Futures 42 (2010) 59–68

Contents lists available at ScienceDirect

Futures

journal homepage: www.elsevier.com/locate/futures

Linking foresight and sustainability: An integral approach

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ARTICLE INFO

Article history:
Available online 22 August 2009

ABSTRACT

This paper looks at the growing confluence between sustainability thinking and futures thinking. Drawing on developments based on Integral Theory, it then looks at how an emerging Integral Sustainability (IS) promises to enhance theory and practice in the sustainability field. In particular, the paper looks at how IS makes sense of sustainability challenges from an ontological position based on *perspectives* in place of *objects* (and their systems). A framework is outlined for understanding how various sustainability perspectives are constructed. This framework is then used to analyse a range of general perspectives the authors have identified that relate to nuclear power as a response to climate change. The strength of the IS approach is considered in the context of ongoing debate in Australia over the appropriateness of developing a local nuclear power industry as a response to climate change.

1. Introduction

As we write this in November 2006, it seems that a significant shift may be occurring with regard to collective understanding of the connections between human activity, environmental health and civilisational futures. The evidence for global anthropogenic climate change seems to be shifting the stances of even the most reluctant national governments. In Australia, the precariousness of water supplies across the continent is almost universally acknowledged to be at or beyond crisis point. As we head into another summer at the end of a decade of drought, the forecast is for the most severe bushfire season in at least twenty years.

Sustainability concepts are perhaps coming of age. Such a thesis might be supported by the *Limits to Growth* experience. Three decades after publication of the original version, the thirty-year update gently but firmly reminds readers of this project's purpose and intent: not prediction of a specific state of affairs at a specific time, as many critics assumed, but demonstration of the general consequences of particular civilisational goals and strategies for achieving them, enacted within a finite world [30]. The *Limits* message did not sink from view as some predicted: instead it seems to have become more relevant, and more urgent. The message can now be considered in that historical context and assessed more readily on its merits.

With this maturation, the links between futures thinking and sustainability thinking seem to grow stronger. A glance over the titles of the twenty-five most downloaded articles from the journal *Futures* at the time of writing seems to add weight to this observation. At least nine of these were explicitly related to environmental sustainability and a further three related to corporate social responsibility [1]. With this in mind, it seems timely to consider the directions in which sustainability theory and its application might be heading and to consider how sustainability practice might be made as effective as possible. Over

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0016-3287/$ – see front matter © 2009 Elsevier Ltd. All rights reserved.
doi:10.1016/j.futures.2009.08.001

the past decade, Richard Slaughter has pioneered the development of Integral futures studies and foresight, more recently in conjunction with colleagues from the Strategic Foresight Program at Swinburne University of Technology and other centres of learning [33,34]. Slaughter and others have made the case that this emerging approach to futures work represents a necessary and beneficial trajectory for the field [21].

It may come as little surprise then that the Integral approach is seeing similar application to sustainability theory and practice. Integral Sustainability is under continuing development, based on Ken Wilber's Integral Theory [36], and draws on contributions from practitioners all over the world under the guidance of Barrett Brown at Integral Institute based in Boulder, Colorado.[1] The concepts discussed in this paper draw in particular on Brown's introductory work on Integral Sustainability (see [10,11]). We also draw on Sean Esbjörn-Hargens's foundational work on Integral Ecology (see [17,18]).

This article commences with a brief look at how we see the connection between sustainability and foresight/futures thinking: the first question that we address is "why sustainability?" We then introduce some of the theory of Integral Sustainability, and following this we will attempt to demonstrate how these ideas can be used to better understand (and hence respond to) a contemporary sustainability concern. The particular case study that we examine here is the current focus on nuclear power as a possible response to climate change.

2. "Why sustainability?": sustainability and foresight

Our interest in sustainability represents a particular worldview, but one that appears to have much currency and significance for futures thinking. This shared worldview rests on two basic ideas. The first of these is that humanity's present global situation is one of unsustainability: human activity has exceeded or is close to exceeding many of the planet's bio-physical limits. The second basic idea underpinning our worldview is that continuing down this path appears likely to lead to futures in which human civilisation is significantly impoverished: we would like to avoid the emergence of such currently plausible futures.

This worldview is founded on three general sets of observations regarding the interaction between bio-physical limits and human activity:

1. Renewable resources are being used at rates greater than replacement.
2. Wastes are accumulating faster than our environment can assimilate them.
3. Non-renewable resources are not being used with the long-term implications of their non-renewability in mind: suitable substitutes are not being developed while these resources are still plentiful.

