

Academia and the Climate Emergency

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Abstract

A risk exists that climate change could get out of human control if average global temperatures reach 2° C above pre-industrial levels. Climate change threatens all classes in all nations, just some before others. Some corporations, including much of the mass media, some think tanks and many politicians have been perpetrating *intellectual fraud* in promoting climate denier ideologies for two decades. Climate change deniers *pretend* to be interested in the quality of the science, but are really protecting their own ideologies, income and wealth, and that of their financiers. Some of the leaders are ideologically extreme liberals but their financiers are closer to short-term materialists. Supporters of up-to-date global warming and climate change evidence and theory must urgently reconsider their social analysis and communication strategies, even where some prominent business is now supporting a carbon pollution price. Many people supporting a carbon price are still only in favour of some weak regulatory elements.

I expect that, more than other sectors, *academia* across the world has the imagination, authority, intellectual diversity, and sufficient flexibility, to be able to form *integrating multi or interdisciplinary action teams* to support climate science and mitigation strategies. Teams could gradually develop integrating analyses and strategies to work inside and outside universities. Under the present emergency conditions, climate scientists cannot be expected to work alone to avert the crisis.

Problem elements of the population concerning climate change can be divided into *financiers, deniers (contrarians), denier followers, real sceptics, doubters and idlers*. The most prominent or senior deniers work chiefly in think-tanks and the media, while some are academics, other professionals and even religious leaders. The corporate financiers of this work remain behind the scenes. The financiers and deniers are chiefly *knowing* (know they are pretending), whereas many of the followers are *deluded*. Some may have started out knowing, fearful of short-term loss of income and lifestyle, but have now become partially or fully deluded, and are convinced their belief is scientific scepticism. Some deniers and followers appear to seek notoriety or wish to express hate of environmentalists, while others may suffer from hopelessness. Ordinary doubters have often been persuaded to call themselves sceptics and ally themselves with deniers. Idlers tend to support conservative climate theory but fear change and do very little. Denier shifting between their various claims and mutual incompatibility between their ideas is an underrated argument against deniers.

Activism combined with social research might best be integrated rapid action research via dialogue. Dialogue with deniers has been tried but we are not sure of the effectiveness of an integrating team strategy targeting a range of problem types. We need more emphasis on communication that closely combines four ideas, namely contemporary ice collapses and other relevant disasters, dire climate futures, the increasingly hopeful technology on offer, and reasonable behavioral changes that could be expected. A network of university action teams is needed across nations, and then across the world. If methodologies are to be progressively improved, effectiveness evaluation must be carried out. In this emergency, universities should make sure that such collective work is supported morally if voluntary, or funded quickly, and suitably credited. Leadership is needed. Deniers are starting to see the light. I am sure that a global network of universities can do more to lead the world, turn the tide towards a revitalized culture, and later benefit from the consequences. Once the tide turns, it will snowball.

Summary

The present dire climate situation has been exacerbated by the temporary obstruction by the deniers. Some corporations, including much of the mass media, think tanks and many politicians have been perpetrating *intellectual fraud* in promoting climate denier ideologies for two decades. Some leading deniers are ideologically extreme liberals, opposed to government, influenced by the Cold War experience, but their financiers are closer to short-term materialists. Most deniers have been holding back effective government policies by *pretending* to challenge the quality of climate science and adding confusion to the public discourse.

Supporters of up-to-date global warming and climate change evidence and theory must urgently reconsider their social analysis and communication strategies even where some business is now supporting a carbon pollution price. Many such people are still only in favour of some weak regulatory elements.

In reality, climate change deniers are not interested in the quality of the science, but are mainly protecting their own income and wealth, and that of their financiers. Some have been persuaded of climate change denial, unaware of the background of the ideology and others have forgotten the origin of their beliefs. Those who vehemently claim that their scepticism is genuine should explain why they do not challenge other theories, such as plate tectonics, that have no negative implications for their income.

We have to get people to understand that in the long-term, global warming and climate change threatens us all, not just the poor. It threatens everyone or our descendents. Moreover, it is highly probable that globally totalled promises of emission reductions are so far too little to stop high temperatures and uncontrollable climate change. Those governments and businesses seeking certainty and low targets are not yet on board. We need radical action

Governments, in developed and developing nations, will not quickly implement sufficiently strong policies without much more effort from all of us across the world. I expect that *academia* (and related institutions) has the imagination, authority, intellectual diversity, and sufficient flexibility, to be able to augment or form effective *integrating multi-disciplinary or trans-disciplinary action teams* to support climate science and mitigation strategies. Such teams could include not only climate and related scientists, but many types of technologist, social scientist, humanities specialist, language experts and importantly their retired colleagues. Under the present emergency conditions, climate scientists cannot be expected to work alone to avert the crisis. Teams should not be confined to those few inter or multi-disciplinary departments already established, but range right across all universities. Teams could collectively and rapidly develop analyses and strategies to work inside and outside universities. They need to approach different local individuals, organizations, sectors, classes, electorates and populations. Climate academics would move from performing a relatively reactive role with the media to a strategic proactive one. University teaching of students needs to be routinely extended to ‘community extension’.

Much greater efforts should be made to understand how the various forms of ‘sceptical’ and related thinking arose, and how its influence can be countered. The varieties of social scientist need to conduct dialogue among themselves to move towards a consensus analysis and strategy. Not only will effective cooperation between disciplines be difficult due to different values and ideologies, holistic thinking will be extremely difficult in this specialized world. Academics can however try by focusing on the aims, goals and techniques, using a process approach of integrating multi-disciplinary or cross-disciplinary teams. Special philosophical, values, ideological and personality issues could be set aside, or handled by trying different strategies and techniques in sub-groups.

I suggest that the problem elements of the population concerning climate change can be divided into *financiers, deniers (contrarians), denier followers, real sceptics, doubters and idlers*. The most prominent or senior deniers mainly work in think-tanks and the media, while some are academics, religious leaders and other professionals. The quiet corporate financiers of the think-tanks and the media, include the managers, directors and most influential shareholders, especially in the fossil fuel industry. Foundations set up by wealthy industrialists are sometimes intermediaries between corporations and think tanks. Financier industries and some others commonly use greenwash. Some deniers are just ideological, either politico-economically or religiously. Denier followers, who have been converted, often without understanding the origin of denial, are found in many walks of life, but tend to be lightly educated. The financiers and deniers are, by my definition, chiefly *knowing*, whereas many of the followers are deceived or *deluded*. Some may have started out knowing, fearful of short-term loss of income. However, they have now become partially or fully deceived or deluded, and are convinced their belief is one of scientific scepticism. ‘Sceptic’ is a confusing term as it is now used in several ways, but the term ‘real sceptic’ identifies a very small number. Some deniers appear to seek notoriety similar to exhibitionists or vandals, while others may suffer from hopelessness. It is probable that the internet has given rise to a habit, not simply of scepticism, but of public self-assertion regardless of knowledge. Ordinary doubters have often been persuaded to call themselves sceptics and ally themselves with deniers, but are relatively easy to bring round. Idlers, who broadly support conservative climate change evidence and theory, are nevertheless often fearful of change, and are doing or advocating too little. Powerful quiet idlers in major public and private organizations have great change potential. As both doubters and idlers are common, it is important that we put effort into converting them to ‘activism’, even if mild.

