptions of the debate. Participants representing those stakeholder groups who were actually party to the consultation process – the Policymakers, Commercial organizations, Scientists and NGOs – tended to couch their definitions in similar terms.

While the Environmentalists unequivocally viewed the initiative as a positive response to climate change, the four Consumers expressed the object of the BSO intervention in very different language. The Consumers were on the whole sceptical of the ostensible reasons and tended to emphasize the political dimension of the BSO. Whether the object expressed in their root definitions was to appeal to 'green' voters, appease potential coalition partners, or advance an economic agenda, the Consumers were suspicious and tended to view the initiative as a manipulative ploy.

Consumer 4 gave two different definitions that spoke to national and international objectives. She believed the BSO intervention was intended at a national level, "*To give credibility to government by the introduction of biofuels through the Biofuels Sales Obligation towards achieving a perception that they are addressing peak oil and climate change*"; whereas at a global level, she felt the purpose of introducing "*biofuels by the BSO* [was] *towards achieving the sustainability of the oil companies*".

Consumer 3 went even further: "*The introduction of biofuels by the BSO towards achieving a continuation of the end-game of sustaining the lifestyle of indulgent, middle-class people who have incredible privilege compared to former generations, while saving the arses of the oil companies and industrialists*", a definition that attracted a lot of attention and popular support when presented to the focus group.

6.2.2.1 Documented aims of the BSO mandate

Included in the Ministry of Transport's 'Discussion Paper on Proposed Policy' was the stated objective of the BSO initiative, which could serve as a root definition of the intervention:

> The Government is committed to encouraging the uptake of biofuels in New Zealand for a number of reasons including creating a sustainable energy system by using renewable energy, reducing our net carbon dioxide emissions and contributing to the security of supply and diversity of transport fuels. The Biofuels Sales Obligation is the proposed policy for achieving this (Ministry of Transport, 2006c, p. 4).

Checkland & Howell (1998, p. 161) argue, with reference to similar mission statements, that the implication of such a assertion is that the presence or absence of these activities, and the connections between them, can be investigated. Hence, conceptual models constructed from accounts of purposeful activity can be used to help "*structure a debate*" about how the mission is being pursued (Checkland & Howell, 1998, p. 161).

The researcher was therefore able to construct an SSM root definition using the formula 'PQR' (Checkland & Poulter, 2006). The following definition was formulated to help guide the process:

> To encourage the uptake of biofuels in New Zealand through the Biofuels Sales Obligation towards achieving a sustainable energy system by using renewable energy, reducing our net carbon dioxide emissions and contributing to the security of supply and diversity of transport fuels.

Converting the Ministry of Transport mission statement into a root definition enabled the researcher to analyze the purposeful activity of the BSO by comparing it to the root definitions developed by participants.

6.2.3 CATWOE analysis of interviews

Analysis of the interviews was conducted using the mnemonic acronym, CATWOE (Customers, Actors, Transformation, *Weltanschauung* or Worldview, Owners and Environment) to gather information on participants' worldviews and perceptions of the situation. Some participants were predictably more comprehensive in their listing of stakeholders than others, but most of the participants agreed on a common core of major players.

The CATWOE analysis and root definitions for all participants are contained in Appendix IV.

6.2.3.1 C: Customers

The list of Customers, 'C', consisted of those acknowledged by the various participants as being affected by the development of biofuels in New Zealand. The Policymakers and the Commercial Organizations provided the most comprehensive lists of direct stakeholders with most other participants identifying a selection of the stakeholders on this list (see Appendix III). The combined list included:

> The Government and its agencies (MOT, MoE, EECA, ERMA) oil companies (Caltex, BP, Shell, Mobil and Gull) regional councils and Territorial Local Authorities (TLEs i.e. Christchurch and Auckland), vehicle manufacturers (imported motor vehicle dealers, MIA and MVIA – Motor Vehicle Importers and Agents) biomass producers, first generation biofuels producers (e.g. Argent, LanzaTech) second generation biofuels producers (e.g. Scion, Fonterra, BioDiesel Oil Services) consumer groups (AA, Motor Trade Association) Greenfleet (SBN) and consumers (general and commercial, i.e. bus and trucking fleets).

However, *Consumer 4* perceived the problem situation differently and compiled a list of stakeholders that included civil society, future generations, people who would otherwise be eating the food crops, alternative energy providers, biodiversity impacts, and current feedstock buyers.

6.2.3.2 A: Actors

Checkland (2006) uses the term 'actor' to refer to those actively engaged in the transformation. The active stakeholders most commonly identified were the Government and its agencies, oil companies and biofuel producers. In three cases, biofuels manufacturers are substituted for researchers, however *Scientist 1* and *NGO 1* felt the Government was currently the sole actor. Otherwise there was little variation from these three: *Consumer 4* added "*agribusiness*" and "*the business community at large*", Consumer 3 added "*sheep*" and "*farmers*", *NGO 2 "retail network"* and *NGO 3* included the "*electricity producers*". Conversely, *Policymaker 2* included all stakeholders listed as Customers (see above list under C: Customers) with the exception of consumers.

6.2.3.3 T: Transformation

The majority of those interviewed appeared to accept the Government's contention that the Transformation, 'T', represented the shift:

> from New Zealand as a user of (almost) exclusively fossil fuels, to the country as a developer and user of a proportion of biofuels.

Furthermore, this statement of transformation was in line with the Ministry of Transport's root definition (see above) linking the BSO, biofuels development and carbon dioxide emission reductions.

Commercial organization 2 however held a different view. He suggested the transformation represented the shift from an efficient fuel system to a more inefficient one, "*The oil industry has to change what is currently a very efficient system of supply and distribution of hydrocarbon products to the market and they will have to disrupt that current degree of efficiency and they will then incur quite significant costs in doing that."*

Although the BSO didn't come into effect until 1 April 2008, the present SSM study could be considered unusual in that in this case the transformation 'T' could be said to have already taken place with the announcement of the BSO on 13 February 2007. Due to the instigation of the BSO mandate and its immediate and mid-term implications, the debate has so far tended to focus on the introduction of biofuels, however with regard to New Zealand's Kyoto Protocol obligations the transformation logically represented the shift:

> from New Zealand as a high volume emitter of greenhouse gases, to the country as a decreasing emitter of greenhouse gases in line with its Kyoto Protocol obligations.

This statement of transformation addresses New Zealand's GHG emissions, which is the problem biofuels is purported to improve. Yet rather than conducting an investigation through public discourse into the feasibility and desirability of biofuels, the consultation process has focused on the efficacy of the BSO mandate to deliver biofuels.

It has been largely assumed that the introduction of biofuels will improve New Zealand's GHG emissions, however the consequences of this intervention cannot yet be predicted. Instead of examining the feasibility of this proposed solution with regard to

GHGs, the Government has moved the enquiry down a systemic level and reframed the problem as 'how do we implement biofuels?' Consequently by focusing on the wrong transformation the consultation process has insisted on addressing the wrong problem.

6.2.3.4 W: Worldview or *Weltanschauung*

Worldview or *Weltanschauung*, 'W', denotes the particular mental framework with which an individual makes sense of the world (Checkland, 1999). 'W' then inevitably hapes notions of a transformation 'T', appropriate for improving a particular problematical situation and the values on which it is based. It is the participant's worldview that decides the criteria of feasibility and desirability in each individual case. The criteria for ethicality can similarly vary, with some participants emphasizing individual independence, while others accentuate social cohesion, representation and the interests of the market.

As one would anticipate then, the worldviews held by participants in the research varied widely. The conceptual model in Figure 6.1 (below) was therefore developed to explore these respective worldviews. In it participants' worldviews are mapped according to the levels at which they expressed their understanding of the issue.

In each case, the apex of the 'teardrop' denotes the focus of a participant's attention with reference to his or her *Weltanschauung*. The teardrop's length and position indicates the participant's awareness of and ability to integrate the issue under discussion across multiple systemic levels. For example, the elongated, yellow teardrop indicates *Commercial organization 1* expressed an interpersonal focus while also taking organizational and inter-organizational perspectives into account.

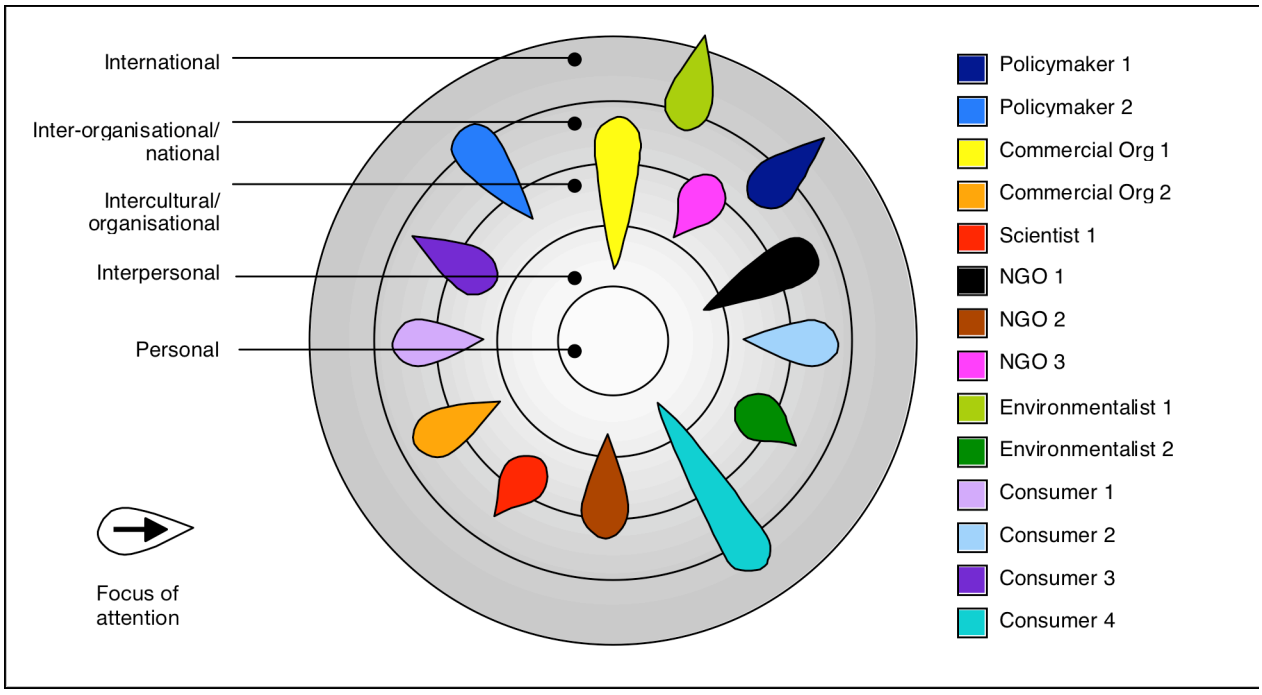


Figure 6.1. Conceptual model mapping different participant worldviews or *Weltanschauung*, across the different levels of abstract systems and sub-systems implicit in this issue.

While expressing dissimilar worldviews, *Consumer 1, Consumer 2* and the representative of *Commercial organization 2* showed a comparable perspective on biofuels development by emphasizing the intercultural aspects from an inter-organizational standpoint. Both *NGO 1* and *NGO 2* expressed a similar level of comprehension to the previous three, but also showed awareness of those relationships on an interpersonal level.

NGO 2 and *Policymaker 2* appeared to share a similar perspective of the issue to one another. Whereas *Environmentalist 2* seemed to accept the Government's avowed intentions, *NGO 2* and *NGO 3* emphasized the impact of the BSO at a more interpersonal or organizational level. *Environmentalist 1* looked towards an international even planetary level, but appeared to jump from subject to subject without establishing corollaries between points.

Consumer 3 expressed a 'big picture' comprehension of the impact of biofuels and consequently focused his attention at the level of global warming. Therefore his apprehension of the issue was at an international level although he took a national standpoint.

While perhaps contributing conflicting ideas to the biofuels debate, the representatives from *Commercial organization 1* and *NGO 1,* together with *Consumer 4* demonstrated perhaps the broadest comprehension by expressing an awareness of the issue across a number of systemic levels.

The different systemic levels at which participants concentrated their attention suggests their understanding of the problem was based on experience of widely different contexts and dimensions. Hence the way they made sense of the situation also differed widely. For instance, someone who focused on the effects of biofuels on their imported car would locate the problem situation at a different level from someone considering the global consequences of climate change.

6.2.3.5 O: Owners

Opinions of who constituted the Owners, 'O', of the situation largely coincided, with the majority of participants believing the Government and the oil companies were in a position to stop or change the transformation.

NGO 3 acknowledged that, although conceivably consumers could refuse to purchase biofuel-blends, this eventuality was highly unlikely, particularly if all fuels contained biofuels and the only choice was to use biofuels or not run their vehicles. *NGO 1*, *Policymaker 2* and *Commercial organization 2* however, each maintained that price and compatibility would have a significant bearing on the fuels' acceptance.

Commercial organization 1 and *Scientist 1* both reasoned that while biomass producers might also halt the transformation process due to in an inability to meet supply quality and regularity requirements, any stoppage would be temporary and merely propel the oil companies to secure reliable supplies overseas.

6.2.3.6 E: Environmental constraints

'E' refers to the practical constraints of the environment in which a transformation takes place. These are typically issues such as budget, regulatory and body of law. In the case of New Zealand biofuels development, access to technology, population size, landmass, and, paradoxically climate, would all play a part.

Policymaker 2 and *Commercial organization 1* argued that the transformation to biofuels would be constrained by New Zealand's small consumer demand and its distance from the engine and automotive manufacturers supplying the country's vehicles. As overseas vehicle manufacturers would not be subject to changes in the New Zealand regulatory environment, the compatibility of imported vehicles to biofuels was likely continue to be a restriction.

Commercial organization 2 asserted that the cost of fuel would increase as a result of the BSO as the Government was forced to subsidise biofuel-blends by raising the pump price of conventional motor spirit: an action that would have knock-on consequences for the economy as a whole. He also argued that the efficient growing of crops for biofuels was dependent on New Zealand's climate and that such land-use was unlikely to be commercially justifiable against the rising price of dairy. These factors would inevitably place constraints on the efficacy of the transformation.

Further to the analysis of root definitions and CATWOE data, conceptual models were developed in order to examine the purposeful activity from the perspectives of various worldviews. These were conceived as 'holons' to explore groups of activities that would achieve the root definition according to the worldview of a participant or stakeholder group. The first two models explore the biofuels intervention with two more exploring the discourse around NZ biofuels.

6.2.4 Models of biofuels intervention

6.2.4.1 Model one: the BSO biofuels development strategy

Figure 6.2 (below) outlines the proposed activity initiated by the Government's BSO legislation. This is a model based on the MOT literature and developed from Government's 'root definition' (See 'Root definitions of BSO initiative' above, adapted from Ministry of Transport, 2006c, p. 4). The blue area contains actions concerned with the production of biofuels, while the activities outside it and bordered by the black line are in support of the means of production. The defensibility of this imagined 'holon' is reliant on the logic of the actions included and the viability of relationships depicted in the model as a whole.

The value of such a model is as an object of reflection, allowing the enquirers (i.e. both researcher and participants) to explore different perspectives and comprehend the bases of choices made by participants. In addition to being logically defensible and technically feasible each model also needs to be politically and culturally feasible (Stacey, 2007).

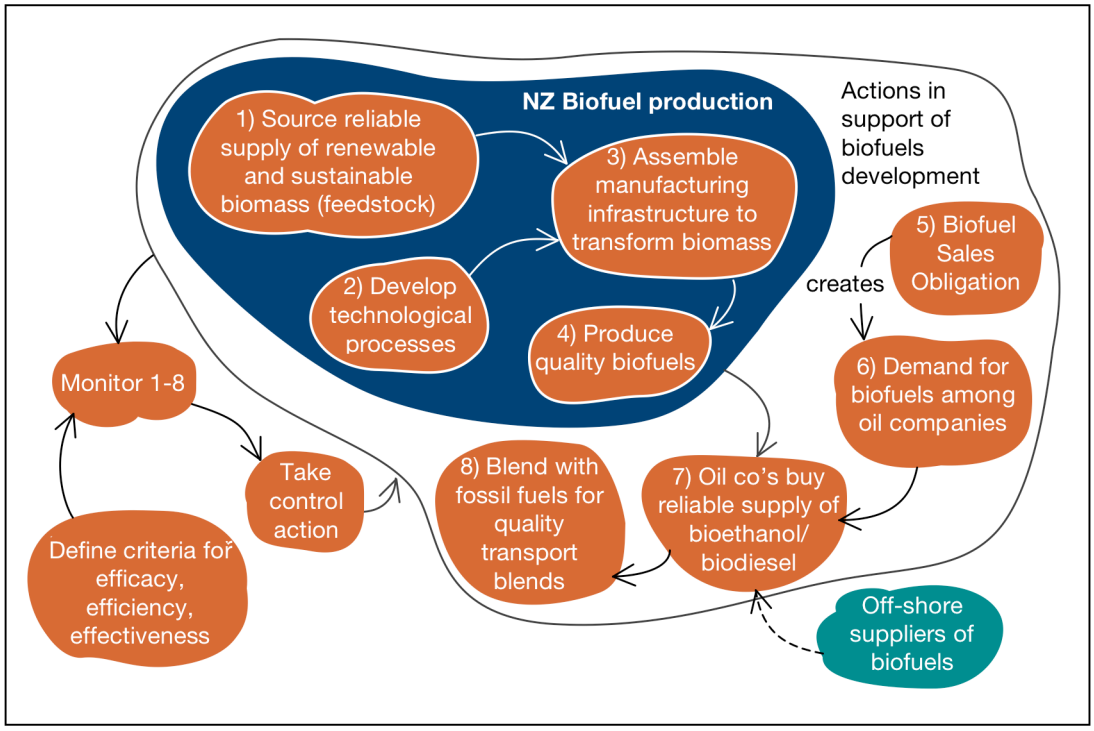


Figure 6.2. Conceptual model of biofuels development strategy.

The prominent activities of the model Figure 6.2 are now explored in sequence followed by the definitions of the evaluating criteria. These criteria, E_1, E_2 and E_3, are used to assess the logical defensibility and cultural feasibility of the activities in the model. Additional information, drawn from documentation supplied in support of the consultation process, is included to place participants' comments in the context of the dominant discourse. Hence, the model provides a structure for the investigation of the purposeful activity it portrays.

1) Source reliable supply of renewable and sustainable biomass (feedstock)
The participants from *Commercial organization 1*, *Commercial organization 2* together with *Scientist 1* voiced doubts over the availability of biomass feedstocks in New Zealand, and whether biofuels could be supplied cheaply enough and in sufficient quantity to reliably supply the oil companies and enable them to meet their obligations under the BSO mandate.

Each of these participants independently maintained that tallow was the most likely locally produced source of biofuel currently available as there was only a very small quantity of ethanol available for fuel use in New Zealand. *Commercial organization 1* and *Commercial organization 2* argued that the total amount of tallow produced was probably only sufficient for one of the four largest oil companies to supply enough biofuel to meet their obligations over the course of the mandate.

The respective submissions of BP, Caltex, Mobil and Chevron also support *Commercial organization 1* and *Commercial organization 2's* contention that there insufficient feedstock is available to meet the BSO mandate. In their submissions, BP and Chevron contend there is only a small amount of ethanol locally available, with the latter

claiming this equated to roughly 0.05 petajoules of bioethanol. Furthermore, Chevron argues that, based on discussions with the Meat Rendering Association, the amount of tallow available of suitable quality is currently around 100,000 to 110,000 tonnes, whereas BP estimates it to be approximately 90,000 to 100,000 tonnes. This tallow is calculated as producing a maximum of 100 million litres of biodiesel (3.5 petajoules). However, this is not considered enough to allow the oil companies to meet the obligation over the years four and five of the mandate.

This was also assuming that all the tallow produced in New Zealand annually was used entirely for biodiesel production, which these participants insisted was unlikely in view of the markets that already exist for this product overseas. Currently a proportion of it is sold locally and to markets in Asia. As *Commercial organization 2* asserted "*the reality is that it's part of a global market. Again efficient in terms of product going out and product coming back and the Chinese demand that product for use in their soaps*". Therefore unless new biological feedstocks become available, New Zealand will need to import either feedstock or converted biofuel to meet the sales obligation targets.

One biofuels company, LanzaTech Ltd, has suggested that land in the Waikato might be converted to growing maize in order to produce ethanol (Flagler, 2007; Macfie, 2007). Again *Commercial organization 2* expressed doubt as to whether this crop could be produced cheaply enough locally as, unlike the US, New Zealand doesn't operate a subsidy policy to encourage its farmers to grow these crops. Also the production of maize would require a change in land use, however as maize isn't a particularly efficient way to produce ethanol (Bourne, 2007), *Commercial organization 2* questioned the advisability of substituting a long-established and highly profitable dairy industry with an inefficient system of ethanol production. The BP and Chevron submissions similarly assert that new sources of locally produced ethanol would not be available for use in the proposed time frame.

2) Develop technological processes

Commercial organization 1 and *Commercial organization 2* also maintained that, although the commercial processes had been developed overseas, New Zealand had little or no history of converting biomass into fuel at a commercial scale and would therefore need to develop the technological expertise. Given New Zealanders' reputations for inventiveness, *Consumer 1* felt some of the necessary expertise might come from "*individual inventors*": a theory that accorded with *Consumer 2*'s notion of marginal "*tinkerers*".

Nonetheless, *Policymaker 2, Commercial organization 1* and *Commercial organization 2* each maintained that the proximity of original engine manufacture was significant in the development of effective biofuels. This was particularly apparent, they argued, when considering the major overseas users of biofuels such as the US, Brazil and Germany. It was also felt that the distance of vehicles from their point of origin would be likely to present an impediment to consumers gaining reliable information on engine compatibility under the present initiative.

3) Assemble manufacturing infrastructure to transform biomass
The third activity would involve assembling the manufacturing infrastructure to transform biomass into usable biofuels. *Commercial organization 2* insisted that there was insufficient time in the mandate schedule, and commercial production was not likely to come on stream until 2010. *Commercial organization 1* made a similar point, arguing that it would take a minimum of three years, with the consent process, to bring an ethanol plant into full production. This, he maintained, would create further problems in securing reliable feedstock supplies: "*I would say you wouldn't get up before 2011*".

4) Produce quality biofuels
Commercial organization 1, Commercial organization 2 and *Scientist* claimed that not all tallow was suitable for the manufacture of biodiesel and consistent quality was therefore likely to be an issue.

5) Biofuels Sales Obligation creates *6) Demand for biofuels among oil companies*
All participants maintained that the former would be effective in leading to the latter activity unless the oil companies decided that it was more economically acceptable to pay the penalty. However, this was widely considered unlikely given the size of the fine.

7) Oil companies buy reliable supply of bioethanol/biodiesel
The seventh stage activity assumes that the oil companies will choose to purchase New Zealand produced biofuels, however given the short timeframe and that the manufacturing capabilities are not yet built or tested, *Commercial organization 1* felt it was highly probable that the oil companies would wish to secure a reliable supply overseas in order to meet their BSO obligations.

The reliable supply of locally produced biofuels depends on market conditions, particularly the price of biomass and fossil fuel internationally. However these factors are inextricably linked, as local producers of biomass are also consumers of fossil fuel: a situation that could cause an inflationary spiral. *Commercial organization 1* felt this represented a precarious basis for the supply chain of biomass suppliers, biofuels producers and oil companies, particularly when there are other markets already competing for these 'first generation' feedstocks.

Undoubtedly the biomass suppliers will wish to ensure the best price and a long-term market for their product, *Commercial organization 1* reasoned. However, they will face the twin difficulties of fixing a price in a volatile market and selling their product at a rate that allows it to be sold at a comparable price to mineral diesel or petrol.

8) Blend with fossil fuels for quality transport blends
Policymaker 1, Policymaker 2 and *NGO 2* expressed concern over the suitability of the current New Zealand vehicle fleet to run on biofuels. *Commercial organization 1* and *Commercial organization 2* both argued that the quality of biofuels might have a negative impact on consumer confidence in biofuel blends. Despite a certain relaxation of specifications, particularly on vapour pressure on ethanol blends in summertime, there

has been no change in the requirement that fuels be 'fit for purpose'. Hence a biofuel cannot claim to be fit for purpose when a vehicle that previously ran efficiently on petroleum fails as a result of that fuel. Both called on the Government to set new standards and guidelines to simplify the issue for the benefit of the New Zealand consumer.

Define criteria for efficacy, cost-effectiveness, efficiency
The criteria of efficacy, efficiency, effectiveness and ethicality serve as a basis for continual assessment of how competently or incompetently the various stages and activities that characterize a model are carried out. These criteria are defined according to the 'culture' or shared view of participants in a transformation process.

E_1 (efficacy) looks at whether the proposed intervention achieves what it is intended to achieve. For example, *Commercial organization 1* insisted that the timescale on delivery of biofuels could have an impact on the adoption and acceptance of alternative fuels. He expressed concern that the inefficacy of the fuel could create a backlash, *"the amount of heat and damage that takes place with credibility around product quality and consistency. It could have a serious and detrimental effect on biofuels."*

E_2 (efficiency) concerns whether the activities in this model can be achieved without wasted energy or resources. Efficiency, then, would be assessed according to the quality of biofuel confirmed, reliability of supply, and price, particularly comparative to the price of fossil fuels. These factors are in turn dependent on the quality, consistency and reliability of supply of the biomass feedstocks used.

Commercial organization 2, Environmentalist 2 and Consumer 4 questioned whether diverting food crops to biofuels production was an efficient use of energy, particularly when fossil fuel was used to produce the crops. In this respect, *NGO 1, NGO 3* and *Consumer 3* identified wood pulp and paper mass as a significant source of reliable biomass. *Commercial organization 1* claimed this resource to be the only feedstock currently available in the country of sufficient volume to meet the oil companies' total obligation under the BSO. However, such second-generation lignocellulosic biofuels are still considered to be five to ten years away (Worldwatch Institute, 2006). *Environmentalist 1* proposed olive oil as alternative source of biofuels.

E_3 (effectiveness) is concerned with whether the intervention contributes to a higher-level objective. The root definition developed from the Ministry of Transport statement above includes achieving a sustainable energy system by using renewable energy, reducing our net carbon dioxide emissions and contributing to the security of supply and diversity of transport fuels.

