

**Hypnotized by Progress:
Does the Modernist Approach to Social Science Obscure the Essence of the Oil Sands Boom?**

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Introduction

In the course of designing and conducting my recent sabbatical studies of the oil sands^a, the problem repeatedly arose that the manner in which studies are conducted seems to allow a number of key questions close to the heart of the tar sands developments to go unaddressed. This has an impact on the ongoing development plans, identification of problems, and on the types of solutions that are devised. This paper explores the character and causes of this problem. It argues that the modernist approach to social science obscures the essence of the oil sands developments. The paper investigates how this occurs—through the production of fragmented of knowledge—and how this leads to the development of solutions that are primarily technical adjustments to what are considered a given, even mechanistic reality. The paper asks why these types of solutions often paradoxically seem no longer to work or actually end up producing new problems. It does so by seeking to understand the deeper assumptions behind the modernist approach to analysis.

Section I: Initial Exploration of Modernist Social Science and the Oil Sands

The problematic

A wide variety of researchers in universities, interest groups, and think tanks have been drawn to study various aspects of the oil sands development.¹ This is not surprising. Science and technology have historically played a critical role in economic development, the extraction of natural resources, as well as environmental change and damage. In particular, the modernist, Enlightenment-shaped, approach to science has been influential. This has already been widely argued. In *Something New*

^a Not surprisingly, the terms *tar sands* and *oil sands* have taken on strong rhetorical and ideological characteristics in popular and scholarly literature. In fact, the material is neither oil nor tar but *bitumen*. In order to leave ourselves open to “hearing” the arguments from all corners, and not prematurely shut down dialogue, I propose we use the terms interchangeably.

Under the Sun: An Environmental History of the Twentieth-Century, for example, J. R. McNeill argues that “Scientists of the twentieth century ... stood on the shoulders of giants of scientific method who held the notion that the job of science was to unlock the secrets of nature and to deploy scientific knowledge in the service of human health and wealth. This persuasive and pervasive idea legitimated all manner of environmental manipulation wherever modern science took hold.”² The influence of modernist science has clearly also been significant in the development of the tar sands. The cooperation of natural scientists with industrial development of the oil sands, for example, goes back to the earliest days of tar sands exploitation, when Canadian and Alberta governments worked in close collaboration with University of Alberta and other scientists on issues such as extraction of bitumen from the tar sands.³

This paper explores a further consideration on this broader issue. Not only has the modern approach to natural and social sciences helped “unlock the secrets of nature” in the oil sands developments and enabled increases in “human health and wealth,” but in so doing it has also obscured, and to a degree ignored, the essence of the oil sands boom. This has contributed to the emergence of paradoxical and often destructive problems in the oil sands developments. The modernist approaches to human and social sciences—with their commitment to using the approaches of the natural sciences—seem unable to generate adequate solutions for these problems. The modernist approach of the social sciences, utilized by many think tanks and scholars, disaggregates the phenomena it studies into interest group and/or disciplinary elements. While this is often a necessary step in analysis, if the resulting fragmented knowledge is utilized in decision-making in this format, it encourages oil sands developers, regulators, and critics to devise solutions based primarily on narrow expertise. These solutions often take on the character of technocratic adjustments within existing processes, systems and structures. Since these studies are generally not embedded in larger analyses of the essence of the overall tar sands phenomena, decision makers usually fail to consider whether their solutions also need to address the overall direction of these systems. The narrow usage of social science expertise as technocratic knowledge has failed to solve some of the more difficult and persistent problems associated with the oil sands boom.

The modernist approach to social science

When I speak of the *modernist approach to social science*, I mean the “naturalism-empiricism-positivism tradition,” as Donald Polkinghorne names it in *Methodology for the Human Sciences*.⁴ The core of *naturalism*, Polkinghorne argues, is the belief that “all phenomena can be explained in terms of natural causes and laws without attributing moral, spiritual, or supernatural significance to them.” (19) *Empiricism* adds to these positivist beliefs the idea that “experience of the senses is the only source of knowledge.” (19) Finally, the primary themes of *positivism* he summarizes in 3 statements:

- (1) all metaphysics should be rejected and knowledge confined to what has been experienced or can be experienced. Thus science should restrict itself to discovering reliable correlations within experience.
- (2) The adequacy of knowledge increases as it approximates the forms of explanation which have been achieved by the most advanced sciences.
- (3) Scientific explanation is limited to only functional and directional laws (Comte) or to only mathematically functional laws (Mach). (18-9)

Polkinghorne also identifies and discusses two *anti-positivist approaches* which were developed in competition with this modernist approach. The first is the “descriptive or phenomenological approach” and the second the “hermeneutic or interpretive approach” (p. 201 and see chpt 6). He observes, however, that

In spite of the ferment stirred by the anti-positivist response during the formative stage of the sciences of the human realm, *the positivist position clearly won the debate*. The study of human

phenomena has come to be conducted under standards and procedures adopted from the physical sciences. Experimental procedures with operationally defined variables are used to determine correlations and law-like relationships among various aspects of the human realm. (51, my emphasis)

These anti-positivist approaches have generated a number of the promising contemporary approaches that promise to contribute more sweeping and deeper studies.

In this paper, I focus on the positivist or *the modernist* approach because it still dominates much of contemporary political, economic and industrial life. For all intents and purposes, it seems to shape the majority of studies produced on and for the oil sands, and perhaps more significantly, sets the conditions for the patterns of thinking of most active participants in, observers of, and even some critics of, the oil sands developments. The *anti-positivist approaches* are beginning to yield some results, but at this point, few if any surface within the organizations at the centre of the oil sands boom. This paper is restricted to examining the consequences of *the modernist approach*.

The modernist approach to science shows up in a wide variety of places in the oil sands operations. It is the principal approach, of course, in *natural scientific studies* conducted on a wide variety of aspects of the oil sands. This modernist approach also shapes much of the *social or human sciences* used to study the oil sands developments. These social scientific studies⁵ form the primary focus of this paper. The products of these studies show up in corporations, government, the Cumulative Environmental Management Association (CEMA) for the Athabasca oil sands, labour unions, media, some think tanks and research institutes, academic studies, and broader public debate.

Two additional comments: first, when I refer to the “essence” of the oil sands development, I do not mean some substantial fixed core. The oil sands developments are a complex set of projects that are rapidly expanding, changing and adapting to the pressures of government, the public, and most of all, the global economic system. They are causing huge economic, social, environmental, and political impacts and have ramifications far beyond the borders of Alberta and Canada. A multitude of scientific and technical studies have been, and are being, done on the tar sands in order both to build it and to understand its consequences. Most studies analyze one or another element, aspect, or dimension of the oil sands ventures, usually in isolation. Few studies, however, examine the inner coherence of the character, structure and dynamic of the whole venture. By the “essence” of the tar sands development, therefore, I mean the heart, spirit, or real meaning of this complex set of developments. Second, by raising this question, I do not want to imply that studies conducted within the modernist approach are simply flawed and valueless. Indeed, I have learned an immense amount on a wide variety of aspects of the oil sands developments from these studies.

Obscuring the Essence of the Oil Sands Development

How does the modernist approach to the social sciences function to obscure the essence, or true character, of the oil sands developments? What is it, exactly, that allows a particular approach to science to produce knowledge about an object, while perhaps obscuring deeper, bigger dynamic aspects of the same ‘object’?

Fragmenting knowledge

The key problem of the modernist approach to social science is that it assumes that the process of scientific analysis and abstraction that results in fragmented information is the key, if not the exclusive, manner of achieving knowledge. Furthermore, this fragmented knowledge can be used directly and reliably to inform life, practice and problem-solving. On a certain level, narrowing one’s analytical focus, and thereby fragmenting reality in the search for knowledge, is a normal aspect of scientific investigation. A wide variety of interest groups, think tanks, and scholars in various disciplines have been drawn to study the oil sands developments in this way. Some emphasize the economic side of this development (like shortage of skilled workers, or skyrocketing construction

costs), others examine the social situations (like family tensions, housing situations, foreign worker integration, drug abuse), some groups and studies stress the environmental side of oil sands developments (like water usage, green house gases, surface and wetlands reclamation, impact on ecology and wildlife), other studies stress the political aspects of the oil sands developments (like government royalty structure, provision of infrastructure, environmental and other regulations), and yet others examine the historical dimensions of the oil sands (like industry involvement, government subsidy of technical oil sands research).