Deniers started by denying global warming, then climate change, often just sowing deceptive doubt. Then as the evidence for change became incontrovertible, they started to deny its human cause, and subsequently claimed that it is cooling. Then they often denied that it can be stopped, that the mitigation efforts will destroy the economy or society, that developing countries will take advantage of the developed, or that technology will allow adaptation, and so on. They tend to shift when a previous position has been publicly refuted, eventually becoming social deniers, again in sequence, when all biophysical options have been exhausted. This shiftiness and incompatibility between the ideas is an underrated argument against deniers. The shifting denier onslaught has meant that scientists have long been routinely defending the science against ‘sceptics’ and deniers, when if they had known they could simply have been proclaiming that these people are either liars, or have been deluded.

More effort needs to be put into understanding the relative roles of ignorance, specialization, power, powerlessness, wealth, poverty, self-centeredness, boredom, habit formation, detail or complexity overload, confusion, marginalization, work overload and other factors in the thinking of these types that contribute to social inertia. Activism combined with social research might best be chiefly rapid action research via dialogue, and reporting. If methodologies are to be progressively improved, effectiveness evaluation must be carried out. Working together nationwide and internationally, universities should make sure that such collective work is supported morally if voluntary, or funded quickly, and suitably credited. Academics, potentially, have a lot to offer in this emergency. If academics as a whole do not lead, who might? If the publish or perish syndrome, that forces academics to spend so much time doing specialized research, could be reduced, universities could contribute more to world leadership.

Many public methods such as addressing business meetings are being tried and should be continued. However, more team effort could be put into conducting private informal dialogue with senior or powerful individuals of the above six types at least, to the extent that they can be identified, and that identification is appropriate. It may be that dialogue will be conducted where some contact with

business or other relevant organizations already exists or can be easily organized. We need to show them that not only should businesses and households move rapidly towards 'zero carbon', but that they could make a larger contribution to educating and persuading other businesses and politicians. If business declines to discuss, then alternatives can be tried.

Many opportunities will present themselves for collaboration with activist climate organizations outside universities, as well as between universities within nations and internationally.

Another possible strategy is to work in swinging electorates where denier organizations backed by political parties, think-tanks and media have sown doubt and confusion previously at the 'community' level. Quality videos are perhaps underrated.

Everyone agrees it is much easier to change a doubter, strengthen an idler's understanding, or perhaps move an idler to action, than change deniers or financiers. Thus identifying and working with the most influential doubters and idlers would be very worthwhile. The senior financier-denier alliances have been a major indirect cause of the present emergency. But evidence comes from the USA (Frank Luntz and the Southern Baptists) Britain (*Sunday Times and Daily Mail*) and Denmark (Bjorn Lomborg) that a few prominent deniers have modified their views. This must be further publicized. A key question is what proportion of deniers approached will retract and then be willing to admit their retraction publicly, and what influence this will have. Many believe that retractions are extremely difficult to obtain and at any rate are less effective than initial truth. But we are not sure of the effectiveness of an integrating, or trans-disciplinary team strategy. An effective network of action teams is needed across nations, and then across the world.

Dialogue, presentations, videos and documents should make sure that senior managers and directors, and others approached, understand the importance of eight key propositions.

1. A risk exists that climate change could get out of human control if average global temperatures reach 2° C above pre-industrial levels.
2. If this were the case, all social classes in all nations would eventually suffer severely--including the descendants of industrial leaders and their friends-- just some before others.
3. Moderate emission reductions may merely delay disaster.
4. Emissions of all greenhouse gases and dusts must be reduced to near zero.
5. Carbon dioxide must be captured from the atmosphere to reduce its levels towards pre-industrial levels.
6. The origin of climate denial is in opposition to change of income, wealth and lifestyle and thus the strident opposition to government regulation of private business, not in so-called scepticism about climate science.
7. China is doing better than the USA, Canada and Australia in investing in renewable energy.
8. In the end the issues are not economic, social or political, but ones of long-term cultural and human survival.

Academic teams could also vigorously promote double benefit programmes such as energy security, job creation, new technology export, oil drilling regulation and better urban planning. Increased energy efficiency will increase energy consumption.

We need not only to bring people and governments to an acceptance of the IPCC stance of 2007 but to support for the more up-to-date evidence and theory of climate science in 2010, despite remaining disagreements over the details.

Given the slow change towards incentives for renewable energy and other technological change, should we not be promoting behavioural change more? A carbon pollution price with limited

technological change will force the poorest to use less energy. This will be more palatable if we all practice behavioural change.

Where some business support has evolved for a carbon pollution price, we must remain vigilant lest relatively progressive business begins to dominate by supporting an inadequate programme. Business and unions that work in relatively less energy intensive sectors, and have been idlers, but see opportunities for growth in 'green' manufacturing and export may attempt to obtain relatively favourable terms for their support of government plans.

Alternative forms of media such as creative videos, exciting websites, independent newspapers, a national weekly university newsletter evolving into a newspaper, posts on social networking websites, also need to be developed, to make up for the serious weaknesses in the private and public mass media. Other alternative strategies, including public debate and challenges to deniers, direct action and court cases, will soon be needed more widely if quiet approaches fail. It will be important to soon start retraining the fossil fuel labour force. Somehow, academics could collectively proclaim that deniers are either lying or deluded.

In addressing those who have fallen into despair, we can expect that once the tide turns, the turn will snowball, and we will see the beginning of a new global culture, exhibiting greater cooperation, fairness, learning, sufficiency and appreciation of nature. I am sure that universities, networking worldwide, can do more to lead the world, turn the tide towards a revitalized culture, and later benefit from the consequences.

Two Topics

This article covers two main topics,

1. An analysis of the six types of 'problem elements' in the population concerning the climate emergency, namely *financiers*, *deniers (contrarians)*, *denier followers*, *real sceptics*, *doubters and idlers*.
2. A proposal for the establishment of networks of *integrating multi-disciplinary* teams and sub-teams in universities to help lead the case for radical mitigation action.

The Situation

Despite the widespread announcements of new government policies around the world, it is very widely believed that the global total of promises is insufficient to prevent global temperatures rising above 2° C, let alone keeping it below 1.5° C (for example, Lara Lazaro-Touza, 2010). In view of the dire situation, I believe that supporters of climate change evidence and theory must reconsider their social analysis and communication strategies. Even if the majority of many nations support action on climate change, is their commitment strong enough and sufficiently based on the latest science that is alarming, and the latest technology that is promising? Is there sufficient understanding of human affairs to influence governments indirectly and directly, not merely to support a weak emissions trading scheme, but to radically upgrade policy, preferably with a rising carbon tax?

We must not be misled by the daily floss of politics fed by the mass media, because long term understanding, attitude and power shifts tends to lie elsewhere in other social and cultural elements. The power also lies in corporations, including the media, in their use of ideologies and propaganda as well, as in universities, the civil service, to some extent in unions, and in new movements in the civil society'.

The danger exists that *all* social classes in *all* nations will experience catastrophic loss, just some *before* others, as the global temperature rises, and especially if the climate gets out of control. Mark Lynas (2008) has described a degree by degree degradation of the global environment to a state amounting to human oblivion at 6 degrees. Professor Kevin Anderson of UK's Tyndall Centre believes that only 10% of the world's population will survive even at 4 degrees (Guardian 29-11-09). Nearly all practising climate scientists believe something like this with varying degrees of concern and certainty. According to Kofi Annan, about 300,000 people are already dying from climate change annually. But behavioural options and alternative technology can solve this problem if we act quickly and decisively.