Biofuels have been added to petrol as a way of making it 'greener' – however whether New Zealand's overall emissions of greenhouse gases are reduced remains dependent on how, and from what source of biomass, biofuels are produced (refer to Chapter 2).

Commercial organization 1 and *Commercial organization 2* insisted that a shortage of suitable and available biomass would lead the oil companies to look offshore for

suppliers of biofuels: an action that would seem to preclude security of supply and revenue income. The Government's plans for a burgeoning biofuels industry would be set back significantly if the oil companies decided to import biofuels from overseas suppliers rather than purchase biodiesel and bioethanol locally. This could also have a serious knock-on effect on the production of second-generation biofuels. The lack of buyers for first-generation biofuels could damage confidence in the New Zealand market for alternative transport fuels and deter investment in essential Research and Development (R&D).

This model occasioned a particularly detail exploration of the activity portrayed as the subject intersected with the substantial documentation produced with respect to the technical discourse on the BSO intervention. However, a number of serious concerns were raised in this analysis that place considerable doubt over the defensibility of the strategy of biofuels development.

Model two: developing biofuels as a technology for export

The root definition developed from the Government's stated aims includes the suggestion that biofuels might be developed as a technology to earn valuable export revenue. *Consumer 1,* in particular, was convinced that the primary purpose of the Government's BSO intervention was to stimulate the development of technology to generate export revenue. This possibility was also included as an aspect of the root definitions of *Environmentalist 1* and *Scientist 1*. This concept is explored in greater detail in Figure 6.3 (below).

Following Checkland and Poulter (2006) the major activities of the model Figure 6.3 are now explored in sequence with the criteria for evaluating their efficacy (E_1), efficiency (E_2) and effectiveness (E_3) subsequently defined. Much of what was written on the 'biofuels development model' regarding feedstock supplies, pricing and economic viability also applies here. The necessary instrumental actions for biofuels production are grouped in the blue area while the surrounding black line contains the activities concerned with technology and supporting R&D. In contrast to the previous model however, much of the examination of Figure 6.3 is based on unsupported argument according to the logical defensibility and cultural feasibility of the activity.

The first three stages of activity contained in the blue area are the same as those in Figure 6.2, the reader is therefore directed to refer to the previous model for an explanation of the numbered activities 1), 2) and 3).

4) NZ Government subsidy and regulation

The Government has provided only regulation so far, however there's a need for consistency in that regulation, particularly if biofuel manufacturers are to invest in manufacturing infrastructure and technology.

5) Research and development

Publicly funding for R&D is provided in the form of grants to specialist research units, such as crown research institutes and universities. While encouraged by government

grants, private R&D requires the investment support of venture capital companies. EECA reports that the 'alternative' tag has made commercial investors wary of the potential risks of funding projects in renewable fuels: perceptions that could equally apply to biofuels (EECA, 2006b).

Interestingly, *Commercial organization 1* argued that the penalties levied on the oil companies for non-compliance was approximately equivalent to the funding required for research into the development of biofuel technologies.

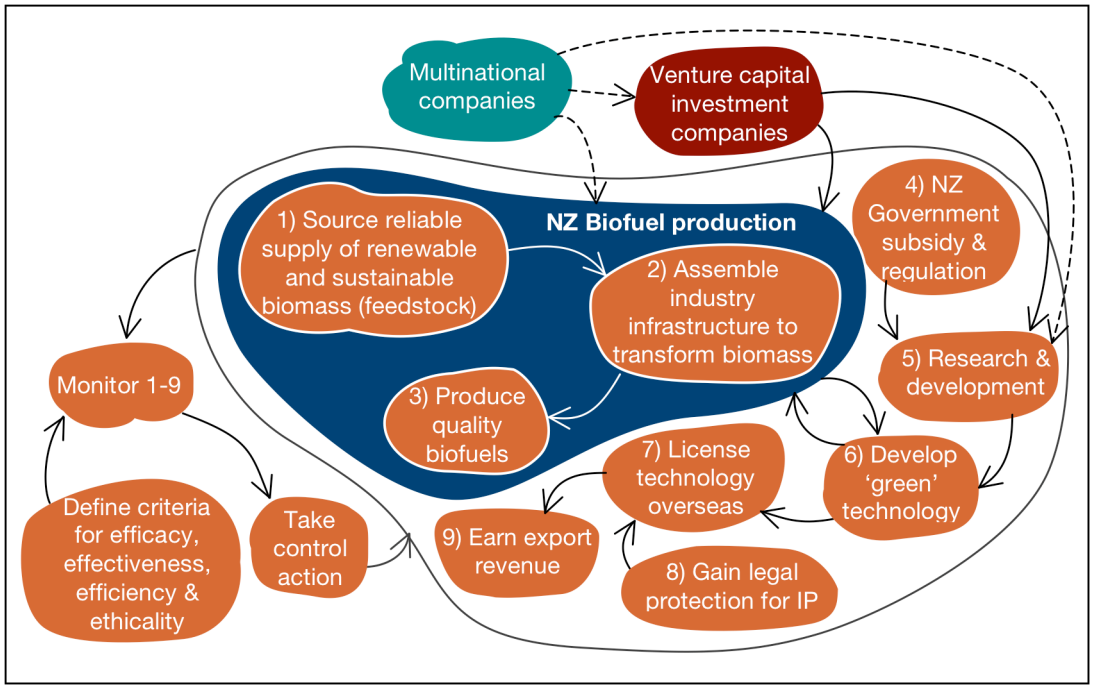


Figure 6.3. Conceptual model of developing biofuels as a technology for export.

6) Develop 'green' technology

This activity relies on the energy efficiency of specific types of biomass, the efficacy of the technology and its specific suitability to a New Zealand context. A technology's 'green' credentials will need to be assessed according to how efficiently it converts energy from biomass and the environmental impact of the fuel's production lifecycle.

7) License technology overseas

If the proposition is compelling enough to attract serious investment then it is likely that larger multinational companies, including oil companies, would wish to acquire that technology for themselves, in which case government funding risks supporting revenue generation for overseas companies.

While some companies do claim to be earning from overseas licensing, figures suggest that New Zealand as a whole is not particularly successful in the global knowledge economy. Royalty and licence fees account for just over 1% of New Zealand's services exports, or about 0.3% of total exports (Skilling & Boven, 2006).

8) Gain legal protection for IP

While biofuel technology could be potentially rich in terms of the types of inventions that may be protected by a patent, IP protection is difficult and costly to enforce in foreign markets. The governments own intellectual property management guidelines warn that, "*Inventors rarely become rich from IP licensing or royalty payments alone. Most value is added during the product development and commercialisation phases.* " (FRST, 2008, p. 1).

9) Earn export revenue

Depending on the logically defensible and culturally of this model, the preceding eight stages of activity would result in the accrual of export revenue to return to the New Zealand economy.

Define criteria for efficacy, cost-effectiveness, efficiency

E_1 (efficacy) concerns whether the activity will produce revenue and that a proportion of that revenue stays onshore.

E_2 (efficiency) concerns cost-effectiveness and affordability. This criterion assesses whether the activity is likely to provide a favourable return-on-investment.

E_3 (effectiveness) is concerned with whether emissions are lowered as result of the activity, whether it generates substantial revenue long-term and safeguards the country against fluctuations in oil market prices.

E_4 (ethicality) is concerned with whether the activity of the model is exploitative, abusive and culturally or environmentally damaging. It considers whether the purposeful activity depicted is morally justifiable and acceptable according to cultural norms of behaviour.

Commercial organization 2 recognized revenue as a factor in the development of the BSO, he asserted however, that the mandate would not achieve this aim if the oil companies were to decide to import biofuels rather than source them locally: "*I think there's also potentially an issue there to redress New Zealand's balance of payments by perhaps not importing so many fuel products, although the reality of that situation is that there are unlikely to be any significant biofuels producers in NZ so in actual fact it's going to make no difference to the balance of payments in a real sense*". In conclusion, while it is possible that the development of biofuels technology could achieve the export revenue, the success of ventures working in this area depends on investment funding, a viable domestic market for biofuels and the availability of indigenous biomass.

6.2.5 Root definitions of discourse around NZ biofuels

In the present study, the term discourse is used to denote the series of interactions between different stakeholders taking place around the issue of biofuels, with particular regard to the consultation process on the development of the BSO mandate. Of the fourteen stakeholders interviewed in total, only seven gave recognisable root definition of this discourse.

The smaller number of definitions of discourse was due for the most part to participants not responding to the request for a definition, or running out of time in the interview process. It addition, it needs to be acknowledged that the degree of reflection required to develop a definition of the discourse represented a second level of abstraction when some participants had already experienced difficulty defining the activity surrounding the BSO. Nonetheless, those who did respond were split fairly evenly between participants who saw the discourse process as being an activity in support of the BSO intervention and those viewing it as a cynical process of legitimisation for a preferred policy.

The response of *NGO 2* definitely represented the former group. He expressed the view that the consultation process was a way of minimizing the risk to key stakeholders while expediting the uptake of biofuels. *NGO 3* perceived a similarly pragmatic approach, seeing the discourse as "*a practical conversation about feasible options*".

However, *Commercial organization 1* articulated a more finely balanced appraisal of the intervention. While he saw the discourse as a means of gaining knowledge, he also argued its role in building rapport, and saw the significance of both functions in preparing the country for alternative fuel sources. He argued for the importance of considering *"How do we make them all a hero in their own journey?"* a question that implied an empathy with diverse viewpoints and the importance of stakeholder engagement in the discourse.

In contrast to *Commercial organization 1*'s Homeric vision of open accord, *Consumer 3* was disparaging of the discourse around the BSO. He was particularly critical of the consultation process, which he saw as a means of legitimising *a priori* decisions to adopting biofuels and avoid any real debate on more thorny questions regarding the consequences of continuing society's profligate consumption of oil.

Consumer 3 believed strongly in the crucial role public discourse has to play in transforming individual viewpoints. So, rather than simply endorsing the *status quo*, he felt the aim should be to engage consumers in a considered reflection of the environmental impact made by their individualistic choices.

Consumers 1 and *2* were also critical of the consultation and shared the view that it represented political posturing and a cynical attempt to curry favour with possible coalition partners towards future re-election. *Consumer 4* also felt the notion of public consultation had been manipulated to acquire legitimacy for a preferred policy option. It is this divergence between things as they are presented and things as they are that is explored in the following section.

6.2.5.1 Model three: BSO policy development as a 'public relations' exercise

Around half of those interviewed expressed scepticism at the stated purposes of both the BSO and the public consultation process conducted in support of it. *Commercial organization 1* and *Commercial organization 2* were sceptical of the political agenda behind the introduction of biofuels. They were particularly scornful of Gull's launch of E10 in August 2007.

All four participants from the *Consumers* stakeholder group suspected that an ulterior motive lay behind the government initiative and it was merely the exhibition of laudable aims. *Consumer 1* question whether the development of an alternative fuels policy was anything other than a way to "*show government progress with environmental issues towards achieving re-election*", and consequently assumed their policies would reflect a focus on similarly short-term political goals "*with a slightly green tinge*". He seemed unclear however as to the level of support in the country for action on issues of sustainability.

Consumer 2 also insisted that the Government was chiefly interested in retaining power and sought to use the BSO as a means of sweetening its relationship with the Green Party. *Consumer 3* maintained that the primary aim of the activity around biofuels was to gain *'international kudos for New Zealand'*, a view that *Commercial organization 1* and *2* shared. *Commercial organization 2* was no more convinced: "*The cynic in me goes, this initiative is about making noise and looking good*".

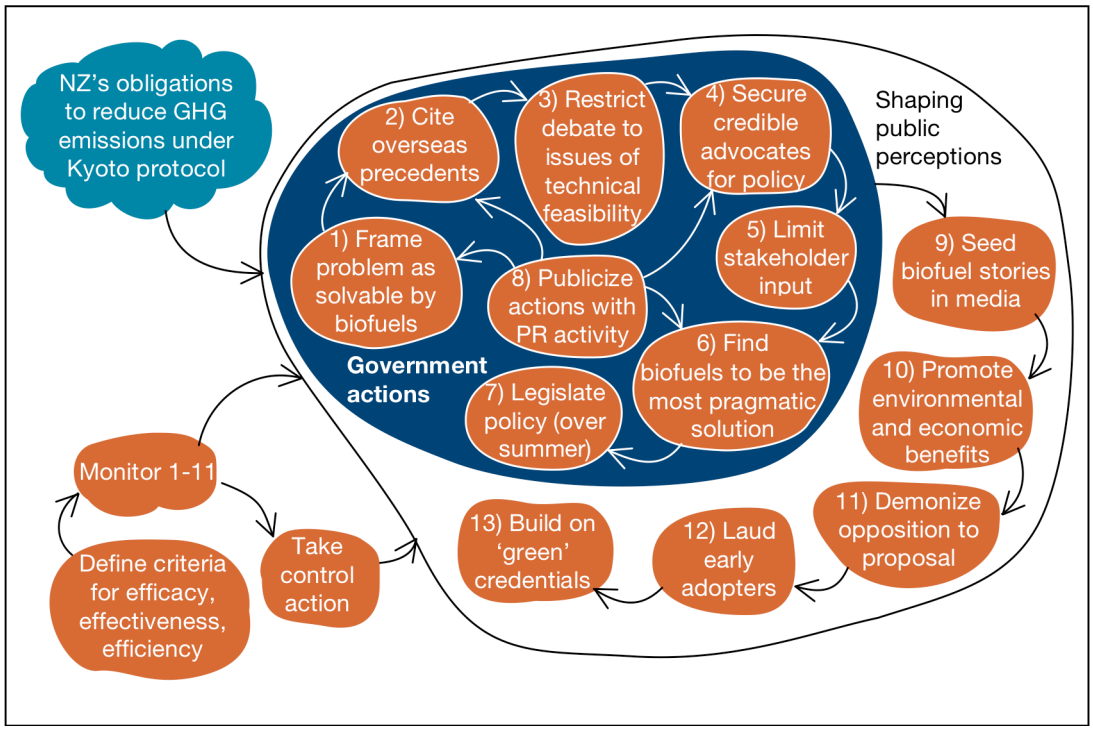


Figure 6.4. Conceptual model of BSO policy development as a 'public relations' exercise.

Figure 6.4 (above) shows a model of the steps leading to the BSO mandate conceived as a public relations exercise. The actions of the Government are contained in the blue area, while the area bordered by the black line contains activity designed to influence broader perceptions within society.

1) Frame problem as solvable by biofuels, 2) Cite overseas precedents, 3) Restrict debate to issues of technical feasibility, 4) Secure credible advocates for policy, 5) Limit stakeholder input, 6) Find biofuels to be the most pragmatic solution.
The process described in Chapter 2 and largely drawn from the documentation provided in support of the mandate does not contradict the inclusion of these six activities included in the model.

7) Legislate policy (over summer)
The instrumentally most advantageous time to pass legislation would be during the summer months when much of the country is distracted with holiday plans. The discussion document was released on September 12 2006 to coincide with a call for submissions with the consultation process closing on October 20 2006. This provided a short five-week window for the development of submissions, however it occurred well advance of the summer recess. The BSO legislation was announced on February 13 2007.

8) Publicize actions with PR activity
On 1 August 2007, the prime minister launched Force 10, Gull's E10 bioethanol/petrol blend from ethanol supplied by Fonterra. Force 10 is a 98-octane fuel suitable for high performance vehicles, as *Policymaker 2* asserted, *"the vehicles that probably the ethanol will go into, first and foremost, are larger-engined cars"*. There is an obvious incongruity between this activity and the stated objectives of the mandate.

9) Seed biofuel stories in media, 10) Promote environmental and economic benefits, 11) Demonize opposition to proposal,
The government initiated most of the research informing the consultation process. For example, the *NZ Trade and Enterprise* magazine, *Bright, reflecting business brilliance* (Flagler, 2007) was one of the key sources of the Macfie article (2007) in the February 2006 *New Zealand Herald* supplement.

12) Laud early adopters
The central role played by the prime minister in launching E10 represented a major publicity coup for Gull. It would appear from their submission that Gull had been in correspondence with the government prior to the consultation process.

13) Build on 'green' credentials
The activity portrayed in the model above would be effective in promoting New Zealand's cultural identity as a country with a 'clean and green' reputation.

Define criteria for efficacy, cost-effectiveness, efficiency
E_1 (efficacy) concerns the impact of action on positive perceptions of the government by boosting its 'green' credentials nationally and internationally. Be seen to be actively tackling greenhouse emissions.

E_2 (efficiency) is concerned with minimising the risk and cost of biofuels being publicly accepted.

E_2 (effectiveness) is concerned with the longer-term effects of an activity, such as the investment in burgeoning biofuels industry, sales of technology, international kudos and a ruling majority at the next election.

This model explored the policy development BSO as an exercise in public relations. *Policymaker 1, Policymaker 2, NGO 1, NGO 2, Commercial organization 1* and *Commercial organization 2* all raised the question of biofuels' compatibility with older Japanese cars. This issue has already been raised in the national press where the danger of fire risks was broached (Gregory, 2007) and could ultimately prove damage consumer perceptions of biofuels. Reports of vehicle fires as a result of them using biofuels would be clearly detrimental to the public relations exercise of introducing biofuels.

Interestingly *Environmentalist 1* and *Consumer 4* felt that seen from a different level, the adoption of biofuels was something the oil companies might welcome. From the perspective of their own PR, the oil companies could see this as a way of repositioning themselves as organizations that provide of 'energy' rather than businesses specifically tied to fossil fuels: a shift of emphasis that BP has already communicated. However, carrying the responsibility of a policy that was unlikely to achieve its intended aims is presumably not a risk that the oil companies would want to take.

6.2.5.2 Model four: techno-rationalist worldview of discourse

A model based on a techno-rationalist worldview was constructed and compared with the procedures followed in the development of the BSO policy (see Figure 6.5 below). The model also illustrates an approach that coincides with some of the views espoused by some of the interviewees in talking about the discourse process.

For example, *Commercial organization 2* claimed that the use of a mandate was doctrinaire and paternalistic, "*It's very autocratic – it's parental. It is 'I'm your dad you'll do as you're told*'." *Commercial organization 1* also maintained that power dominated the consultation process and the BSO was unnecessarily severe: it's *"all stick and no carrot, it is addressed through a mandate penalty, which is very stringent,"* he maintained.

Policymaker 1 noted that the form of the policy displeased the oil companies, however he argued that their response was understandable given the force of the directive: *"They didn't like the idea of an obligation particularly, like anyone they didn't particularly like the idea of being bossed around."* It appears then that the consultation process was characterised by a clash between techno-rationalist ideologies with the worldviews of Government and the multinational oil companies vying for supremacy.

1) Set goals

Goals are set according to the criteria of evaluation. The model assumes the problem is clear and implies that the activity of setting goals will define the purpose of all other

activities. Once set, goals become fixed and the system closed, as information gained from the enquiry process is not fed back into the model to help redefine the problem.

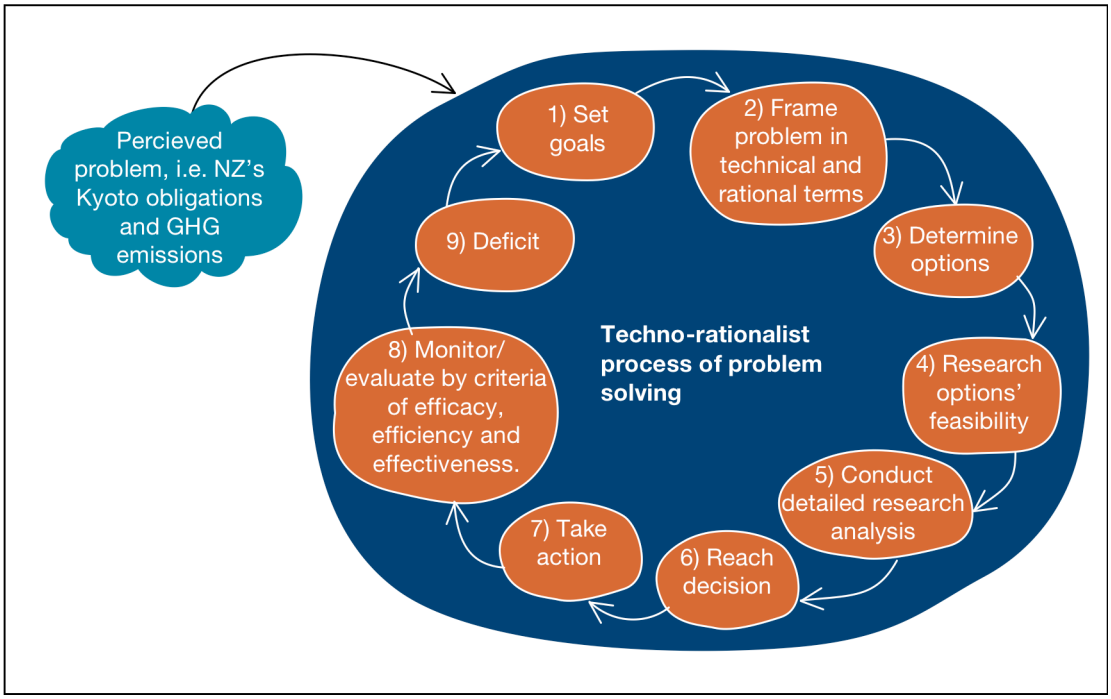


Figure 6.5. Conceptual model of discursive problem solving from a techno-rationalist worldview.

2) Frame problem in technical and rational terms
This activity further defines the problem. In the case of the BSO, the required policy investigations were laid out in a scope document compiled by NZIER (Stephenson & Davies, 2005).

3) Determine options
A strategic choice is made from available options and then tested. Even where options are developed through 'brainstorming' techniques, their implementation is according to previous patterns consequently new ideas frequently fail.

4) Research options' feasibility
Consultation could be held at this point to ascertain an idea's acceptability. In many organizational settings this would take the form of a strategic conference. Research is subsequently undertaken or commissioned.

5) Conduct detailed research analysis
Activity 5) becomes a drilling down process of activity 4).

6) Reach decision
A decision is made according to the same criteria by which the goals were set. As an option's consideration has already been determined by activity 3), often a decision is attained by degrees.

7) Take action
Without continual evaluation, action taken to improve a situation could be based on a definition of the problem that may no longer be relevant.

Define criteria for efficacy, cost-effectiveness, efficiency
As proponents of a techno-rationalist view consider such criteria to be absolutes these are specifically acceptability, expertise and industry knowledge and validity.

E_1 (efficacy) concerns achieving a culturally acceptable, reductively provable improvement in emissions while ensuring the system remains economically viable.

E_2 (efficiency) concerns the cost, risk and economic impact of an intervention. These would all need to be kept low comparative to the revenue generated by the operation. This criterion addresses the technical feasibility of a solution and its compatibility with existing infrastructure.

E_3 (effectiveness) is concerned with the economic sustainability of an activity. It addresses the ability of an adopted solution to perpetuate itself while ensuring clear ongoing economic benefits.

Figure 6.5 (above) shows a linear, largely self-referential process based on a worldview that considers phenomena to be predictable and controllable, consequently the model is similar to Figure 3.1 in the Literature Review. Although initially constructed as a systemic model, the researcher had to alter the diagram to represent a process without ongoing systemic reflection; hence there are no external loops of problem recognition or critical evaluation. Instead evaluation is made retrospectively and perception of the problem becomes another activity in the process. Without any form of continual correction, by the time an action is taken the problem has often changed, subsequently after the first action cycle the problem moves to one of effective implementation.

According to the worldview explored in Figure 6.5, perception of a problem is achieved by reductive analysis therefore once a problem is defined there is no allowance for the inclusion of phenomena beyond the defined boundaries of enquiry. Instead each activity is conceived as the honing of the previous activity. As an individual action is viewed in isolation, there is no provision made for the interrelationships between layers in the criterion of effectiveness. Consequently, there is little allocation for learning.

6.3 Stage two – issues of social discourse

The enquiry into the discourse around biofuels was divided into two distinct, but related aspects. Firstly, participant perceptions of the official debate and consultation process, drawn in this study from the data gained from the interviews: the transcribed text, the rich pictures, CATWOE analysis and root definitions. The second aspect was concerned with the context of the debate or the way the discourse around it was conducted. It involved exploring the basis of how stakeholders related to one another, considered the SSM process itself and the quality of the discourse between participants and the

researcher. Stage two of the study examined the second aspect of the discourse; an analysis of which is outlined below.

6.3.1 Summary of focus group session

Having completed the first round of interviews, the resulting rich pictures, CATWOE analysis and root definitions provided information about relative power, expertise, levels of interest and assumptions underlying the discourse. The root definitions were then presented to a focus group variously comprised of participants drawn from the six main stakeholder groups.

It was the researcher's aim to use these textual models to stimulate dialogue *about* dialogue. Hence the session focused on the improvement of the communicative process, which took precedence over the substantive issue of biofuels development. The session began with participants being asked how they would make sense of the definitions if they were presented as submissions during a consultation process.

NGO 1's immediate suggestion was to rank the submissions according to common themes, yet what he did not say was how that might be done and according to what criteria. Adopting the standpoint of government, *NGO 1* proposed that the most popular themes would appear to be the most politically acceptable: an apparently rational suggestion with inherent suggestions of political expediency and self-interest.

Consumer 1 maintained the need to identify submissions' authors in order to give "*credence*" to the submissions via claims to knowledge and authority. He then immediately contradicted himself by suggesting that anonymous submissions might reduce the politics involved in the categorising process. *Consumer 2* thought that politics were inevitable while *Consumer 4* considered that identifying submitters made the process more transparent.

NGO 1 made the distinction between the perspectives of politicians and a bureaucrat attempting to make sense of the submissions on behalf of the politicians. This led *Consumer 3* to introduce the symbol of the "*cruel, faceless bureaucrat*" who was given the task of deciding what was or was not acceptable and included. Consequently he insisted all the 'root definition' submissions should be rejected on the basis they lacked "*substantial supporting documentation*". This injunction was met with laughter, but also raised important points about access to resources, knowledge of procedures and the recondite nature of official forms of language. It also prompted questions over the integrity of those given the role of mediating between individual citizens and government, and the transparency of evaluation criteria and the process.

Consumer 1 again raised the topic of anonymity, but *Consumer 3* argued that a document's appearance would betray its origins according to how well resourced it had been. *Consumer 1* then suggested a word limit to submissions, a proposal *NGO 1* dismissed as leading simply to submissions on submissions.