Whether the narrowing and fragmenting of knowledge is caused by the demands of a disciplinary focus, a problem-based orientation, or the impetus to serve a discrete interest, the resulting knowledge necessarily becomes narrowed, focused, abstracted, and to a certain degree, isolated. This is largely a normal and necessary element of analysis. The narrowing and fragmenting of knowledge can become a problem, however, when it is used in this form to identify problems and develop solutions. In their study *Panarchy*, for example, Gunderson and Holling argue that some of the “contributing causes” to the failure of environmental politics lies in the way “scientists and analysts, study and perceive the natural world.... So much of our expertise loses a sense of the whole in the effort to understand the parts.”⁶ With their colleagues, Gunderson and Holling further conclude, “...existing theory and practice for linked systems of nature, economies, and people are too partial and fragmented among ecology, economics, and social science. Well-intentioned recommendations of the expert therefore can often be so partial that they become ammunition for powerful vested interests to distort public information and policy.”⁷ J. R. McNeill puts it graphically: “From about 1880 to 1970 the intellectual world was aligned so as to deny the massive environmental changes afoot. While economists ignored nature, ecologists pretended humankind did not exist.”⁸

From my survey of studies done of and for tar sands development, it is apparent that no single science study can grasp the entire phenomena of the oil sands development or propose an overarching solution for the nest of issues and problems the oil sands presents. Any think tank, disciplinary study, or government agency that claims this, based on these types of studies, is clearly overstating its capacity. One reason why, Lawrence Busch argues, is that disciplinary fragmentation produces the “paradox of experts.” He states,

the continuous fragmentation of both science and engineering into ever smaller subfields has several paradoxical effects. Even those who claim to be experts are laypersons in other fields, due to the sheer volume of scientific and technical information. ... Even in the biological sciences, the molecular biologist who is searching for a gene that codes for a particular trait—at home amidst various pieces of laboratory equipment—often looks with incomprehension at the field ecologist who attempts to analyze the interactions among flora, fauna, and the climate in the Amazon rain forest.⁹

In the modernist approach, the fragmentation of knowledge as a necessary element of the scientific abstraction process is not balanced or reintegrated by other expert investigators or researchers who specialize in or appreciate the whole of integral reality. This means that problem-identification and problem-solving will be conducted based exclusively on the results of these narrow types of analyses and in isolation from a clear sense of the whole, that is, without a clear grasp of the essence, or overall thrust, of the complex interweaving of the tar sands projects. This is a particularly acute difficulty if the required solutions must also address the character of the overall system or need to introduce systemic changes rather than a smaller technical adjustment. What if genuine solutions must have the quality of addressing the system’s overall direction or characteristics? But we jump ahead of our argument.

Producing partial and technical solutions

The originators of the modernist approach to science believed that the expert knowledge gradually discovered by scientists would naturally produce a body of information that was reliable,

coherent and almost directly useable. This belief is communicated in common social science methods textbooks. Nachmias and Nachmias, for example, argue:

The ultimate goal of the social sciences is to produce an accumulating body of reliable knowledge. Such knowledge would enable us to *explain, predict, and understand* empirical phenomena that interest us. Furthermore, a reliable body of knowledge could be used to improve the human condition.¹⁰

While a great variety of these studies can and have been profitably used to “improve the human condition,” the reality in some cases is now turning out quite different.

The most common way for the understanding produced in specialized disciplinary or interest-group-based studies to be used, is as fragments that directly address and solve focused and isolated problems. One way of understanding this problem is through the notion of issue-oriented problem solving. When problems arising from exploiting the tar sands, they are conceptualized as stand-alone “issues.” It is then tempting to try tackle and solve them in isolation from the overall situation. While an issue-oriented approach has the virtue of aiming to be concrete and practical and wanting to avoid theoretical tangents, it also has the vice of loosing the integral and complex reality out of which the issues grow. A wide variety of studies emerging about problems within the oil sands end up taking an issue-oriented approach, e.g. health problems, skilled labour market shortages, water usage, municipal infrastructure problems, greenhouse gas emissions tailings ponds clean up, skyrocketing rental rates, etc.

One way in which this approach to problems has proven troublesome is in problem identification which must, by necessity, identify a theory of causation and change involved in the problem. By its very character, however, the limited and fragmentary knowledge produced by the modernist approach, along with a limited or absent understanding of the causality involved in the whole, can produce inappropriate and distorted solutions. Users of disciplinary or interest-based knowledge may propose solutions for their problems, that lack clarity on how these solutions influence, interact with, or impact on other aspects of the overall oil sands development, or for that matter, the larger social, economic, or natural contexts. Gunderson and Holling describe this approach as follows:

The familiar responses to ... issues are often flawed because the theories of change underlying them are inadequate. The stereotypical economist might say ‘get the prices right’ without recognizing that price systems require a stable context where social and ecosystem processes behave ‘nicely’ in mathematical sense (i.e., are continuous and convex). The stereotypical ecologist might say ‘get the indicators precise and right’ without recognizing the surprises that nature and people inexorably and continuously generate. The stereotypical engineer might say ‘get the engineering controls right, and we can eliminate those surprises’ without recognizing the inherent uncertainty and unpredictability of the evolving nature of the interaction between people and nature.¹¹

A further characteristic of the solutions produced using these types of studies, is that they frequently end up devising solution that are conceptualized as *technical adjustment solutions*. In *Pursuing Truth, Exercising Power: Social Science and Public Policy in the Twenty-First Century*,¹² for example, Lisa Anderson argues that during the course of the 20th century social scientists’ understanding of how their knowledge can produce change in society changed from *moral means* to *technical* means (19, my emphasis). They expected “that social science expertise would easily and instantly be translated into policy” (31). Their “expert advice” could be used as “*technocratic* expertise” to improve society. This belief lay behind Harold Lasswell’s optimism in the 1960’s about applicability of social science to politics, and his adoption of the term “policy science” (30). Thus the widespread use of modernist or “positivist methodology” by mainstream social scientists, Polkinghorne argues, was supposed to allow social science “to guarantee progress through *technical* means applied to the social realm.”¹³ The problem with this understanding of solutions is that it assumes that the overall system or structures are given and probably generally acceptable, and all that is needed are

technical adjustments derived from social science studies. Technically adjusting a system, of course, is the language of abstraction and assumes that reality is a mechanism. We return later in the paper to consider the modernist understanding of reality as mechanism, an assumption that made conceptualizing solutions as abstract technocratic adjustments seem logical and even obvious.

Abstract scientific vs. integral-everyday knowledge

Unfortunately, utilizing abstracted and restricted scientific knowledge directly in ‘real life’ produces its own problems. Daily knowledge that each of us develops and utilizes is complex, integral, and interconnected, that is, it is constructed in response to, and takes simultaneously into account, a wide and full range of dimensions and functions of daily-life experience. Science, on the other hand, necessarily focuses on one or a few elements, abstracts them, and then develops expert knowledge of them. Not surprisingly, solutions developed from one-sided expert knowledge, may not fit or work all that well in everyday, rich, textured life.

Scientific knowledge, apart from being fragmented and partial, always remains abstract.¹⁴ “The abstract, ‘objective,’ impersonal, dispassionate language of science can,” Wendell Berry notes, “helps us to know certain things, and to know some things with certainty. It can help us, for instance, to know the value of species and species diversity. But it cannot replace, and it cannot become, the language of familiarity, reverence, and affection by which things of value are ultimately protected.”¹⁵ For this reason, he laments, the “application of science” is “generally crude.” This is particularly true in the oil sands developments, I would add, since they are so large, complex, and occur at such a rapid pace. Melody Lepine, Director of Industrial Relations, Mikisew Cree Nation observes, for example, “We haven’t even come to terms with trying to understand what it [oil sands development] is doing on a national or even on a global scale yet. It’s just really too much, it’s too overwhelming to understand.”¹⁶

The very process of abstraction and analysis, indicative of science, results in the loss of significant dimensions of reality. Berry further observes,

However large the context, however generous the acknowledgement of context, the results of the research still cannot be applied *both* generally and sensitively. Finally it is ‘brought home’ to a specific community of persons and creatures in a specific place. If it is then applied in its abstract or generalized or marketable form, it will obscure the uniqueness of the subject persons or creatures or places, or of their community, and this sort of application is almost invariably destructive. (147)

This is the thrust of Former Vice-President Al Gore’s comments on the oil sands:

The fact that oil is beginning to get more expensive more quickly will contribute to the realization of how dysfunctional our current pattern is. Take the tar sands of western Canada. For every barrel of oil they extract there, they have to use enough natural gas to heat a family’s home for four days. And they have to rear up four tons of landscape, all for one barrel of oil. It is truly nuts. But you know, junkies find veins in their toes. It seems reasonable, to them, because they have lost sight of the rest of their lives.¹⁷

Section II: Political manifestations of fragmented knowledge

In this section, I briefly explore how fragmented scientific knowledge and associated decision-making described above are compatible with, or at least easily feed into, two common but polar opposite models of politics—the pluralist interest-group model and the administrative state model. I show that both models can and have been used or supported by representatives of virtually all democratic ideologies.

Pluralist interest-group model

Pluralist theory argues that society is composed of autonomous individuals who are free to democratically choose and value as they will.¹⁸ These individuals voluntarily form interest groups in order to persuade government to serve their interests. Since individuals have many and changing interests, pluralist theory suggests, they participate in a wide variety of different and shifting groups in accordance with their evolving interests. Pluralist theory identifies government action and policy as the outcome of this interest group competition. The government reacts to the demands of various interest groups, and as a good broker, produces an appropriate policy compromise. According to pluralist theory, *public interest* policies spontaneously and mechanically emerge from *private interest* competition.

The fragmented and isolated knowledge products of modernist social science easily feed into this interest group process. Each interest group—armed with specialized and fragmentary expert knowledge supporting its interests—inputs into the government brokerage process and consequently has its interests accommodated within the emerging ‘public interest’ framework.

I think it is normal that interests and interest groups arise from our location in and interaction with variety of dimensions of everyday life. To have health concerns, for example, is to have an interest in a health care system, and an incentive to join an interest group in order to articulate and push for public policies favourable to this health care system. Thus, having specialized knowledge of, and advocating for, one’s interests can be a good thing. Assuming that we could neutralize all of the problems with interest group pluralism—like the unrepresented interests of the poor, marginalized people, and the environment, or power imbalances between interest groups, and so on¹⁹—it is still doubtful that a brokerage process could re-unite disparate interests with their accompanying fragmented knowledge into a new whole, namely one embodying the public interest.