Such observations are not novel. They provided the motivation over thirty years ago for the *Limits to Growth* project [30] and have been clearly articulated by economists such as Herman Daly [15]. They are supported by empirically verifiable, objective evidence, such as that presented by Lester Brown in his recent *Plan B 2.0* [12]. They are becoming embedded in the narratives of our age, in books such as Jared Diamond's *Collapse* [16], films such as *An Inconvenient Truth* [23] and books such as Jeremy Leggett's *Half Gone* [25] about peak oil. Even so, we seem to continue along a similar path. The picture that emerges is one in which humanity is faced with global challenges of unprecedented complexity.

How can this worldview of unsustainability be connected with the theory and practice of foresight? We suggest that this starts with the observation that the possibilities of the future do not exist on their own: these possibilities are always human psychological and cultural constructs; they always occur in the context of human cognition, intentions and desires that cannot be separated from the cultural histories, narratives and images in which we are embedded. As such, our images and ideas about possible futures are restricted only by our imagination. The sky is not even the limit, we might say. Nonetheless, in implementing our images in the present we face some rather concrete limits. It seems reasonable to suggest that most of the sustainability challenges that we presently face have their origins in earlier failures either to recognise or respect some of these limits. So while Jim Dator's Second Law of Futures – "Any useful statement about the future should seem ridiculous" [4] – acts on the one hand as an important reminder of the ever present cultural barriers faced by innovation processes, sustainability thinking is an important reminder that not all "ridiculous statements" are in fact useful or lead to preferred futures. Some (in fact *many*) ridiculous ideas have the potential to lead us to unsustainable futures.

In other words, sustainability thinking involves negotiating the boundaries around what is both possible *and* preferable. So, we might say that while even the sky is *not* the limit for our ideas about the future, sustainability thinking very quickly brings our futures thinking back down to earth. Bio-physical limits, such as those described in the references cited earlier, interact strongly with humanity's desires and intentions for the future. In more abstract terms, it has become conventional in sustainability thinking to consider futures that might work for all of us together in terms of economic, environmental and social categories of limits, often referred to as the triple "Bottom Lines" by which human activity should be assessed for its worthiness and potential consequences.

[1] A substantial and growing IS knowledge base has been assembled by Integral Institute, with resources available for download from the Integral Institute website. See [3] for details.

3. An introduction to Integral Sustainability: the nature of reality

This more conventional approach to sustainability serves as a point of departure for looking now at Integral Sustainability (IS). At the heart of IS is a shift from thinking of sustainability in terms of a world comprised of *objects* and *systems of objects*, to thinking about sustainability in terms of a world comprised of *perspectives*. IS starts by going back to basics, and asks some very fundamental questions about the nature of the reality that we are interested in sustaining. The position arrived at using the Integral approach is that the basic units of existence, that we cannot ever simplify any further, are not objects but are instead *perspectives*. It follows from this that the way the practitioner makes sense of the world has a central role to play in the practice of IS.

In starting to better understand what this means, consider again the conventional sustainability ontology – the domain that the practitioner takes to be real, the accepted ''the nature of reality''. We have seen that sustainability thinking usually considers the world in terms of the categories economy, society, and environment. The relationship between these domains of reality is often conceptualised as shown in Fig. 1. In fact this is taken from Swinburne University's sustainability covenant with the Victorian Environment Protection Authority [7] (p. 2). We could say that in this view, reality is comprised of economic, social and environmental systems, arranged according to their physical size, or span. Economic systems are seen as part of social systems which are seen as part of environmental or perhaps bio-physical systems.

The IS ontology has a very different basis, and as we will show, it is considerably more complex. The IS ontology is depicted in Fig. 2. IS starts with a view of reality that is evolutionary or developmental in nature. In this view, reality is comprised of increasingly complex structures that emerge through and then include within themselves the earlier structures. The most basic structure is the sum total of all matter and energy, labelled here as the *physiosphere*. Emerging through and including the physiosphere is the *biosphere*, the sphere of all life. Emerging through the biosphere is the *noosphere*, to use the term first coined by Édouard Le Roy in 1927, ''building on Vernadsky's ideas and on discussions with Teilhard de Chardin'' [35] (p. 13). This is an encompassing sphere or layer that includes all structures that involve cultural or linguistic reproduction [36].