At this point the researcher asked the group to contemplate an ideal situation and to consider how a consultation process might operate that didn't suffer from the problems

of the 'faceless bureaucratic' model. Interestingly *Consumer 4* proposed a form of stakeholder engagement that worked to build a "shared level of understanding", a model that bore comparisons with SSM. She argued that, whereas the existing process did not attempt to shift conflicting viewpoints, one that encouraged dialogue could help government to understand the "*political realities and practical issues*" and improve the consultation process. *NGO 1* characterised this as comparison of the real world with "*utopia*".

If the approach *Consumer 4* proposed was adopted, *Consumer 2* reasoned, then someone would be needed to coordinate, someone who wasn't operating according to his or her own agenda. *Consumer 4* furthermore argued for broadening the consultation to include silent interests such as those of future generations or biodiversity. *Consumer 2* wondered who would coordinate the process and for whom they would be working. She proposed it should be someone outside New Zealand politics who was "naïve" about the system of faceless bureaucrats. "*That's international, faceless bureaucrats*," declared *Consumer 3*.

This brought the discussion back to the theme of transparency. *Consumer 1* asserted that transparency would ensure "*that whatever the effects are on the process we can at least see what they are*". Consumer 3 insisted it was a question of *"intention"* because attempting to open the debate to include broader perspectives involved *"more PR than a deep intellectual look at things"*.

The researcher restated the intention to explore ways of transforming the discourse so that it fulfilled more of the participants' concerns and asked the group if it could suggest a basis for proceeding. "*Level the field"* by capping the amount spent on each submission was *NGO 1's* suggestion. *Consumer 4* argued for participants identifying the key things they most valued in the consultation process.

Consumer 1 proposed using on-line technology to make things more transparent. That way, he argued, "*anyone could go on and see what's being contributed so the bureaucrat loses some control over what gets privileged." NGO 1* countered by insisting that while more transparent, it would encourage *"nutters"* rather than people who wished to make more considered contributions. *"Who do we ignore?"* asked *Consumer 1. "The faceless bureaucrats"* asserted *Consumer 4. "The nutters"* insisted *Consumer 3*. Otherwise, *NGO 1* argued, it's "*decision-making by talkback radio*".

While recognizing that existing processes were flawed *Consumer 3* maintained that it would be difficult to improve on them. Traditional committee hearings, he asserted, did "*have a process that is transparent, where hopefully it involves a sort of stakeholder mentality, but where you also have those independent people who have not been involved at an earlier stage, but who have the ability to assess what's put in front of them*".

It wasn't so much the process, *Consumer 4* insisted, but that there was a different level of "*arrogance*" at a central government space. The culture was very different, and in a phrase that encapsulated communicative rationality, she argued: "*it's not just the*

process, but what we agree about how we agree to do the process". *Consumer 3* concurred; as did *NGO 1* who gave the example of on-line submissions where the way questions were framed decided what concerns were included for discussion.

Consumer 3 also objected to consultation processes that automatically excluded whatever didn't fit into the framework of the enquiry. He pronounced it "*a way of tripping up people who don't have the expertise with language*". He also pointed to the exclusion of sections of society either through a lack of language skills or knowledge about accepted procedure. *Consumer 3* then expressed the opinion, "*that a broad debate…is the best debate*". This emboldened *Consumer 1* to take up the cause of technology once more and restate that the advantage of submitting on-line would be to enable anyone to see what had been submitted.

Consumer 4 contended that society had a responsibility to make the submission process accessible *"across various levels of time poverty"*. She proposed that there might be many ways of contributing to a debate according to how much time one had available. She also asserted that many like herself, *"had no idea how to contribute in a bureaucratic sense other than vote",* implying that for most people democratic participation was limited to casting a vote at election time.

Consumer 3 took up this point by postulating that there were thousands of issues up for submission at any one time, but either due to disinterest or lack of awareness, these debates occurred outside the everyday activity of most people's lives. Hence democratic awareness as such only developed from political engagement with an issue by which one was directly affected.

With so many debates, *Consumer 1* felt that the difficulty was judging where to place one's time and effort. *Consumer 4* argued that while consumers were affected they were just one group of stakeholders among many and she was "*beginning to feel quite strongly about making sure that voices that wouldn't otherwise be represented are required to be represented*". Currently, she maintained, those with a relatively small voice were not well resourced to take part.

Consumer 3 claimed that the ethics of the issue exceeded the bounds of the biofuels debate, as people generally were not prepared to take responsibility for the consequences of the way they lived. *Consumer 4* also pursued this point, but argued however that the biofuels debate had specific ethical dimensions. There might be four or five different ethical issues missing from "*the discourse because there's no one in there to drive them*". Instead the discourse was skewed against those interests towards those of the voter.

The researcher then asked *Consumer 4* whose voice was loudest in the current discussion space. "*The ministers*'" she replied and argued that this brought the conversation full circle to the cynicism with which she viewed the way the discursive process was undertaken: *"It's all very well to have the process, because we had the process 20 years ago, but we're listening differently."*

As New Zealand is part of the international community, *Consumer 3* reasoned the issue of biofuels was being driven from outside as *"It would look really Luddite-ish and stupid if we weren't considering these things*." *Consumer 4* agreed that biofuels production was "*on the agenda globally, but it might not be the right solution*". The BSO, *Consumer 1* maintained, looked "*like we're delaying making decisions about the nature of the society we live in"*. He argued that the biofuels debate was really about *"how we maintain this particular lifestyle of high car dependency"*. It was *NGO 1's* contention that the alternative was not one that would get very far politically.

In response to a question from the researcher, *Consumer 4* reasoned that the country was obviously not ready to accept what needed to be done otherwise "*otherwise we'd be doing it"*. *Consumer 3* and *Consumer 1* agreed. As the discussion was about to end, *Consumer 2* said she wondered if the selection of biofuels was not consistent with New Zealand being *"mostly an agriculturally based economy",* and therefore attractive to farmers. This she maintained was "*how it works for all of us*" whether we're individuals, groups or a nation making-decisions: "*We make choices based on our frameworks, our view of the world. And New Zealand's no different than anybody else*."

6.3.2 Issues of discourse raised

From the above summary of the discussion it is possible to discern a pattern of discursive themes that were introduced and considered, often several times, during the focus group session. Many of the recurring issues could be seen to shift subtly during the session as participants negotiated their own positions among culturally established suppositions of public discourse.

The session began by looking at how evaluation criteria are established in the submission process. Although these criteria were not made explicit in the BSO consultation, they determined whether or not a submission was deemed significant and hence represented articulations of monologic power. The question of evaluation also raised questions of resources, cultural credibility and qualification as means of distinguishing 'expert' from merely 'personal' perspectives: a conception suggesting a hierarchy of opinion.

The issue of transparency was raised several times both with regard to standards of evaluation and institutional attempts to dominate the process. This led to an examination of notions of integrity and on what basis these were established, particularly with regard to who should be given the role of coordinating a consultation process and how to ensure their independence. Technology was repeatedly suggested as a way of 'levelling the field' and increasing transparency, but was criticized over its lack of discernment.

From questions of integrity, the group moved to discuss clarity of intention with regard to consultation and the importance of establishing agreement on the purpose of public discourse. Several participants expressed concern at the susceptibility of public discourse to be co-opted for different purposes such as entertainment, political point scoring or self-promotion.

The value of traditional processes of evaluation was extolled where expert judgment was informed by expert opinion, however *Consumer 4* argued "*it's not just the process, but what we agree about how we agree to do the process*" and proposed an approach that sought to build a shared level of understanding through stakeholder dialogue. The group contemplated what constituted an ideal situation and reflected on how conditions of communication could be established that were undistorted by power interests.

The discussion shifted to a deliberation of representation. The ethics of representation were recognized as being dependent on inclusion, democratic participation and stakeholder value. The contribution of those without power or political presence was not sought after or valued, a problem that was exacerbated by the under representation of the environment or future generations.

Whereas elsewhere in society people are aware that the views of whoever is in control of the media of communication will inevitably dominate the discourse, public perceptions of participatory discourse frequently assume it to be value-free. Participants recognized the way that perceptions of cultural acceptability drive issues of political expediency and exclusion. This affects the cultural feasibility of particular policy initiatives.

Key themes

Though circular and at times rambling, the focus group session contained a number of recurring themes that structured the discussion. Eleven key themes emerged from the conversation on discourse conducted between the participants of the focus group. We can see that the conversation broached many of the major themes of language and power raised in the Literature Review.

- Equality of access (language, technology, awareness)
- Equality of resources (time, money, knowledge, consultants)
- Disinterest (apathy)
- Inclusion (representation)
- Integrity (of process and arbitrator)
- Breadth of discourse (level of system)
- Transparency (of process and evaluation criteria)
- Role of technology (neutral, excluding or representing dominant power)
- Ideologies of power
- Conflicts of interest
- Dialogue (respect for other worldviews)

6.3.2.1 Model five: Imagining discourse as a democratic ideal

Based on the themes emerging from the focus group, Figure 6.6. (below) shows a model of the ideal discourse activity. This represented the 'Transformation' element of Checkland's (2006) 'CATWOE' directed at public discourse viewed as an information system.

Transformation: From self-referential New Zealand decision-making process to reflexive problem solving through public discourse

The activity begins with 1) an investigation of the situation and begins to explore the implications of the problematical situation in more depth. It concerns examining what is meant by the problem, what characterizes it as a problem and according to whose perspective. This activity will lead to a gathering of different viewpoints on the situation, 2), which is similarly likely to garner different strategies for improving the situation, 3).

In some cases, it might be necessary to return to the first step at this point, but presuming that some strategies remain and are felt worthy of further exploration, the next step, 4), would involve opening the debate further around the feasibility and desirability of the possible solutions identified. Once more, this activity may prompt the enquiry to return to step 2) and/or 3) in order to reframe the problem further or gather more information in the form of expert opinions in order to clarify viable options, before a solution is selected, 5) and action taken, 6).

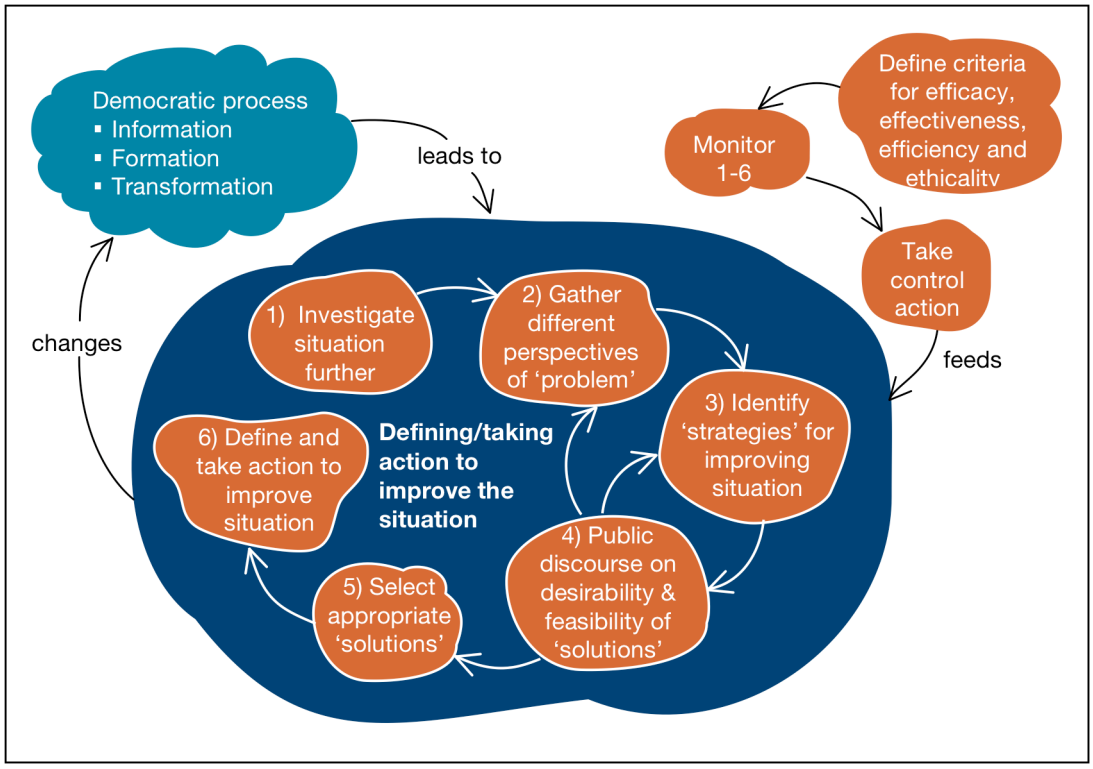


Figure 6.6. Conceptual model of ideal discourse activity based on ideas raised in the focus group.

Public discourse, 4), represents the democratic process in microcosm, as the criteria for assessment are decided according to cultural values shared, but also negotiated through the participation of individuals of different worldviews. These values then are themselves negotiated at a sub-level through conversations that constitute the discourse. Consequently the activity may also need to be structured at a sub-level to take account of the activity this entails.

As discussed in Chapter 3, such democratic discourse functions not only as an information system, but is also formative and transformative with regard to collective identities. Being engaged in collective action through the exercise of democratic

principles such as joint consultation or voting processes can reinforce individual identification with membership of a social grouping. It may also contribute to the transformation of the culture of that organization or society through the inclusion of critical viewpoints.

The criteria for evaluating proposed solutions emerging from the holon illustrated in Figure 6.6 are outlined below.

Define criteria for efficacy, cost-effectiveness, efficiency
E_1 (efficacy) concerns how an activity tackles the problem or improves the situation identified: what Habermas refers to as instrumental action.

E_2 (efficiency) concerns whether the eventual 'solution' intervention involves a considered use of resources, i.e. time, energy, goodwill, opportunity and money.

E_3 (effectiveness) is concerned with whether the intervention contributes to some greater aim. In this case, E_3 assesses the extent to which the consultation process contributes to the formation and transformative aspects of citizenship in a democratic society.

E_4 (ethicality) addresses whether an action is considered historically reasonable and socially acceptable as negotiated in a specific social interaction. It is through this process of communicative rationality that social organizations both endure and simultaneously evolve to changes in their surroundings (see Methodology chapter). Ethicality is determined by the efficacy of the democratic process and effectiveness in the ethical basis of communicative rationality providing a basis for moral judgement.

6.4 Summary of chapter 6

This chapter presented an analysis of the data from the two stages of the research study. The data from the interview process in stage one was explored in the first part of the chapter, and included an examination of the rich pictures developed by participating stakeholders. These pictures were used to analyze the problem situation of the discourse surrounding biofuels with respect to participants' specific worldviews. The colours, symbols and metaphors used in the pictures were considered both for their implications and as a means of gauging participants' engagement with the principles of SSM.

Perceptions of the problem were then explored using the CATWOE framework and the root definitions formulated during the interviews with participants. Five conceptual models were developed from this analysis. The first was a model of participants' *Weltanschauung* constructed to examine participants' consideration of how the discourse intersected distinct systemic levels, two models explored views of biofuels intervention and another two considered discrete approaches to the discourse. The researcher used these models to reflect on the problem situation and deepen the analysis.

The second part of the chapter was concerned with gaining insights into the discourse from an examination of the focus group process. It explored perceptions of the ways in

which public consultation is conducted. One conceptual model was developed to explore the ideal process of public discourse.

The next chapter explores the implications of the data from the study and presents a discussion of the findings based on the analysis in this chapter.

Chapter 7: Discussion of Findings

> *It is a secret known but to few, yet of no small use in the conduct of life, that when you fall into a man's conversation, the first thing you should consider is, whether he has a greater inclination to hear you, or that you should hear him.* Sir Richard Steele

7.1 Introduction

This, the penultimate chapter, brings together practice and theory by considering the findings from the previous chapter in the context of the research project as a whole. The chapter seeks to draw conclusions from the data in the Analysis in accordance with the concepts and theories examined in the Background, Literature Review and Methodology chapters, and refers to those chapters to qualify inferences emerging from the discussion.

This discussion of the findings is structured around the four key questions introduced in the first chapter. These are used to assess whether the project succeeded its aims and the extent to which this led to the acquisition of new knowledge. The questions were:

1. Is the introduction of the BSO mandate a viable and appropriate intervention according its own criteria?
2. How 'healthy' was the discourse conducted in this case?
3. How, and to what extent, might the use of SSM facilitate co-creative dialogue in public discourse?
4. What has the researcher learned from his participation in this process and to what degree is this learning generalizable and transferable?

Accordingly, the chapter is divided into four main sections. Each section brings together analysis and theories from elsewhere in the thesis to examine the questions in turn. Consistent with the principles of SSM and Habermas's critical rationality, evaluation is grounded in self-reflexivity and hence the questions are assessed according to their stated objectives. To repeat Warren's (1984) words cited in the Methodology chapter:

> criticism gains its right to impute ideological meanings to a text insofar as the text is irrational with regard to its own criteria of adequacy. (p. 542)

This means that key claims in the debate, such as the root definition formulated in the Analysis from the Ministry of Transport stated aims *vis-à-vis* biofuels, can be assessed against their own measures of success. Therefore the purposeful activity at each of these four levels: the BSO, the public discourse surrounding it, the implementation of SSM and the knowledge gained in this research, can be evaluated with regard to its declared criteria of logical defensibility and cultural feasibility.

After considering these four questions, the chapter presents a critical examination of the overall project and examines the limitations of this research.

7.2 Section I: The Biofuels Sales Obligation

7.2.1 Is the introduction of the BSO mandate a viable and appropriate intervention according its own criteria?

Here the notion of 'viability' is interpreted as concerning the logical defensibility of the BSO intervention while 'appropriateness' relates to the cultural feasibility of it being accepted by society in the context in which it has been applied. Although the scope of the present study does not extend to a detailed evaluation of the technical viability of developing biofuels in New Zealand, it is germane to consider both the content of the debate and the way it has been presented in order to gain a fuller understanding of the discourse.

The previous chapter included a root definition formulated from the stated intentions of the Ministry of Transport's biofuels discussion document, which read:

> To encourage the uptake of biofuels in New Zealand through the Biofuels Sales Obligation towards achieving a sustainable energy system by using renewable energy, reducing our net carbon dioxide emissions and contributing to the security of supply and diversity of transport fuels.

As Checkland and Howell (1998, p. 161) assert such statements can be used to 'structure a debate'. In this case then, the 'successful' implementation of the BSO mandate can be assessed against whether it is likely to achieve its aims. Accordingly the definition above, and a higher-level definition modelling the connection between biofuels and reduced greenhouse gas emissions, is evaluated on the basis of its logical defensibility and cultural feasibility.

7.2.1.1 Logical defensibility

While some participants voiced ethical or economical objections to the form of intervention adopted by the Government, of those interviewed no one queried the causal logic of imposing a mandatory obligation on the oil companies in order to stimulate demand and hence all considered that the BSO would be likely to lead to the uptake of biofuels. As the New Zealand Institute of Economic Research (Stephenson & Davies, 2005) the BSO mandate exhibits the properties of a 'good' tax by being resource efficient, cheap to administer, flexible and largely self-regulated.

Nonetheless, while serving to secure a market for biofuels, the BSO mandate does not by itself address uncertainty over supply, or mitigate the risk of investing in the production of biofuels feedstock, infrastructure and new technology in a potentially volatile economic market. Participants therefore expressed doubt over the practicality of meeting the demand locally within the scheduled timeframe of the legislation.

Principal among participants' concerns were reservations over the practicality of supporting a domestic biofuels industry. Such a lack of confidence over the quantity and quality of available biomass, if reflected in the market, is liable to lead to increased risk regarding investment. Biofuel manufacturers will therefore have to manage the risks of obtaining a reliable feedstock supply while meeting the demands of the oil companies to

maintain a consistent quality of output and price. This suggests a highly competitive and volatile market in which spiralling costs trigger higher inflation. There are already indications of this trend, with demand for biomass pushing up prices of human and animal food crops internationally and resulting increases in the costs of dairy and livestock products locally (Robison, 2007; "The end of cheap food," 2007).

Despite the government's assurances with regard to the availability of whey and tallow feedstocks, there was apprehension among participants and those making submissions that the quantity of these feedstocks was insufficient to meet the obligation. *Commercial organization 1* considered the amount of whey-based bioethanol obtainable to be only sufficient to meet the obligation of one of the mandated companies (Flagler, 2007). Indeed *Scientist 1* even made the contention that the shortfall was deliberately intended to stimulate new sources of feedstock.

There was also concern over whether production facilities and infrastructure could be assembled in sufficient time to supply the quantities of biofuel needed to enable the oil companies to meet their short-term obligations. This doubt is likely to put considerable pressure on the supply chain as the mandate progresses. If a yearly quota is not met it rolls over to the next year meaning the oil companies require more biofuel (see Figure 2.2 in Background). Given this scenario, oil companies are likely to need to look offshore to meet their obligation.

The economic efficiency of the BSO intervention will be assessed according to the price differential between biofuel and imports of fossil fuel. However, the cost of biofuels will be determined chiefly by feedstock costs. As Stephenson and Davies (2005) assert in the NZIER report, instituting a mandatory biofuels target creates additional importation, transportation, storage, blending and distribution costs, which in turn have an impact on the cost of feedstocks and subsequently the price of transport biofuel blends. This suggests that biofuels will be more expensive.

Charles *et al.* (2007) argue that the large amount of energy expended in the production of first generation biofuels represents a poor allocation and inefficient use of energy resources. In addition, it is highly probable the move to biofuels will contribute to further rises in fossil fuel prices as, besides costs from changes to infrastructure, any penalties imposed on the oil companies under the terms of the BSO will ultimately be passed on to consumers.

The effectiveness of the BSO can be assessed on its ability to meet the higher-level or longer-term aims of the Ministry of Transport root definition above. The definition included four long-term objectives that the BSO intervention is purported to support:

- achieving a sustainable energy system by using renewable energy
- reducing our net carbon dioxide emissions
- contributing to the security of supply
- contributing to diversity of transport fuels.

EECA defines renewable energy as energy that is self-restoring (EECA, 2008). The BSO is intended to contribute to a sustainable energy system by using renewable fuel, thus implying that biofuels will be produced renewably. However, to be wholly renewable, no resources, in the form of plant crops, livestock products, energy, land or water, would be 'wasted' during the lifecycle process of production. As the Worldwatch Institute (2006) asserts, the only truly renewable energy source of biomass is from genuine waste products, such as animal effluent, solid waste or refuse, and only then if their use doesn't ultimately degrade the land. Logically then, a more sustainable society uses its resources more efficiently, it uses less energy and discards less in the form of waste.

For biofuels to be economically viable, the amount of energy produced needs to appreciably exceed the energy needed to produce it. Paradoxically, the development of biofuels is likely to require a significant amount of fossil fuel in the construction of the necessary infrastructure for its manufacture, in the distribution of feedstocks and the supply of finished product (von Blottnitz & Curran, 2007). In addition, the lower energy content of biofuels compared to conventional petroleum means that more must be consumed (Bourne, 2007; Charles et al., 2007). Furthermore, the Worldwatch Institute (2006) maintains that producing heat and power is a much more cost-effective, and less GHG emitting, use of biomass than converting it to biofuels for transport. Yet EECA claims it is currently uneconomical to generate power from biomass in New Zealand (EECA, 2006b).

The New Zealand Government has introduced a clause to the Biofuels Bill that stipulates biofuel supplied under the BSO mandate must come from sustainable sources. However, discounting whey and tallow, the production of first generation biofuels is based on diverting food crops for energy use. Such shifts in land-use, and the subsequent mechanized cultivation of the land, can result in serious ecological damage. Despite claims of 'carbon neutrality', the production of biofuels can have a severely damaging environmental impact, such as the deforestation by fire in Malaysia and Brazil, leading to large quantities of GHGs, an increase in air pollution through soot and noxious emissions, and a loss of biodiversity (Zah & Hagmann, 2007). Another of the already apparent consequences of the international rush to biofuels has been the huge rise in food prices and its resulting impact on foreign aid and poorer countries as existing food crops and vegetation are displaced to make way for 'fuel crops' (Lemaître, 2008). Yet not one of the participants interviewed included either environmental damage or human starvation in their conceptions of sustainability.

A truly sustainable system will need to provide for low carbon emissions and clean air, environmental and human sustenance, sources of renewable energy and social benefit. However clichéd, this represents a holistic vision of harmony and accord. Assuming then that the oil companies do meet the terms of the BSO and the introduction of biofuels do indeed result in lower per capita GHG emissions, then the initiative would still meet its stated objective only if the New Zealand fleet remained the same size or shrank. However even these supposed benefits would be more than offset by growth in population, industry, deforestation and dairy, leading ultimately to higher volumes of

GHGs in New Zealand. As vehicle advocate *NGO 2* asserted "*the solution is to consume less fuel by better fuel economy and efficiency. There are better ways of achieving that objective.*"

Reducing per capita fuel consumption will entail shifting to vehicles with better fuel economy, higher-efficiency and smaller-capacity engines: a move currently being promoted by initiatives like the Government's Fuelsaver website. So what is the role of biofuels in supporting this shift? The ethanol in Gulf's Force 10, currently the only commercially available biofuel, has been used to boost the octane rating, making it an attractive 98-octane fuel to larger engine 'performance' vehicles or in *Policymaker 2*'s phrase "*boy and girl racers*". This presents an obvious incongruity between the fuel and the stated objectives of the BSO. As *Policymaker 2* claimed "*The reality is, if they put the amount of effort… that they are putting into this, into getting little elves at service stations pumping up people's tyres, they'd get exactly the same result.*"

It appears then that first generation biofuels represent a far from sustainable energy system and will not reduce the country's net carbon dioxide emissions to any significant extent. As *Commercial organisation 2* asserted, the 3.4% of transport fuel stipulated in the BSO will make little, if any, noticeable difference.

Nor is the small percentage of locally produced biofuels likely to improve security of supply in any considerable way as the country will continue to need to import the bulk of its fuel. Indeed the use of biofuels may even instigate another spiral of dependency through rises in associated costs of biomass, grain and animal feed.

Although it seems reasonable that the BSO could ultimately contribute to the diversification of transport fuels, *Commercial organisation 1* and *Commercial organisation 2* argued the benefit will be in building experience in using different fuels. Specialist adaptations to the existing infrastructure in themselves are unlikely to expedite the uptake of other transport fuels significantly in the future. Indeed as Charles *et al.* (2007) maintain, biofuels may even obstruct this shift by creating a vested interest in the provision of certain biomass feedstocks and thereby inhibiting the development of more efficient forms of technology.