Pretence and Real Fraud

Those who believe that the findings of climate science are due to incompetence, fraud or conspiracy, should ask themselves why the same doesn't apply to the theories of other sciences such as genetics, aeronautical engineering - or indeed accounting. The main reason some people are attacking climate science is that it implies that they must change their lifestyle due to reduced income and wealth in the short-term. The 'leaders' only *pretend* to be interested in the quality of the science. They have been promoting obscuring propaganda, adding confusion to the public discourse, often claiming that any uncertainty in climate science (that is normal in natural science) means more research is needed, or action is not necessary. Some leading deniers in think tanks may be ideologically extreme liberals, seemingly opposed to government, influenced by the Cold War experience, but their financiers in the corporations are closer to short-term materialists. This deceptive tactic has been shown up by Dinyar Godrej (2006) science historian Naomi Oreskes (2007) as well as George Monbiot (2007), Hoggan and Littlemore (2009), Clive Hamilton (2010 a & b), and many others who have studied think-tank ideologies and funding, and the abusive emails sent to climate scientists.

It is in the denier movement where the real fraud has been, but few have realized it, partly because of our inadequate mass-media (including the government owned media). As the above writers have shown, for two decades this pretence has largely been financed by the fossil fuel industry, assisted by the tobacco companies and foundations that have been ideologically committed to undercutting government. For they believe that they and/or their benefactors have most to lose if we markedly reduce our use of fossil fuels. The 'denial ideology' originated in the rejection of environmentalism that required government regulation of corporations. As well, some evangelical Christians are supporting the idea of a climate Armageddon in the expectation of Jesus's return.

Oreskes and Conway in their book *Merchants of Doubt* have shown that senior US physicists supporting star wars (SDI) and other cold war issues in the 1980s were the first leading deniers, contesting Carl Sagan's theory of a nuclear winter. In 1989 these cold war warriors moved onto acid rain, the ozone hole, and then global warming when the Soviet empire collapsed. Early in the contest, think-tanks in the USA used legal threats claiming that the media fairness doctrine required both sides to gain an airing, however minor and deceitful one side was. They continually threw the bogey of socialism at climate scientists and other environmentalists as if a political belief invalidated any scientific credibility of the holder. They did this whether or not the target held the belief. At first they did not deny the findings of climate science. They just ignored what was on their desks in front of them. Much of the problem was caused by scientists and social scientists who were not climate scientists or even environmental scientists. They were a small number of physicists and economists seemingly driven by a faith in markets unhindered by government regulation that used the conclusions of natural science, as well as a faith in economic discounting and a conservative view of industry. The public, well assisted by the mass media, could not see that the expertise of physicists and economists, no matter how eminent, gave them no credibility on climate science (Oreskes and Conway, 2010).

In Australia, the corporate-industrially oriented political parties have recently been among the leaders of the fraudulent processes in swinging electorates. Denier organizations backed by political parties, think-tanks and elements of the media have sown doubt and confusion at the 'community' level. This negative movement allied itself with other single issue movements such as the anti-taxation and fear of world government movements. The politicians and media publicly responded to the deceptive and deluded voices, sowing more doubt among the populations. This feedback process led to an important growth in denier followers, influenced a split in one party, and engineered more votes for the industrial parties. The politically savvy knew they could start this process largely out of the view of academics, NGOs and others concerned. (based on information from a senior institutional staff member). Now more aware, we will find it harder to turn it around than it was to start in the first place. It is tragic that the rich corporate side of the world sees fit to deceive the wider populace so often to further their already considerable wealth and power, at least in the short-term. The long-term will of course be different, if only they understood sufficiently, and/or cared enough for their descendants.

Many materialist professionals including physicists, engineers, economists and geologists understood at least the short-term threat to their income, wealth, status and lifestyle, and possibly their ideology of liberalism that implies continuous 'economic' growth, in the implications of climate science. They began to espouse what they called scientific scepticism, partly independently of the corporations. Although at first they must have understood the lie in their position, having chosen climate science over their own and other sciences, over the years many appear to have become deluded, coming to believe that they were real sceptics. Some geologists may feel resentment at being outflanked by palaeo-climatologists coming from another background. (Evidence from books, traditional media, websites and personal communication). Some scepticism exists in all sciences, but not usually under this name, until recently at least. What we appear to have here now is mainly deluded 'scepticism' or denial led and backed by defensive denial organizations, set up for ideological and short-term material reasons. Some deniers may just be enjoying the limelight, something they could never obtain with genuine contributions. According to Hamilton (2010a) post-modernism's opposition to empiricism and some anomalous left-wing opposition to 'middle class' environmentalism have also made small contributions. Much of the mass media has been financially induced to participate in this intellectual fraud using omission and a false 'balance' of scientific and denier claims; and others have followed.

Seven types of evidence make a convincing case that the quality of the science is irrelevant to denial. Early evidence comes from the ideological origins of the movement, the selective nature of the attacks, and the institutional origins of their writings. Notably deniers must ask themselves why it is that they now only attack climate science. They do so because it is the science that has far and away the greatest implication for their future wealth, and not because the science is in any way weak. This has meant that scientists have long been routinely defending the science against 'sceptics' and deniers, when they should simply be proclaiming that these people are either liars, or have been deceived. More recently, we have seen the deniers' rejection of dialogue about climate science, the poor quality of their contributions, the internal contradictions in their ideas, and the avoidance of the 'worst-possible case'. (This is treated at greater length in *It's the Lifestyle, Not the Science* page on my website) Thus we should consider reducing our public 'debate' on the science, as that is what the deniers feed on, and try other approaches.

Some favour mitigation, and others, such as Oxfam, favour adaptation, seemingly as they have long worked closely with the most immediately vulnerable. While appreciating this latter stance, we must realize that adaptation is only temporary if the temperature continues to rise and especially if the situation becomes out of human control.

Poor Progress

Note that a slight effort, such as a 5% or even 20% reduction in emissions by 2020 may merely delay disaster a little. To substantially reduce the risk, a much greater reduction is needed. The exact figure is in doubt as it depends on the comparison date, the extent that non-CO₂ substances are included in the calculations, and whether it is a gross or net reduction. Clarification from climate scientists is needed here.

Climate scientists, including the better geologists, as well as energy scientists and engineers, and applied biologists have been producing scientific documents on these problems and their solutions for several decades. Despite this huge effort, and creative communication, the denial organizations are presently close to triumphing, in some countries more than others, especially those supposedly democratic, with large coal or tar sands reserves. This poor progress and even retrogression in affecting government action has arisen partly because the scientists are either insufficiently aware of the nature and practices of the organizations, movements, personalities and ideologies arrayed against them/us, are unwilling to reorient their efforts towards countering deniers, cannot find appropriate applied social scientists to help them, or are finding it difficult to obtain funding to do so, and are fearful of losing credit in universities for such efforts. Oreskes and Conway (2010) note that contemporary scientists who nearly always work in teams are loath to speak out lest their colleagues see it as hogging the limelight. They also point out that scientists are reluctant to appear to ‘politicize’ an issue thus perhaps jeopardizing their scientific credibility. Some have become wary of denier attacks, quite understandably given the rudeness and repetition.