Michael Shellenberger and Ted Nordhaus come to this conclusion, for example, in their essay “The Death of Environmentalism: Global warming politics in a post-environmental world.”²⁰ The big, system-wide changes required to tackle climate change have not been achieved, they argue, because the environment is far bigger than interests, since it includes us too. Climate change is integrally linked to our entire way of life and built into our societal institutions and core values. Partial, fragmented knowledge mediated through interest group action will not add up, in a brokerage politics approach, to a true solution. They conclude that “we will never be able to turn things around as long as we understand our failures as essentially tactical, and make proposals that are essentially technical.” Significantly, they propose taking “a collective step back to rethink everything.”

James W. Skillen also concludes the pluralist interest-group process fails the environment.²¹ The Lockean liberal view of government, individuals, and property forces us into a situation in which environmental interests win only when an interest group convinces the political majority to override individual property rights in order to protect the environment. The Lockean worldview assumes, Skillen argues, that since individuals and rights—including property rights—precede the social contract that forms the state, governments cannot claim that they have a prior duty to protect or enhance nature, i.e. land, water, plants, or animals (113). In today’s politics, he continues, “ecological well-being has to prove its importance by having a legislative advocate with an environmental interest or claim who can deliver sufficient evidence to convince a majority of legislators that such an interest really belongs to each of them and to those they represent.” This interest group lobbying on behalf of ecological well-being ***must be repeated over and over again for every single disputed case!*** The liberal conception of government, Skillen concludes, cannot conceive of protecting ecological sustainability as “a precondition of private property and liberty” (120).

Administrative state model

While the ‘administrative state’ model stands, in many respects, in deep tension with the above pluralist model, it too assumes, and flourishes on, the fragmented knowledge produced by modernist social science. Instead of focusing on the political process as the means to reconcile competing interests

and knowledge, this framework begins with the (non-)democratic presumption that government administration houses or can access expert scientific knowledge and utilize it to determine appropriate public courses of action on problems. The administrative state assumes, Robert B. Gibson argues, that

For administrative purposes the world should be divisible into tidy categories, and what goes on in those categories should be understood by appropriate experts. Or, at least, it should be open to competent inquiry leading to adequate understanding. Some complexities might be involved and sophisticated methodologies might be required for inquiry and analysis. But, in the end, the world should permit the appropriate experts, armed with the suitable methodologies, to define the problems correctly, to identify the appropriate response options, and to reach the rational conclusions.²²

Clearly, the administrative state fits wonderfully with the modernist understanding of science and knowledge. It assumes government decisions and policy are best achieved through its administration which is infused with expert scientific knowledge.

Significantly, Paehlke and Torgerson argue in the same edited volume,²³ that the arrangement of expert-driven administrative bureaucracy also occurs in *private* bureaucracies. Consequently, they state, “There has been a tendency for public and private bureaucracies—despite conflicts—to develop patterns of mutually supportive relationships that shut other potential participants out of the decision-making process... the administrative state thus plays a key part in a world largely dominated by an ensemble of great organizations.” (8) Since the administrative state is primarily concerned with efficient resource extraction, they continue, they tend to reduce environmental, but also social or economic, critique to “an expression of narrowly self-serving groups and individuals.” Such critique is seen as “a socially pathological response to a natural and necessary course of development—a response termed the NIMBY syndrome. The task of administration is thus identified as one of containing and overcoming irrational resistance.” (8) Interestingly, the administrative state model depends on expert knowledge and seems to reject outside interest-group input that is not standard scientific knowledge.

The weakness Paehlke and Torgerson identify in the administrative state model is its dependence on fragmented forms of expert knowledge. Administrative organizations, they argue, “have been especially effective in dealing with *narrowly defined problems*. By and large, conventional administration seems to work so long as there is no need to worry about side-effects.”²⁴ Unfortunately for this model, they continue, complex issues such as the environment keep emerging, and present “an accumulation and interaction of side effects.” (2) Gibson agrees and notes that the public has become increasingly cynical about administrative competence precisely because the “world is complex and uncertain to an extent far beyond all hopes of administrative capability. Nowhere has this understanding been more effectively fostered than in conflicts over environmental concerns.” (146) Ultimately, we are left to wonder whether the amalgamation of fragmented forms of knowledge achieved by the administrative state experts will ever reflect the fuller multidimensional character of reality.

Irony, tension and paradox

Ironically, both the so-called ideological left and right can end up supporting or operating within either of these two models.²⁵ Furthermore, one government may end up using both models simultaneously, in spite of the inherent tensions. In the oil sands, for example, we see Alberta’s Conservative Government simultaneously supporting market solutions, a pluralist approach to resolving some interest group [stakeholder] conflicts, while relying on the scientific expertise of its administrative bureaucracy, and/or that of corporations, to solve a host of other problems through technical adjustment policies.

These two models of understanding politics also contain a *tension* at their core. On the one hand, autonomous rational individuals should be absolutely free to shape their futures, doing so through *pluralist interest group competition* and shaping of public policy. These rational individuals develop

scientific knowledge that allows them to master nature for their own free use. On the other hand, once scientific expertise enters the picture, it soon seems best to place the determination of key decisions over conflicting development interests and desires, in the hands of experts. The *administrative state has the capacity and scientific expertise* to understand the world and to determine the best public policies. Free individuals do not necessarily have this capacity. This irreconcilable tension between free autonomous individuals and the expert administrative state manifests itself as a *paradox*. We want both to be free to engage in democratic interest-group politics and we want to experience progress through the administrative state's imposition of scientific knowledge.²⁶ In the next section I explore several other similar paradoxes found in and around the tar sands developments in order to dig deeper into the assumptions of modernist social science.

Section III: Paradoxes: deeper suspicions of modernist science

To this point I have argued that modernist social science has the effect of obscuring the essence of the oil sands developments when the fragmented knowledge it produces is used to identify problems and construct solutions. Lisa Anderson advises social scientists, and the various consumers of their studies, “to think self-consciously about the links between their [scientists] tools and techniques and their values and aspirations.”²⁷ Similarly, Donald Polkinghorne advises researchers not to assume the validity of their particular tools for inquiry. They need to begin their work at a deeper level where the assumptions and relationships of the systems of inquiry themselves are examined. This deeper level provides a much broader range of choice in the use of particular methods and designs, but it also places a responsibility on researchers to understand and explain the assumptions they have incorporated into their approaches.²⁸

But how do we push to “a deeper level” and examine “the assumptions and relationships of the systems of inquiry”? In the above sections, I noted that the modernist approach to social science produces fragmented knowledge that, if used in a certain manner to solve problems, *ironically* ends up producing new problems. Some solutions *paradoxically* make the oil sands problems they intend to solve worse. What can a close examination of these paradoxes teach us about the influences of modernist social science on the oil sands developments?

A preliminary ‘value’ question

Before proceeding further, however, we need to face a preliminary ‘value’²⁹ question, namely, that the paradoxes arising in the oil sands operations are indicative of some sort of mistake, problem or human irresponsibility. This exposes a deep normative or value question. Is the world or reality so constituted that when it displays fundamental paradoxes in human culture, society and behaviour, these paradoxes can be interpreted to indicate deeper tensions or conflicts that ought not to exist in our lives, societies, institutions or thought? Or, are paradoxes of this type inherent in the ‘nature’ of reality? People in general, and scholars in particular, offer different ‘value’ answers to this question and a variety of similar questions. These answers, in turn, seem to shape their analyses. This value question edges us into our examination of ‘deeper’ questions. I leave direct consideration of this question in abeyance for now, in order first to explore a few paradoxes and ask whether and if so where they show up in the oil sands developments.

What might paradoxes tell us?

Lawrence Busch uses the concept of paradox to analyze society in *The Eclipse of Morality: Science, State and Market*. He observes, for example, “What had been previously described as side effects, as externalities, as temporary inconveniences on the road to scientific progress, now close in on us, threatening our very lives. The air we breathe, the food we eat, the soil we walk on, the water we drink, the very climate we take for granted are now problematic in ways unimagined a century ago.”³⁰

These developments manifest the character of a paradox. Clearly similar paradoxical phenomena are occurring in Alberta where air, water, soil and climate are all being problematized by oil sands and other resource developments.

In the *Risk Society*, German sociologist Ulrich Beck argues similarly, that the risks posed by the application of the results of new scientific discoveries and technologies are starting to take on the character of paradox. He identifies three reasons for this development, namely, the vast increase in the “scale of risk,” the “proliferation of sometimes contradictory expertise” amongst scientists, and the “way techno-scientific innovation has begun to escape experimental control” of the laboratory.³¹ Today we live in a “risk society”, Beck argues, “science has become so powerful that [society] can neither predict nor control [science’s] effects. It generates risks too vast to calculate. In the era of nuclear fission, genetic engineering and changing climate, *society itself has become a scientific laboratory.*”³² The core of the paradox, Beck argues, is that “Science is *one of the causes, the medium of definition, and the source of solutions* to risks.”³³ But ironically, scientists can point the way forward for society, since they do not agree on the presence, levels, or solutions for risks.