7.2.1.2 Cultural feasibility

Public interest in issues of sustainability has clearly been a contributing factor in providing the cultural conditions in which the BSO was deemed an appropriate intervention. Indeed *Consumer 4* argued it would have been more politically unpalatable for the Government *not* to have instigated a policy initiative on biofuels at this time, as *"politically, I can't really believe that the strongest motivator isn't 'Well, we've got to be seen to be in this space to get re-elected'."* *Consumer 1* and *Commercial organization 1* also maintained that the BSO consultation and its subsequent legislation represented an achievable intervention within the current election period and has been selected at least partly for its appeal to potential coalition partners, particularly the Green Party.

However, the most immediate impact of biofuels is likely to be in the form of higher prices for both food and fuel. Many motorists will also be required to modify or upgrade their vehicles to be more fuel-efficient and more compatible with biofuels. While these factors could be considered as contributing to an increased awareness of sustainability issues, as *Commercial organization 1* argued, they will need to be handled sensitively if there is not to be a backlash against biofuels before they even become established in the market. This would not prepare people for diversity in transport fuels in any positive way.

In summary, the tight schedule imposed by the BSO could result in unsustainably produced imports of biomass or biofuel, higher pump prices, scepticism among investors, distrust of alternative fuels among consumers and increased environmental damage.

The in-depth examination of cost, benefit and risk that constitutes the official enquiry into the BSO still rests on the assumption that biofuels are a logical and feasible solution to the reduction of New Zealand's GHG emissions. The basis of this assumption is examined below.

7.2.2 Is the local production of biofuels a desirable and feasible improvement in the problem situation of New Zealand's rising greenhouse gas emissions?

Once again, while it is not within the remit of the present study to attempt to provide a technological evaluation of the BSO mandate's viability in solving New Zealand GHG emissions, the rational defensibility and cultural acceptability of the introduction of biofuels can be assessed based on the findings of the research and the theories presented earlier in this thesis.

7.2.2.1 Logical defensibility

The BSO intervention was purported to address the problematical situation of reducing New Zealand's greenhouse gas emissions, yet as implied by the definition developed from the Ministry of Transport mission statement, the intervention's ability to achieve this purpose it has been largely assumed. The transformation considered in the consultation process chiefly addressed the efficacy of the BSO in encouraging the uptake of biofuels, which represented the shift:

> from New Zealand as a user of (almost) exclusively fossil fuels, to the country as a developer and user of a proportion of biofuels.

It was consequently the policy's effectiveness that came under scrutiny and not whether biofuels themselves represented a feasible and desirable response to reducing greenhouse gas emissions, an improvement to a problematical situation more accurately represented by the transformation:

> from New Zealand as a high volume emitter of greenhouse gases, to the country as a decreasing emitter of greenhouse gases in line with its Kyoto Protocol obligations.

Yet despite the first commitment period of the Kyoto Protocol beginning in April 2008, this was not the focus of enquiry during the consultation process. Instead, the discussion

document reallocated the problem situation of reducing GHGs to a higher-level aim against which the appropriateness of biofuels was not rigorously examined, but glossed over with reference to international precedents.

International opinion and the country-by-country popularity of biofuels have been significant factors in its selection as a desirable intervention. The economic practicality of keeping research costs down was undoubtedly another inducement in following the lead of foreign policymakers. However, in drawing on overseas research, the Government has uncritically adopted many of the original researchers' assumptions and added to them the supposition of parity between the conditions in New Zealand and those elsewhere in the international community.

This supposition is false on a number of important counts. First, widespread international support for the substitution of biofuels has been driven primarily by countries with surplus food stocks generated by subsidised local agricultural industries (Worldwatch Institute, 2006). Second, countries with well-established biofuels production capabilities such as the US, Germany and Brazil also possess domestic engine and vehicle manufacturing. Third, the high proportion of used imports and older vehicles in New Zealand's fleet increases issues of compatibility. Add to these the country's geographic isolation, its fragile ecology, its economic reliance on agriculture and the unusual shared infrastructure of the oil industry, all of which build a case for New Zealand seeking a more holistic intervention suited to its specific conditions. As *Consumer 4* argued, biofuels production is "*on the agenda globally, but it might not be the right solution*".

The introduction of first generation biofuels is contentious given the possible environmental and social impact it could have. Therefore the success of the BSO, even according to its own criteria, depends on how carefully it is implemented and administered (Charles et al., 2007; Worldwatch Institute, 2006).

Despite the depth of the investigation and weight of documentation surrounding the decision to implement this mandate, the process appears ultimately to have been self-referential, in that nowhere in the enquiry has the assumption of biofuels efficacy in reducing New Zealand's GHGs been substantially challenged. Instead the mandate appears to have been superficially selected for its ease of administration and cultural feasibility.

7.2.2.2 Cultural feasibility

The focus of the biofuels debate has largely been confined to the issue of transport, despite the agricultural sector generating almost half the country's GHG emissions (Ministry for the Environment, 2007b). While transport makes up 19% of the country's emissions, at 43% agriculture is the highest contributor of GHG emissions (Ministry for the Environment, 2007a). Yet the main thrust of emissions policy has targeted energy and transport through initiatives such as the BSO, whereas there has not been the same motivation to tackle agriculture.

This was something that several of the participants picked up on, with *Consumer 1, Consumer 2* and *Commercial organisation 2* each noting that agricultural emissions was a politically sensitive area. As *Commercial organisation 1* asserted "*You're going to be very wary of mucking around with dairy, because that is your main exporter, forestry is going through a state of flux and stoush with them now, and that leaves transport.*"

The Government has argued that New Zealand's strengths lie in biotechnology and renewable energy (Ministry for the Environment, 2007a). Consequently, the introduction of biofuels has been presented as playing to these strengths without risking the country's economic livelihood.

> Almost half our emissions come from pastoral agriculture, the backbone of our food exports. This presents a major challenge for New Zealand because the technology currently available will achieve only limited emissions reductions (Ministry for the Environment, 2007a).

The 'logic' of implementing transport biofuels at this point in time seems to emphasize the cultural feasibility of this form of intervention and a replication of overseas initiatives, rather than sound research into its efficacy in reducing GHG emissions in a New Zealand context. As *Commercial organization 2* maintained *"I think what's driving NZ as well is the fundamental brand that we are 'green', and that we do 'green' things and this is you know, at face value, is a 'green' thing to do*" and *Policymaker 1* insisted "*Kyoto is a significant part of this*". *Commercial organization 1, Consumer 2, Consumer 4* and *Policymaker 2* also maintained that biofuels represented a culturally and economically acceptable intervention in response to New Zealand's Kyoto obligations. Ironically, the introduction of first generation biofuels may increase agriculture and agricultural emissions.

As a signatory to the Kyoto Protocol and a member of the international community, New Zealand at a governmental level has embraced biofuels as a normative response to lowering GHG emissions. *Commercial organization 1* explained it in this way "*Now, a big effect on the government here is being part of the OECD and being a lookalike of the OECD*". *Consumer 1, Consumer 4* and *Commercial organization 2* also expressed the view that the country was acting to assert its 'green' credentials globally. It would appear then that at least some of the motivation behind the decision to implement biofuels at this time was to be seen to be doing the 'right' thing in an international context. According to the reasoning of *Consumer 3 "It would look really Luddite-ish and stupid if we weren't considering these things.*"

There are many further problems arising from the substitution of biofuels for fossil fuels because the intervention attempts to supplement one 'unacceptable' part of the fuel system by adding one that is deemed more 'acceptable'. The mandate promotes biofuels, but has nothing to say about rising vehicle use or fossil fuel consumption in real terms. To quote *Consumer 1 "It does look like we're delaying making decisions about the nature of the society we live in."*

Increasing consumption of energy and resources are 'lifestyle' choices that are currently pursued at high cost to the environment. Such choices are antithetical to reducing GHG emissions, however *NGO 1, Consumer 1, Consumer 3* and *Consumer 4* argued that New Zealanders make those 'lifestyle' choices without being fully aware of the true environmental consequences and associated costs of those choices. Consequently, the selection of biofuels has been made on its cultural feasibility in adopting a form of intervention that doesn't substantially address consumption, as *Consumer 4* maintained, *"That's us saying, 'Yay, we'll be happy, because peak oil is coming so at least we'll be able to keep running our cars and maintain this unsustainable community environment that we've created in our urban cities*.'"

Raising awareness around the consequences of profligate lifestyle choices is an important first step in engaging with the problem of GHG emissions. While individual actions might not make a difference in themselves, a wider discourse is needed in order for consumers to fully participate in transforming New Zealand society by collectively pursuing choices that have a lower overall impact on emissions. However atypical this form of self-reflection might be, it appears essential if the country is to be prepared for either the short-term effects of alternative fuels or the long-term effects of climate change. In this respect, the conceptual models developed out of SSM could prove useful in structuring a discussion of the logical defensibility of assertions arising from this debate.

7. 3 Section II: Quality of public discourse

7.3.1 How 'healthy' was the discourse conducted in this case?

The nature of the debate surrounding biofuels development appears to support Rorty's (1980) contention that certain values, or ways of expressing those values, within a debate are more persuasive than others. Consequently competing techno-rational approaches have used various statistical and positivist devices to dominate the discourse and assert their respective ideological positions. As Bahktin's model of centripetal discourse (Holquist, 1981).

The question in SSM terms then is, whose worldview is dominant and how does it shape perceptions of the problematic real-world situation? The majority of participants appeared to accept the official framing of the problem situation as the 'how' of biofuels implementation rather than the 'what' of an intervention to improve levels of GHG emissions. While some participants argued that the BSO was an overly directive and authoritarian form of government and others that the debate was too narrow, the problem situation was largely accepted as presented. The principal concern here remains that by framing the objective as the introduction of biofuels, the efficacy of biofuels in reducing greenhouse gases was relegated to a secondary issue. This discursive closure represents a form of 'false consensus' operating to block free and open communication (Deetz, 1992).

The consultation process appears to have been characterized by a clash of techno-rationalist ideologies with the worldviews of Government and the multinational oil companies vying for supremacy. However, regardless of who claims ultimate power, the dominance of the techno-rationalist paradigm has led to the subjugation of other significant issues such as social values, identity or cultural representation, hence systemically distorting public consultation and the ensuing decision-making process.

Commercial organization 2 claimed that the implications of biofuels warranted a broad debate rather than a directive from the Government. As a global phenomenon which ultimately affects us all, he argued the issue of climate change "*suggests that it's even more important to have a more considered approach than a big stick mandate-type approach which says 'thou shalt in this time of extreme uncertainty do these specific things'.*" He also maintained that issues such as environmental concerns, the country's 'green' reputation and the independent character of New Zealanders had been omitted from the debate.

It was not only issues that were excluded, but also many diverse interests of stakeholders who were not considered to have relevant industry experience or technical expertise. *Consumer 4* claimed that the interests of those not immediately affected by the BSO were also ignored and cited as examples people who would ordinarily consume the food being diverted into fuel production, subsistence farmers in other countries, future generations and biodiversity, each as a distinct 'stakeholder' interest. However, these interests were excluded either because they lack the resources to contribute or because there was no one representing the issues.

The literatures of Bourdieu (1988) Bråten (1983) Clegg (1989) Deetz (1992) Foucault (1986) Habermas (1989) Illich (1973) and Kuhn (1970) are all concerned with the ways in which some voices gain dominance over others in a discourse. The discourse in this study was strongly shaped by the dominance of specific stakeholders through the attribution of economic, technical, procedural and ideological status. As *Consumer 4* argued, this dominance of the discourse was not in the interest of a legitimate public consultation process; *"you know, we don't want an overly strong voice of* [any] *one stakeholder"*.

In addition to the submission of written proposals, the normative public consultation process takes the form of information including reports, press releases and websites, and participation through the attendance of public meetings, conferences, hui and industry forums. New Zealand citizens also have the option of taking an issue up with their member of parliament or the minister responsible for a particular portfolio. The discursive processes of a democracy serve the functions of information and formation by instituting cultural understandings and establishing societal membership. Habermas argues that in addition to providing information, public discourse functions as a participatory process of opinion formation, and hence social membership, and gradual transformation through the inclusion of dissent and critique (S. Chambers, 1995; Deetz, 1992). Public discourse then serves a purpose beyond the monologic provision of mass

communication, but provides the essential channels of reciprocal exchange that identify a society as democratic by enabling it to evolve.

Logically, policy development qualifies as an enquiry only when those undertaking the enquiry remain open and willing to learn from one another, otherwise the practice is merely a formality. Deetz (1992) and Morgan (1997) argue that discourse becomes distorted when a system resists adapting to changes in its environment and becomes increasingly disconnected from anything that it does not itself produce through the systemic reification of its own normative views. In attempting to problem-solve around an internationally recognized global crisis, the consultation became 'egocentric' paradoxically when those responsible for coordinating the enquiry rejected the possibility, however slight, that they might learn something of significance that they did not already know. This consequently represented another instance of discursive closure (Deetz, 1992).

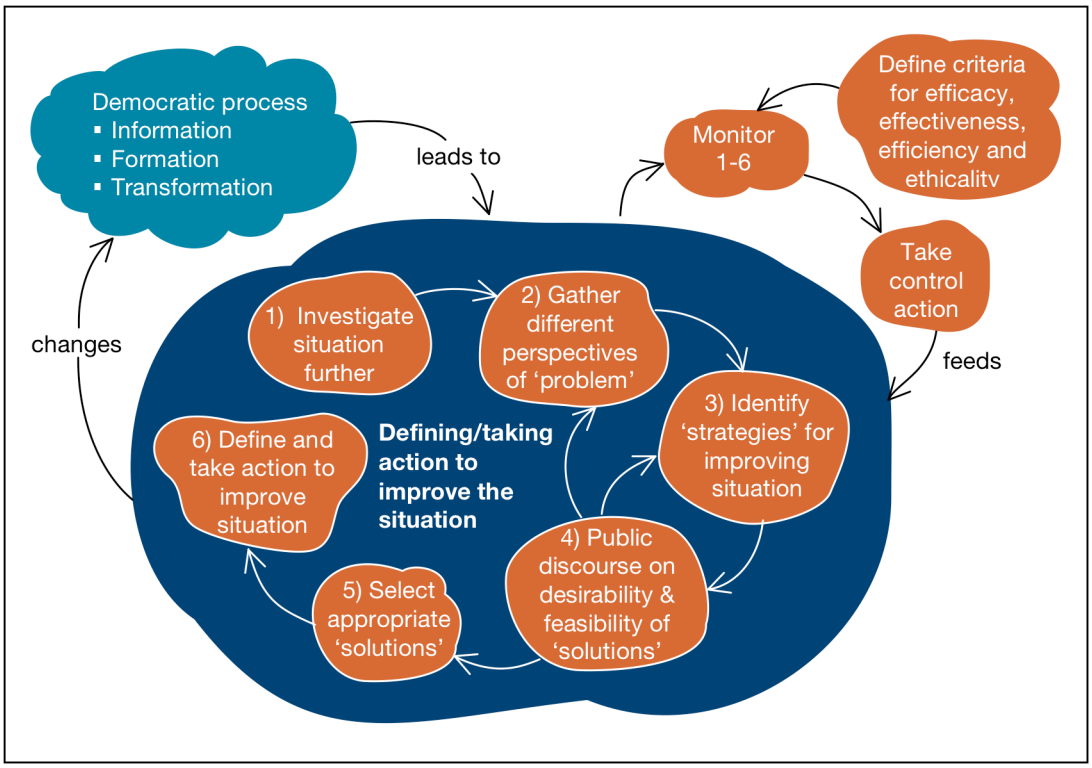


Figure 7.1. Conceptual model of public discourse in support of policy development in a participatory democracy.

Communication was also distorted by confusion over strategic and communicative action. Communicative action is where the aim of an action such as consultation is to reach an understanding, and strategic action is where an action is orientated towards the achievement of a particular goal (Deetz, 1992). Public discourse can be distorted when the goal of a consultation process is merely to gain legitimization. It is therefore important to question whether the purpose of the consultation process was to understand the viewpoints of stakeholders or satisfy official etiquette in order to get the BSO legislation passed. The views expressed by participants in the study suggest it was the latter, views moreover that simply support what the Government stated in its

documentation; that the decision had already been taken 'in principle' (Ministry of Transport, 2006b). Hence manipulation occurred through the intrusion of strategic action into an initiative of ostensibly communicative action.

Figure 6.6 in the previous chapter showed a conceptual model of ideal discourse activity based on ideas that were raised in the focus group. This model is reproduced above as Figure 7.1 to explore public discourse as a process of 'defining/taking action to improve a situation' in support of policy development in a democracy. It is valuable to compare this model to the techno-rationalist decision-making model (see Figure 3.1) introduced in the Literature Review. Where the models differ significantly is that the one above demonstrates a non-sequential flow of activities and their reflexive interrelationships. This form evokes a process that is less goal-orientated and more dialectical by allowing new knowledge to be reflected on as an enquirer learns more about a problem situation.

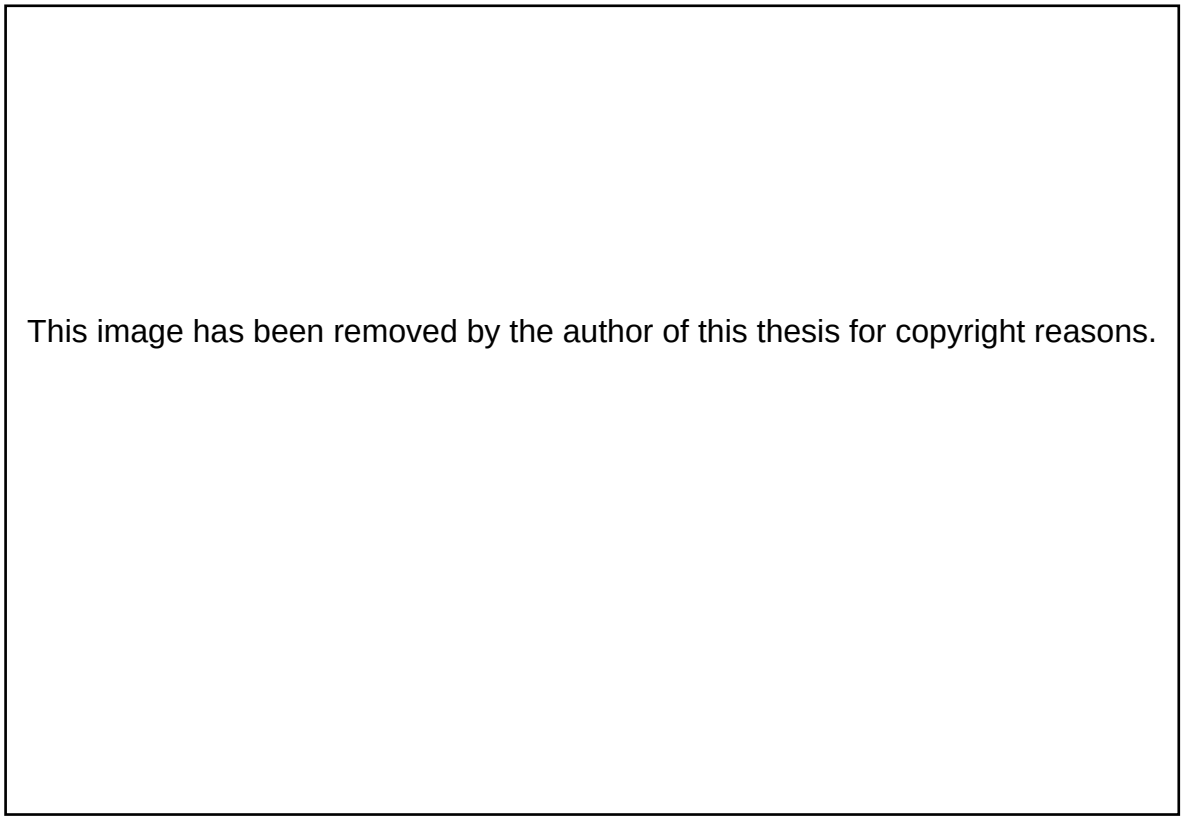
Significantly, an external 'loop' is included for monitoring and evaluating the activities contained in the blue area. These criteria of feasibility and desirability are decided according to the specific worldviews of individuals participating in the discourse, which are themselves negotiated at a further sub-level in the conversations that constitute discourse. According to the ideas of communicative rationality, these normative criteria are both established and constantly renegotiated through discursive policy development, and need to be structured to work on different levels. The process is also cyclical and therefore ongoing.

7.3.1.1 SPEaR initiative

Improvements in the monitoring of research in support of policy development have already been attempted through cross-agency initiatives like SPEaR. The diagrams included in Figure 7.2 and 7.3 (below) were taken from the *Social Policy Evaluation and Research Committee (SPEaR) Good Practice Guidelines Package* developed to illustrate the context for social policy research and evaluation (R&E) (S. Walker et al., 2004). Figure 7.2 illustrates 'The Policy Cycle Ideal', which is the theoretical model of the social research in support of policy development, while Figure 7.3 presents 'The Policy Cycle in Practice', a representation of the 'reality' of the situation based on experience.

An initiative that arose from the Improving the Knowledge Base (IKB) project in 2001, SPEaR represents a 'co-ordination hub' for New Zealand government agencies and the social R&E sector. It has the authority to '*oversee the government's social policy research and evaluation purchase*' with the intention of establishing best practice. Thus the document outlines how an effective social research initiative would be conducted and provides guidelines with regard to policy development research.

The SPEaR guidelines were intended to improve the standard of R&E practice across the social sector as a whole. This included enhancing the generation of information informing policy development and service delivery, and encouraging the development of respectful and ethical working relationships between all participants in social sector R&E. These guidelines are therefore pertinent to public discourse, consultation and submission processes.



The sole difference between the two models is the bottom green arrow linking 'multiple sources of ideas' with 'evaluation and/or monitoring', which represents a 'learning loop' connecting the activity of 'monitoring and evaluation' with that of 'ideas generation'. A comparison of the 'Ideal' SPEaR model with the model in Figure 7.1 shows how this green arrow equates to the 'loop' to the right of the blue area of 'defining/taking action to improve a situation'.

While the SPEaR document shows awareness of the absence of such a learning loop in the practice of research and evaluation undertaken in 2005, and evidence of efforts to improve social policy research in this respect, the evidence of this study suggests that the practice was not successfully implemented. Participant experience of the public consultation process on the BSO reveals that this important feedback loop is still missing from government policy research.

The decision-making process displayed in Figure 7.3 is goal-seeking, in which change is restricted to a mechanistic plus or minus equation leading to a subsequent alteration and/or substitution of a particular component. Even Figure 7.2 with the addition of the green arrow linking 'monitoring and evaluation' and 'ideas generation' shows a limited understanding of learning through enquiry. While Figure 7.2 attempts to feed information gained from monitoring and evaluation back into the enquiry process, this link would achieve single-loop learning at best. It still approaches social phenomena as though they would submit to the ostensibly rational process of formulating and implementing strategies. It is therefore useful to compare Figure 7.2 with the model of techno-rationalist problem solving developed in Figure 6.5 in the previous chapter.

The level of adaptive change, conceptualized by Argyris (1996) as single-loop learning, involves incremental adjustments to strategies or actions while the underlying values on

which they're based remain untouched. However in transformational change or double-loop learning, the critical reflection of participant enquirers changes underlying assumptions, which can then result in different ways of thinking and affect future strategising leading to systemic change (Ellis & Kiely, 2000). In this way self-reflexivity provides a form of critical evaluation.

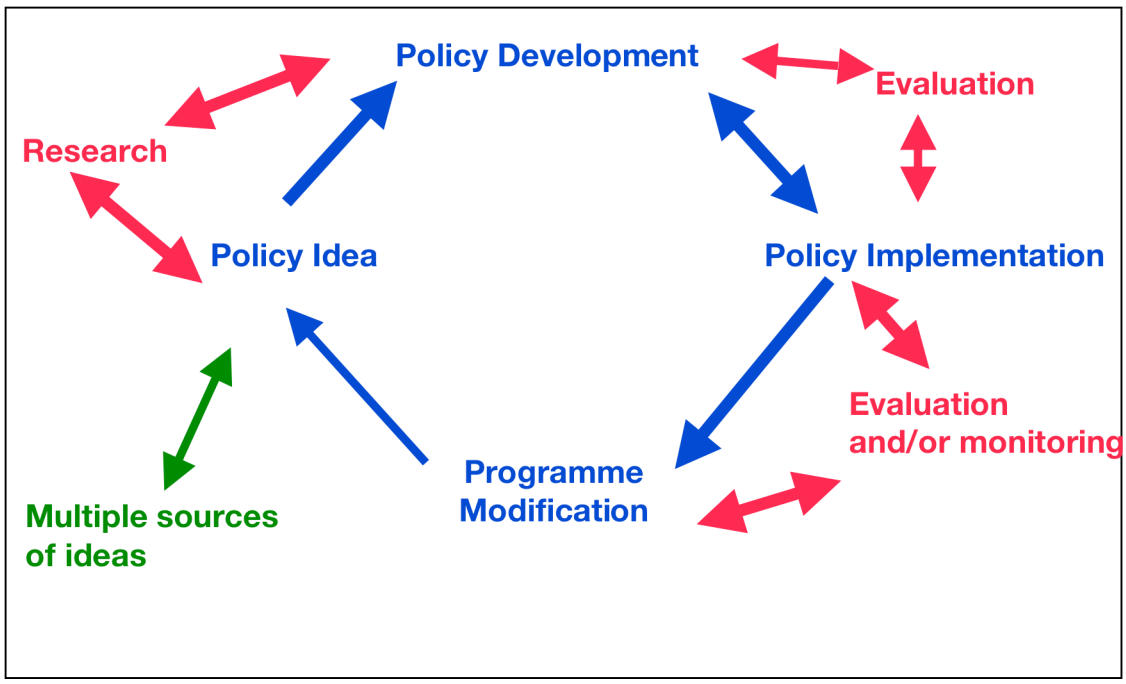


Figure 7.3. Model of the policy cycle in practice developed by The Social Policy Evaluation and Research committee (S. Walker et al., 2004).

While Figure 7.2 portrays a 'policy idea' emerging from 'multiple sources of ideas', the model doesn't include a process of critical enquiry directed at evaluating these ideas and why one idea would be deemed more worthy of investigation than another, or how the basis of evaluation is itself established. Instead, the process of enquiry is assumed to be at least probabilistically predicable and recursive as is the purpose of the enquiry. Subsequently, the investigation refers to the same limited frame of reference that was used to determine the selection of a policy idea for development to begin with. It does not consider any initiative as a whole, exhibit the capacity to learn reflexively or have the flexibility to alter course in response to contextual changes.