In nations where some business support has evolved for a carbon pollution price, we must remain vigilant lest relatively progressive business begins to dominate thinking by supporting an inadequate programme. Some business and unions that work in relatively less energy intensive sectors such as retrofitting buildings and electronics, and have been supporters of conservative climate evidence and theory, have done very little so far. However, having sensed a public or political belief change and seen opportunities for growth in lower carbon manufacturing and export, they may come on board, attempting to obtain relatively favourable terms from government for company support. They may support an ETS, that enables them to ‘export’ their responsibilities, rather than a tax, and almost certainly support free rather than auctioned carbon pollution permits, and high rather than low permits. In reality, much business support for what they call a carbon price, rather than a carbon pollution permit price, verges on greenwash. According to Andreas Loschel, in Germany, 40 percent of the companies that have entered a weak ETS have done nothing except lobby for more free permits (Climate Spectator).

How Well Do We Understand Financiers, Deniers, Doubters and Idlers?

Although we are advised not to label people, a distinction can be drawn between labeling for analysis and labeling in communication. Just as biologists and geologists use classification or labels all day long, social scientists use labels such as consumer, employee, working class or terrorist. Labels are necessary to describe and analyze, although when communicating, and especially when meeting people face to face, one can be diplomatic when appropriate. Here I extend the labeling past that usually applied in the climate debate and contest. We must of course realize that the categories are fuzzy, often with continuums between them. People also change from one to another, hopefully in a good direction.

The polls vary with time and location, but it is certain that millions, especially in the former Anglo-Celtic colonies, have been persuaded by denier organizations using certain traditional and online media to deny climate science.

It is hypothesized here that the ‘problem elements’ of the population concerning climate change can be divided into six types, namely *financiers*, *deniers (contrarians)*, *denier followers*, *real sceptics*, *doubters and idlers*. This obviously requires testing, hopefully in the near future.

Financiers and Deniers

As well as the outspoken *senior deniers* or *contrarians*, we should separately consider the industrial *financiers* who are much quieter, but directly or indirectly fund them. The financiers include many of the top managers, directors and most influential shareholders of fossil fuel and other energy intensive corporations, as well as some foundations. Foundations set up by wealthy industrialists are sometimes intermediaries between corporations and think tanks. Shareholders notably include share holding organizations such as pension funds that may be party to financing denial whether or not they understand it. As in legal matters, ignorance should not be an excuse in moral concerns. Initial resistance and financing started with a rough understanding of climate science and its implications for the future of such industry and related consumption. They recruited ‘sceptics’ who soon became knowing deniers if they were not already. Financier industries, and some others, commonly use greenwash.

Although we rail against denier or ‘contrarian’ selfishness and ignorance, we hardly know the extent to which they are self-interested or selfish, and to what extent they are ignorant, ideological or have other relevant characteristics. Oreskes and Conway’s recent study shows clearly that the small number of dominant US deniers that were linked to think tanks in the 1990s were ideologically driven. The financiers, and the large number of media deniers, however, are not as well known. Their dominant values are high materialism, but to what extent do they wish this for their grandchildren, and to what extent are they aware of the risks that climate change poses to future violence-free prosperity? To what extent might they be defending what they see as a threat to their ideology of unrestricted company and national growth, supported by neo-classical economics, with only minor personal concerns? On page 245 of *Storms of My Grandchildren*, James Hansen, America’s leading climate scientist, says that the fossil fuel executives have been informed. He seems to plump there for financier selfishness or ideological belief, the more common street view, but many others focus on ignorance. The implications of Hansen’s book as a whole indicate that he believes ignorance is a major problem for the public.

A flexible interpretation including ignorance, selfishness, ideology and other factors would be useful. For a start, it seems probable that the ratio of selfishness and ideology to ignorance rises with seniority. The financiers and deniers may have heard the evidence, but how deeply did they understand and how much did they want to understand? Some have probably blocked out opportunities to learn, and now they are in contradictory double denial, denial of the science, and denial that it is useful to learn the science, or at least to learn more. Some, who initially were driven by self-interest, have listened so often to denier messages that now they believe they are genuine scientific sceptics.

Much evidence supports either actual ignorance or an assumption of ignorance. A CSIRO survey has found that many public and private organizations in Australia do not even distinguish between mitigation and adaptation (Gardner, J., Parsons, R. and Paxton, G. ,2010). In producing an excellent new document, *The Science of Climate Change: Questions and Answers*, the Australian Academy of Science appears to plump for ignorance, at least as far as the wider public is concerned. The Academy seems to believe that we are not so much self-interested as ill informed. Climate Works Australia’s ‘Science Meets the Boardroom’ programme appears to be based on similar assumptions that business must learn more. I have seen no public statements on Australian institutional websites that academics and others working with them believe industrial financing, denial or general inaction is based on anything other than a neutral or generous and non-ideological attitude.

Senior or leading deniers or financiers, at least, are probably chiefly motivated by short-term material gain or conditions, some ideological shock, combined with limited knowledge of the distant climate and human future. The degree to which managers, directors and owners are relatively selfish, ignorant, ideological or have some other characteristic presumably varies from sector to sector. Some senior deniers are more religiously ideological, starting from opposition to evolutionary theory, expanding their vision to include other natural science theory. That most relatively well known deniers work for think tanks or the mass media suggests however that they were, at first at least, motivated by materialistic or economic ideology or the fear of short-term loss.

Deniers started by blaming the sun or denying global warming, then climate change, often just sowing deceptive doubt. Then as the evidence for change became incontrovertible, they started to deny its human cause, adding cosmic rays to the sun, and subsequently claimed that it is cooling. Then some denied that it can be stopped, that the mitigation efforts will destroy the economy or society that developing countries will take advantage of the developed, or that technology will allow adaptation, and so on. They shift when a previous position has been publicly refuted, eventually becoming social deniers, again in sequence, when all biophysical options have been exhausted. This shiftiness and incompatibility between the ideas is an underrated argument against deniers. The shifting denier onslaught has meant that scientists have long been routinely defending the science against ‘sceptics’ and deniers, when they should simply have been proclaiming that these people are either liars, or have been ideologically or mentally deluded. I haven’t heard it yet, but we may hear deniers, when they do retract their positions, claim that they were deceived, as the more tolerable option.

Real Sceptics

To these ‘leaders’ we should add the few real sceptics who tend to be habitual and may be independent or funded. They have adopted a stance from which retreat is mentally difficult. It can be assumed that real sceptics are roughly as common as in other sciences, that is rare. As a post-graduate student in stratigraphy and later, human geography, and then a practicing groundwater scientist for about 15 years up to 1995, I never heard the term sceptic. The conclusions of groundwater science do not have implications for the future of humankind quite in the same way as climate science does. I knew the term sceptic only from reading philosophy texts, but now it is rampant and may excessively infect other undeserving sciences.

Denier Followers

Then we have the *denier followers*; the thousands, often poorly educated, who have been persuaded to deny climate change evidence and theory, many seemingly without understanding the origin of denial. Those juniors in denier networks have been persuaded to challenge climate science online and in the older media, chiefly using rough language. They appear to revel in notoriety, and might be ignored. Many ordinary people who call themselves sceptics in idle conversation may be better called doubters, as explained below. Occasional denier followers may be in influential positions.