In his study of the ‘administrative state’s’ impact on the Canadian environment, Robert B. Gibson also uses *paradoxes* to open up the unforeseen reactions and results of policy on issues such as, lead poisoning, budworm infestation, acid rain, and biotechnology.³⁴ In each case, he argues, the solutions used to tackle these problems have caused many new unexpected, practical problems.

If we turn to the tar sands extraction operations, the toxic tailings ponds provide a good example of these features as oil companies experiment with ways to help toxins settle to the bottom faster. Covering more than 80 square kilometres now, these toxic tailings ponds pose incredible risks. Simon Dyer of the Pembina Institute observes:

What the companies hope to do is to slowly separate some of the fine suspended material and incorporate that into reclaimed dry landscapes. And then, the most watery fine matured tailings, at the end of the mine life, pump those into a deep pit and top them off with fresh water and walk away. It’s never been proven and it’s a real risky process and I think it could have long term ramifications for Albertans.³⁵

In this situation, we are faced with the paradox that scientists have simultaneously enabled us to develop this state of affairs, identified the huge risks, and promised to discover timely and cost-effective solutions. What are we to believe in this contradictory reality from these conflicted ‘experts’?³⁶

Dutch economist and philosopher, Bob Goudzwaard,³⁷ sets out a helpful way of understanding the role paradoxes can play in broader analyses. He argues that “*solution paradoxes*” are key indicators that something is deeply wrong with our approaches to development. In *Hope in Troubled Times*, along with co-authors Mark VanderVennan and David Van Heymst, he defines “solution paradox” as situations in which the solutions we use “either intensify the problems they were intended to solve or create new and even more serious problems. Too often the cure is worse than the disease.” (20) When “standard approaches have begun to fail” and problems no longer respond to current solutions (19), these authors argue, a “solution paradox” has emerged. The book explores “solution paradoxes” in relationship to four widespread problems: distribution of global wealth and poverty, security, the environment, and financial markets. They conclude that “Unexpectedly, more money, technology, science, and market forces—*solutions* that until recently seemed self-evident—often cause global poverty, global insecurity, environmental ruin, and the tyranny of financial markets to deteriorate even further. The solutions themselves lead to stalemates or deadlocks, to a number of specific, discernible end points in our time.” (24) In this way, paradoxes are a way of identifying dysfunction within the larger reality rather than in the fragmented slices of the world analyzed by traditional modernist science.

For purposes of illustration, I share two of the many paradoxes that *Hope in Troubled Times* identifies. Both are currently manifested in contemporary culture and are also relevant to the oil sands

boom. First, the **environment paradox**: “Why, specifically in a time of unprecedented prosperity, have the world’s environmental dilemmas slipped out of control? Never have the possibilities for redressing environmental deterioration been better than today.” (88) Second, the **scarcity paradox**: “In an environment of increased economic growth and a rising standard of living, a new, generalized feeling of scarcity is permeating Western society.” Why should a “rising sense of general scarcity [occur] in the midst of unprecedented luxury”? (88, 220 n.5)

An important reason for the failure of the solutions in these cases, and the rise of solution paradoxes, Goudzwaard argues, is that we are end up attacking symptoms not root causes. “For just like most contemporary politicians, contemporary Western political scientists and economists give far more attention to the symptoms of social and economic problems than they do to their real root causes.” To rephrase, problem-identification and solution-definition built on the fragmented knowledge produced by modernist social science inadvertently will be drawn to focus on symptoms, the superficial problems, rather than tackling problems in light of deeper sweeping causes. Symptoms are easier to identify and pursue in the modernist approach to analysis. As discussed above, however, the technical adjustment solutions our society devises for these isolated problems, may simply have no real effect on the deeper problems. This signals profound difficulties with employing the modernist approach to analysis for these bigger, overarching problems.

Oil sands ‘solution paradoxes’

In the oil sands developments, some of the key solutions that are implemented or being proposed for problems, now exhibit paradoxical characteristics. In fact, it is becoming evident that large, often more intractable problems are emerging from economic, social and environmental practices in used to exploit the oil sands. Advanced science and technology now make oil sands extraction, upgrading, and refinery technically possible, for example, but the problems they leave in their wake are often serious and more obstinate than some of the problems they solved, e.g. tailings, tailings ponds, GHG emissions, acid rain, strip mining, loss of water, destruction of eco-systems and wildlife, social problems, aboriginal issues, labour shortages, etc. While intended to solve real problems, some solutions are now making things worse or birthing new series of problems. Think of the practice of using clean natural gas as a fuel in the process of extracting the dirtier, polluting, and GHG producing bitumen for transportation fuel? Or, think of the irony of an amazingly wealthy society like Alberta exhibiting a variety of new forms of scarcity and poverty during the height of the current oil sands fired economic boom.

If we move to the larger scale, above the immediate contradictions within oil sands operations themselves, and ask why this series of developments is occurring to begin with, we confront the society-wide and global **paradox of transportation fuels**. In *The Age of Scarcity*, a study released April 24, 2008, CIBC economist Jeff Rubin notes that transportation fuels “now account for half of the world’s oil use and more than 90 per cent of demand growth in recent years.”³⁸ A significant portion of oil sands production goes to **transportation fuels**, some estimate as high as 70%. Transportation is central to modern society both in the private automobile and in the globalized economy. Both are deeply linked to freedom—individual freedom of the car and freedom of market exchange. The aim of contemporary automobile transportation, for example, is to maximize individual freedom of movement. The car frees us to go where and when we please. While the automobile may have problems with efficiency and effectiveness, it maximizes our personal freedom! Transportation in globalized markets also assumes the free, unrestricted and unregulated movement of goods, services and people. The free market, *laissez faire*, says if we can move these things around the globe and make a financial profit, than we should do so.

Paradoxically, the energy demands of this **freedom** ideal—that is the way we exercise and institutionalize our pursuit of individual and absolutized market freedom—now begins to **determine**, force, require, even demand that we develop the oil sands for transportation fuel. This is so, in spite of

the clear and manifold risks, and widespread social, economic, and environmental costs. What choice do we have? As a leading Canadian oil company CEO recently stated, the oil sands developments are troublesome on many fronts, but we need transportation fuels, don't we? Our overall societal obsession and fixation with *freedom, necessities* that we engage in destructive practices in oil sands extraction, upgrading, refining and transportation. The obsessive pursuit of freedom entangles us in the necessity of exploiting the tar sands.

Or, we can take the transportation paradox in another way. We want more transportation fuel in order to be free to live the good life, both by free individual movement in the automobile and by acquiring more and more goods and services in the free global market. Yet, *paradoxically*, doing so requires and demands that we rapidly develop and exploit the oil sands. These tar sand developments threaten a host of new, risky, difficult, or perhaps even impossible to remedy social, economic, environmental and political problems. The resulting damage, in turn, is beginning to seriously threaten both our free to move and our enjoyment of 'things' in this world.

Hypnotized by progress: Paradoxes push us to look even deeper

It is truly amazing that although these solution paradoxes are manifesting themselves more often, and in clearer and more obvious ways, we continue to rush head long down the same pathway. Why? In order to grapple with this question, we need a clearer sense of which 'highway' we are actually rushing down, and disclose the character of this 'route.'

Bob Goudzwaard offers a helpful approach³⁹ for doing this. In *Capitalism and Progress: A Diagnosis of Western Culture*, he argues that we rushing down the highway of Enlightenment progress.⁴⁰ In *Hope in Troubled Times* (with co-authors Mark Vander Vennen and David Van Heemst) he elaborates: "...on one hand a number of problems today are becoming increasingly immune to the tools and instruments of progress. And on the other hand those same tools and instruments weigh more and more heavily on us because we view them as inevitable manifestations of the very progress we simply cannot miss out on." (25) Thus the he and the co-authors conclude, "perhaps...progress itself has become our problem." (25) The Enlightenment pursuit of progress through science, technology, and the market has ushered in a relentless dynamic into modern society. This dynamism of progress, they argue, is the "*deeper source of the paradoxes*" (90 my emphasis). They explain: "Paradoxes ... clearly emerge at the dividing line separating what can expand as a result of the current technological and economic dynamism and what is simply not in a position to expand." (90) Thus, "problems morph into insurmountable paradoxes where and when the laws of the dynamism set the tone." (90) This, they argue, is the origin of the solution paradoxes like those I described. Unfortunately, they conclude, we have become *hypnotized by progress* and are no longer able to resist or see beyond the promises and temptations of progress. We continue to pursue the dynamistic solutions prescribed by progress, in spite of increasing signs of that they are beginning to fail us.