The institution of government and its agencies conversely work within the confines of what they assume to be the bounds of cultural and political feasibility within New Zealand. However, without engaging in an open dialogue with the country's stakeholders they do not avail themselves of the opportunity to test these assumptions. As *Consumer 4* argued, *"The one* [policy option] *we choose and the mix that we choose is what is going to be most politically salient today for New Zealand."* This represents a form of false consensus in relation to assumptions of cultural feasibility and electoral popularity.

Moreover, even the process of changing the model of Figure 7.2 to Figure 7.3 is consistent with a plus or minus equation, in this case the addition of the component of

the green arrow. The feedback loop represented by the green arrow was not a feature of the BSO research and evaluation process. In the case of the BSO, the commitment was at best to incremental change rather than systemic transformation, which suggests such incremental changes fail to become integrated. In this respect, Figure 7.1 is an improvement on Figure 7.2 as it includes a continuing process of critical reflection and a discourse that proceeds from, 2), gathering different perspectives on the 'problem' or subject of investigation. Thus Figure 7.1 presents a process in which assumptions are continually challenged.

Commercial organization 2 maintained this depth of investigative reflection was missing from the discourse on biofuels:

> I think in this case the government's kind of skipped all that stuff, skipped all the consultation about Kyoto and sustainability, and renewable resources and the independence of New Zealand. I think it's skipped all that and gone straight to their solutions, which is that we'll bring in biofuels.

As earlier discussed regarding the ostensible transformation investigated in the consultation process, the government effectively collapsed the levels of enquiry by reframing the discussion to focus on the tactics of the BSO rather than developing a strategy to tackle GHG emissions. The intervention of the BSO was made on the assumption that the viability of biofuels in reducing GHG emissions had already been made at an international level and that the government was therefore justified in implementing this at an inter-organisational level. It did not address the intercultural, interpersonal or personal aspects of the decision and thereby ignored its implications for democratic participation (refer to Figure 6.5: Worldviews).

Sustainable initiatives require the support of sustainable consultation practices. If we accept Deetz's (1992) assertion that a 'healthy' discourse is one that is systemically co-creative, learning and differentiating for its participants, then, based on evidence of the public consultation process, we would have to conclude that the official discourse process was not healthy. Indeed, it demonstrated a systemic failure to provide the principal conditions for representation, open dialogue and reflexivity.

7.4 Section III: SSM as an exemplar for stakeholder engagement

7.4.1 How, and to what extent, might the use of SSM facilitate co-creative dialogue in public discourse?

An SSM enquiry can be seen as an information system that, like democratic public discourse on a larger scale, acts to uncover stakeholders' beliefs and assumptions, enable representatives of a social system to make decisions that support the collective interests of society, and also to validate the action subsequently instigated by those decisions.

The nature of SSM is then dialectical in that it engages with multiple viewpoints through a process that eschews assumptions of judgment, but will inevitably contain the inherent bias of those participating, particularly anyone in a co-ordinating role. It does

not promote a specific worldview, but encourages a systemic approach to thinking about multiple worldviews. By encouraging levels of reflexivity SSM ensures the criteria for evaluation are fully explored and are therefore made reasonably transparent in any subsequent discursive examination.

Its cycle of learning is enriched through iterations that see the understanding of the problematical situation increase. Modelling different levels enriches understanding of a problem situation, which enables them to be brought into discussion, and their logical defensibility and cultural feasibility can then be evaluated according to certain criteria. Those criteria can then also be challenged and renegotiated.

SSM allows participants to structure a dialectical investigation while also providing the means of establishing propositional criteria of evaluation. Checkland (1999) proposes using SSM to explore different worldviews in order to explore the foundation of participants' reasoning. Therefore, in line with communicative rationality, a critique of a model of activity is made on the basis of its logicality and reasonableness.

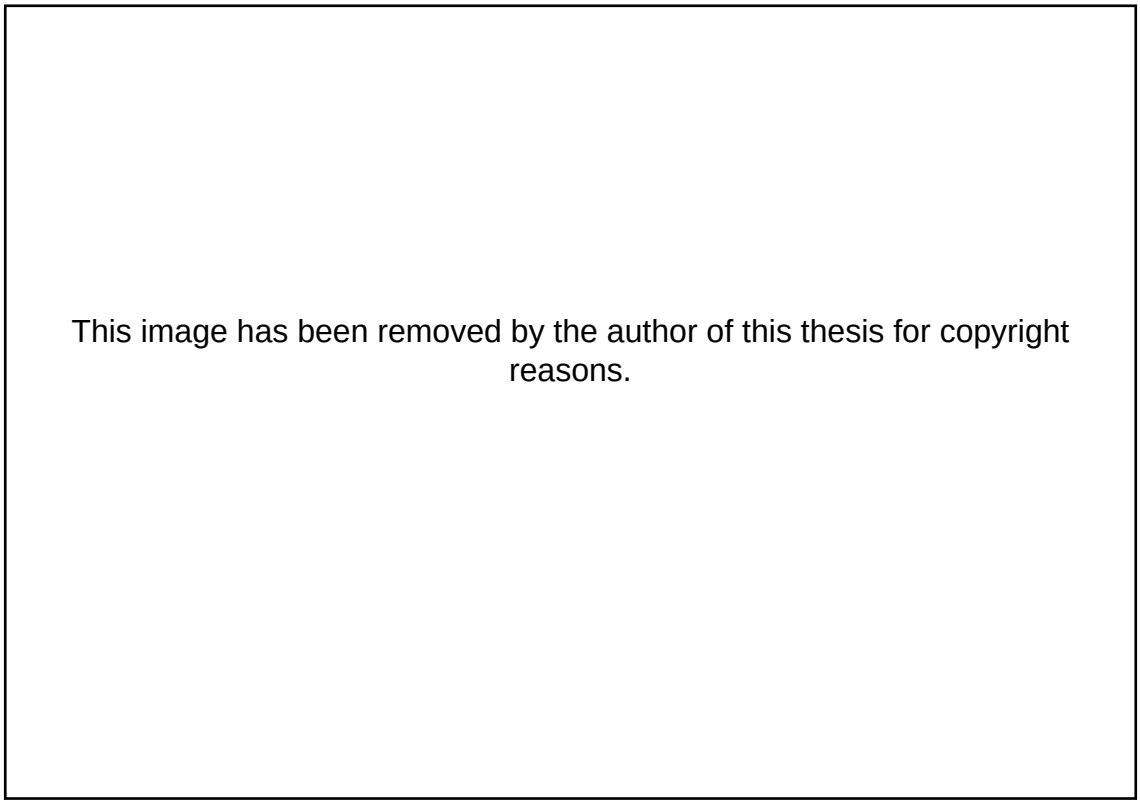
Checkland (1999) insists that a 'holon' or systems concept is an arbitrary, subjective hypothesis and systemic models are therefore merely devices for structuring thinking. Provided participants retain this level of impartiality, the use of models helps move the argument to a level of abstraction where a worldview prevails purely through force of argument rather than as a result of ideological power relations.

However, as Foucault argues, power cannot be separated from communication and is a necessary part of discourse. What is of most concern is the moral status of its application. The application of the principles of SSM could facilitate co-creative dialogue in public discourse, but their effectiveness depends on the extent to which reflection on the conditions of discourse is built into the discursive process and an awareness of how implicit power relations systemically distort those conditions.

7.4.2 What was SSM's contribution to exploring and improving public discourse in this case?

By disclosing their ideas on paper participants were able to see and examine what they were thinking. Through this process of reflection, participants were made aware of their own worldview and how it differed from those of others in the discourse. This encouraged them to distinguish between experiencing conflict with an individual opinion from conflict with the person holding that opinion.

As *Consumer 2* astutely observed, *"That's how it works for all of us. Whether we're an individual making decisions or whether we're a group or whether we're a nation making decisions. We make choices based on our frameworks, our view of the world. And New Zealand's no different than anybody else."* In this case therefore, SSM contributed to the discourse by enabling stakeholders participating in the research to understand how different worldviews shaped the discourse around the decision to introduce biofuels to New Zealand via the BSO mandate. From this, participants became more aware of how these diverse worldviews constituted an important aspect of the problem situation.



7.4.3 How might SSM be used to facilitate consultation on a contentious issue?

Figure 7.4 above shows a conceptual model of SSM approach to problem solving. Again this can be compared to Figure 3.1 in the Literature Review. Whereas Figure 3.1 suggests five incremental steps between the recognition of a problem and the implementation of a solution, these steps describe a specific approach to problem solving: one that assumes a problem can be reduced to a sequence of decision-making. Figure 3.1 does not indicate how one is to explore the situation or recognize that understanding of the problem could change.

There is then the implication of an individual decision-making process that, if imposed onto the model in Figure 7.4 above, moves from '1) Finding out about the situation' directly to '4) Defining/taking action to improve the situation' without discussion. While missing from Figure 3.1, steps 2) and 3) are essential if one is to engage with the problem situation represented by multiple stakeholder viewpoints.

Where Figure 7.4 also differs is in the inclusion of feedback loops to the left and right of the blue area, 5). These loops allow for learning about a situation to the extent that one's understanding of a problem can change. Proceeding through iterations of action and critical reflection, the process has the potential to promote cycles of learning that shift stakeholder perceptions of a problem situation and thereby enable action to improve it.

The practice of SSM makes overt reference to models of purposeful action that are based on different worldviews and proposes using these as the basis for discussion. While not usually labelled as such, models or ideologies are present in any discourse although they

ordinarily take the form of tacit assumptions. By making these assumptions explicit, SSM promotes a rigorous process that includes double-loop learning.

While encouraging a reflective cycle of learning however, SSM does not necessarily promote the triple-loop learning that Bohm advocates. Triple-loop learning requires one to not only reflect on what one is thinking, and the assumptions on which those thoughts are based, but also learns to understand how one reasons and communicates in relation to others. It involves reflection on the theoretical, philosophical and psychological assumptions underlying the holon of one's own behaviour. This reflects the implications of Habermas's ideas of emancipatory interest with reference to psychotherapy, in which one actually uses the dialogic process in relationship with others to explore the ideologies by which one understands and is restricted by one's ideas of the world.

Salner (1999) and Oliga (1988) argue an SSM investigation can be considered a hermeneutic loop. The self-reflexive rigour of participants decides how encompassing that enquiry should be and therefore how critical. Otherwise it is just as subject to manipulation and ideological distortion as any discursive enquiry. An open and sincere discourse is reliant on the criticality of participants, as this will determine the level of reflectivity and hence the extent of any transformation

SSM could therefore provide a useful approach to scoping an area of proposed policy. Its processes could help clarify the field of enquiry and structure ensuing discussion without incorporating unquestioned evaluative assumptions or excluding 'externalities'. This approach could lead to a process of consultation about consultation, but this presents a difficulty only insofar as it differs from conventional practice. While problematic, it need not be difficult to manage, as it is in essence the equivalent of conducting a continual process of evaluation and monitoring. Familiarity with the processes of SSM would gradually establish a more systemic practice.

An SSM study of sufficient scale and implemented consistent with the principles of Participatory Action Research (PAR) would in time enable the participants to acquire the facility to develop their own models. Enquirers would subsequently learn to critique those models and thereby develop improved models that may or may not be used as a basis for action. Through an iterative cycle of learning, reflexive problem solving is developed, which enables the enquirers to move beyond their basic assumptions towards constructing new ways of thinking.

Horn's (2000; 2004) research using visual representation in organizing public discourse suggests that conceptual models developed within SSM could prove a useful means of structuring a discussion of the logical defensibility of assertions arising from debate on any contentious issue.

7.5 Section IV: Learning by enquiry

7.5.1 What has the researcher learned from his participation in this process and to what degree is this learning generalizable and transferable?

The following section looks at 'learning by enquiry' and considers the learning of the researcher and the extent to which this can be considered to be generalizable and transferable. It begins by establishing criteria for evaluation, which are then used to assess the value of the study.

An assessment of the learning attributable to SSM is difficult because, as Checkland and Scholes (1989) claim, "*every sophisticated use of methodology needs to be research on its use in a particular case*" (Salner, 1999) contends that this approach has created confusion among SSM practitioners over the relationship between research outcomes 'using SSM' and 'research on SSM'. However, Rose (1997) argues that the validity of SSM as a form of research enquiry must be established by ensuring consistency between a study's research methods and its underlying philosophical standpoint. It was this approach that was explored in the Methodology chapter, with the eventual location of SSM and the present study within the methodological principles of Habermas's critical theory. Moreover, Salner (1999) maintains that SSM can be evaluated according to the criteria of efficacy, efficiency and effectiveness advocated by Checkland: an approach consistent with Warren's (1984) assertion that a text may be critiqued insofar as it is "*irrational with regard to its own criteria of adequacy*" (p. 542).

Hence, since Checkland (2006) claims SSM to be a 'cycle of learning', then it is relevant to evaluate the study according to the degree of learning experienced by participants, including the researcher. While the extent of the transformation engendered by this learning was inevitably constrained by the scale and duration of the study, criteria for evaluating the study can nonetheless be established with reference to the thesis of the research outlined in the Introduction. This stated that:

> the sincere engagement of willing participants in a shared process of enquiry will create conditions in which they are able to listen to the viewpoints of others without prejudice, and reflect, and possibly reframe, their own points of view.

In the present study, the criteria for evaluation, E_1 E_2 E_3, can be determined by treating this statement as though it were a root definition of the enquiry.

E_1 (efficacy) then concerns the extent to which participants deliberatively engaged with the problem situation of the discourse surrounding the BSO using SSM and changed their opinions as a result.

E_2 (efficiency) refers to the participants' (including the researcher's) competent use of resources (i.e. time, goodwill, energy) in engaging with the problem situation.

E_3 (effectiveness) assesses the extent to which participants acknowledged a transformation in their thinking wrought by the process of co-creative dialogue.

The study explored the discourse in two ways. It examined diverse views of the action taken to introduce biofuels to New Zealand by interviewing stakeholders, and in holding a focus group, it considered the ways in which the discourse was actually conducted as well. After the study, participants were asked to comment on the experience. An examination of how and to what extent the study facilitated learning and co-creative dialogue is included below.

7.5.2 What did participants gain from the study?

An assessment of the thesis of the study can be made in relation to participants' testimonies of their experience of the research process. These have been organized according to the criteria of evaluation, E_1 E_2 E_3, developed above. After some general remarks about the process, participant feedback is categorized according to whether it reflects a) a shift of opinions, b) transformations in thinking or c) co-creative dialogue.

7.5.2.1 General remarks

While participants' comments could be interpreted in different ways, they do indicate that participants engaged with the study and consequently gained experience of the dialectical approach to enquiry promoted by SSM's 'cycle of learning'.

"I found the interview itself with the whole picture drawing aspect really interesting… so different from my experience in data collection." Consumer 2

"*I found it interesting to discuss this* [issue] *with other (more knowledgeable) people.*" *Consumer 1*

7.5.2.2 Shifting opinions

There is an inherent process of reflection in participants' considering their experience. Where participants' expressed a shift in opinions, researcher interpreted this as a process of single-loop learning.

"*In terms of 'did it change my opinions?' – I think so.*" *Consumer 4*

"*It was fascinating to hear the opinions of people with real authority in business and institutions and I thought it was a good process.*" *Consumer 3*

"It crystallized and confirmed my thinking rather than challenging it." *Consumer 1*

7.5.2.3 Transformation in thinking

Participants who maintain the experience has transformed their thinking are alluding to a process of double-loop learning.

"*The process changed my thinking as it made me think deeply about the issue – I hadn't indulged in that before.*"

"*Through reflecting on issues raised by you and others and through making explicit my own thinking processes.*" *Consumer 4*

"The discussion… touched on the ethics surrounding the issue, the rights and wrongs of a change to biofuel, how does our governance structure deal with this stuff which I hadn't expected." NGO 1

7.5.2.4 Co-creative dialogue

Co-creative dialogue denotes a shared process of enquiry occurs in which participants willingly engage with others in a sincere, mutual, learning exchange of different points of view.

"*I loved being thrown together with a group of people to discuss an issue – people who I would not normally engage with. " Consumer 4*

"I enjoyed it, particularly the varying perspectives and the underlying recognition that there are multiple approaches to the concept of 'sustainability'." Consumer 3

"I would say my thinking broadened as a result of the focus group, perhaps that is because I had limited knowledge of the topic to begin with." Consumer 2

7.5.3 What has the researcher learned from his participation in this process?

Like the participants, the researcher was engaged in a self-reflective process throughout the study. The research project represented an ongoing process of meaning making, from deciding how to engage with the problem situation to the construction of the models. As Stacey (2007) asserts, meaning is constructed under the specific terms of a social interaction. Hence the power relations around which a discourse revolves are liable to be reflected in the form of that conversation. Mumby (1988) argues that this is particularly evident in discourse with individuals whose worldview asserts theirs as the dominant position.

The interview with the representative of *Commercial organization 2* provided an instructive example of such power relations. Before the interview could begin, the participant was insistent on anonymity even though that had already been guaranteed in a letter prior to the interview. It appeared incumbent on the researcher to convince the participant that he (the researcher) posed no threat.

This preamble coloured much of the meaning attributed to the ensuing exchange and perceptions of antagonism were active in shaping the researcher's experience of the encounter. As a consequence, the researcher was uncomfortable with the environment and the discursive conditions in which this interview occurred. Consequently, when the participant expressed his opinion that:

> in a consultation process generally the most important groups to consult with would be those that were most significantly affected, because in reality people who are not affected are probably quite unlikely to either have an opinion or a basis of knowledge to make a meaningful contribution,

the researcher interpreted this to mean that he was being critical of the researcher's own claims to knowledge. It appeared that the interviewee sought to discount any argument that did not conform to his own view, including that of the researcher.

As explained in the Literature Review, the exclusion of other stakeholders according to criteria of industry knowledge and experience is characteristic of 'techno-rationalist' ideologies of power: a view seemingly borne out by the participant's emphasis on values of "*technical detail*", "*practicality*", "*pragmatism*" and "*commonsense*" (Mumby, 1988). The implication then was that *Commercial organization 2* was expressing a techno-rationalist worldview.

The participant's relationship to the researcher and his insistence on dominating the conversation similarly supported the view that *Commercial organization 2* was taking a 'managerialist' approach (Mumby, 1988). Indeed it seemed ironic, given the participant's primary complaint that the organisation he represented had not been adequately listened to during the consultation process, that in his determination to make himself heard, he did not allow space for any reciprocal exchange in his own communication.

A later statement also implied a 'techno-rationalist' standpoint by likewise advocating the rejection of other perspectives from the biofuels debate.

> The issue probably is people really lacking industry knowledge and experience and a pragmatism to go about these things in a practical, commonsense way. With the greatest respect to yourself, you can't have academics making all of these decisions when in reality sometimes there needs to be a very practical approach to things and people looking at the detail. (*Commercial organization 2*)

If the participant intended to imply the researcher lacked practical knowledge and experience, it was based on a supposition that he made no attempt to substantiate. Again the researcher took this to be a veiled criticism of his right to contribute.

However, when the researcher listened to the recording several months later and was able to step back from his own reaction, he heard the interview quite differently, which led him to reconsider his initial interpretation of the interview.

Instead of being an argument for exclusion, the first statement quoted could simply be seen as an expression of *Commercial organization 2*'s frustration at the exclusion of his organization from a decision-making process that had a significant effect on his business. Instead of arguing against other voices, he might merely have been arguing that the consultation process around the BSO did not satisfy the discursive conditions of justification and acceptability.

Equally the participant's second 'techno-rationalist' statement can be interpreted as a straightforward objection to the decision-making process being dominated by one group, in this case 'academics', to the exclusion of those most directly targeted by the legislation. If the personal reference is taken as a genuine attempt to exempt the researcher from his generalized remarks on academics, *Commercial organization 2* could simply be arguing for the inclusion of 'key stakeholders'.

The nature of communication makes it impossible ever to be entirely clear of the meaning that another individual attributes to his words. While context provides many

indications, there is no way of establishing with any precision what the researcher took to be an aggressive and patronising tone. The interaction elicited uncomfortable reactions in the researcher, but to what extent were these the expression of an established pattern of interaction? This presents the possibility that the interview represented two entirely different experiences of the same event.

One might argue that the participant had succeeded in making the researcher responsible for his own fears. However, might power, like meaning, be similarly attributable to the moment, except that we perceive it to pre-exist? During the interview, the researcher experienced being 'talked at' and excluded from the conversation. However, on reflection he recognized he was assuming that meaning was fixed on some level.

In accepting and being subject to an ideology of power, the researcher has to acknowledge his own part in the perceptions, reactions and eventual substance of the interview. The only thing the researcher can be really confident of is his own learning in this situation.

Generalized conditions of communicative reason are subject to the acceptance or rejection of specific assertions by participants in local context bound by everyday practice (Deetz, 1992). *Commercial organization 2* could also be subjugated by the same ideology of power that he appeared to ascribe to and which might not actually be in his own interests. It is quite feasible that the participant could hold several conflicting worldviews simultaneously.

Despite his insistence of claims to authority, the interviewee also frequently spoke in favour of a more holistic approach:

> And I think that if there was a more trusting relationship between all the parties involved, … a lot of the issues that we currently see could be reasonably quickly resolved in a pragmatic and practical way.

While an interview inevitably tends to be one-sided, that doesn't mean there is no opportunity for dialogue and the chance to reframe one's views. Through his engagement with the participant and subsequent reflection, the researcher gained an experience of dialogic learning, which he could not have had individually. The process enabled him to comprehend his own specific perceptions of the problem situation as distinct from that of the interviewee.

7.5.4 Ideal speech situation

Figure 7.5 below represents an attempt to model Habermas's 'ideal speech situation'. Habermas (1989) considered this to be an 'ideal' in terms of a standard against which communicative action can be evaluated. The criteria of this model are in support of an open, sincere and mutually respectful discursive interaction. In addition to the usual criteria of efficacy, efficiency and effectiveness, elegance and ethicality are included. Reciprocity represents perhaps another criterion for monitoring and evaluation.

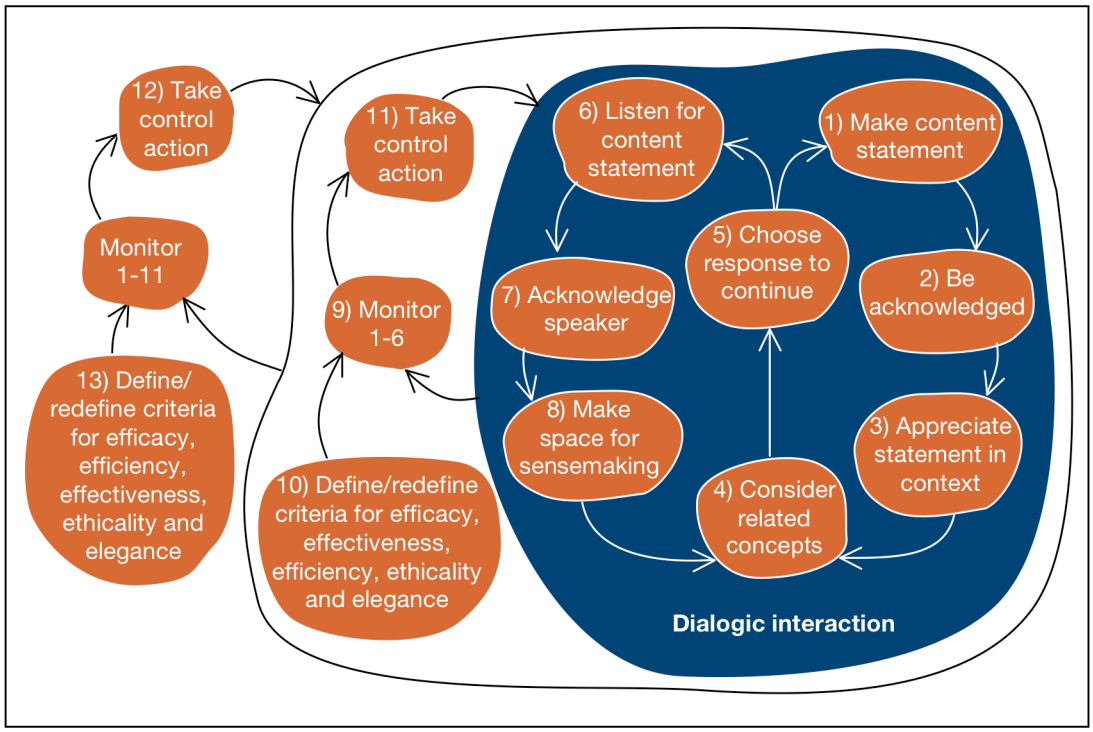


Figure 7.5 Ideal speech situation (based on Habermasian notions of ethical discourse).

The blue area shows the dialogic interaction showing a figure-of-eight to denote the notion of reciprocity where participants meet in mutual respect to take it in turns to hear and be heard. On the right hand side of this blue area, the speaker makes what Mead (1934) terms a 'significant symbol', usually a vocal gesture 1) while at 6) the listener correspondingly is receptive to this gesture. Accordingly, lines of interaction may be imagined running horizontally to and fro between listener and speaker. Points 2) and 7) are significant in that power rests in the degree of acknowledgement given to each participant.

The model includes two processes of monitoring and evaluation, which represent reflective processes of critical engagement. These denote two loops of learning: the first evaluating what is said and the second assessing the legitimacy of the discourse process. Other such loops could also apply to various activities in the dialogic interaction, such as 3) and 8) where the listener or speaker makes meaning of what has been said in the context of the interaction.

This model is included here as it represents one of the key learnings that emerged from the study. While it is not claimed as definitive, it suggests a means of exploring the premise of co-creative dialogic learning introduced as the thesis of this research.

7.6 Limitations of the study

The principal limitations were time and resources, both those of the researcher and participants. Had the scope of the study been larger, then additional participant reflection would have been achievable, involving further discussion of the conceptual models in iterative cycles of learning. The study was also limited in the time allowed to

participants to fully explore the SSM process of enquiry. Ideally participants would have the opportunity to become more familiar with the methods and engaged in their own enquiry.

Although many interviews did extend beyond their allotted time, the limitation of an hour tended to restrict the depth to which the interview process could explore the issue and participants' responses to it. Unfortunately, this was largely unavoidable due to participants' other commitments.