The Knowing and the Deluded

Although complex combinations no doubt exist, it is postulated that deniers might thus be divided into *knowing deniers*, who are mainly senior, and like financiers, tend to realize the gross pretence, and the *deluded deniers*, the followers, and those who have practiced vocal denial for many years, who usually do not. Could it be easier to convert a knowing denier than a deluded denier? The knowers may be more susceptible to persuasion to retract their stance to the extent that they realize the truth of climate science, and may just need explanation of technological options, manageable costs, or the severity of the risks to their descendents. But conversion may depend on some empathy for their descendents.

Young working class people such as coal miners may need assurance of the feasibility of retraining and relocation programmes. If the deluded can be helped to understand the progress of their thought patterns they may be convertible. Psychologists could help here.

Psychological or Sociological Effects?

Jenni Metcalfe (2010) reports on the ideas of several psychologists and science communicators on climate change. However, the report does not include a full discussion of motivation, or properly address dialogue.

Some deniers may 'suffer' from what psychologists call 'cognitive dissonance', but it is not clear whether this concept is more useful than more simply described knowing or deluded denial. They are said to experience a contradiction between two beliefs, say the right to a comfortable life on the one hand, and climate change evidence and theory on the other. To resolve the contradiction they plumb for the easier option. Some may have genuine coping problems, feeling powerless and hopeless, becoming 'sceptics' seeking to reassert control over their lives, or at least thumb their nose at what they see as scientific authority. In both cases they probably soon forget why, if they ever realized. They start out knowing and become partially or fully deluded. One well known 'sceptic' seems to have adopted climate scepticism on the rebound from a multi-factor loss in a different ideological contest.

To what extent people have decided to become deniers on their own and to what extent they have been influenced directly or indirectly by the media or other organized denial is a moot point. My guess is that influence is the dominant path as it is just the one science that is so susceptible. While powerlessness is seen as a background cause of hopelessness in general, is it not a sociological or political-economic condition prior to a psychological one, common in most societies? Hopelessness is prevalent among the poor and ill-educated. In this case, powerful corporations and allied political parties have exacerbated the situation and feeling. Moreover denier shiftiness indicates cunning rather than simply dissonance or powerlessness. Some types of denial might thus be said to be psycho-sociological.

Some deniers appear to seek notoriety similar to exhibitionists, graffiti sprayers, or vandals beyond caring for anything and anyone. Net users include criminals and pranksters that could well see denial as fun. It is probable that the internet has given rise to a habit, not simply of scepticism, but of self-assertion regardless of knowledge or morality. These people are encouraged by deniers and some could be described as denier followers, but others are probably simply miscellaneous rogues. Would the term communication terrorist be too strong for some of these people?

Newell and Pitman (2010) discuss several other types of psychological reason for 'scepticism'. They explain 'sampling' of available data and ideas, framing the issue (meaning information presentation) comprehension of risk and other complexity, and process and perception of consensus building. However, I would question whether risk can be fully discussed, as the authors do, without fully considering the risk of natural feedback driving uncontrollable climate change. The psychological ideas can help people presenting or in dialogue, but other social science and philosophical disciplines such as the history of science, sociology and political economy are needed to further understand the issue, as the authors note. However, I would go further and suggest that these other disciplines should be involved from the start with climate science so the most important issues can be examined first, or that at least the issues are examined in a planned sequence.

Belief Development

We need to study further the part that ignorance, specialization, techno-economic and religious ideology, power, powerlessness, wealth, poverty, self-centeredness, boredom, habit formation, detail or complexity overload, confusion, marginalization, work overload and other factors play in the thinking of the climate problem types. This is all clearly related to systems such as ‘capitalism’, the mass media and schooling.

What we call selfishness is obviously common among humans, but we must ask whether selfishness and generosity, being two ends of a continuum, are distributed equally among populations from the labourer to the CEO of a mega-corporation, how the differences came about and how they might interact with ignorance and other factors. Those caught up in commercial culture enter a self-seeking world that hardly encourages learning beyond business techniques and the particular technology in use, although business people do have other interests. Specialization means millions hardly know enough to begin to study climate science and the mitigation strategies required, let alone adaptation. We need to try harder to understand business, probably through dialogue.

Hypothetical Sequence

The typical case of a senior industrial financier and materially oriented professionals who were not initially at least in the knowing network was probably some combination of reasons in sequence, starting with a self-centered, competitive personality, early training in the short-term material corporate world and entrapment in high materialism. Most were probably not highly ideological. Early awareness of the implications of global warming led to an initial reluctance to accept any change in income or wealth, status, and/or ideology and lifestyle. Moreover, a weak knowledge of complex natural and social systems, together with a reluctance to spend time learning, and a realization that a proper understanding requires considerable effort, led to an attraction to simple ideas that doubt the truth of complex theory and evidence. They soon came to the realization that others may take advantage of any emission reduction action one carries out. This led to further blocking out of any new worthwhile information, reinforcement of these ideas by others in similar situations, and jumping on any small opposition evidence. Such developing denier financiers may feign ignorance in the face of children's questions, perhaps have a weak empathy for the future situation of their children or grandchildren, and perhaps had a willingness to suffer later if one can enjoy a life of ease now. They began actively searching for denier arguments, leading to the adoption of the denier ideology, and finally deciding to speak out or offer funding to think-tanks. This sequence probably leads ultimately to delusion.

Once a reluctance to sacrifice wealth and income leads to a temptation to accept the denier position, it becomes difficult to decide to study the science. Later expert presentation of climate change evidence and theory could not be properly assimilated. It was often presented without adequate dialogue, or understanding of the personal history of involvement with climate change evidence and theory. It may be worthwhile to try to understand them. Sensitive dialogue with teams may be able to get behind the facade.

Climate science proper as found in the peer-reviewed journals is difficult for other scientists, let alone those trained in finance, management, journalism or the arts. How easy is it for a ‘political’ journalist or financial manager to understand future climate risk, carbon dioxide equivalent, ocean inertia, natural feedback and palaeo-climatology, even if accompanied by clear summaries? Analyzing the human and technological affairs of low-carbon strategies may be a bit easier than climate science, but it can be difficult for those not trained in background areas. On the other hand, how easy is it for a climate scientist to understand the psychology and sociology or political economy of denial and social inertia? Some biophysical scientists may not at first realize or accept that social scientists have much to offer, but they should ask themselves why the deniers are winning with some populations? Perhaps

the deniers know more about industrial political economy, cynical electoral politics, ‘public relations’, and the techniques of thought manipulation or propaganda.

Ex-deniers

An important question is, during or after sensitive dialogue, what proportion of deniers approached will retract fully, and then be willing to admit their retraction publicly, and what influence will this have. Many climate change watchers with long experience of deniers believe that retractions are extremely difficult to obtain and at any rate are less effective than initial truth.

There have been some notable retractions, but I have not seen an assessment of how they were obtained or their influence. Some years ago Frank Luntz and the Southern Baptists in the USA, previously in denial, announced that global warming was real. The *Sunday Times* recently retracted their Amazon-Gate story. Bjorn Lomborg has now raised global warming considerably up his list of crises requiring attention. Michael Hanlon of the *Daily Mail* in Britain is slowly changing his view, and especially after visiting Greenland. Prominent ex-deniers should be given more support to speak out. In Stephen Schneider’s last public appearance at UNSW, he managed, through dialogue with an audience of about 50 people to start to lay to rest the ‘scepticism’ or doubt of two people. He did not present, but answered questions and continued one-to-one dialogue. A worthwhile research project would be a study of these and other ex-deniers or real sceptics to determine exactly what prompted them to retract, and to speak out.