Notice that in this view, the physiosphere is considered *part of* the biosphere and the biosphere is depicted as *part of* the noospere. Coming to terms with this perhaps counter-conventional view is essential to appreciating the full value of IS and bears further elaboration. The nesting of ontological levels or domains in IS departs sharply from the nesting of economy, society and environment in Fig. 1. Whereas the nesting in Fig. 1 is related to physical extent or span, in Fig. 2 this nesting is based on the asymmetric nature of emergent properties. All of the properties of the physiosphere are present in and remain essential to the existence of the biosphere (for example: gravitational, electrical, magnetic and nuclear forces; properties of solids, liquids and gases; thermodynamic behaviour). With the arising of the biosphere however, properties arise that are neither present in nor reducible to the physiosphere—the biosphere cannot be understood simply by looking at the characteristics of the physiosphere. Similar asymmetry distinguishes the noosphere from the biosphere. An important consequence of this is that the physioshere can exist independently of the biosphere, but not vice versa; the biosphere can exist independently of the noosphere, but not vice versa. Destroy the noosphere, and the biosphere can continue; destroy the biosphere and the physiosphere can continue [36].

The next important distinction in the IS ontology draws on a basic tenet of the ecological sciences. One of the central lessons from ecology is that individuals of any thing – a tree for example – always occur as members of collective systems—for example, a forest. That is, if you want to understand any thing properly, you need to look not only at that thing in isolation, but at that thing in the context of its surrounding environment. But both views are important for understanding the situation

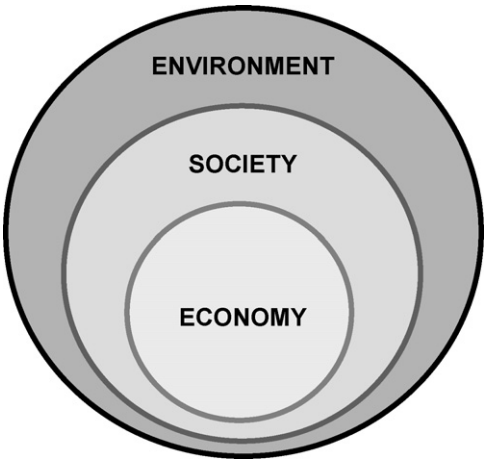

Fig. 1. A typical arrangement of the conventional sustainability ontology.

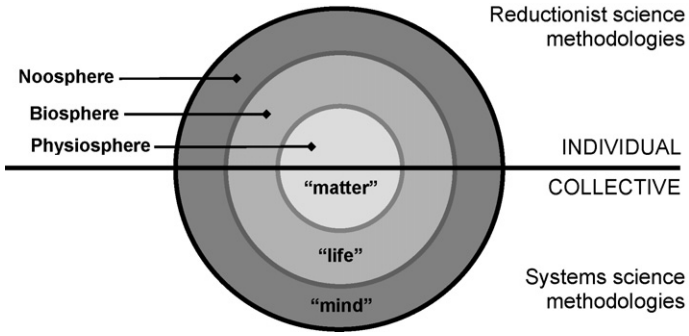

Fig. 2. Diagrammatic representation of individual and collective views of three levels of reality and general families of methodology for enacting knowledge of the resulting domains.

of interest. The IS ontology recognises this, by always including the individual view alongside and in the context of the collective view.

These individual and collective *views* come about through the application of particular *methodologies*. There are methodologies specifically suited to looking at individuals in isolation, and methodologies specifically suited to looking at these collective contexts. For individual things, reductionist or empirical science methodologies are most appropriate, for collectives, systems science methodologies are best. The point to take from this is that each of these aspects or dimensions of the IS ontology can be revealed by training in and applying specific investigation methodologies. Fig. 2 depicts this multi-level reality comprising individual entities that are always individuals in the context of collectives. Individuals and corresponding collectives always occur together.

The examples above – a tree and a forest – have been drawn from the physical world, the world of material *stuff*. This is the world that is studied via the natural and biological sciences and via the systems sciences. In working up to the next important distinction included in the IS ontology, we enlist the help of Albert Einstein who is reputed to have said that:

> It would be possible to describe everything scientifically, but it would make no sense; it would be without meaning, as if you described a Beethoven symphony as a variation of wave pressure [2].

IS recognises this and accommodates Einstein's concerns by drawing a distinction between the exterior reality of wave pressure – or trees and forests – and the interior reality within which the experience of Beethoven's symphony is recognised as musically meaningful or pleasing. This is depicted in Fig. 3. The importance of this dimension is well characterised by the work of Masanobu Fukuoka, the Japanese pioneer of natural farming who has written about farming not just as a means for making food, but as an aesthetic and even spiritual endeavour [22].