Being a post-hoc study with respect to the legislation of the BSO mandate placed restrictions on the possibilities for real transformation. As double-loop learning represents the result of deep reflection it is not necessarily immediate. Although participants' rich picture building and modelling prompted reflection, the extent of its capacity for transformation could well exceed the confines of the interview.

As one also participating in the problematical situation, the researcher had an influence on how the problem situation was perceived, however AR recognizes this as inevitable and that it is impossible to determine the degree to which it occurs with any certainty. Enquiry inevitably changes the thing under consideration, however the researcher was careful to reflect on his own prior assumptions and monitor the extent to which they could have distorted the discourse. Indeed, the researcher was surprised by, and thereby learned substantially from, the findings of the study.

7.7 Summary of chapter 7

This chapter presented a discussion of the findings of the present study. Over four sections, it has explored key questions identified as relating to four systemic levels at which the research engaged with the problematical situation of conducting and open and sincere debate on the discourse surrounding the introduction of biofuels to New Zealand.

The first section considered the viability and appropriateness of the BSO mandate according to its own criteria and assessed the logical defensibility of reducing the country's GHG emissions through the introduction of domestically produced first generation biofuels. This was evaluated against the same criteria stipulated in the BSO proposal documentation.

The health of the public discourse conducted through consultation over the intervention of the BSO mandate was examined in Section II. It also considered the effectiveness of government-backed initiatives to improve the reflexivity and learning of research processes in support of policy development.

Section III, considered the extent to which SSM could help improve the discourse corresponding to the research thesis outlined in the opening chapter. This section assessed SSM's contribution to improving public discourse on biofuels and other contentious issues.

Section IV attempted to evaluate the knowledge that emerged from this research. This included an assessment of both the researcher's and the participants' self-reflexive learning. The chapter concluded with an examination of the limitations of the study.

A summary of the major conclusions emerging from the four key research questions at these four levels of enquiry follows in the final chapter.

Chapter 8: Conclusion

> *"There is nothing so delightful as the hearing, or the speaking of truth. For this reason, there is no conversation so agreeable as that of the man of integrity, who hears without any intention to betray, and speaks without any intention to deceive.* Plato (originally Aristocles)

8.1 Introduction

The final chapter presents a summation of the major conclusions emerging from the discussion of findings. The previous chapter attempted to comprehend the problematic situation of the public discourse surrounding the introduction of biofuels to New Zealand through the Biofuels Sales Obligation policy. It addressed this problem situation through four systemic levels of enquiry using four key questions. These were:

5. Is the introduction of the BSO mandate a viable and appropriate intervention according its own criteria?
6. How 'healthy' was the discourse conducted in this case?
7. How, and to what extent, might the use of SSM facilitate co-creative dialogue in public discourse?
8. What has the researcher learned from his participation in this process and to what degree is this learning generalizable and transferable?

Based on the reasoning in the discussion, this chapter concisely and unequivocally presents the conclusions of the research and also identifies areas of further study.

8.2 Evaluation at four levels of enquiry

8.2.1 The BSO mandate

From the investigation conducted in this project, the conclusion of the research is that the BSO mandate is not a viable and appropriate intervention according to its own terms. While purportedly a 'green' or 'environmentally-friendly' policy initiative, the decision to issue a mandate for first generation biofuels does appear, in the words of *Consumer 4* to "*be the right solution*". In responding to the country's obligations under the Kyoto Protocol, the Government appears to have been motivated to act by a misplaced desire to be seen to be doing the 'right thing' internationally and at home. However as Charles *et al.* (2007) argue, promoting biofuels consumption could prevent the replacement of first generation biofuels with more efficient and environmentally less damaging second-generation fuel types. Indeed in introducing biofuels at this time, the Government is not merely in danger of 'doing the right thing wrong', but of 'doing the wrong thing right', as Ackoff (2004) explains:

> The righter we do the wrong thing, the wronger we become. When we make a mistake doing the wrong thing and correct it, we become wronger. When we make a mistake doing the right thing and correct it, we become righter. Therefore, it is better to do the right thing wrong than the wrong thing right (Ackoff, 2004, p. 2).

The policy development was based on massive assumptions that were not adequately explored; this evinced narrow and uncritical thinking that unchecked is liable to continue to exacerbate the problem of New Zealand's GHG emissions.

8.2.2 Healthy public discourse

The following points represent six fundamental failings that emerged from an assessment of the discourse surrounding the BSO, findings that were discussed in detail in the previous chapter.

8.2.2.1 Emphasis on techno-rationalism over learning through action

Techno-rationalist approaches are typified by the exclusion of stakeholders from participating in the decision-making process on the ideological justification that few people have the necessary technical expertise or access to information to contribute effectively. The dominance of techno-rationalist approaches in the discourse systemically distorted public consultation and decision-making around the BSO. This led to the exclusion of important social issues such as the place of values, identity or cultural representation in this debate.

8.2.2.2 Self-referential and 'egocentric' autopoeitic enquiry

Morgan (1997) explains the 'egocentric' tendency for organizations to resist adapting to changes in their external environments. This self-referential tendency was evident in the consultation processes in the biofuels debate in which the government and its agencies became increasingly disconnected from anything that they did not themselves produce. Systemically distorted and 'autobiographic' communication is inherent when normative views are not challenged. Where an assumed consensus exists, discursive closure inevitably follows, with organizations and social systems operating as closed systems to the extent that institutional arrangements are taken as self-evident (Deetz, 1992).

8.2.2.3 Single loop rather than double loop learning

Argyris (1996) characterizes single-loop learning as a level of adaptive change involving incremental adjustments to strategies or actions while the underlying values on which they're based remain unaltered. Without any provision for participant reflection and learning in the consultation, the exploration of the problem situation was restricted to a very small hermeneutic circle that took little or no account of what the enquirers did not already know at the beginning of the process. As the SPEaR models (Figures 7.2 and 7.3) showed, there was a lack of critical reflexivity leading to an overly constrained, and self-referential process. However with double-loop learning, the underlying assumptions of enquirers are tested through critical reflection (Ellis & Kiely, 2000), a process that can develop more holistic ways of thinking which could lead to the systemic transformation necessary to tackle climate change.

8.2.2.4 Incremental rather than transformational change

By following a goal-orientated approach, the decision process emphasized incremental rather than transformational change. While the Government claims to be committed to reducing the environmental impact of society's activities, the discourse was restricted to the 'strategic choice' of a limited number of superficial options (Stacey, 2007).

8.2.2.5 Confusion over instrumental and communicative action

The action of the consultation process was orientated to purposive 'success' instead of being concerned with reaching an understanding. As Deetz (1992) asserts, in discursive situations where a party is not unintentionally deceiving him or herself, manipulation can occur where strategic action is concealed under the appearance of communicative action. In this case, the public discourse became distorted when the consultation process was cynically used to legitimate a prior decision.

8.2.2.6 Collapsing the levels

From an exploration of the conceptual models it would seem that the BSO initiative collapsed the levels of the 'holon' in which it was operating. By assuming that biofuels represented a viable solution to the issue of the country's rising GHG emissions, the consultation process promptly shifted the discourse from a strategic level to a tactical level. Whereas strategy involves long-term reflective thinking, tactics are concerned with the means of immediate action. The procedures employed to engage with the complex and ill-defined issue of climate change exhibited narrow, linear and goal-orientated thinking, by approaching the acquisition of future knowledge as a process of funnelling existing information into policy.

8.2.2.7 Unhealthy discourse

The conception of 'healthy' discourse employed in this research is as a systemically co-creative process that involves learning and differentiation for its participants (Deetz, 1992). As the official discourse process did not fulfil these terms, it cannot consequently be considered 'healthy'. Instead the consultation process represented communication that was systemically distorted according to the principles set out in the literature and reflected the systemic failure of those mediating the discourse process to provide the conditions of social representation, open dialogue and reflexivity.

By not ensuring a wider debate during the consultation process and not, even then, taking full account of the views of those participating, the resultant policymaking risked its own legitimacy by denoting a serious failure of representation according to democratic principles. The study data suggests that the public discourse surrounding the BSO served to reinforce some stakeholders' sense of powerlessness, disengagement and disillusionment with the political system. This is not ultimately in the democratic interests of society as a whole or even the individual interests of those who might benefit most from the dominant ideology.

Such a failure of representation does not seem consistent with the avowed collective interests of a small population democracy, particularly one that foresees its economic

future in technological innovation and creative entrepreneurship. Public discourse needs to provide collaborative channels of communication if alternative viewpoints are to be heard and innovative ideas gain support.

Ideologies of power dominate through the insistence of a single worldview at the expense of diversity; they inhibit radical alternatives and impede more politically critical questions that are necessary to creatively challenge powerful normative presuppositions. The data showed the discursive process demonstrated inherently restrictive and self-referential thinking, which contrary to the espoused purpose of transformational improvement did not broadly gather and disseminate knowledge and understanding, but encouraged a distinct body of knowledge to become reified. With respect to the implications of climate change, this represents a 'pathological' distortion of communication in Habermasian terms.

Ackoff quotes Einstein with reference to the frequent failure of those in positions of executive power to understand their own or the patterns of thought of others.

> Without changing our pattern of thought, we will not be able to solve the problems we created with our current patterns of thought. (Einstein, cited in Allio, 2003, p. 21)

Ackoff (2002) argues that leaders need to learn to think more holistically and reflexively. By engaging in participatory enquiry and co-creative problem solving people become better informed. As Bohm (1996) contends, engaging with diverse views in conditions where they are supported to comprehend the perspectives of others through dialogue encourages enquirers to reflect and possibly reframe their own points of view. There are consequently lessons for future consultation processes and R&E of policy development in the present examination of discourse.

8.2.3 SSM and co-creative dialogue

By applying systems concepts to qualitative research, Soft Systems Methodology was particularly suitable for the analysis of multiple stakeholder discourse. As examined in the Methodology chapter, SSM is philosophically compatible with a number of approaches to social research. Its conception of a problem situation or holon accommodates multiple worldviews, meaning it offers an inclusive, holistic method of problem solving without championing a specific ideology. Thus it could be adopted as an approach to public consultation in which proposed solutions and the various worldviews of stakeholders were modelled, however further research would be needed to establish the technical and cultural feasibility of implementing such an approach.

The use of rich picture building in the present study allowed participants to reflect on their own assumptions. The findings therefore suggest that acts of visual representation can contribute to a healthy discourse around contentious issues, provided they are used to examine the ideologies of power of dominant and subjugated groups.

SSM allows participants to structure a dialectical investigation while also providing a method of establishing propositional criteria of evaluation. It therefore offers a

potentially valuable approach to public consultation and the R&E of policy development.

8.2.4 Transferable learning

The study engaged with the problem situation of the discourse surrounding the introduction of biofuels via the BSO mandate at four distinct but interrelated systemic levels. The purpose of this study was:

> to examine the discursive engagement of stakeholders in the decision to develop biofuels in New Zealand via the BSO mandate by conducting an enquiry using SSM to uncover insights into dialogic approaches to problem solving facilitated by visual representation.

The design of the study ensured that the transformation in the above definition was fulfilled. The researcher interviewed 14 stakeholders and conducted a focus group on the principles of discourse presented in this debate. Using the principles of SSM, the study included the development of rich pictures in order to investigate the key issues dividing the debate and examine power relationships. The relationships between espoused viewpoints and underlying values were assessed with reference to documentation and models of activity. This represents transferable learning by providing "*an argument which could be explicitly retraced at any time with links to supporting evidence*" (Checkland & Scholes, 1989, p. 199)

Stakeholders would ideally learn to develop their own modelling skills as part of an ongoing process of exploration. However the scope of the present study did not extend to a further cycle of reflection in which participants were able to fully engage with the conceptual models included in the Analysis. Nonetheless, the researcher was able to explore the application of SSM in context and reflect on his own discursive assumptions. This process of reflection provided insights into specific and diverse perceptions of the problem from different viewpoints. The researcher also gained feedback from the participants about what they learned through their experience of the enquiry, which suggested that SSM's cycle of learning was generalizable and transferable, not merely with regard to the content of the enquiry, but at an epistemological level.

SSM engages with each problem situation as though it were an open system rather than perpetuating the normative techno-rationalist approach where problem solving is understood as a process of narrowing or closing down to discrete moments of decision-making. The present study found that the consultation process was itself part of the problem situation, whereby all those participating in the process were perpetuating a reductive approach to knowledge.

Greater familiarity with the use of the tools in SSM is liable to enable more stakeholders to be open to the reflective cycles of systems thinking and action research. As a basis of public discourse this would facilitate the way that different worldviews are understood and the values that inform any discourse. SSM's cycle of learning includes a discursive exploration of those values, the things that we as stakeholders most value. Therefore,

the more that the cycle of learning extends beyond the consultation process to allow problem solving on a day-to-day basis, the more it allows us to improve our negotiation of uncertainty. By creatively exploring possible solutions, we increase our potential for innovation by being able to hold a point of uncertainty open for longer and not submitting to our anxieties for closure.

8.3 Areas identified for further research

The insights provided by the research suggested a number of significant areas of further study.

As an enquiry using AR, the cycles of learning in the current study were comparatively few, which inevitably placed restrictions on the depth of participant reflection. A larger research project allowing for additional iterations would provide the researcher with a better opportunity to evaluate the use of systemic thinking in the facilitation of public discourse. Further iterations would enable participants to learn the techniques of conceptual modelling and to further explore their reflective learning and understanding, independent of the researcher.

There is scope for further research in examining the potential of SSM in public discourse, particularly given the limited scope of the present project. The small sample of individuals who participated in this study was not necessarily representative of a broader spectrum of society. The extent to which acts of visual representation could contribute to a healthy discourse around contentious issues needs further exploration. This could include research on learning approaches to public discourse and how the use of SSM's conceptual modelling combined with online technology might contribute to the facilitation of stakeholder engagement.

While SSM encourages cycles of double-loop learning, it does not necessarily promote the triple loop learning that Bohm (1996) advocates. Triple-loop learning requires that one not only reflects on what one is thinking and the assumptions on which those thoughts are based, but also reflects on how one thinks and makes meaning from one's communication with others. This suggests another avenue of potential investigation involving Habermas's (1989) ideas of emancipatory interest with reference to psychotherapy. It would examine the extent to which processes of deep dialogue can help us to explore the ideologies by which we understand and are restricted by our comprehension of the world.

8.4 Summary of chapter 8

The premise introduced at the beginning of this thesis was that the sincere engagement of willing participants in a shared process of enquiry could create conditions in which they are able to listen to the viewpoints of others without prejudice and reflect, and possibly reframe, their own points of view. The participant feedback, particularly from those taking part in the focus group, indicates that this could be so.

However, three major themes emerged from the study, which have an important bearing on the cultural feasibility of this premise. The first is the idea of interrelatedness. In the context of the current research it concerns the stakeholding each of us has in the discourse on issues attendant to our social democracy, and as we are all affected, the role each of us has in addressing global issues such as climate change.

The second theme concerns reflexivity, by which we challenge our assumptions and thereby continue to learn. This is one of the essential conditions for co-creativity and innovation as it enables us to make connections between diverse ideas and distinct pools of knowledge.

The third concerns dialogue. The two themes already mentioned are included in dialogue as by engaging in a shared process of enquiry we become more self-reflexive individually and societally. The notion of interrelatedness also argues for our interest in ensuring conditions of discourse that contribute to a more tolerant and innovative society. These three themes are vital for the healthy autopoeitic functioning of a participatory democracy.

This thesis began by considering the subject of biofuels within the wider context of international events. It described how the governments of the world are conversing about what action to take with regard to climate change. Therefore the implications of this research extend beyond the present debate on biofuels to encompass the way we communicate, and consequently the way we understand each other and the problems of the world.

List of Abbreviations

AA	Automobile Association
AR	Action Research
BSO	Biofuels Sales Obligation
CATWOE	An acronym for analysis within SSM, CATWOE stands for Customers, Actors, Worldview, Owners, Environment
CP1	The first commitment period of the Kyoto Protocol operating from 2008 to 2012
CRI	Crown Research Institute
CST	Critical Systems Thinking
E5	Blended fuel of 5% bioethanol added to petroleum
E10	Blended fuel of 10% bioethanol added to petroleum
EECA	Energy Efficiency and Conservation Authority
ERMA	Environmental Risk Management Authority
FAO	Food and Agriculture Organization of the United Nations
GHG	Greenhouse gas
IKB	Improving the Knowledge Base in Social Practice, a 2001 Ministry of Social Development review initiative, which aimed to enhance the production and dissemination of research knowledge
IPCC	Intergovernmental Panel on Climate Change
MED	Ministry of Economic Development
MfE	Ministry for the Environment
MIA	Motor Industry Association of New Zealand
MVIA	Motor Vehicle Importers and Agents
MOT	Ministry of Transport
PAR	Participatory Action Research
NEECS	National Energy Efficiency and Conservation Strategy
NGO	Non-Governmental Organization or for the purposes of the research, a representative of such an organization
R&E	Research and Evaluation
SOE	State-Owned Enterprise
SPEaR	The Social Policy Evaluation and Research committee

SSM	Soft Systems Methodology
SUV	Sports Utility Vehicle
TERNZ	Transport Engineering Research New Zealand Ltd
TLA	Territorial Local Authority
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
NZIER	New Zealand Institute of Economic Research
NZPA	New Zealand Press Association

Appendix I

Register of submissions made to the Ministry of Transport on BSO

Compiled 2 November 2006

Oil Industry

1 BP Oil New Zealand

2 Chevron New Zealand

3 Gull

4 New Zealand Refining Company

5 Shell NZ

6 Mobil (informal only)

Biofuels Industry – Producers and Suppliers

7 Argent Energy NZ

8 Biodiesel Australasia Limited (AH)

9 Biodiesel Australasia Plant operator (JB)

10 Biodiesel Australasia Plant operator (SC)

11 BioDiesel Oils NZ

12 Biodiesel Producers Limited

13 Biodiesel Putauaki Ltd

14 Biodiesel Fuels (NZ) Limited

15 Lanzatech NZ Limited

16 Proprietors of Taharoa Block C Incorporation

Councils

17 Auckland Regional Council

18 Environment Canterbury

19 Local Government NZ

20 Waitakere City Council

Consultants

21 MacLeod & Associates (NZ) Ltd (TS)

22 PFS Consultants Limited

23 PowerCoast Ltd.

Energy Industry

24 Meridian Energy Limited

25 Solid Energy New Zealand Ltd

Interested individuals

26 Ben Clark

27 John Wilson

28 Michael D Malloy

Motor Vehicles and Transport

29 Australasian Association of diesel specialists, New Zealand Branch

30 Mitsubishi Motors New Zealand Limited

31 Motor Industry Association

32 Motor Trade Association

33 New Zealand Automobile Association Inc

34 Road Transport Forum NZ

35 Silver Fern Shipping Limited

NGOs

36 Agri Energy/Federated Farmers

37 Climate Defence Network

38 Greenhouse Policy Coalition

39 IPENZ

40 Meat Industry Association and The Renderers Group

41 Zero Waste NZ Trust

Universities and Research Organizations

42 Faculty of Law, University of Otago (CW)

43 The University of Auckland Business School

Appendix II

'Analysis One'

I. 'Client' – University of Waikato – Professor Richard Varey
Government funding for Research into Dialogue around Biotechnology Issues.

II. 'Practitioners' – Peter Crowe & Dr Terry Nolan

III. 'Issue Owners' – Stakeholder groups

1. Government
    a. Prime Minister – Helen Clark
    b. Transport Minister – Annette King
    c. Associate Transport Minister – Judith Tizard
    d. Climate Change Minister – David Parker
    e. Ministry of Economic Development: Minister – Trevor Mallard, CEO – Geoff Dangerfield
    f. Biofuels Officials Group (including representatives from the Ministry of Agriculture and Forestry, Ministry for the Environment, Investment NZ, NZ Customs)
    g. Crown Research Minister – Steve Maharey
    h. EECA
    i. Ministry of Transport
    j. Ministry of the Environment
    k. Ministry of Economic Development
    l. Regional councils
    m. City Councils
2. Opposition parties
    a. The Green Party – Jeanette Fitzsimmons
    b. The National Party – John Key
    c. United Futures Party – Peter Dunne
    d. New Zealand First – Winston Peters
    e. ACT – Rodney Hyde
3. Environmental Groups
    a. Action for the Environment – Carrick and Norina Lewis
    b. Sustainable Energy Forum – John Blakeley
4. Philanthropic Organisation
    a. Tindall Foundation – Stephen Tindall (investor in LanzaTech)
5. Biotechnology Research Organisations
    a. Crown Research Institutes
        i. Scion – Elspeth MacRae
        ii. AgResearch – Dr Andrew West, Chief Executive

b. Biotechnology Companies
    i. ViaLactia (Fonterra) – Ashvin Sood
    ii. AgriGenesis BioSciences – Stephen Hall
    iii. New Zealand Ethanol – Ian Coard
    iv. Girvan Institute of Technology, near Stanford University, CA (Aquaflow a member)
c. Research Departments in Educational Institutions
    i. University of Waikato – Professor Richard Varey
    ii. University of Sydney – Associate Professor Ray Kearney (particulates in fossil fuels). Recent guest of Tindall Foundation & LanzaTech

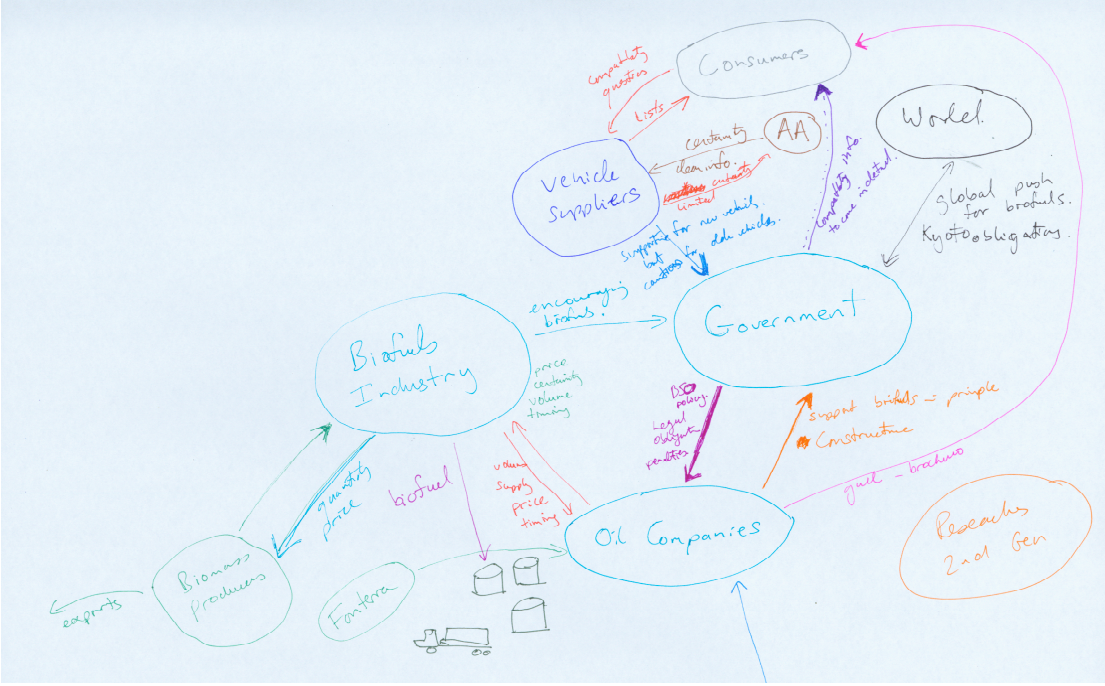
6. Biofuel manufacturers
    a. BioDiesel Oils (tallow) – Tom McNicholl
    b. Argent (tallow) – Dickon Posnett
    c. Pacific BioFuels
    d. BioJoule (salix) – Jim Watson
    e. Aquaflow Bionomic (algae sourced from sewage ponds) – Barrie Leay
    f. LanzaTech (maize, industrial waste gases) – Dr. Richard Forster, COO and Director
    g. Mascoma, MA. – Colin South
    h. Diversa Corporation, San Diego/Florida –
7. NGOs
    a. Sustainable Business Network – Mark Roberts
        – Marion Wood, SBN National Board member
        – Karen Davis, Northern Regional Manager
    b. EPMU (Engineering, Printing and Manufacturing Union)
8. Petrol companies
    a. Shell
    b. Caltex
    c. British Petroleum
    d. Gull Petroleum
9. Feedstock suppliers
    a. Bio-ethanol production:
        i. Whey, i.e. Anchor Ethanol (Fonterra) – Roger Ryan
        ii. Cellulose – salix, grass, wood waste, i.e. Carter Holt Harvey, salix copse growers
        iii. Industrial waste gases from Glenbrook Steel Works
        iv. Maize – US
        v. Sugar cane – Brazil
    b. Bio-diesel production:
        i. Tallow (150,000 tonnes produced a year)
        ii. Rapeseed

iii. Palm Oil (Malaysian)
iv. Algae – sewage
v. Used cooking oils (only 5000 tonnes produced a year)
vi. Solvent waste