An effective network of action teams is needed across nations, and then across the world. Although failures have been noted by economist Jeffrey Sachs and Clive Hamilton (2010 a), we should try again with teams, combining dire climate and hopeful technological scenarios, hopefully right across nations to gain a broad ‘peer effect’.

Doubters

Then there are the millions of *doubters* who still have private or public doubts that have been sown by deniers. Doubters are the numerous relatively ‘harmless’ people who have heard both ‘sides’ of the argument and genuinely don’t know which way to jump. They are perhaps more intelligent and generous people than the denier followers and have ordinary concerns that can be addressed with clear information and explanation. They can at least appear to be brought on side within a short time if one is willing to discuss carefully. They know a little but may be willing to admit they feel confused. This is where the psychological ideas on communication are very worthwhile. Although some doubters may call themselves sceptics unaware of the implication, these people should generally be distinguished from those who claim to be serious sceptics who for the most part are really deniers. The denier ideology includes the claim that doubters are sceptics in an attempt to align them with the deniers. The problem is that doubters may either pretend to have lost their doubt, or become idlers temporarily or permanently. Doubters contribute seriously to social inertia. We could perhaps start by proclaiming that doubting is a viable position quite separate from scepticism/denial. In talking to such people we should try to move them from doubt straight to mild activism.

Idlers

Another type measured in the millions, is the *idlers* who, who although often claiming to support at least the more conservative versions of climate theory, such as those derived from IPCC reports, are waiting for someone else to act. Many people, although fairly well informed, either do or advocate little, thereby contributing vastly to social inertia. This inaction is due to human nature and modern culture. They exhibit some combination of limited imagination, self-centeredness, habit retention, a low self-confidence or a follower attitude, personal inertia, or procrastination and fear of the costs of

change. Some may actually not know what to do. This syndrome is exacerbated by work overload. It appears to be partly due to biased mass media dominated by a few corporations and the public media influenced by them, the ideology of competition and consumption fostered by ‘capitalism’, and a feeling of isolation and confusion due to specialized schooling and the complexity of our systems. The inaction may still be based on some doubt that is not usually expressed publicly, but comes out at opportune moments. Some who are well aware of the science have become despondent and despair that governments can lead, and thus do little themselves. Idlers could conceivably be divided into two sub-types, those who readily admit they are idlers, and those who remain quiet or pretend to be doubters, calling themselves sceptics as they believe this absolves them from responsibility to act.

Idlers probably constitute the majority of powerful business people, civil servants and academics. Presumably they mainly support a conservative IPCC-2007 view of climate science. We should try to persuade more from the ‘intelligent’ side of business to come out fighting for sense. We all know of famous business people who surely cannot be deniers but who have remained largely silent. Bill Gates recently made some supportive statements that could be strengthened. Activist academics could usefully conduct dialogue with their colleagues.

Some powerful idlers are speaking out. The CEO of BHP-Billiton has not retracted any public denial financier stance, but has recently promoted a carbon tax and emissions trading combination for commercial reasons. Some businesses that see an inevitable global price for carbon pollution permits wish to buy them when they are cheap. Is it possible that there could be rush of interest and thus support, not for the science, but for action, ignoring previous idling and even financing? Is it possible also that companies are seeing a drift in support to carbon taxes, and much preferring *free* and tradable carbon pollution permits, handed out by government, are starting to support an ETS or a hybrid scheme. Such business support will be too weak, at least at first, to stop major and possibly uncontrollable, climate change, and must be strengthened.

A special type of idler, who is also a special type of social change denier, are biophysical scientists who have a very good understanding of climate change theory. They deny they can do anything social, or that what they are already doing can be improved. Climate scientists and other academics who are conducting research as usual, apparently unable to reorient their work, might like to consider whether this is a form of social denial, an unwillingness to change in the face of the evidence that we are nearly losing this society destroying contest. Biophysical research to explain the cause, or predict the rate of climate change more accurately will be of little value for an imploding society. We must all reconsider our work, hobby and leisure orientations.

Anecdotal evidence suggests a significant number in business may be minor financiers, mild doubters or idlers, but feign support for a weak ETS, expediently following the leader when the idea of a carbon price is in the ascendency. This may be the condition that leads *Environmental Business Australia* to claim that it has a large membership that wants certainty, although earlier slipping in member numbers. Yes, a definite weak ETS is probably better in the short-term than debilitating uncertainty for the energy sector especially—but also for all those who directly or indirectly use a lot of carbon. Australia is losing investment in the energy sector because of this uncertainty, leading to predictions of brown-outs within five years. Whether business groups, such as EBA, include members who are largely quiet financiers, deniers, doubters or idlers, needs action research that may best be done through subtle private dialogue with relatively senior people, as mentioned above.

Conservative and Radical Positions among Idlers

A large proportion of climate theory idlers are aware of the IPCC recommendations through the better mass media, but are less aware of the more up-to-date information such as that presented in the *Copenhagen Diagnosis* and elsewhere, and the more radical proposals such as those of James Hansen’s teams (Hansen et al 2008), Safe Climate Australia, and now Zero Carbon Australia. Climate

scientists will have to put more effort into examining the evidence and explaining the difference in risks between the old IPCC targets and the new proposed targets such as 1.5° C. and 350 or 300 parts per million (David Spratt and Phillip Sutton, 2007). They should also explain whether these figures are for carbon dioxide or the equivalent (CO₂e), perhaps updating of CO₂e calculations or offering more options rather than calculations for 20 and 100 years only. Moreover, more discussion and assessment is needed of the other gases and dusts such as methane, black carbon soot, ozone and the halogen compounds (See Mario Malina et al, 2009; Robert Goodland and Jeff Anhang, 2009; Baiqing Xu et al, 2009). There is dispute, or at least misunderstanding, here that the public hardly understands. Whether governments understand also needs clarification.

During the Copenhagen meeting in 2009 many Pacific Island and African nations appeared to have a better understanding of risks than the so-called developed nations. Many programmes nominally aiming at 450 ppm and 2°C appear to need major strengthening. How many understand the risk of uncontrollable feedback taking over at about 2°C? I believe that this difference between the politically inhibited, conservative IPCC view and the more radical up-to-date science-based view is seriously underestimated by the public and even some climate scientists. Governments must realize this. Senior idlers in business and government who only support a conservative view of climate science should be approached. Governments need to use modern multi-media to educate the population in the issues, after they have studied them themselves.

Most deniers have now admitted that warming is taking place, but as a fall back position, they deny that it is due to humans. This leads to another issue that is not much discussed, namely whether it is best to say to them that we have to combat it regardless of whether it is natural or human induced. Tony Abbott, leader of the Australian parliamentary Opposition in 2010, appears to have taken this 'combating nature' view on at least one occasion. I don't believe it is worth arguing, publicly at any rate, about the cause, when such people are only pretending to be interested in the quality of climate science, or are deluded. Publicly, it may be best to just focus on the solutions while conducting dialogue in private.

Activists

Three types of *activist*, all small in number, can be identified, namely those who actually move towards a low carbon lifestyle, those that do the same for their organization, and those who present the case for such. Although the first are occasionally admired in the media, the second and especially the third, the *advocates*, are more important. Of course, some do all three. It is usually important for the advocates to do something physical, such as ride a bicycle, to give credibility to their communication. Denier followers rejoice, and disseminate the critical information, when they find an advocate who left a light on. Advocates that have been vocal for years if not decades tend to support the radical version of climate science. Recent converts are more conservative.