We see some signs that a phenomena like the '*hypnosis to progress*' is also occurring in the oil sands developments. Let's begin, by way of example, with Premier Ed Stelmach's statement following his surprise victory as leader of Alberta's Conservative party (December, 2006): "The government needs to provide the necessary services for the province and industry to flourish, he said, and the market will eventually control itself. 'There's no such thing as touching the brake,' he said. 'The economy, growth – that will sort itself out. We just want to make sure that we're globally competitive.'⁴¹ Even when the widespread social, economic, and environmental problems are regularly being publicized and debated—by none other than former Premier Peter Lougheed⁴² or current mayor of Fort McMurray Melissa Blake⁴³—Premier Stelmach still argues a "slowdown" of oil sands development is unthinkable. When asked about the call for a moratorium, Hanneke Brooymans reports, "Stelmach instead warned of the consequences of a 'total shutdown.' If that's what they're asking for, he said, 'you devastate Alberta's economy, you devastate Canada's economy, you put at risk hundreds

of billions of dollars of investment, and there won't be one social program that's going to be alive, anywhere."⁴⁴

In order to come to grips with these types of paradox, Goudzwaard advises, society needs to dig deeper. He observes that "almost every current diagnosis [science and analysis] of the crisis of our time lacks something fundamental" (26) namely, a clear consideration of "the roles played by *people's deepest longings, dreams, and commitments...*" or "*spiritual or religious dimension... of contemporary events,*" and an understanding of "how these profound aspirations become inscribed in the dynamic forces, interactional patterns, and institutions of contemporary Western society." (26, my emphasis) Confronting these value questions is not a trivial matter, since a more holistic and integral approach to analysis might open the door "to *alternative, perhaps unforeseen solutions, genuine solutions* that could actually help turn around rising insecurity, global poverty, and environmental degradation." (26)

Section IV: Science, ideology and the Oil Sands

We now explore some of the ways that the Enlightenment vision of progress is influencing science and its role in the oil sands. For the second time, therefore, we are confronted with a fundamental 'value' question at the root of modernity and its approach to social science. Our preliminary 'value' question is joined by a series of new deeper 'value' questions! I briefly examine two ways in which science is influenced by one or another ideology. First, the results of science can be instrumentally used by an ideology and an ideologically shaped way of life. Second, ideological beliefs may directly penetrate and shape the internal practices of science.

First, results of science may be instrumentalized by ideology

Gunderson and Holling in their study *Panarchy* note, the way "scientists and analysts, study and perceive the natural world" as parcelled up and fragmented, can "can provide unintended ammunition for political manipulation."⁴⁵ This has occurred on a variety of micro-levels in the oil sands, where industries have used scientific findings to support or rationalize partial or flawed positions within their larger oil sands operations. We see this occurring, for example, with ads showing an oil sands company claiming to have adopted the correct environmental measure because it recycles water in its operations, or advertisements that brand an oil sands product 'green' based on only a single element of the production process, or companies that favourably compare their oil sands water use to irrigation agriculture because irrigation farmers use more water.

On the macro level, however, the ideological instrumentalization of scientific findings and reports occurs in more dramatic ways. Two leading ideologies that use the results of science in this way, which I shall briefly address, are the economic growth ideology and nationalism. The modern idea of science is integrally connected with the overarching cultural myth of our culture, namely the Enlightenment vision of progress realized through economic growth, scientific and technological mastery, and the domination of nature. A key ingredient of this progress vision is the belief that human happiness on earth can best be guaranteed through material progress, and that the best means for achieving this is economic growth, sometimes achieved purely through market means, sometimes with the help of an interventionist state, and sometimes through a 'planned economy.'

J. R. McNeill's powerful study of 20th century environmental history, *Something New Under the Sun* offers a good overview of this economic growth ideology. Along side "conversion to a fossil fuel-based energy system" and "very rapid population growth," McNeill argues, the main "driver of ecological change in the twentieth century," was the "ideological and political commitment to *economic growth and military power.*"⁴⁶ He describes this as a "*growth fetish*" and identifies the economists who promised to deliver this "holy grail" as "high priests." (335) The religious allusions are not accidental. The pursuit of economic growth has come to function as a salvific, meaning-giving

activity for societies around the globe. This “quest for economic growth” was by no means restricted to capitalism, McNeill notes, “Capitalists, nationalists—indeed almost everyone, communists included—worshipped at this same altar because economic growth disguised a multitude of sins.” (334) “Economic growth became the indispensable ideology of the state nearly everywhere.” (335) This quasi-religious obsession with economic growth, as a means to happiness, and a method of escaping problems, caused massive problems, McNeill concludes:

No reputable sect among economists could account for depreciating natural assets. The true heretics, economists who challenged the fundamental goal of growth and sought to recognize value in ecosystem service, remained outside the pale to the end of the century. Economic thought did not adjust to the changed conditions it helped to create; thereby it continued to legitimate, and indeed indirectly to cause, massive and rapid ecological change. The overarching priority of economic growth was easily the most important idea of the twentieth century. (336)

Thus, Wendell Berry can conclude, “everywhere in the ‘developed world,’ human communities and their natural and cultural supports are being destroyed, not by natural calamities or ‘acts of God’ or invasion by foreign enemies, but by a sort of legalized vandalism known as ‘the economy.’”⁴⁷

Science and technology that are conducted within this modernized context, are easily co-opted as *means* in the program of progress through economic growth. In fact, modern culture developed a strong ‘faith’ that the proper conduct of science—as the modernist approach developed it—would produce knowledge and understanding that could be used to control, master, and exploit the earth in order to guarantee happiness. Again, Wendell Berry summarizes this nicely,

There is a sort of scientific faith that is legitimate. It is hard to see how the work of scientists could be done if scientists did not have faith in the workability and soundness of their methods. This is not faith of the highest sort, obviously, but is akin to the unproven confidence with which we non-scientists face the unknown of our own workdays. But under various suasions of profession and personality, this legitimate faith in scientific methodology seems to veer off into a kind of religious faith in the power of science to do all things and solve all problems, whereupon the scientist may become an evangelist and go forth to save the world.⁴⁸

Economic growth ideology in the tar sands

Berry’s description of the results of economic growth ideology as “legalized vandalism” strongly resembles some of the emerging descriptions of economic, social and environmental problems associated with the development of the oil sands. World-renown Professor of Ecology (University of Alberta) Dr. David W. Schindler, for example, recently declared of the tar sands: “I would nominate this for the world’s most unsustainable development.”⁴⁹ On another occasion, he argued:

They ought to put on the brakes and say: ‘Come back when you can get your water consumption down to half, when you can get your green house gas emissions down to half, when you can reclaim these landscapes and then we’ll hear about more oil sands plants. But, our government’s not doing that. It’s absolutely out of control up there, you’ll see.’⁵⁰

In spite of growing evidence that Schindler and other critics are onto important problems, mainstream participants in the oil sands development continue to cast it within the framework of progress, and therefore either claim such damage and costs are acceptable or scientifically and technologically solvable. Leading politicians and leaders constantly justify current oil sands development patterns in the light of economic growth and progress. Alberta’s Premier Stelmach, in releasing the 2007 “New Royalty Framework,” declared that “Alberta’s economic growth is really the engine of Canada’s prosperity.”⁵¹ In *Alberta: A Plan for the Future*, he declares Alberta has “become Canada’s engine of economic growth...” “Alberta must capitalize on new opportunities if we are to continue growing our economy, building strong communities, and securing long term prosperity — for all Albertans.”⁵² The now reorganized Alberta Energy and Utilities Board (AEUB), mandated to

oversee these and other developments, states in its *Vision 2006*: “Any doubts that Alberta’s bitumen resource has secured the province’s position as an energy superpower were put to rest in 2006 as activity levels in the oil sands region reached new highs.”⁵³

Canada’s Prime Minister, Stephen Harper, speaks in much the same manner, describing the oil sands developments as “an enterprise of epic proportions, akin to the building of the pyramids or China’s Great Wall. Only bigger.”⁵⁴ In an address to the Canada-UK Chamber of Commerce, Prime Minister Harper declared, “One of the primary targets for British investors has been our booming energy sector. They have recognized Canada’s emergence as a global energy powerhouse – the emerging “energy superpower” our government intends to build.”⁵⁵

Not only have the tar sand developments been rationalized within the ideology of economic growth, the ideology of nationalism also plays an important role; in particular American nationalism. President George W. Bush admitted in his 2006 State of the Union Address, that “America is addicted to oil.”⁵⁶ The US strategy has not been to devise energy conservation strategies, but to find new technologies, and to find safer sources of petroleum to enhance national security. The Canadian-based oil sands have been identified as one of these key safe sources. Premier Stelmach recently played up to this USA nationalist security concern, in order to downplay American environmental concerns with oil sands, when on March 2008 in Washington, D.C. he states:

There’s a myth out there that oil sands production comes at too high an environmental cost. here are ongoing attempts in some quarters of this country [USA], and of course in ours [Canada], to slow down or even stop oil sands production. These attempts don’t really reflect reality. Even worse, they could serve to jeopardize this country’s [USA] energy security, at a time when Asian markets are clamouring for oil.”⁵⁷

This is the language of rationalizing troublesome energy developments in the name of economic growth and nationalist ideologies.

The fragmented, issue-oriented findings of modernist social and natural sciences are easily co-opted into the direction and overall aims of these ideologies. In fact, these types of scientific studies seem almost irrelevant for finding a deeper understanding, and pondering the greater consequences, of these ideologies and the approach they recommend for oil sands development.

Second, ideological influences *within* science

We now look at the impact of ideological beliefs within the practice of science. Lisa Anderson, in *Pursuing Truth, Exercising Power*,⁵⁸ argues that not only do ideologies co-opt the results of science, they can influence the internal practice of the social sciences. “The social sciences’ organization of knowledge, choices of problems, selection of analytical tools, definitions of solutions all represent commitments to politically inflected values. For most social scientists, these are the values of American liberalism...” (107) She further states, “our science itself has been shaped by our values: even as we have denied any such influence, our truths have been shaped by how we have understood power.” (108). She refers to this influence as “American parochialism” (109), although I suspect Canadian social scientists do not fare much better.