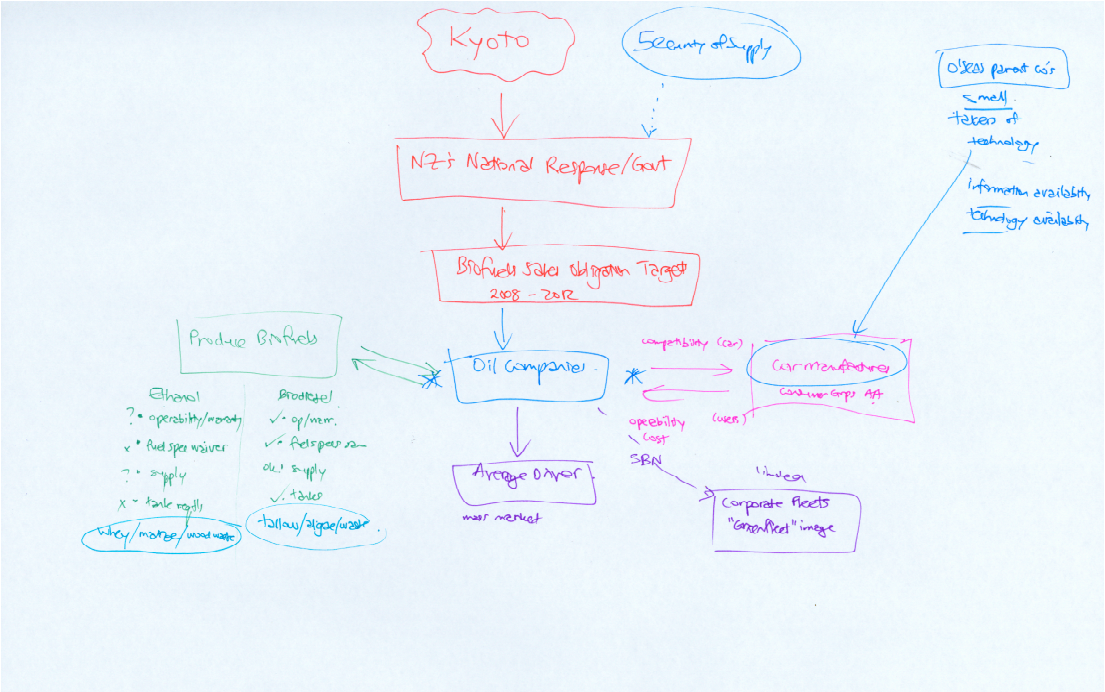
10. Consultants & Venture Capitalists
    a. Direct Capital – Howard Moore (BioPacificVentures)
11. Motor Vehicle Industry Groups
    a. Vehicle suppliers, i.e. car importers and dealerships
12. Fuel consumers
    a. Individual private vehicle users
    b. Private vehicle user groups, i.e. AA
    c. Public transport operators, i.e. Stagecoach buses,
    d. Heavy transport industry (mainly diesel users), i.e. Mainfleet
    e. Farmers groups, i.e. Federated Farmers
    f. Commercial fleet operators, i.e. Waste Management trucks,
13. Current users of feedstock materials
    a. Lactose
        i. Food products
        ii. Liquor manufacturers, i.e. 42 below
        iii. Industrial solvents
    b. Tallow
        i. Domestic tallow users (12,000 tonnes a year)
        ii. Asian tallow users (30,000 a year)
            - Soapmakers
            - Industrial oil manufacturers
            - Stock feed manufacturers
    c. Maize
        i. Suppliers of maize as livestock feed
        ii. Buyers of maize as livestock feed
        iii. Human consumers of maize
14. Suppliers of alternative petroleum oxygenates, i.e. MTBE (Methyl Tert-Butyl Ether)

Appendix III

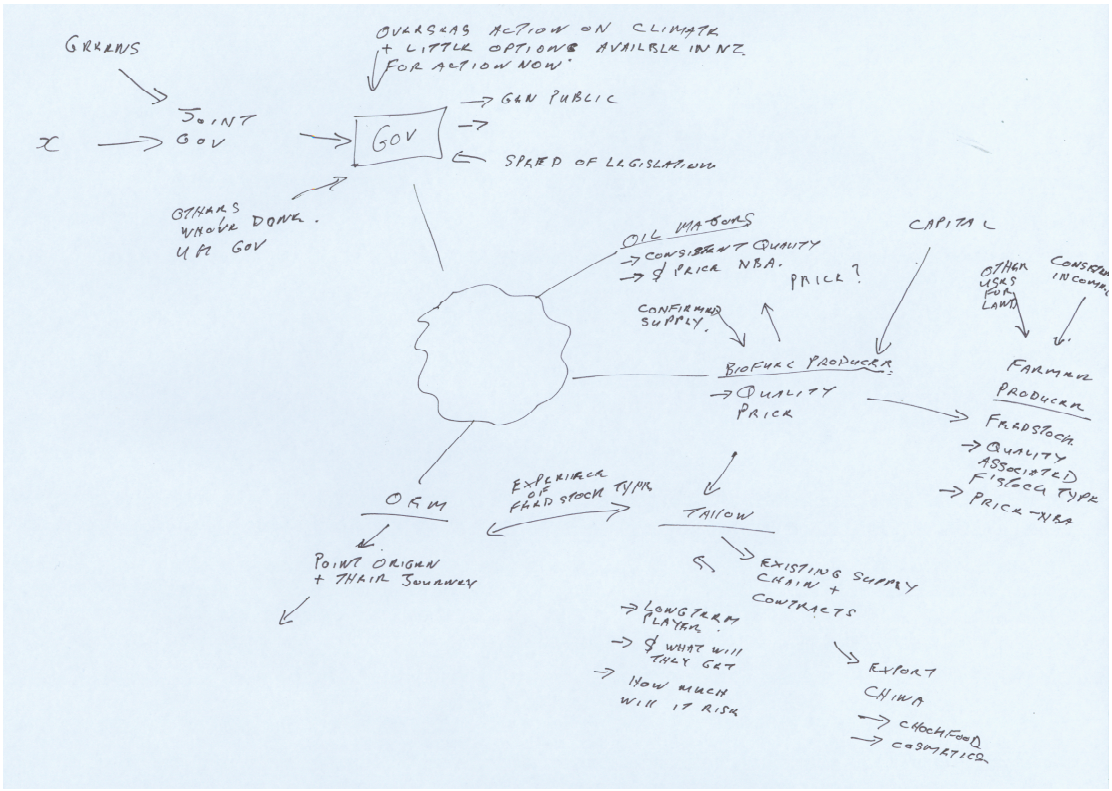
Participants' rich pictures



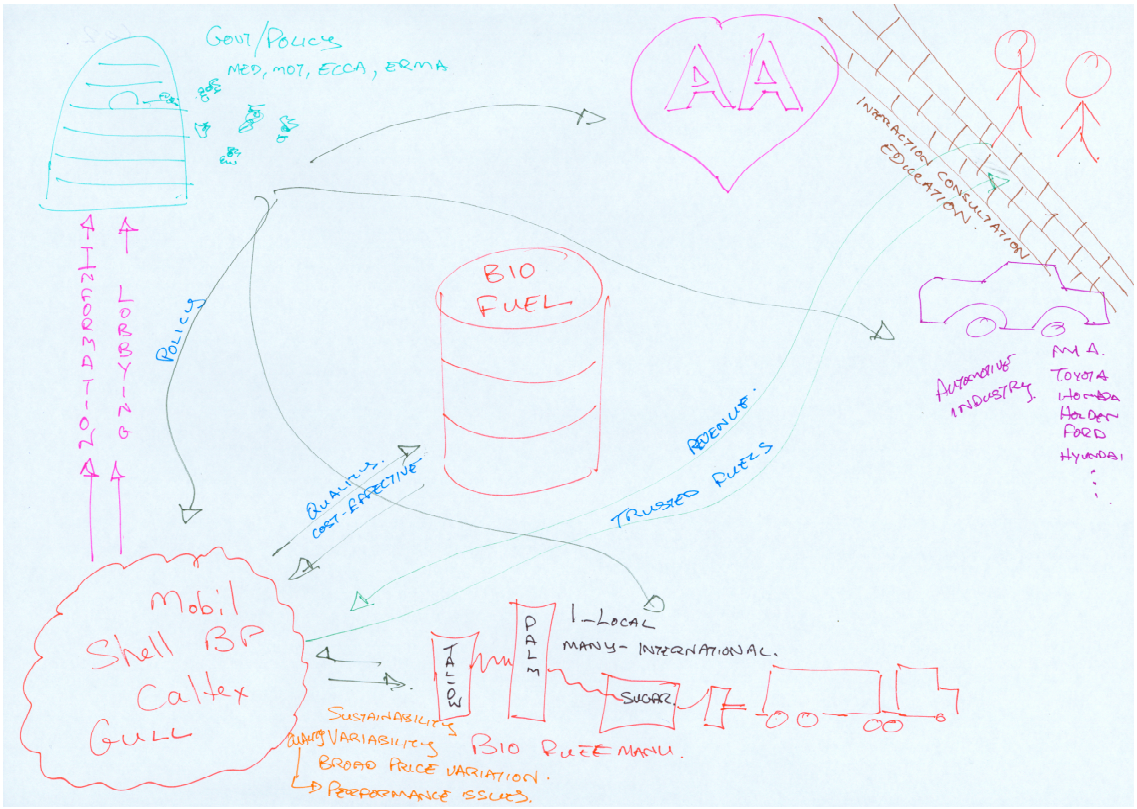
Policymaker 1



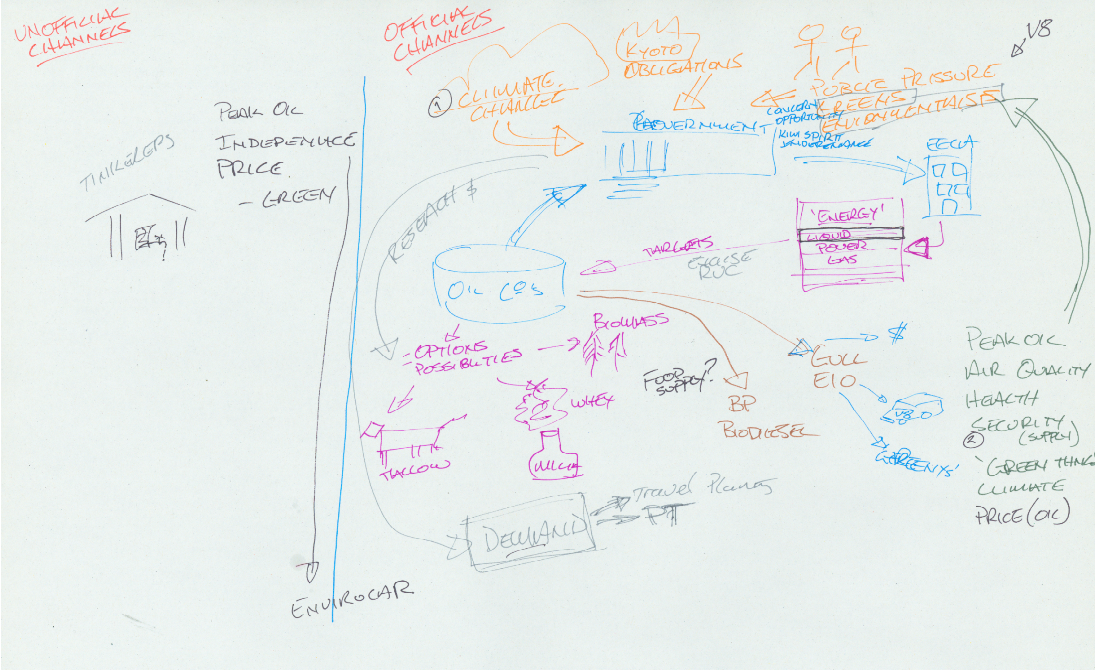
Policymaker 2



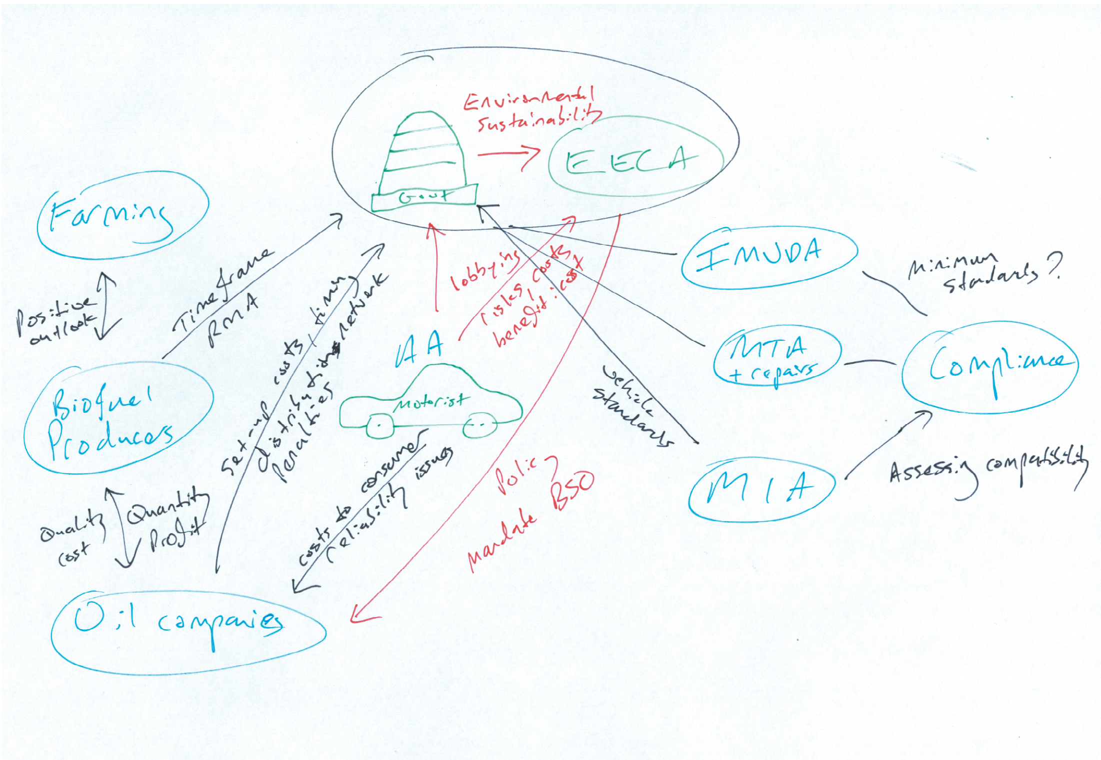
Commercial organization 1



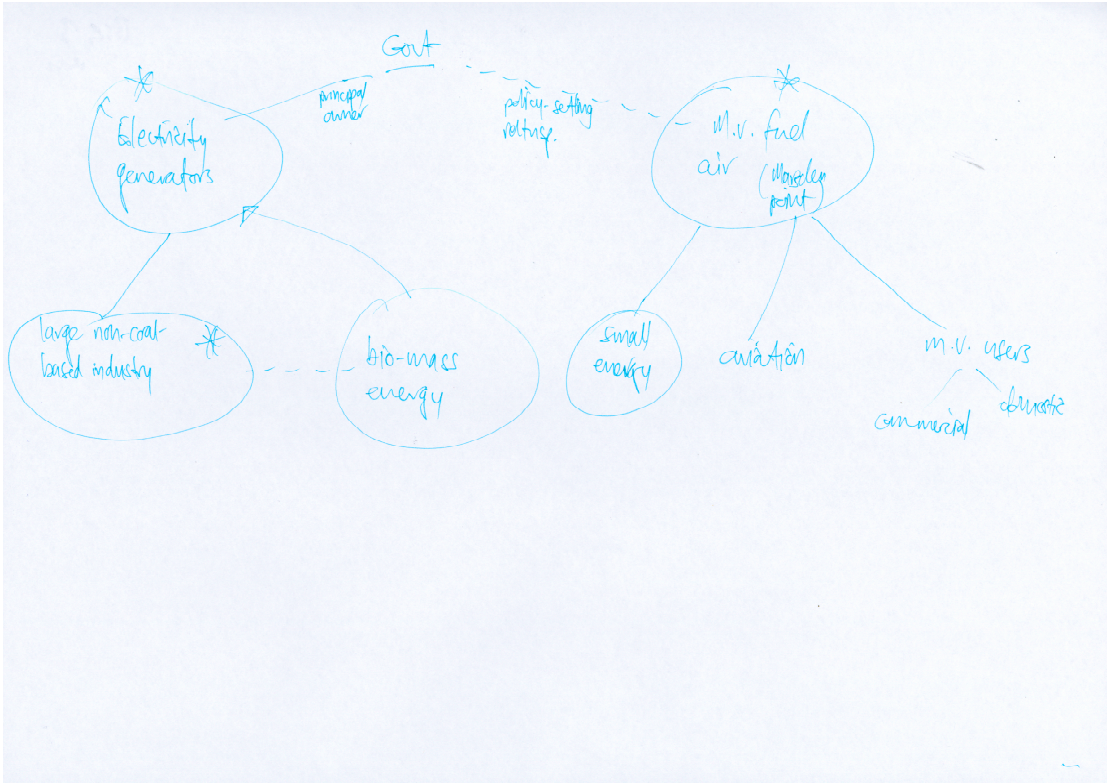
Commercial organization 2


UNOFFICIAL CHANNELS
OFFICIAL CHANNELS
CLIMATE CHANGE
KYOTO OBLIGATIONS
FORCE PRESSURE
GREENS
ENVIRONMENTALISTS
GOVERNMENT
V8
EECA
PEAK OIL
INDEPENDENCE
PRICE
- GREEN
RESEARCH $
OIL COs
'ENERGY'
TARGETS
EXCISE
RUC
OPTIONS
POSSIBILITIES
BIOMASS
WHEY
TALLOW
FOOD SUPPLY?
BP
BIODIESEL
GULL
E10
'GREENYS'
PEAK OIL
AIR QUALITY
HEALTH
SECURITY (SUPPLY)
'GREEN THING'
CLIMATE
PRICE (OIL)
DEMAND
Travel Plans
ENVIROCAR

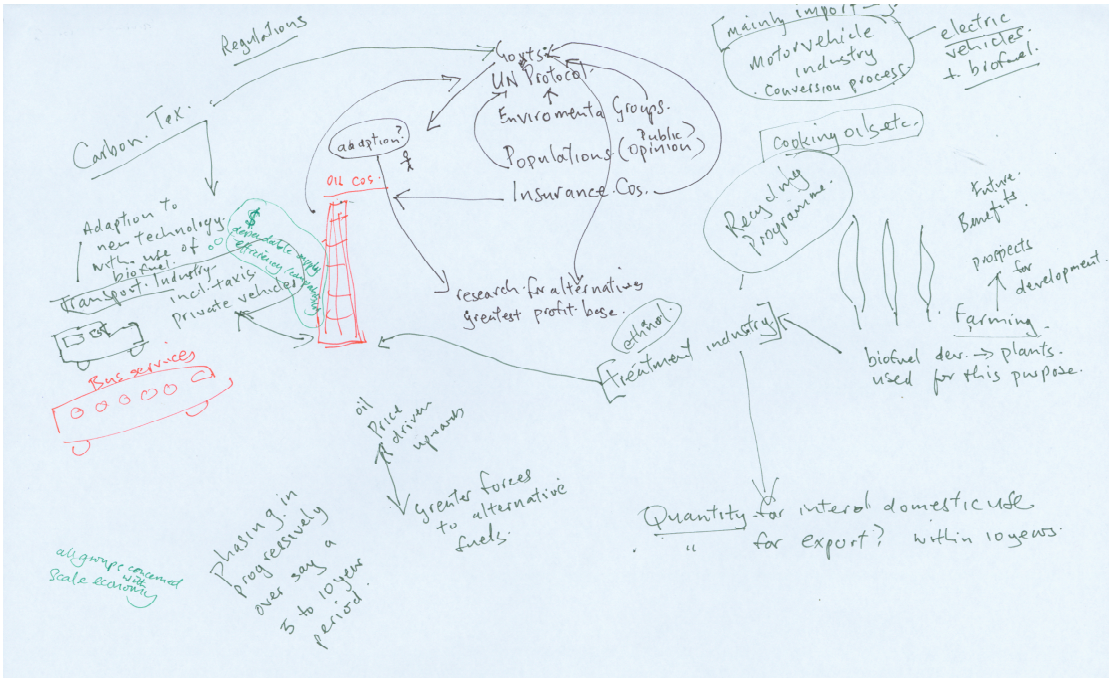
NGO 1


Environmental Sustainability
EECA
Govt
Farming
Positive outlook
Time frame
RMA
Biofuel Producers
set-up costs, timing
distribution network
penalties
AA
Motorist
lobbying
risks costs
benefit : cost
Policy
mandate BSO
costs to consumer
reliability issues
vehicle standards
IMVDA
minimum standards?
MTA + repairs
Compliance
MIA
Assessing compatibility
Quality
cost
Quantity
Profit
Oil companies