In the 1960s it was the students who led the university staff in protesting against Apartheid, the US-Vietnam war, the early environmental movement and other issues. Now these old crusaders are mainly in retirement. Now, with new generations raised on materialism from the late 1970s, and with environmentalism, running not mainstream, but in a smaller parallel stream, supporting millions of salaries, universities seem weak in their leadership of 'society' on important issues. We need to awaken both staff and students to the severity of the climate and denier threats alongside both technological/biological and social solutions.

Rapid Action Research

Clearly this is all crying out for *rapid* research, but it may be most effective as *action research* through dialogue. Dialogue is usefully introduced in a paper by Awakening Technology (1996). One promising point is that deniers are less common in developing countries, as the denier machinery has not spread widely there, yet. We must get the truth out before lies take hold. The value of cooperation between teams in universities in developed and developing nations is obvious.

Potential for Change and Dangers

As was mentioned above, some deniers are retracting their views, and the previously quiet industrialists are sometimes volunteering support for change. New technologies such as concentrated solar thermal with molten salt heat storage, super-thin or painted photovoltaic panels, photovoltaic electricity and heat cogeneration, and vertical algal beds, together with increased support for a carbon tax, and the continued news of progress in individual countries, offer some hope. Giles Parkinson (2010a&b) discusses recent progress. Scotland now expects to have 80 percent of its electricity generated by renewables by 2020. But they appear not to have factored in increased demand from electric transport. Then they need to look at GHGs from their rural sectors. Denmark has managed to post a rise in employment and maintain conventional economic growth, by reducing payroll taxes while also imposing significant carbon pollution penalties. Ellen Sandell (2010) gives an upbeat account, noting that 32 countries now have emissions trading schemes. It is coming to light that it is not only many US cities and states that are leading a laggard federal government, but the same is happening in Canada. Moreover, the incentives are sufficient to tempt fossil fuel companies among others to invest increasingly in renewables (Mordant and Taylor, 2010).

We should not forget the double benefit of programmes such as reducing import uncertainty, ‘green jobs’ and lowering the risk of higher oil prices, not to mention mitigating devastating oil leaks. Some, such as sociologist Anthony Giddens (2009) believe that the greater part of a mitigation strategy can be based on such ideas. Although this seems unduly optimistic, we should be promoting them far more rapidly than we are. Increased energy efficiency will mainly increase energy consumption.

People don’t change their relatively selfish or generous personalities or values overnight, but previous positive swings in the polls show that accurate information and ideas can change people’s attitudes. Belief about climate change ranks as an attitude, but that towards science and relatively objective knowledge as a whole can be seen as a value. But the question is, to what extent are knowing and deluded denial reversible? Conditions such as newly discovered fossil fuel resources, unemployment and cold weather can, of course, influence attitudes negatively.

Those Australians, for example, who are most intransigent about climate theory might note that if India, Indonesia and China begin to suffer seriously they will be likely to look out more assertively for resources abroad. If they perceive Australia to be a relatively bountiful source they may not be polite in demanding access to food in particular. The USA may increasingly be concerned with its own hemisphere as it becomes more Latin.

Some of the richest financiers and idlers may believe that their families, buttressed by industrial wealth, can weather the physical and social storms of the next half-century and more. The chances may be especially high if they are quick to move to the cooler developed regions, although the recent fires in Russia must be dampening their enthusiasm. We should indicate that although the rich may survive well for one or perhaps two generations, the third or fourth are less likely to experience a congenial life.

The climate crisis is not a problem like poverty, a recession, bee decline, a lifestyle disease or perhaps drugs, where under most circumstances the wealthy can avoid problems. But it is more akin to nuclear war or perhaps a virulent contagious disease where in the long run some of the wealthy are likely to survive perhaps a couple of years or decades longer than the poor. It is certain that all classes in all nations will eventually suffer badly if too little is done. When wealthy families understand that, they are more likely to listen.

Academics, potentially, have a lot more to offer in this emergency. If the publish or perish syndrome could be reduced, universities could contribute more to world leadership. No other institution has the potential to assemble thousands of integrating multi-disciplinary teams across the world to work collectively on this problem.

Strategies to Combat Denial and Social Inertia

Existing Strategies

According to websites and my discussions, apart from research, the prevalent action being taken by academics appears to be policy development, public and organizational presentations, some discussions with politicians and some public debate in various media. NGOs on the other hand practise 'activism' using public protests, door knocking, and increasingly, email campaigns. Government departments are contributing mainly to policy, but they do take some interest in public education. Some climate scientists and others involved do often respond to school and community groups' requests for presentations. Many climate scientists also respond to media requests. Academics have put some effort into directly approaching politicians and business and submitting articles to newspapers.

Evaluation and Alternatives

What level of effectiveness does all this have? The success of the denier organizations, especially from late 2009 on, suggests that the methods that have been tried have had insufficient effectiveness overall, in this period at least.

While many academics have taken on deniers and others, few appear to have focused on those in business, including the media. Even fewer have done that in, or with the guidance of, an integrating multi-disciplinary team using a strategy. Much of the effort has been directed at the mass media consumers, the public, or the wider electorate, hoping that somehow the powerful will hear directly or be influenced indirectly, perhaps through elections. A lot of climate scientists' effort has amounted to reaction to media demand, rather than strategically oriented effort. The usual media channels may not be the most important at the moment.

Several organizations of academics have been set up, such as *Climate Scientists Australia*, which have organized visits to talk to politicians and give occasional addresses to business. Some academics have conducted dialogues with politicians on numerous occasions. From websites I have seen only a little evidence of true multi- or inter-disciplinary teams, for example at Melbourne University, but I have seen no accounts of teams organizing dialogue with senior 'problem types' or an evaluation of the efforts so far.

We need to see strategy discussion documents and evaluations of work that has attempted to overcome the influence of denial so far. The reason that this has not been done is presumably because biophysical scientists do not usually work in this way. However, we are up against commercial organizations that regard such documents as bread and butter. We must objectively evaluate our effort so we can improve it.

Compared with climate science, which has been thoroughly researched, and even researchers' knowledge of the socio-technological strategies for stopping global warming, our understanding of the dynamics of the broader population's thinking on these matters is weak. If we are to reduce emissions and keep global warming to controllable levels, we must put much more effort into the analysis of human affairs and action on these matters.

Building Holistic Multi-disciplinary Action Teams in Academia

Those researching either climate science or social and technological mitigation strategies, and indeed any other basic and natural scientists and engineers, need to shift at least part of their effort towards collaboration with appropriate social science researchers to try to understand the reasons for widespread climate change denial and social inertia, and ways to overcome it locally, nationally and globally. To a greater extent than other sectors of society, I expect that academia has the imagination, authority, intellectual diversity and adequate flexibility to build *integrating multi-disciplinary action teams*. They could interact with influential and powerful people or wider groups and organizations on global warming. Such teams are needed to support the climate scientists who are often at the forefront of academic effort. The teams should not be confined to those few multi-disciplinary departments already established, but range right across all universities. Teams could collectively and rapidly develop analyses and strategies to approach different local individuals, organizations, sectors, classes, electorates and populations. University teaching of students needs to be extended to 'community extension'.