As with the exterior dimensions, the individual interior experience always arises in the context of collective culture—that is, in the context of shared interior structures for interpreting meaning. This aspect of the IS ontology grounds all individual experience within cultural and linguistic structures, as described by Berger and Luckman [9]. That all "sustainability knowledge" is grounded in intersubjective contexts simply cannot be ignored if sustainability practice – and the futures to which this might lead – is to be made as widely and deeply effective as possible. Again, as with the exterior quadrants, there are specific methodologies suited to inquiring into these interior dimensions of reality.

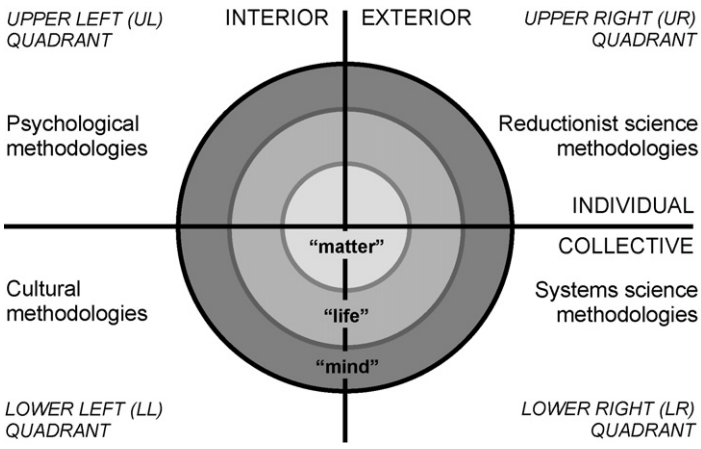

Fig. 3. The Integral Sustainability ontology and general methodological families.

The differentiation of this ontology into individual–collective and interior–exterior results in four major ontological domains, described as shown in Fig. 3 as the upper right (UR) quadrant, lower right (LR) quadrant, upper left (UL) quadrant and lower left (LL) quadrant. Each of these quadrants represents a distinct domain of knowledge. Notice that the LR quadrant in Fig. 3 generally covers the terrain included in the conventional sustainability view that we saw earlier based on environmental, social and economic systems. By including the interior–exterior distinction in addition to the individual–collective distinction, the IS ontology starts to move well beyond the conventional view.

4. The what, how and who of IS

The basic position that we started with was that Integral Sustainability involves a shift in stance from a world comprised of objects to a world comprised of perspectives. How does the ontology that we have just introduced fit with this? To answer this, we need to consider the question "what makes a perspective?"

The straightforward response to this is that every perspective has three underlying components [17,18]. The first of these is the "what-component". This is the ontological component that we have just examined. The second is the "how-component": the methodologies that are used in the processes of revealing that ontology. Every perspective involves an ontology, enacted via some methodology. The third and final component is the "who-component": this describes the investigator—a perspective always involves a subject who is perceiving some object. To understand any subject's role in the formation of a perspective (including our own), we need to know something of the epistemologies, or the *capacities* for knowing, that they – or we – are using.

To complete this introductory examination of an approach to sustainability based on a world comprised of perspectives, we will look now at the "who-component" and in particular at what is meant by capacities for knowing. Albert Einstein once again provides a useful commencement point. Einstein is reputed to have said that:

> The significant problems we have cannot be solved at the same *level of thinking* with which we created them [emphasis added] [2].

Einstein's reference to *levels of thinking* links the who-component of any sustainability perspective to the epistemologies of an individual—bearing in mind that an individual's interior capacities need always to be considered in the context of the collective culture in which that individual participates.

The Integral approach looks at these capacities in terms of levels of thinking in multiple developmental *lines*, in a similar approach to that of Howard Gardener's multiple intelligences [37]. To understand any perspective, we need to know something about where the perspective-taker sits in these lines. Each of these developmental lines explores the unfolding of responses to what Wilber has described as "Life's Questions" [37]. Some of these are reproduced here in Table 1.

During their lifetime, any individual has the potential for their capacities in each of these lines to unfold through at least three broad stages or levels:

Level 1. Egocentric stage: responses to the questions are most narrowly focused.
Level 2. Sociocentric stage: responses to the questions are centred around the individual in relation to their immediate social or ethnic group.
Level 3. Worldcentric stage: responses to the questions place the individual within a whole-of-humanity or global context [37].

Importantly for our present focus, it seems to be with the worldcentric stage of thinking that ideas start to emerge about sustainability extending to all of humanity, and perhaps beyond this to all species, now and into the future.