Along the same lines, Lawrence Busch⁵⁹ argues that a narrow approach to economics imposes hidden ends on society: “Indeed, behind the gloss of mathematics, as sociologist Pierre Bourdieu puts it, ‘economism removes responsibility and demobilizes by annulling politics and imposing an entire series of undiscussed ends, maximum growth, competitiveness, productivity’” (1998:56). Busch continues,

The **certainties** of neoclassical economics appear as a set of untested assumptions—assumptions so opaque as to be invisible even to many of the proponents of neoclassical economics themselves. These assumptions must remain unchallenged, undiscussed, self-evident, if the neoclassical edifice is to be built, for if they were ever brought to public debate, they would be rejected out of hand. (128-9)

Bob Goudzwaard affirms these suspicions, arguing that the pursuit of “purely objective and unbiased” science leads many social scientists to restrict themselves to activities like studying “correlations ... in the empirical data” or studying “practical applications of political measures.” When trying to analyze complex problems, however, this view of science excludes “the possibility of categories which sound far less scientific and objective, like ‘abuse of power’, the presence of greed, and even blatant forms of injustice.” This practice, he concludes, may end up evading “the claims of truth itself.”⁶⁰ Science, he concludes, needs to get at the “real roots” of problems.

In light of these suspicions, if we return to Polkinghorne’s⁶¹ description of modernist social science, we note that it excludes or narrowly defines a number of items—e.g. “moral, spiritual, or supernatural” causes; acceptable forms of knowledge; a restricted view of science’s task, and more. Do these limits and exclusions limit the serviceability of science in understanding what is really happening in a development such as the oil sands? What hidden ideals or excluded considerations lurk within the modernist assumptions of the social sciences? And how might these influence our understanding of, and action within, the oil sands developments? I briefly introduce some key assumptions of modern science, each of which deserves and requires much more analysis and reflection than the available space permits at this point.

Science excludes religion but now functions like one itself

The modernist approach to science has excluded the influence and assumption of faith and/or religion from its operation. This leads to a flattened out understanding of human reality, and removes motivations, understandings and worldviews that may shape and direct human behaviour. Furthermore, this approach to science now seems to effectively replace traditional religious beliefs with a faith in science itself [and perhaps also ‘faith’ in the market, technology, the state, etc.]. Ulrich Beck argues, for example, that “Science had replaced church and priest” when it “tried to create security for people...”⁶² And Lawrence Busch observes, “So opaque has faith in science and technology become that many who believe in it often do not even notice that they hold beliefs.”⁶³ Thus, modernist science fails to consider traditional religious beliefs as potential causal influences in its investigations of life, while simultaneously failing to consider and investigate whether a new ‘faith’ in science might now be shaping behavior in unexpected ways.⁶⁴

Science dismisses human agency and accountability

A second distortion occurring within modernist social science, is the tendency to exclude consideration of human agency and accountability. Nineteenth-century social scientists led by the economists, Goudzwaard and de Lange argue, sought to achieve certain and value-free scientific knowledge by expelling a wide range of human concerns from their field of study. First, economists believed they should not make judgements about the value of particular economic needs. All individuals were believed to be autonomous and thus free to define their own *needs, desires, and pursuits*. Science must treat these as given data, equally, and as straightforward points of departure from which economists calculate how best to fulfil these needs efficiently.⁶⁵

Second, and closely related to the former, was the belief that economists must expel from their field of study all concern for economic *accountability*.⁶⁶ The consequence of this move was that individuals, organisations, entrepreneurs and corporations were scientifically treated like objects that react to facts and processes in a *presupposed manner*. As a consequence, economists no longer asked *who caused the change*, but rather *what certain economic things or processes*—e.g. slow economic growth or inflation—*are setting into motion in the economy*. The discipline of economics, therefore, no longer believed that it was necessary or even possible to assign responsibility for economic damages to real economic actors. Economists refused to assign the cause of economic problems to particular persons, organisations, businesses or unions. Ulrich Beck argues, for example, that

We are living under the conditions of organized irresponsibility. If you ask who is responsible for climate change, you have a hard time to answer it. Scientists are not, the economy is not, the politicians are not, the intellectuals of course are not, nobody is actually responsible. And this is not an individual way of answering, it is the institutionalized version of answering the question of responsibility. And therefore, I think, in order to get out of this mess, we have to re-address the question of responsibility.⁶⁷

Science replaces real world with an idealized mechanical world

A further consequence for science of accepting needs as given and banishing accountability—in the name of certainty—was that society and institutions were conceptualised as mechanical and deterministic. In this conceptual universe, causes are believed to mechanically impact re-actors. In the case of economics, Goudzwaard argues, it ended up creating a mechanistic laboratory called the “market mechanism.” He states,

[I]n this self-created world, no one will ever ask the question: Who or which agency has caused that phenomenon? For the only accepted question is: What factor has caused this event? Within a mechanical universe, no person or agent can be responsible or accountable. Everyone's behaviour is presupposed to be stereotypical, to be always the same if other factors are constant (the so-called *ceteris paribus* clause).⁶⁸

In this hypothetical laboratory situation, Goudzwaard concludes, social scientists can no longer talk about deeper human causes if one is confronted with a concrete socio-economic problem. The problem has to be taken as it is, as it presents itself now, specifically as a disturbance in the working of the mechanism. Either it will solve itself, if the (mechanical) laws of nature are permitted to operate, or it can be solved by taking the best and most efficient engineering approach to redress it (just as a car is repaired). The mechanistic world, therefore, is not only a world without moral good and evil. It is in fact also a world without a real history.⁶⁹

In a similar vein, Anderson observes that social scientists became, experts who understood the unseen workings of an abstraction known as the market rather than specialists knowledgeable about the social and moral problems of the day. Truth was now invariant, abstract, universal, and power and policy were merely responses or reactions to the truths scientists were to discover.⁷⁰

The truth of whether or not exploitation, oppression, or abuse lays behind the oil sands developments is simply not touched on by most modernist social science studies. Solutions that are developed for this type of world will, necessarily be shaped like technical adjustments. They will not involve elements of re-directing the fundamental ideas and beliefs of our culture.

Conclusion:

Whether or not my attempt at exposing the operative ‘values’ or beliefs and ideologies shaping modernist science is persuasive to the reader, it is becoming increasingly clear that the development of a truthful understanding of the essence of complex developments like the tar sands, will require the adoption of more integrated and deeper approaches to scientific analysis and knowledge.

The disintegration of information, knowledge, and interests inherent in the modernist approach is leading to technocratic solutions for problems in the oil sands. This is recognized on some levels, and an attempt to pull together diverse interests and disparate studies, as well as generate more comprehensive studies has begun to occur in limited settings and on select issues. The Cumulative Environmental Management Association (CEMA)⁷¹ in the Athabasca oil sands region, for example, is one method of integrating studies, information, and interests related to environmental problems in the

tar sands area. It offers an element of hope, although it deals with only limited concerns and has functionally exhibited serious deficiencies and flaws.

The project that produced the study *Panarchy* is another example, of an attempt “to develop an integrative theory to help us understand the changes occurring globally.”⁷² While offering some promise, this approach does not adequately deal with some of the deeper assumptions of modernist approach to science.

A variety of approaches have sprung up over recent decades to challenge the Enlightenment liberal approach to analysis. Many of these aim to be less fragmented and more integrated approaches. They include feminist,⁷³ post-modern,⁷⁴ and refurbished neo-Marxist⁷⁵ approaches. While each explicitly wishes to approach reality more integrally, and very helpfully challenges one or more of the basic assumptions of modernist science, they do not seem to challenge the centrality of progress and economic growth in this approach.⁷⁶ An approach that shows more promise for challenging these modernist assumptions more deeply, is Mark Anielski’s *The Economics of Happiness*.⁷⁷ He lay out an integrated approach that tries to overcome fragmented and reductionistic approaches to science, and their consequences, while dealing with the deepest levels of life. He also offers a practical examples for achieving change in the oil sands. Notably, he states: “I don’t believe that the solutions in society will come from the left or the right or the north or the south. They will come from islands within those organizations; islands of people with integrity who want to do something.”⁷⁸

In the end, we will need a plurality of scientific approaches, and a structurally plural academy—in addition to individually diverse institutions—that can sustain and support a variety of approaches. As philosopher Nicolas Wolterstorff argues:

We enter [the academy] as feminists, as Christians, as Jews, as African-Americans, as gays, as agnostics, as atheists, or whatever. And we then engage each other as much as possible with the goal of arriving at consensus on the truth of the matter under consideration, recognizing, what is in any case obvious, that whereas sometimes we succeed in achieving consensus, often we fail.⁷⁹

In this way, society will be in a stronger position to develop many-sided insight into the deeper issues within the oil sands, open up discussion about where society ought to go from here, and devise solutions that go beyond mere technical adjustments.

End Notes:

¹ See, for example, the list of hundreds of research projects related to the focus of energy and the environment (not all are oil sands focused), done under the auspices of the School of Energy and the Environment, at the University of Alberta, retrieved April 24, 2008, from <http://www.uofaweb.ualberta.ca/see/research.cfm>.

² J. R. McNeill, 2000, *Something New Under the Sun: An Environmental History of the Twentieth-Century*, New York: Norton, 328.