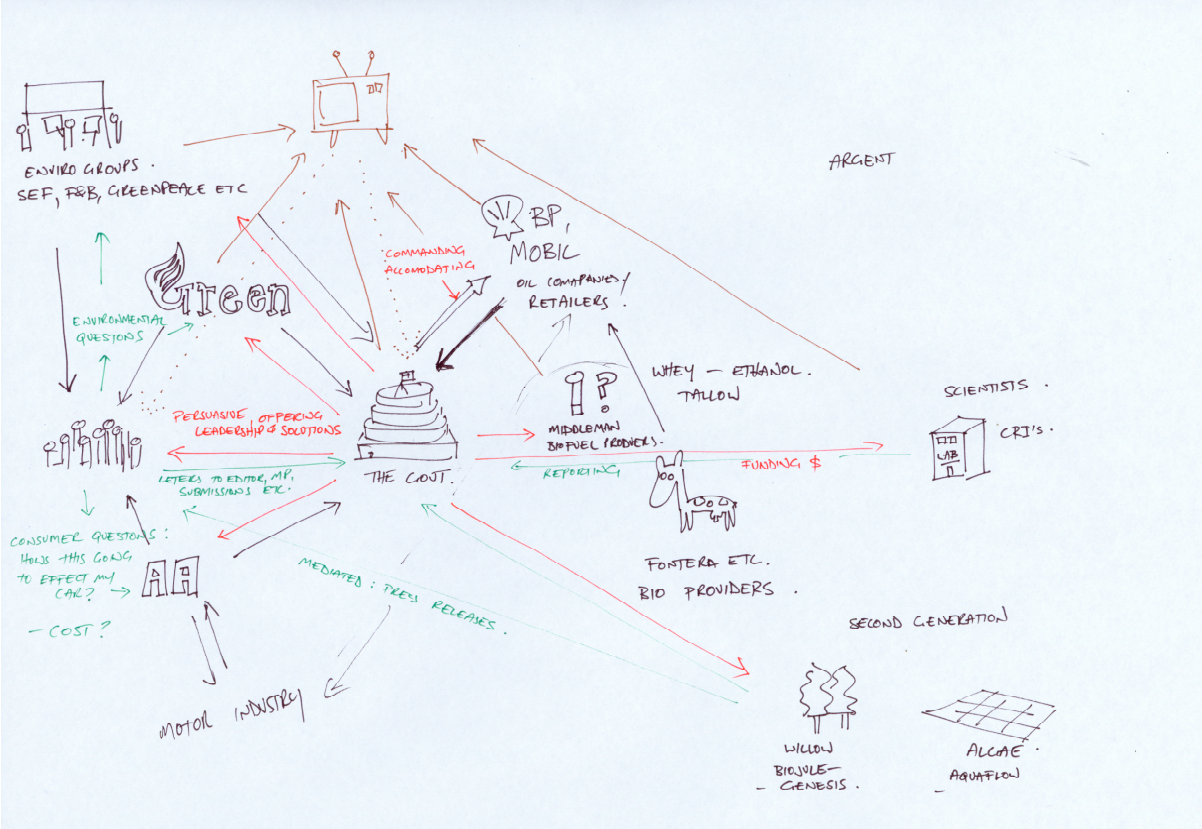
NGO 2



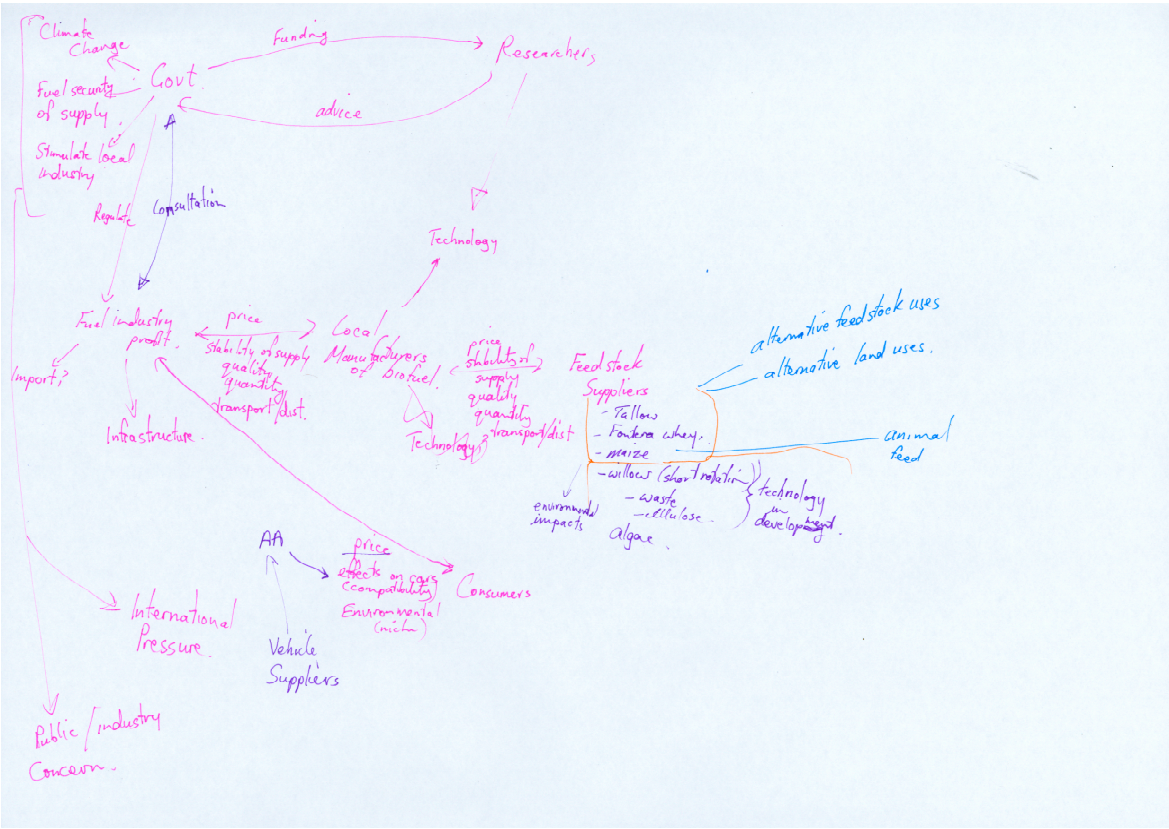
NGO 3



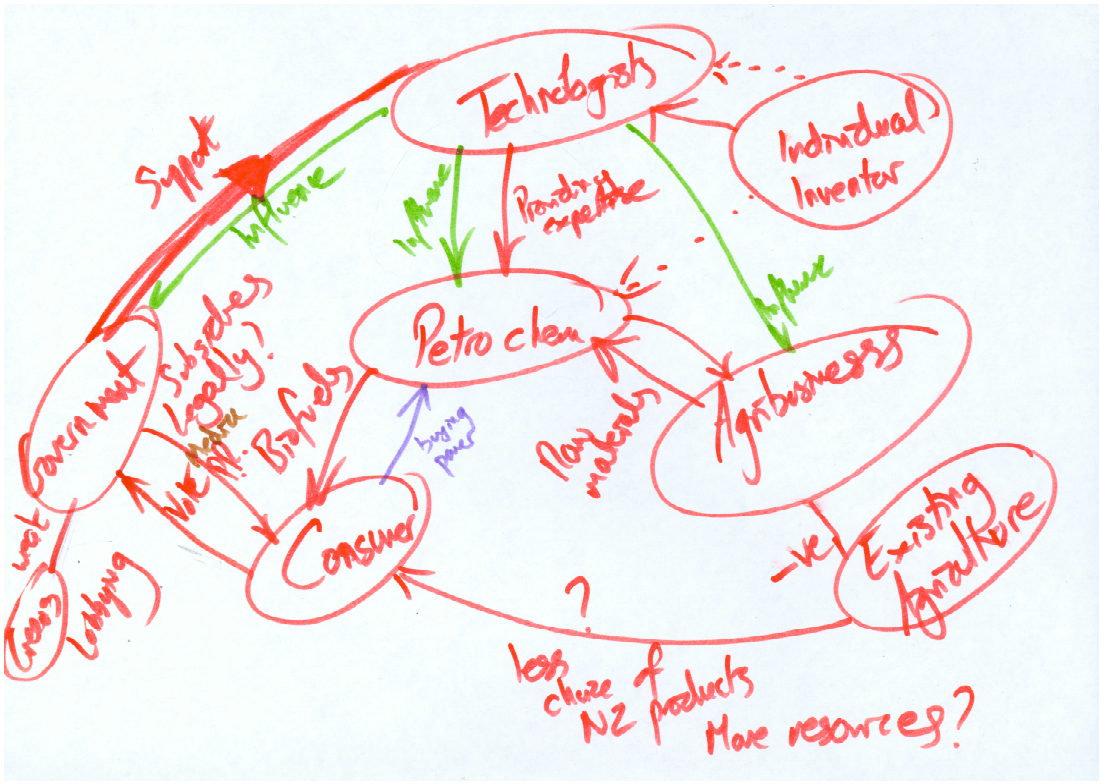
Environmentalist 1



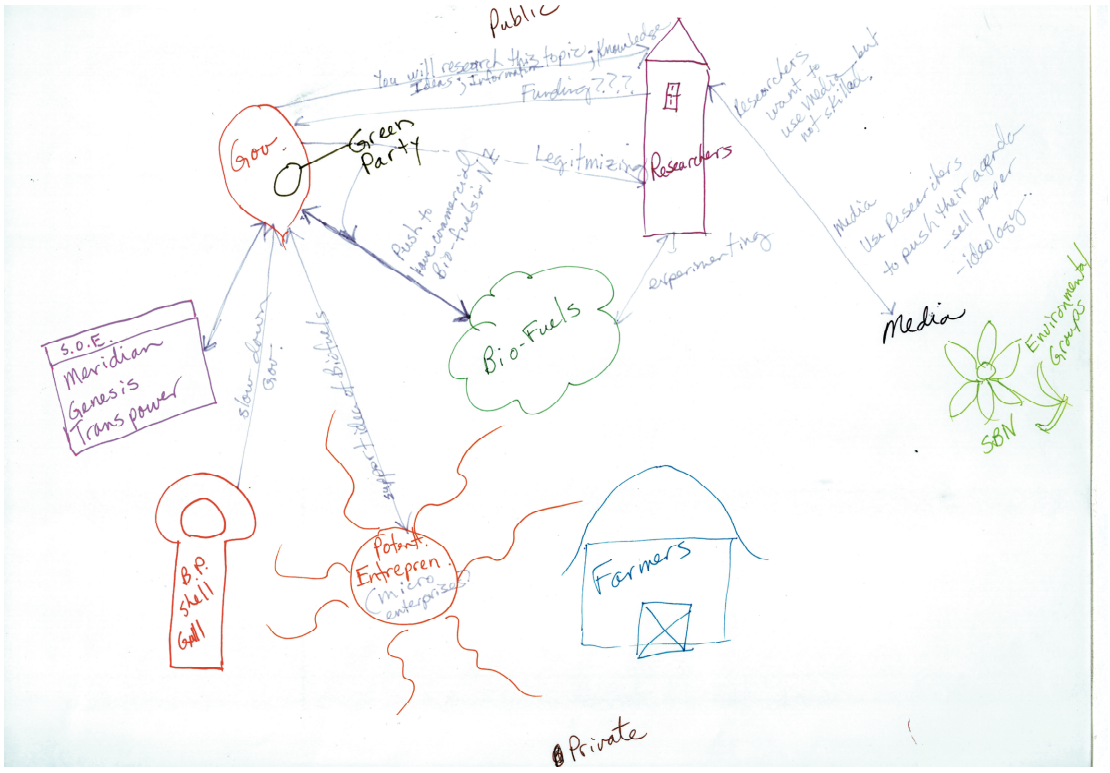
Environmentalist 2



Scientist 1

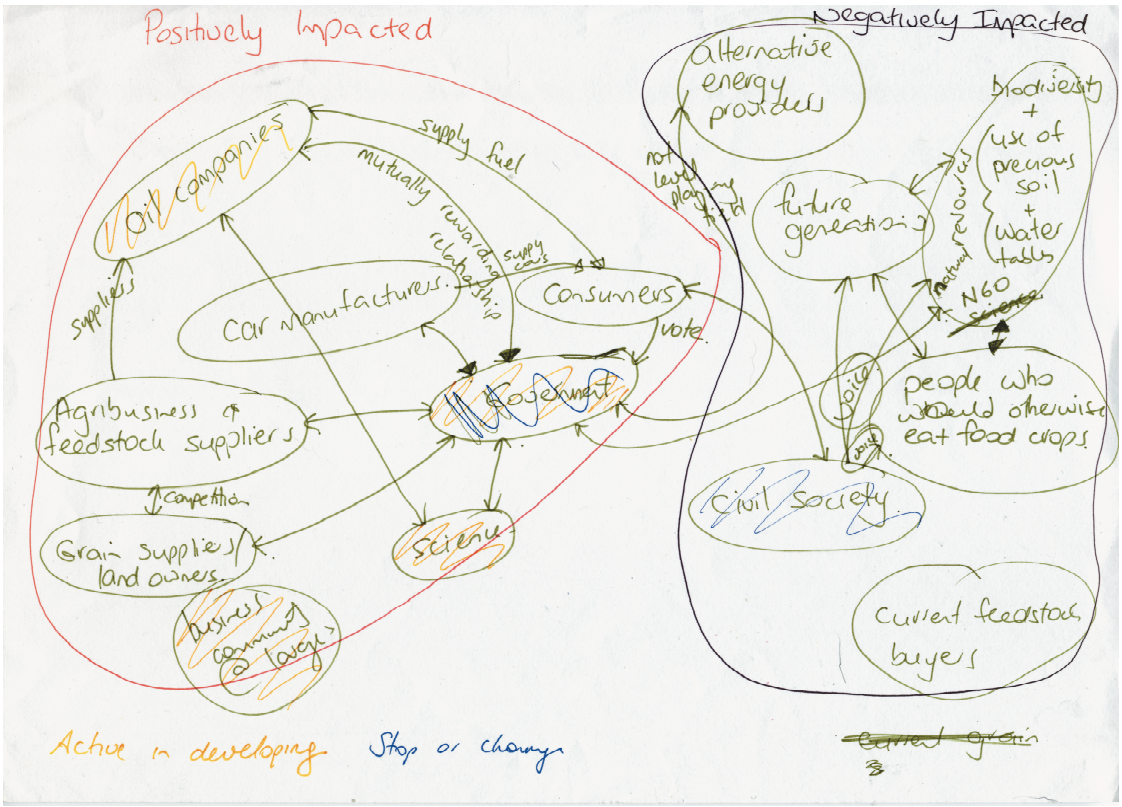


Consumer 1



Consumer 2

Consumer 3



Consumer 4

Appendix IV

Participants' root definitions and CATWOE analysis

Policymaker 1

Audio 20070815 0925

Root definitions – (P Q R) Do P by Q to contribute to achieving R

Root definition of BSO:

> To reduce reliance on fossil fuels by the introduction of biofuels towards the increased sustainability of the transport sector and the reduction of greenhouse gases.

Root definition of discourse:

No definition given

CATWOE

C: Biofuels industry (current and aspiring), second generation biofuel producers (research), oil companies – fuel suppliers (big 4 multinationals), fuel retailers (big 4 plus gasoline alley, supermarkets), consumers (retail – general and commercial, i.e. bus & trucking fleets), biomass producers (tallow sellers, maize growers, oil seeds, waste cooking oil providers), vehicle importers, vehicle sellers, vehicle manufacturers, vehicle repairers, government (policy makers, energy regulators, industrial development – potential revenue opportunities).

A: Biofuels industry (current and aspiring), oil companies – fuel suppliers (big 4 multinationals), biomass producers (tallow sellers, maize growers, oil seeds, waste cooking oil providers), government (policy makers, energy regulators, industrial development).

T: New Zealand as a user of solely fossil fuels – to NZ as a developer and user of a proportion of biofuels

W: Central role of government. Strong governmental leadership through regulation over recalcitrant oil companies. "*They're [the oil companies] being quite constructive at the moment because they realize that government has made a fairly clear decision on policy and therefore there's not much point in them just trying to fight against it forever.*"

O: Government, oil companies (more limited).

E: Not strong enough economic imperative for oil industry to change without BSO intervention, need for long-term economic viability however.

Policymaker 2

Audio 20070816 0948

Root definitions – (P Q R) Do P by Q to contribute to achieving R
Root definition of BSO:

> The promotion of NZ biofuels production through the Biofuels Sales Obligation as a multi-wedge strategy towards getting our greenhouse gases down and obtaining a secure fuel supply.

Root definition of discourse:

No definition given

CATWOE

C: Government & its agencies (EECA, MOT, MoE), oil companies (BP, Caltex, Shell, Mobil, Gull), regional councils & TLAs (Territorial Local Authorities – Christchurch & Auckland), vehicle manufacturers, imported motor vehicle dealers (MIA and MVIA – Motor Vehicle Importers & Agents), consumer groups (AA, Motor Trade Association), Greenfleet (SBN), biofuels producers (from waste – Scion, Fonterra, BioDiesel Oil Services; from food stocks – LanzaTech), informed consumers.

A: As listed above, but with the exception of consumers.

T: New Zealand as a user of solely fossil fuels – to NZ as a developer and user of a proportion of biofuels. The BSO created a captive market for the biofuels companies.

W: Government being seen to be doing the right thing and others living with the consequences. A hierarchy of responsibility has been passed down from Government.

O: Driven by government through EECA.

E: Ethanol essentially neutral – "*although biodiesel has environmental benefits, everyone else involved is basically doing it for the 'feel-good factor'*". Oil companies have to negotiate supply and demand (with vehicle manufacturers). New Zealand is a small taker of technology with respect to vehicle manufacturers (MVIA).

Commercial organization 1

Audio 20070813 1056

Root definitions – (P Q R) Do P by Q to contribute to achieving R

Root definition of BSO:

> A contributory component of the means of addressing sustainability issues through moves towards developing a renewable energy supply.

Root definition of discourse:

> To build rapport and knowledge to enable the process to surface the most efficient and effective option – "How do we make them all a hero in their own journey?" – towards getting NZ's automotive fleet, infrastructure and people ready for alternative fuels and provide more choices around fuel sources.

CATWOE

C: Feedstock supplier, biofuels producer (converts feedstock into biofuel), governmental specification setters (MAF), oil majors (Caltex, Shell, BP, Mobil & Gull), representatives of auto fleets (independent NGOs, e.g. AA, MTA), Government bodies (EECA, MOT, MoE), officials, customers. Above all these, there are global mandatory obligations (i.e. Kyoto).

A: Government, oil companies, bio-fuel producers

T: New Zealand as a user of solely fossil fuels – to NZ as a developer and user of a proportion of biofuels

W: Resigned. "*You're trying to get a win-win. You never will, but that's the objective*".

O: Government and the oil companies.

E: Existing infrastructure, public acceptability, quantity and quality of NZ biomass, cost to consumer.

Commercial organization 2

Audio 20070814 0916

Root definitions – (P Q R) Do P by Q to contribute to achieving R

Root definition of BSO:

> The introduction of biofuels through BSO towards achieving the fundamental brand that we are green and at face value it [biofuels] is a green thing to do, reducing our greenhouse emissions, redressing NZ balance of payments and possibly upgrading NZ fleet.

Root definition of discourse:

> And I think that if there was a more trusting relationship between all the parties involved, and we look at this whole loop here, a lot of the issues that we currently see could be reasonably quickly in a very pragmatic and practical way.
>
> I would think that in a consultation process generally the most important groups to consult with would be those that most significantly affected, because in reality people who are not affected are probably quite unlikely to either have an opinion or a basis of knowledge to make a meaningful contribution.

CATWOE

C: Consumers, oil companies, government departments (MED, ERMA, MOT, EECA) motor industry (automotive manufacturers of new and older vehicles and importers of used-vehicles)

A: Government, oil companies, bio-fuel manufacturers

T: Meet mandate obligations by changing from a very efficient system of to one that is less efficient, but delivers a proportion of biofuels with attendant increased costs

W: "*We don't believe in mandates, we believe the market should drive the way these industries work*". "*I don't think we're being anything other than extremely objective about this*". Power resides with Government, but they are acting without full knowledge of the situation.

O: Government and oil companies

E: Technically feasible, economically viable. "*The oil industry is collectively referred to as an industry and it is an industry, but it is not a partnership. It is four very independent organizations competing like hell with each other, and always trying to grow their own market share at the expense of the others*." Fuel quality issues – all fuels sold must be fit for purpose.

NGO 1

Root definitions – (P Q R) Do P by Q to contribute to achieving R
Root definition of BSO:

> A contributory component by the introduction of biofuels towards achieving the means of addressing sustainability issues through moves towards a renewable energy supply.

Root definition of discourse:

No definition given

CATWOE
C: [Official channels] government, EECA, oil companies, technologists, end-users (environmental & societal benefits), pressure groups, Greens, [unofficial channels] marginal 'tinkerers'

A: Government or its agencies

T: New Zealand as a user of solely fossil fuels – to NZ as a developer and user of a proportion of biofuels

W: Mainstream & marginalized voices: Government wields power on my behalf – otherwise I'm marginalised and my voice is not heard.

O: Government through EECA and policy (possibly oil companies if conspiracy theories are to be believed).

E: Economically viable, largely market-driven, NZ as a federation of independently-minded individuals.

NGO 2

Audio 20070813 1528

Root definitions – (P Q R) Do P by Q to contribute to achieving R

Root definition of BSO:

> The introduction of a biofuels industry by Biofuels Sales Obligation mandate towards achieving reduced emissions, increased sustainability and possibility improved security of fuel supply.

Root definition of discourse:

> A consultation process on biofuels to negotiate trialling and encourage voluntary uptake of biofuels to achieve a minimization of the risks to the consumer and penalties to oil companies towards achieving more sustainable fuel sources.

CATWOE

C: Motorist – consumer, oil industry (five oil companies obliged to meet obligation – Caltex, Shell, BP, Mobil), retail network (oil-company-owned and privately-owned service stations), groups in motor industry – importers of used vehicles, new car distributors (MIA), retail network (car yards – IMVDA, MTA), repair industry (modification), compliance industry, agricultural community (suppliers of feedstock), biofuels manufacturers (Argent, NZ Biofuels, LanzaTech, etc.), Government, EECA.

A: EECA in developing policy, fuel standard and legal framework on behalf of Government, oil companies and their distribution networks, retail network, biofuels producers, MAF minimum safety standards.

T: New Zealand as a user of solely fossil fuels – to NZ with a mandate for oil companies to supply a proportion of biofuels

W: The end-user or consumer is the motorist and the interests of the motorist are central. The majority of people have cars therefore the motorist represents the public good.

O: Government through EECA (deciding not to enforce it), oil companies (could refuse to do it and pay the penalty), motorist (if they decide they don't want to consume it).

E: Policy quite harsh on oil companies, initiative needs to be financially viable, issue is market-driven, no demand – no biofuels. NGO supported the concept of sustainable fuel, but did not support mandate – felt emphasis should be on bio-diesel.

NGO 3

Audio 20070814 1658

Root definitions – (P Q R) Do P by Q to contribute to achieving R

Root definition of BSO:

> To identify capacity and capability for New Zealand to create biofuels locally towards a renewable fuel source which attends to issues of security of supply and reduces carbon emission towards positively contributing to climate change.

Root definition of discourse:

> A practical conversation about feasible options.

CATWOE

C: Customers

- Individual big players, e.g. pulp and paper mills – any big plant is looking for alternative fuel and power sources.
- Marsden Point oil refinery in terms of alternative fuel types, such as bio-diesel and that, and as a collective entity of big four oil companies (Shell, BP, Mobil and Caltex).
- If you mean government broadly, since they are biggest energy producer as principal owner of energy generators and SOEs (State Owned Enterprises) that are generating energy.
- Intermediary converters; Consumers – end-users. Those that have access to biomass may become a combination of users and potential generators.

A: Electricity generators, oil industry, large non-coal based industries. Converters of feedstock, such as the timber industry, are already developing technology to produce power from available feedstocks.

T: New Zealand as a user of solely fossil fuels – to NZ as a developer and user of a proportion of biofuels

[This transformation is a response to greater worldwide consciousness that suggests applying global initiatives to developing alternative sources of power generation in NZ context – NZ already has access to considerable biomass.]

W: "*New Zealand has a more Anglo-American model of putting profit first and everything is incidental to it.*" "*New Zealand corporates are, by and large, taking the line that this change has been demanded socially, not even by the market, but it is a social policy, and we will only accommodate it if the market will accommodate it.*"

O: Oil companies, Government (depending on level of compulsion they wish to employ) as primary energy generators, also in setting mandate and specifications for fuel types.

Government regulation around emission levels and fuel specifications. Ownership relationship of SOE's has an effect on fuel-use generally.

E: New Zealand has access to considerable feedstocks. Green commerce is market-driven – based on consumer expectation and behaviour. There has been sufficient community concern and growing demand for greater consciousness of issues of climate change. Demand precedes supply and commerce follows. The government is also responding to pressure from international initiatives

Environmentalist 1

Audio 20070813 1324

Root definitions – (P Q R) Do P by Q to contribute to achieving R
Root definition of BSO:

> Development of NZ biofuels by Biofuels Sales Obligation to contribute towards tackling shortages of oil supply, the development of new technology, rising fuel prices and climate change through carbon emissions towards achieving the saving of the planet from appalling conditions and destruction from climate change of a horrendous nature that can devastate huge areas of the planet.

Root definition of discourse:

No definition given

CATWOE
C: People, health workers and health industry as a whole – health benefits, farming (organic farmers in particular), central and local Government, transport industry (Double-edged sword as existing fleets will have to be adapted, but in the longer-term economic benefit, as the country becomes more self-supporting and less dependent on imported fuel), benefit economy through balance of trade (Dr Bill Sutch - formerly head of Trade & Industry).

A: Government.

T: From New Zealand as a user of solely fossil fuels – to NZ as a developer and user of a proportion of biofuels

W: "*Adapt or die*."

O: Government.

E: Environmentally sustainable, financially viable, technologically feasible, internationally acceptable.

Environmentalist 2

Audio 20070814 1407

Root definitions – (P Q R) Do P by Q to contribute to achieving R

Root definition of BSO:

> The reduction of carbon emissions by 1m tonnes through the achievement of the biofuels mandate as part of the global battle against climate change.

Root definition of discourse:

No definition given

CATWOE

C: Government (MOT, MOE, EECA), oil companies, Fonterra (Agribusiness), consumers (consumer commission), environmental groups, opposition parties.

A: Government, oil companies, scientists and researchers.

T: From New Zealand as a user of solely fossil fuels – to NZ as a developer and user of a proportion of biofuels

W: "*I don't think the government would do anything terribly radical that the oil companies wouldn't like*."

O: Government, oil companies and possibly consumers.

E: Economically viable, sustainable, practical and realistic targets, culturally feasibility of NZ car culture, the lobbying of oil companies sets certain limits.

Scientist 1

Audio 20070815 1401

Root definitions – (P Q R) Do P by Q to contribute to achieving R

Root definition of BSO:

> To stimulate a market for biofuels by regulating the oil industry with the BSO to contribute towards a reduction in greenhouse gases released by fossil fuels, insulate NZ from fluctuations in oil prices and incidentally to create a viable local market for NZ produced biofuels and possibly export.

Root definition of discourse:

> To lay the groundwork for implementation of biofuels introduction through consultation process.

CATWOE

C: Government, fuel consumers – private vehicles, transport & freight, fuel industry, potential biofuel producers/manufacturers, farmers – suppliers of feedstock, researchers.

A: Government or its agencies and fuel industry.

T: From NZ as a user of 100% imported fossil-based fuels to a user of 3.4% biofuels.

W: "*Once we've got the technology…*" "*I think it's feasible, though whether it will work is just that there's a lot of contingencies and everyone wants certainty.*"

O: Government, and fuel industry (local manufacturers might decide not to produce biofuels, but that wouldn't stop the process).

E: Right price, right technology, available feedstocks, manufacture, fuel prices.

Consumer 1

Audio 20070802 0949

Root definitions – (P Q R) Do P by Q to contribute to achieving R

Root definition of BSO:

> The development of biofuels technology as part of a move to a knowledge economy by Government subsidising and regulating technology industries to contribute to achieving revenue through exportable technology with a slightly green tinge.

Root definition of discourse:

> The development of an alternative fuels policy to show governmental progress with environmental issues towards achieving re-election.

CATWOE

C: Agribusiness (supplying biofuel feedstocks), petrochemical companies, biofuels technologists, individual inventors, consumers of food crops and biofuels.

A: Government, petrochemical companies, bio-fuel producers, agribusiness

T: New Zealand as a user of solely fossil fuels – to NZ as a developer and user of a proportion of biofuels

W: "*I think that government is far more likely to act in the interests of society*." Market forces, but directed by government. Those that represent my point of view are powerless – consequently my voice is not heard.

O: Government (either through subsidies and policy legislation), petrochemical companies, agribusiness.

E: "*Environmental voice, represented by Greens, is weak*." Consumer power is limited. Environment is primarily market-driven so any changes must be economically viable: NZ seen as being largely a federation of individual inventors.

Consumer 2

Audio 20070802 0949

Root definitions – (P Q R) Do P by Q to contribute to achieving R

Root definition of BSO:

> Government is seeking an ongoing relationship with Green Party through the Biofuels Sales Obligation towards achieving more years in power.
>
> Introduction of biofuels through Biofuels Sales Obligation towards achieving international kudos for NZ taking a step towards finding a source of sustainable fuels for the future.

Root definition of discourse:

> Interactions between different stakeholders around biofuels.

CATWOE

C: Government, Green party, researchers, private sector interests – established companies and potential entrepreneurs, media interests, environmental groups, eg SBN, SOEs, farmers.

A: Government, researchers, oil companies (currently).

T: New Zealand as a user of solely fossil fuels – to NZ as a developer and user of a proportion of biofuels.

W: Interpretivist-relativist core with functionalist training. Post-modernist cynic.

O: Government.

E: Public and private being fairly far apart. Biofuels being economically viable, largely market-driven

Consumer 3

Audio 20071004 0921

Root definitions – (P Q R) Do P by Q to contribute to achieving R

Root definition of biofuels:

> The introduction of biofuels by BSO towards achieving a continuation of the end-game of sustaining the lifestyle of indulgent, middle-class people who have incredible privilege compared to former generations, while saving the arses of the oil companies and industrialists.

Root definition of discourse:

> The consultation process on BSO by submission towards achieving acceptance of how we maintain this privileged lifestyle instead of asking why do we maintain this privileged lifestyle.

Should be:

> To change attitudes by broad ranging discourse towards achieving positive small steps in changing our lifestyle and the way society organizes itself to improve the quality of our environment.

CATWOE

C: Sheep, farmers (impact on sustainability of industrialized agriculture – degrading farming practices), NZ environment & environmental groups (groups and individuals who speak on behalf of NZ environment), users of biofuels (smugness reinforcing), oil companies, fuel suppliers and distributors, fuel users (consumers) vehicle and machinery suppliers, public transport operators, fishermen, government, industrial & scientific community, entrepreneurs (second generation biofuels), forestry industry, building industry, all of us.

A: Sheep, farmers, oil companies, government.

T: "*The transformation represents a part of wider story of realising there are limited resources on earth – you can't infinitely take something without actually replacing it. You have to consider the effects. We are all responsible because we are all users*".

W: Pessimistic – human condition is to want more and more. It is an exploitative world – business & profit/colonisation.

O: Government, people like Greenpeace, universities, scientists, and industry – oil companies. Cannot necessarily make those solutions acceptable or workable.

E: Economic imperative too strong enough for real change in underlying societal attitudes. How do we create a society has a value structure that in the balance of gains against loss doesn't allow the loss of irreplaceable things? Need to look at how society organizes itself. Participatory democracy comes up against apathy.

Consumer 4

Audio 20071009 1121

Root definitions – (P Q R) Do P by Q to contribute to achieving R

Root definition of BSO:

> To give credibility to government by the introduction of biofuels through Biofuels Sales Obligation towards achieving a perception that they are addressing peak oil and climate change. [at a national level]
>
> The introduction of biofuels by BSO towards achieving the sustainability of the oil companies. [at a global level]

Root definition of discourse:

> To normalize biofuels as the right way of addressing peak oil by biofuels debate towards achieving preferred policy option.

CATWOE

C: Civil society, future generations, people who would otherwise be eating the food crops, oil companies, alternative energy providers, car manufacturing industry, biodiversity impacts, consumers, farmers – agribusiness and feedstock suppliers, current feedstock buyers.

A: Oil companies, government, research scientists, business community at large

T: From doing nothing to tackle climate issues to NZ consumer feeling satisfied at doing something

From doing nothing to tackle climate issues to NZ seen to be doing something useful by shifting reliance on fossil fuels

W: Social conscience – social and environmental perspective, big picture

O: Civil society, government

E: Concerned global citizen. Sustainable guardianship of global resources and appropriate land use – the impact on future generations.

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