5. Human interiors and sustainability: means–ends relationships

It appears that it is only with this more advanced development in the noosphere itself (at the worldcentric stage) that the capacity to construct and hold ideas such as those relating to global sustainability comes about. Prior to development of this capacity, these ideas are simply meaningless. The power of the IS approach for understanding the underlying nature of perspectives hopefully starts to become more clear at this point—we now have a framework for seeing how the variety of

Table 1
Some lines in psychological development. Adapted from Integral Spirituality [37] (p. 60, table 2.1).

Developmental line	"Life's Question"	Pioneering researcher(s)
Cognitive	"What am I aware of?"	Piaget, Kegan
Self	"Who am I?"	Loevinger
Values	"What is significant to me?"	Graves
Morals	"What should I do?"	Kohlberg
Interpersonal	"How should we interact?"	Selman, Perry
Needs	"What do I need?"	Maslow

views in relation to a given sustainability issue might come about. Going even further than this, we can now see that *any* view is exactly that: a view that can be more or less comprehensive.

If we look more closely at the ideas relating to sustainability that seem to emerge with the worldcentric stage, some further distinctions can be made. One particularly useful approach that we have found for further differentiating these perspectives is to look at the sustainability ends – or objectives – that are expressed, and the relationship between these ends and the means – or strategies – for achieving them. At least three broad categories of means–ends relationships tend to suggest themselves, unfolding in the following way:

Level 3.1. Physiosphere and biosphere are valued as means to utilitarian social ends for humans. (This appears to be the least complex of the sub-levels of means–ends thinking.)

Level 3.2. Physiosphere and biosphere are valued for their own sake and should never be means to ends. No particular ends are intrinsically better than any others. (This more complex sub-level seems to correlate with a strongly pluralist-relativist worldview.)

Level 3.3. Noosphere is valued as the means to an end that encompasses physiosphere and biosphere preservation; physiosphere and biosphere are seen as both intrinsically valuable in their own right, and essential to the well-being of the noosphere itself. (This appears to be the most complex of the obvious sub-levels, with strong regard for pluralism, and capacity and willingness to differentiate between more and less appropriate stances on sustainability issues.)

Beyond this there may also presently be – or no doubt will emerge in the future – more nuanced capacities again, with increased ability to handle systems and situational complexity relating to sustainability questions. The capacities outlined in brief sketch form here represent those that we are able to discern as relatively stable and recurring patterns or structures as we encounter sustainability perspectives day-to-day.

6. From theory to application

Having introduced some of the basic elements of the IS tool kit, centred on the key idea that the fundamental units of existence are perspectives rather than objects, we will now turn to the question of application: what does this theory mean for the practice of sustainability? The first part of a response to this question is that if perspectives are the most fundamental units of reality, then in dealing with the sustainability of that reality, we will need to know as much as possible about the perspectives contributing to the state of unsustainability, and the perspectives underlying any proposed response.

The Integral approach allows us to see that perspectives relating to exterior dimensions are well catered for. There is no deficit of objective facts about the problems that we face, or techniques for responding to them. For example, Lester Brown's *Plan B 2.0*, mentioned earlier, is a very comprehensive testament to this [12]. We would suggest, though, that there *is* a deficit in our individual and collective *interior* capacity to care enough to take responsibility for this objective situation, and for the implementation of adequate systemic responses to these problems. This observation is central to Integral Theory and its practical embodiment [36] (pp. 541–2). Following from this, the IS approach leads to four key propositions related to sustainability practice:

1. In light of the suggested *interior* deficit, forming better responses to our complex network of sustainability challenges requires better understanding of the variety of ways that people see things.
2. An Integral approach provides a basis for finding the partial truth in – and hence the opportunities associated with – a greater range of perspectives.
3. More comprehensive perspectives will lead to better responses, helping us to deal with problems on many fronts and from multiple directions simultaneously.
4. An Integral approach provides a path towards mutual understanding and agreement amongst agents in the noosphere, thus helping us to avoid partial responses that bring their own consequential problems later on.

With this in mind, we are now ready to look at application of the theory to better understanding the specific issue of nuclear power as a response climate change.

7. Nuclear power in Australia: some background context

The discussion of nuclear energy as a response to climate change has particular significance for us in Australia. Australia's largest source of export income at present is black coal [8]. Australia also derives most of its electricity from coal-fired power stations [5]. Australia's economic wealth is strongly underpinned by mineral resources, and in particular by our vast reserves of coal. Now consider that in 2004, Australia's per capita greenhouse gas emissions, at 28.2 tonnes, were the highest of all OECD countries and amongst the highest in the world. We are faced in our country with a deep dilemma: to acknowledge the seriousness of anthropogenic climate change means to cast a dark shadow over the source of our economic well-being. Into this picture enters Australia's very large reserves of uranium oxide: in fact, at twenty-four per cent of the world total, the largest of any country [6].