³ Paul Chastko, *Developing Alberta’s Oil sands: From Karl Clark to Kyoto*. Calgary: U of Calgary Press, 2004. See an account of U of A president Henry Marshall Tory’s support of tar sands research beginning prior to WW I, and Karl A. Clark’s discovery of the “hot water separation method” as a member of the Federal government bureaucracy, and eventual refinement of this process as a professor at the U of A from around 1920, chapter 1.

⁴ Polkinghorne covers the empirical approach in chapters 2 & 3, and “briefly reviews” it on pp. 201-203. Donald Polkinghorne, *Methodology for the Human Sciences: Systems of Inquiry*, Albany: State University of New York Press, 1983. He cites Kockelmans on the names of the 3 basic approaches to human sciences.

⁵ I restrict my usage to the term ‘social science,’ although Polkinghorne speaks more broadly of the ‘human sciences’ when dealing with both modern positivist and post-positivist approaches. By the term ‘human sciences’, he means the analytical study of any aspect of human phenomena or the human realm.

⁶ Lance H. Gunderson and C. S. Holling, eds., *Panarchy: Understanding Transformations in Human and Natural Systems*, Washington: Island Press, 2002, 7.

- ⁷ C.S. Holling, Stephen R. Carpenter, William A. Brock, and Lance H. Gunderson, “Discoveries for Sustainable Futures,” in Lance H. Gunderson and C. S. Holling, eds., *Panarchy: Understanding Transformations in Human and Natural Systems*, Washington: Island Press, 2002, 417.
- ⁸ McNeill, *Something New Under the Sun*, 336.
- ⁹ Lawrence Busch, *The Eclipse of Morality: Science, State and Market*, NY: De Gruyter, 2000, 117-118.
- ¹⁰ David Nachmias and Chava Nachmias, *Research Methods in the Social Sciences*, Third Edition. New York: St. Martin’s Press, 1987 (2000), 9.
- ¹¹ Lance H. Gunderson and C. S. Holling, eds. *Panarchy: Understanding Transformations in Human and Natural Systems*, Washington: Island Press, 2002, xxi-xxii.
- ¹² Anderson, *Pursuing Truth, Exercising Power*, Columbia U. Press, 2003, p. 19.
- ¹³ Polkinghorne, *Methodology for the Human Sciences*: 19, my emphasis.
- ¹⁴ See the complex, multidimensional understanding of everyday [“naïve”] knowledge and contrasting more limited scope of scientific knowledge developed by Herman Dooyeweerd in *A New Critique of Theoretical Thought* (4 vols.). Amsterdam/Philadelphia: Presbyterian & Reformed Publishing Company, 1953-1958.
- ¹⁵ Wendell Berry, *Life is a Miracle: And Essay Against Modern Superstition*. Washington, D.C: Counterpoint, 2000, 41.
- ¹⁶ Melody Lepine, Director of Industrial Relations, Mikisew Cree Nation, in “*Oil Sands Fever: The Environmental Implications of Canada’s Oil Sands Rush*,” produced by Blue Monks Studios and the Pembina Institute, 2005.
- ¹⁷ Al Gore in an interview with Will Dana, *Rolling Stone*, July 13-27, 2006 issue.
- ¹⁸ See Martin J. Smith, “Pluralism, Reformed Pluralism and Neo-pluralism: the Role of Pressure Groups in Policy Making,” *Political Studies*, 38 (1990), 302-322.
- ¹⁹ See my discussion of these major problems with pluralist theory in John Hiemstra, “Scientific Blind Spots: Did ‘Philosophy of Science’ and ‘Core Beliefs’ Cause Canada’s Debt?” *Pro Rege*, March 2004, Vol. XXXII, No. 3, 12-24.
- ²⁰ Michael Shellenberger and Ted Nordhaus “The Death of Environmentalism: Global warming politics in a post-environmental world,” released at the Oct. 2004 meeting of the Environmental Grantmakers Association. Retrieved July 4, 2007, from http://thebreakthrough.org/images/Death_of_Environmentalism.pdf.
- ²¹ James W. Skillen, “Liberalism and the Environment,” *In Pursuit of Justice: Christian-Democratic Explorations*, Rowman and Littlefield and Center for Public Justice, 2004.
- ²² Robert B. Gibson, “We Just Don’t Know: Lessons about Complexity and Uncertainty in Canadian Environmental Politics,” in Robert Paehlke and Douglas Torgerson, eds., *Managing Leviathan: Environmental Politics and the Administrative State*, 2nd edition, Broadview, 2005, 145.
- ²³ Robert Paehlke and Douglas Torgerson, “Environmental Administration: Revising the Agenda of Inquiry and Practice,” Robert Paehlke and Douglas Torgerson, eds., *Managing Leviathan: Environmental Politics and the Administrative State*, second edition, Broadview Press, 2005.
- ²⁴ Robert Paehlke and Douglas Torgerson, “Environmental Administration,” 2, my emphasis.
- ²⁵ Think of left and right wing populism, and right and left-wing technocratic states. See also the distinction between “technocratic orientation” and “sociocratic orientation” that cuts across the ideological spectrum, explored in the Dutch Scientific Council for Government Policy [WRR], *A policy-oriented survey of the future: towards a broader perspective*. [Summary of the twenty-fifth report to the government], The Hague: SDU, 1983.
- ²⁶ There is some emerging evidence that these two dialectically opposed positions are increasingly disintegrating into a pragmatist approach to the state. The reflex of the Alberta and Canadian governments, with governance on the oil sands, seems to be shifting increasingly to pragmatism. This position suggests government is simply a means we can choose to solve any problem we face or to provide any public good we want. This assumes that there is no way of knowing what the nature and role of the state is, so the state does what ever the democratic masses, or the weight of scientific experts, push for. In the end, power determines the role of the state.
- ²⁷ Anderson, *Pursuing Truth, Exercising Power*, 109-110.
- ²⁸ Polkinghorne, *Methodology for the Human Sciences*, 9, my emphasis.
- ²⁹ I use the term ‘value’ with hesitation, since it draws in the troublesome history of the fact-value distinction of modernist science.
- ³⁰ Lawrence Busch, *The Eclipse of Morality: Science, State and Market*, NY: De Gruyter, 2000, 117.
- ³¹ Ulrich Beck, “Episode 5 - Ulrich Beck and Bruno Latour,” *CBC Ideas*, December 12, 2007, accessed March 6, 2008, at <http://www.cbc.ca/ideas/features/science/index.html#episode5>. Also see Ulrich Beck, *Risk Society: Towards a New Modernity*, translated by Mark Ritter, London: Sage Publications, 1986.
- ³² My emphasis. Ulrich Beck, “Episode 5,” and also see Ulrich Beck, *Risk Society: Towards a New Modernity*, translated by Mark Ritter, London: Sage Publications, 1986.
- ³³ Busch, *The Eclipse of Morality*, 118, citing Beck, italics in original.
- ³⁴ See discussions on pp. 148-9, 151-2, 157-8, 163-4, and conclusions 165f. Robert B. Gibson, “We Just Don’t Know: Lessons about Complexity and Uncertainty in Canadian Environmental Politics,” in Robert Paehlke and Douglas Torgerson,

eds., *Managing Leviathan: Environmental Politics and the Administrative State*, second edition, Broadview Press, 2005, pp. 145-169.

³⁵ Simon Dyer, Pembina Institute, interviewed in the CBC News story, Darrow MacIntyre presents the feature documentary "Crude Awakening" on the "Alberta Oil Sands," December 12, 2007, part I.

³⁶ Beck is suggesting that before a society takes on the risks of new gigantic projects—in our case, oils sands developments with massive impacts on climate change and countless other items—it needs to engage in public dialogue and develop a broad consensus about whether or not we ought to take on these risks at this time and under current conditions. We also need to carefully and publicly deliberate on whether the new technologies promised for dealing with oil sands risks—e.g. GHGs, air pollution, tailings ponds, water shortages and pollution, forest and wetlands reclamation, and so on—will in fact be developed, actually applied in practice, and if so, in a timely manner.

³⁷ See Bob Goudzwaard and Harry de Lange, *Beyond Poverty and Affluence: Towards a Canadian Economy of Care*, Toronto: U of Toronto Press, 1994; Bob Goudzwaard, *Capitalism and Progress: A Diagnosis of Western Culture*. Grand Rapids: Eerdmans, 1979; and Bob Goudzwaard, Mark Vander Vennen, David Van Heemst, Foreword by Desmond Tutu, *Hope in Troubled Times: A New Vision for Confronting Global Crises*, Grand Rapids: Baker, 2007, see especially pp. 157-166.

³⁸ John Morrissy, "\$225/barrel oil predicted by 2012," *Edmonton Journal*, April 25, 2008, A1; who cites the study *The Age of Scarcity* by CIBC World Markets chief economist Jeff Rubin, retrieved April 26, 2008, from <http://www.cibcwm.com/wm/>. In this study, released April 24, 2008, CIBC economist Jeff Rubin argues that "there has been no growth in oil supply over the past two and half years, contrary to popular misconception. Whereas total output has grown to an estimated 86 million barrels a day, the growth has been in related products known as natural-gas liquids, such as butane, used in cigarette lighters. But those liquids — other than lightly used propane — are not transportation fuels, which now account for half of the world's oil use and more than 90 per cent of demand growth in recent years."

³⁹ Goudzwaard along with co-authors deals with paradoxes in the following: Bob Goudzwaard and Harry de Lange, *Beyond Poverty and Affluence: Towards a Canadian Economy of Care*, Toronto: U of Toronto Press, 1994; Bob Goudzwaard, *Capitalism and Progress: A Diagnosis of Western Culture*, Grand Rapids: Eerdmans, 1979; and Bob Goudzwaard, Mark Vander Vennen, David Van Heemst, Foreword by Desmond Tutu, *Hope in Troubled Times: A New Vision for Confronting Global Crises*, Grand Rapids: Baker, 2007.

⁴⁰ Goudzwaard, *Capitalism and Progress*, 1979.

⁴¹ Archie McLean, with files from Canadian Press, "Stelmach won't 'brake' oilsands growth: Quebec nation debate sparks call for same rights in Alberta," *The Edmonton Journal*, Dec. 5, 2006. Time does not permit an adequate analysis here of Premier Stelmach's positions in the recent Throne Speech and Royalty Review Speech.

⁴² Hanneke Brooymans, "Slower oilsands growth urged," *Edmonton Journal*, Feb. 1, 2008. "Peter Lougheed also repeated his call for a slowdown of oil-sands development during and appearance Thursday [January 31] on CBC's The Current. "Lougheed blamed the former premier Ralph Klein for the runaway development." "They should have never allowed so many of these projects to go ahead at the same time." "Now Stelmach is caught because of pre-existing obligations, he said. It won't be something he can turn around overnight."

⁴³ "Shifting Oilsands," *Telegraph Magazine*. September 15 2007. Accessed on September 21 2007 from http://www.telegraph.co.uk/arts/main.jhtml?xml=/arts/2007/09/15/sm_oilsands.xml&page=3.

⁴⁴ Hanneke Brooymans, "Slower oilsands growth urged," *Edmonton Journal*, Feb. 1, 2008.

⁴⁵ Lance H. Gunderson and C. S. Holling, eds., *Panarchy: Understanding Transformations in Human and Natural Systems*, Washington: Island Press, 2002, 7.

⁴⁶ McNeill, *Something New Under the Sun*, 269, my emphasis.

⁴⁷ Berry, *Life is a Miracle*, 23.

⁴⁸ Berry, *Life is a miracle*, 19.

⁴⁹ "Environmental Effects of Alberta's Current Boom," keynote speech, October 23, 2007 at "Alberta: Living the Boom and Bust," a conference at the University of Alberta, Augustana Campus.

⁵⁰ David Schindler and Simon Dyer, Pembina Institute, interviewed in the CBC News story, Darrow MacIntyre presents the feature documentary "Crude Awakening" on the "Alberta Oil Sands," December 12, 2007, part I.

⁵¹ Government of Alberta, New Royalty Framework Web cast on its new policy: "New Royalty Framework Building Tomorrow: A plan to secure Alberta's future," Thursday, October 25, 2007, 3:00 p.m. MDT. Retrieved October 26, 2007, from <http://events.onlinebroadcasting.com>.

⁵² Premier Ed Stelmach, "Alberta: A Plan for the Future," Oct. 24, 2007. Retrieved October 26, 2007, from <http://www.premier.alberta.ca/address2007/opportunity.cfm>.

⁵³ Alberta Energy and Utilities Board, "Vision 2006," ["Year in Review" 2006], Calgary, AEUB, June 2007, 17. Accessed Feb. 6, 08, at <http://www.ercb.ca/docs/products/STs/st41-current.pdf>.

⁵⁴ Prime Minister Stephen Harper, excerpts of his address to the Canada-UK Chamber of Commerce, July 14, 2006,

"Harper's Index," *The Dominion*, Tar Sands Issue, Autumn, 2007, p. 3; also available online at www.dominionpaper.ca.

- ⁵⁵ Prime Minister Stephen Harper, excerpts of his address to the Canada-UK Chamber of Commerce, July 14, 2006, "Harper's Index," *The Dominion*, Tar Sands Issue, Autumn, 2007, p. 3; also available online at www.dominionpaper.ca. Also see the editorial: "Science in Retreat, Canada has been scientifically healthy. Not so its government," *Nature*, 451, 8666 (21 February 2008).
- ⁵⁶ President George Bush, "State of the Union Address," Washington, D.C., January 31, 2006. Bush goes on to assert that "The best way to break this addiction is through technology."
- ⁵⁷ "Tar Sands the Selling of Alberta," CBC-TV, *Doc Zone*, [CBC documentary] Thursday March 13, 2008, 9 pm, produced and directed by Tom Radford.
- ⁵⁸ Anderson, *Pursuing Truth, Exercising Power*, 109-110.
- ⁵⁹ Busch, *The Eclipse of Morality*.
- ⁶⁰ Bob Goudzwaard, "Perspectives of Christian Higher Education: the Social Sciences," in Natalia Pecherskaya, Ed., *Higher Education in XXIst Century Russian Culture: A Christian Perspective*, St Petersburg: SRPH, 2000, 6.
- ⁶¹ Polkinghorne, *Methodology for the Human Sciences*, chapters 2 & 3, and pp. 201-203.
- ⁶² Ulrich Beck, "Episode 5 - Ulrich Beck and Bruno Latour," *CBC Ideas*, December 12, 2007, accessed March 6, 2008, at <http://www.cbc.ca/ideas/features/science/index.html#episode5>.
- ⁶³ Busch, *The Eclipse of Morality*, 68.
- ⁶⁴ On these issues, see Robert Henry Nelson, *Economics as Religion: From Samuelson to Chicago and Beyond*, Penn State U. Press, 2001; Wendell Berry, *Life is a miracle: And Essay Against Modern Superstition*. Washington, D.C: Counterpoint, 2000; and Bob Goudzwaard and Harry de Lange, *Beyond Poverty and Affluence*, 1994.
- ⁶⁵ Goudzwaard and de Lange, *Beyond Poverty and Affluence*, 53. *Ibid.*, 54.
- ⁶⁶ *Ibid.*, 56-7; Two other concerns expelled from the domain of economic science, Goudzwaard and de Lange argue, were (a) care for nature and the environment which is treated like data, as an input into economic production (55-6), and (b) human labour which loses its intrinsic value and is reduced to paid work (58-9).
- ⁶⁷ Ulrich Beck, "Episode 5 - Ulrich Beck and Bruno Latour," *CBC Ideas*, December 12, 2007, accessed March 6, 2008, at <http://www.cbc.ca/ideas/features/science/index.html#episode5>.
- ⁶⁸ Bob Goudzwaard, "Who Cares? Poverty and the Dynamics of Responsibility: An Outsider's Contribution to the American Debate on Poverty and Welfare," in Stanley W. Carlson-Thies and James W. Skillen, eds., *Welfare in America: Christian Perspectives on a Policy in Crisis* (Grand Rapids, MI/Cambridge, UK: Eerdmans, 1995), 55.
- ⁶⁹ *Ibid.*, 64.
- ⁷⁰ Anderson 16-17. On the social scientific assumption of mechanism, also see 109; Busch, 139-140; McNeill 335-6, and Berry 42.
- ⁷¹ Spaling, H., J. Zwier, W. Ross and R. Creasey. "Managing Regional Cumulative Effects of Oil Sands Development in Alberta, Canada." *Journal of Environmental Assessment Policy and Management*. 2(4) (2000): 501-528.
- ⁷² C.S. Holling, Lance H Gunderson, and Donald Ludwig, "In Quest of a Theory of Adaptive Change," in Lance H. Gunderson and C. S. Holling, eds., *Panarchy: Understanding Transformations in Human and Natural Systems*, Washington: Island Press, 2002, 5.
- ⁷³ Feminist approaches push for an order in which fragmentation into public and private spheres is removed and power relationships between genders are equalized.
- ⁷⁴ For Michel Foucault's version of an integrated approach see "A Brief Paraphrase of the First Chapter of *The Archaeology of Knowledge & The Discourse on Language*," by Michel Foucault, courtesy of Lois Shawver, Chapter One, *The Unities of Discourse*, retrieved April 17, 2008 from <http://users.california.com/%7Erathbone/fouarc.html>.
- ⁷⁵ See for example, Philip Resnick, "Political Economy and Class Analysis: A Marxist Perspective on Canada," in John H. Redekop, ed., *Approaches to Canadian Politics*. Scarborough: Prentice-Hall, (1983, latest edition 1993), 337-359.
- ⁷⁶ See for example, the incisive studies by Gordon Laxer, *Freezing in the Dark: Why Canada Needs Strategic Petroleum Reserve*, Parkland Institute and Polaris Institute, January 2008, and Hugh McCullum, *Fuelling Fortress America: A Report on the Athabasca Tar Sands and U.S. Demands for Canada's Energy* (The Parkland Institute) March, 2006, p. 5. Retrieved Oct. 22, 2007, from <http://www.ualberta.ca/PARKLAND/research/studies/Fuelling%20Fortress%20America%20WEB.pdf>.
- ⁷⁷ Mark Anielski, *The Economics of Happiness*, New Society Publishers, 2007.
- ⁷⁸ Karl Henrik Robert, cited by Anielski p. 163, see fn 15. Mark Anielski, *The Economics of Happiness*, New Society Publishers, 2007.
- ⁷⁹ Nicolas P. Wolterstorff, "Let the Voices be Heard," *Anastasis* (2003) Vol. 2, No. 2, 4-5.