To date, stewardship of both abundant coal reserves and abundant uranium reserves has placed Australia in the unusual position of exporting uranium for electricity generation elsewhere, while never developing domestic capacity for nuclear-fuelled electricity. As a result, the question of whether nuclear-fuelled electricity is an appropriate response to climate change for Australia produces strongly divergent perspectives. For instance, with no precedent for the construction of commercial-scale nuclear power stations, the question of where these might be located is particularly challenging: who would be prepared to accommodate these in their local community?[2]

Significant ethical challenges arise with the export of uranium: Australia derives economic advantage from the sale of raw materials, but does not have to deal with the consequences of the use of this material in the form of wastes that remain toxic for many thousands of years. Do Australians have a moral obligation to share the costs as well as the benefits of this resource windfall? Add to this the fundamental economic challenge for a nation structurally dependent for its prosperity on mineral wealth, in a world where the costs and consequences associated with exploitation of those minerals is no longer ignored, and the task of navigating towards energy futures that are as widely beneficial as possible becomes very complex.

It is situations of this nature for which, we suggest, IS is not only better equipped than more partial approaches, but is in fact the minimum approach necessary if there is to be hope of reaching mutually desirable outcomes. With this assertion, we will now look at how the theory of IS presented in this article might be used to better understand a range of characteristic perspectives relating to the proposal of nuclear energy as a response to climate change. As we explore these perspectives, IS would suggest that it can be quite instructive to observe our own personal response to each—and to consider what this response might reveal about our own epistemology. That is, are there potential *shadow elements*, or *blind spots*, that we are leaving out or rejecting whenever we have a particular preference for one approach over another?

8. Perspectives on nuclear power

With this in mind, we now apply the IS framework to analysis of some of the major perspectives that we see arising in relation to nuclear power as a proposed response to climate change. It should be noted that the perspectives presented here are amalgamations of the stances of large numbers of commentators. They are stereotypes, and as such would need to be seen as depicting caricatures only of any *individual* position. We do not suggest that they align exactly with any *particular* person's views (although they may align closely). Rather, these are representations of typical world views: they represent cultural currents that many readers are likely to recognise or even identify with. While we do suggest individuals that seem to typify these world views, we would do a crude disservice to the individuals to *reduce* them to the perspective as described. Nonetheless, for the sake of useful communication and discussion, boundaries must be drawn: we invite you to reflect on the analysis in the knowledge that we have attempted to remain constantly mindful that we are active participants in writing these stereotypes into existence.

8.1. Perspective 1: energy for all

This perspective first emerged at the dawn of the nuclear power age in the mid 20th century—with the promise of safe, clean power that would be "too cheap to meter". While the political, environmental and economic difficulties associated with nuclear power have limited its growth in recent decades, supporters of the technology have more recently used the issue of climate change to put nuclear power back on the public agenda. The claim that nuclear power is "low carbon" seems to have struck a chord with many politicians, and while the initial limitations of the technology remain, they are rarely addressed.

Another fundamental blind spot of this perspective is a lack of understanding of the nature of energy demand—and that it is socially determined, rather than being a fixed and uncontrollable quantity that simply exists "out there". In this view, knowledge pertaining to the right-hand quadrants (see Fig. 3) tends to be privileged. In fact, the emphasis tends to be on the UR almost exclusively: our knowledge allows us to split the atom, therefore utilitarian capacity should determine what we do. The *materialistic* view of energy demand is illustrated by Sergei Kirienko, Head of the Russian Federal Atomic Energy Agency:

> These [nuclear] plants are needed to counter the fact that economic growth and electricity consumption in Russia, and worldwide, is accelerating faster than predicted [31].

Using the means–ends categories described earlier, this perspective appears to be centred at worldcentric level 3.1—with a focus on the utilitarian ends of human development and economic growth. This perspective tends to ignore and/or fail to recognise the interior correlates of external *things*—and assumes that, not only is increased energy demand inevitable, it is necessary for individual and societal advancement.

[2] Of particular significance in relation to this, it is worth noting that while Australia is the least densely populated continent after Antarctica, it is also the most highly urbanised, with most of the population living within a narrow band along the east coast [13]. Given the large quantities of water required for cooling of nuclear power stations, and given Australia's lack of inland water, it seems likely that reactors would be located close to the coast, and hence in close proximity to densely populated areas [29].

8.2. Perspective 2: safety first

Perhaps the first significant perspective in opposition to nuclear power emerged with the birth of the environmental movement in the 1960s—and gathered momentum in the wake of the Three Mile Island and Chernobyl accidents. This perspective is aware that the physical world is a complex system of interacting agents, and views this *web of life* [14] as something to be protected at all costs. Since compromise is typically not an option for this perspective, the means *never* justify the ends—suggesting a resonance with worldcentric level 3.2. As with Perspective 1, this perspective tends to absolutise the right-hand quadrants, but now the individual dimension is more deeply considered within the context of collective systems. By absolutising exteriors, this perspective still tends towards simplistic responses: by leaving out interior reality, those holding such a perspective tend to overlook the fact that their understanding of the situation is in fact a perspective. Once again, the perspective-holders neglect their roles in enacting the knowledge of whether or not a nuclear response is appropriate. This leads to the assumption that a final, complete and internally consistent position can be arrived at.

One possible blind spot here is the recognition that compromises are sometimes necessary in complex situations—and that the *precautionary principle* can be co-opted as an intellectually lazy basis for rejecting new ideas or technologies without performing a balanced, critical assessment of the risks and potential benefits. Since this perspective tends to argue its case quite forcefully and emotively, it can also alienate people with differing views without recognizing or respecting any *partial* truths contained in these alternate perspectives. Without the willingness – or ability – to *integrate* diverse perspectives, those operating from within this worldview are generally unable to develop workable solutions capable of receiving widespread acceptance.

8.3. Perspective 3: our only hope

A more recent perspective to emerge is one that is – put simply – more concerned about the threat of climate change than threats associated with nuclear power. Environmentalist James Lovelock – inventor of the *Gaia* hypothesis [26] – was one of the first to take this stance:

> We have no time to experiment with visionary energy sources; civilisation is in imminent danger and has to use nuclear—the one safe, available, energy source—now or suffer the pain soon to be inflicted by our outraged planet [27].

This perspective is perhaps distinguished from *Safety First* by its ability to consider longer timeframes, and its willingness to entertain compromise as a means to *civilisation-saving* ends—suggesting that this perspective is located somewhere on the transition between worldcentric levels 3.2 and 3.3. Common criticisms of this perspective are that it tends to gloss over many of the geopolitical (or security) issues associated with nuclear power, and that it has too little faith in renewable alternatives. As with Perspectives 1 and 2, the left-hand quadrants receive little explicit attention: energy demand seems to be a pre-given absolute, rather than a consequence of the interplay between exterior and cultural reality. Even so, there is perhaps an implicit (and pragmatic) appreciation of these aspects of reality. There is a greater sense here that it is in the domain of discourse that the battle for one's position will be won or lost, rather than through more comprehensive cataloguing of "the facts".

8.4. Perspective 4: yesterday's solution

This perspective takes a more sophisticated view of the situation compared with the previous perspective—and is almost defined by its awareness of the previous perspective's two primary blind spots. While there is some implicit acknowledgement that nuclear power may be *one* answer to climate change, it is seen as an inferior option compared with a number of other existing solutions, namely:

- Renewable energy technologies
- Energy conservation
- A reframing of the way we use and provide energy in the first place.

Amory Lovins of the Rocky Mountain Institute articulates a position that is strongly reminiscent of this perspective:

> Based on the literature and on deep practical experience of electric efficiency and production in scores of countries, I see no evidence that nuclear power. . .is or promises to become an economically, technically, or socially sound energy solution [28].

In relation to perspectives of this nature in general (although not specifically in relation to nuclear energy), Peter Senge has this to say:

> Many of today's problems come from yesterday's solutions, and many of today's solutions will be tomorrow's problems. What is most perplexing is that many quick fixes. . .are implemented even though no one believes they address underlying problems [32].

A particular feature of this perspective is that it challenges people to recognise the inherently partial nature of any one solution. Here we see awareness that the current debate has limitations—and that thinking needs to be challenged if more comprehensive responses are to be developed. This perspective starts to bring in a much more significant appreciation of the intersubjective dimension of knowledge and the constructive role that we play in creating an understanding of reality. Here also we see an expansion from worldcentric level 3.2 further towards level 3.3, as an understanding of mind itself starts to inform the knowledge that is enacted.

The limitation of this perspective, however, is that it does not seem yet to fully grasp the fact that people holding the previously examined perspectives are most likely "doing the best they can", and that logic (and even insight) alone is not enough to convince these people of the merit of taking a "higher perspective"—they either can or they cannot (at least for now). This could be characterised as an under-emphasis on knowledge relating to the UL quadrant, where appreciation of the diversity of capacities in relation to the developmental lines described in Table 1 would help to provide insight into the difficulty associated with enacting mutual understanding on the basis of rational logic and facts alone.

8.5. Perspective 5: time will tell

The final perspective we will consider (but by no means the ideal or end-state) appears to be more at peace with letting the chips fall where they may—not because those holding the perspective do not care, but rather because they recognise that they, as individuals, can only do so much to shape the future.

One manifestation of this perspective is a desire to see the *best* (or most comprehensive) solution prevail—even if this goes against their own better judgement or personal preference. There is a humility at play here which recognises that any one solution will only ever be partial, and that any one person will only ever see part of the truth—and therefore that even the wisest of individuals cannot hope to conceptualise a *complete* solution to a given problem. This humility, and the increased insight that accompanies it, suggests the presence of a worldcentric level 3.3 perspective. Here we typically see working awareness of the dynamic co-arising of all four quadrants of reality and of knowledge relating to these.

Another manifestation of this perspective is an awareness that humans may not actually be capable of destroying the biosphere—a realisation that can be somewhat liberating. Michael Zimmerman's view on this is as follows:

> Even if we had a full-scale nuclear exchange, there would still be a biosphere. . .much of mammalian life would disappear, but so did it 68 million years ago. . .and it came back pretty good, didn't it?[24]

Without feeling the weight of the world on their shoulders, people holding this perspective are often able to contribute more freely and openly. This can make them less prone to burn-out, and allows them to be more effective in their chosen field of endeavour.

9. Conclusion

IS would suggest that the more perspectives on an issue we can integrate, the better and more holistic our solution will be. However, this is not simply a matter of giving every perspective equal voice. Rather, it is about critically reflecting on the relative merits (and shortcomings) of each perspective, and drawing out the partial truths of each. This can only be done if we are able to personally *inhabit* each perspective in a balanced and unbiased manner. Frameworks such as IS can assist people wishing to make more objective and balanced assessments of a diverse set of perspectives.

What prospects exist for IS to inform thinking in Australia on the relationship between nuclear energy and climate change? The majority of positions appear strongly polarised, and hence partial—although there do appear to be some exceptions. The intent behind Integral Sustainability's honouring of, and more importantly, attempting to inhabit, all perspectives can perhaps be seen emerging in the position enacted by Tim Flannery, author of *The Weather Makers* [19] in a recent magazine article:

> If Australia were to switch from coal to nuclear power, we would make only a small reduction (about 1 per cent) in global carbon dioxide (CO_2) pollution. But it would be a noble act, for our CO_2 pollution is devastating the entire world while any risk involved in nuclear power would be borne almost entirely by Australians [20] (p. 25).

Much has been made of Flannery's apparent endorsement of nuclear power. A more nuanced reading of his position might make note of his very specific languanging, which points to the greater complexity with which he approaches this topic than he is usually given credit for. His willingness to entertain nuclear power as an appropriate response is best understood in the context of the background to Australia's particular resource situation, introduced earlier. In the quote above, Flannery considers a carefully circumscribed moral issue relating to the breadth of impact associated with coal-fired versus nuclear power. He separates this from utilitarian considerations of which energy source results in the lowest overall carbon emissions, a technical matter of significant ambiguity and controversy. He then proposes a carefully differentiated approach to addressing this complex technical question. Flannery writes:

> How can we tell if nuclear power–or indeed any other power option–can really contribute to combating climate change? There is one sure-fire way to do this: implement a carbon tax [20] (p. 25).

Rather than falling back on a black-on-white rendering, Flannery suggests holding a range of approaches and finding a superordinate basis for coping with the ambiguity and uncertainty that this involves. In this case, he suggests establishing an environment within which very complex economic comparisons can be resolved through the introduction of a carbon tax.

IS provides us with a basis for better understanding Flannery by situating his perspective within a framework for perspective *making*. The strength of IS lies not in determining that one party is "right" and others are "wrong". Instead, with IS we have a basis for understanding more deeply what is at play when *any* perspective is enacted. This can have a significant ameliorating influence in divisive situations, and hence has the potential to greatly assist with reaching mutual understanding. And with mutual understanding, we have the opportunity to create visions together of shared futures that will better serve the interests of us all.

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