Given the present emergency, preferably with administration support, researchers in climate science and energy technology should consider setting aside part or all of their projects and instead work in teams with humanities academics, retired academics, 'consultants', government staff and others. The disciplines could include psychology, communication, sociology, political science, political economy, commerce or business studies, history and philosophy of science, human geography, economics, law, education, literature, dramatic and visual arts, and important languages.

All specialists can, indeed must, learn from others, if we are to best the financier-deniers' scourge. I think the term 'team' is important here. Occasional or even regular conversations with those in other disciplines will not be enough. I suggest the term *integrating multi-disciplinary teams* to indicate a realistic expectation of a slow process towards integration. Trans-disciplinary teamwork, as is used at the Institute for Sustainable Futures, should be considered.

Systematic and wide interaction leading to the development of integrated analysis and strategy that leads to team action will be critical. Teams could each develop their own strategies for local conditions, with nationwide interaction between teams, possibly leading to a degree of consensus. Universities might each form several teams to work with different target groups or populations. If irreconcilable ideological and value differences appear in teams, sub-teams could be formed and their results compared. It may be that some academics such as philosophers or psychologists could help bring people together. I have worked in teams in 'development' in Asia in which a practical goal tended to lead us to suppress our differences. However, this may be more difficult without a formal structure. Committee inertia can be reduced by splitting teams that get bogged down in argument.

Together with the more public publications, policy proposals, media releases, business association presentations, and school and parliamentary visits, such teams might consider ramping up informal, private small-group dialogue with selected influential financiers, deniers, doubters and idlers. Dialogue involves listening as well as talking, and can proceed to any depth, become personal or abstract, be continued later, expanded or contracted, and so on.

It should be useful to try to determine whether a denier is ‘knowing’ or deluded to see if one or the other is more amenable to discussion. However, teams may decide to avoid deniers altogether and focus on financiers, doubters and idlers.

Such effort may require new job descriptions, or reduced regular work on an overall lower pay, freeing up biophysical and social researchers for this most important general educational and dialogue work. Funding should be sought, not only from the usual academic sources but also from foundations and other donors, as happens for research in medicine. This is already happening on a limited scale in climate science. Retired people may be willing to volunteer their services. There has been a tendency for business-minded politicians to oppose ‘inter-disciplinary’ work that doesn’t appear to lead to obvious employment paths, so academia may need to defend this idea politically.

Intermediaries

Senior intermediaries or go-betweens such as CEOs outside the high fossil-fuel using industries, professors in other disciplines, judges, and respected senior retired politicians, will be valuable. Nobel laureates, nationally recognized or awarded individuals, and retired high court judges and governors could be useful here. Prominent senior people seen as neutral could help organize, and lead discussion where necessary.

Multi-disciplinary Teams

The many relevant disciplines all have information and ideas to offer. Science historians or political economists may be able to identify important powerful categories, and explain the ‘political-economic’ origin of denial ‘leadership’. Psychologists and educationists can contribute to strategies for approaching and discussing with financiers, deniers, doubters and idlers. Technologists can be on hand to assure them that feasible alternatives are present for energy supplies as well as highlight the risk of brown-outs if energy investment is not supported. Applied biologists can explain the needs and potential for changes in rural conservation and production. Economists can explain the modest *per capita* costs, the importance of a carbon price, compare emission trading with a tax and hybrid schemes, and the potential for new manufacturing and export. Petroleum geologists could explain the limitations on oil supplies, while economists might put a slightly more optimistic scenario. Political scientists are likely to outline the role that political parties, lobbyists, climate denier groups in swinging electorates, and others play in the contest. Sociologists and anthropologists could explain the importance of considering all classes and ethnic/cultural groups, and the measures that will be needed to counter energy poverty, while sociologists might propose the behavioural changes that will be required to reduce carbon emissions before new technology cuts in. Human geographers could explain the importance of population planning and the relevance of local, national and global action. Political economists and others could help identify key powerful groups, and explain the potential for job-time sharing, retraining, and support for relocation of displaced workers. Lawyers might outline the existing laws on emissions and note the costs and benefits of expanding such laws. Philosophers could contribute an ethical and integrating viewpoint. Computing specialists can help with websites. Humanities or arts academics have the potential to contribute to communication with the four problem types, perhaps using stories of suffering and success. Emotion and anecdote are known to be critical for many audiences. The visual arts are important for video and presentations. Several specialists could help explain the difference between developed and developing country responsibilities, compare the capacities for change, and compare the actual efforts that are sometimes surprising. Documents must be translated into other languages such as Chinese, Russian, English, Spanish and Portuguese.

This list just gives some of the main examples and does not claim to be exhaustive in disciplines mentioned or in the contribution they may make.

Differences among Social Scientists, and with Natural Scientists

It is important that social and natural scientists conduct careful dialogue to try to resolve their differences on social analysis and communication strategies. Differences are notable at least over the categories of people to approach or target, and differences over the best ways to communicate with them. One group (psychologists and communicators) does not identify a population that has been prominent in causing denial, but differentiates general target populations, while another group (the politically oriented) while identifying a causal population of deniers, less often specifies specific targets. Those differentiating the target in general terms emphasize positive messages for the general public, while those who have identified a cause and not a target, nevertheless speak in strong terms about the financiers and deniers. I have the impression that although there is some emphasis on communication expertise, the climate fraternity is sometimes overlooking important allies in the social history and philosophy of science, political science and political economy. If we are to be more effective, all concerned people should try to arrive at a better consensus over the causes of denial and social inertia, the various relevant sub-groups or populations, and the best way to approach each one, in so far as identification is possible and desirable.

While we are told by some not to write and speak negatively, to mention greed or guilt, the technical and social causes of contemporary climate change and the social reasons for our very poor response make it tempting to do so. Psychologists and communications specialists, tend to take a different view (as summarized by Jenni Metcalfe, 2010) from those who study politics, history and geography. Every person may react differently, so while developing a social analysis and general communication strategy, individuals in teams conducting private dialogue can make on the spot decisions, and learn from experience. Clearly academics need to cast their nets widely when setting up teams and attempt to debate these issues before going forth to the public at large.

Some who support the theory appear to be in a state of despair and thus inaction. Some others who are still active thus believe that fearful scenarios should be avoided. But because people may be afraid is insufficient reason not to discuss and present the scenarios derived from up-to-date science. When the audience is children or other vulnerable people, the message should be nuanced. But to the extent that fear or despair produce inaction, we must usually combine coverage of climate futures with strategies for achieving viable technological and social futures. We must link solutions closely to the problems. However, for many, a knowledge of dire scenarios, is driving a determination to act, especially for the benefit of the young and those who are already vulnerable.

We should also include an account of existing developing-country actions to reduce the fear of opportunistic action elsewhere. Deniers now claim that developing countries will take advantage of any developed country effort to reduce emissions as one of their social fallback positions when they have eventually given up attacking the natural science. It should be emphasized that China is doing better than the USA, Canada and Australia in investment in renewable energy. South Africa is planning the world's largest solar energy station, and India has implemented several effective regulations.

Although all the disciplines mentioned above and others could be involved in analysis and strategy formulation, they should form small action teams, to minimize disagreements in each team. Differences will probably persist between natural scientists who tend to believe in 'objective truth' and social scientists who may believe in 'values-influenced truth', although, perhaps not surprisingly, not necessarily the same values. For example, while a sociologist may value what he calls 'participatory decision making', an economist may insist on what she calls 'rational decision making'. It will be important to distinguish between truth within the natural sciences, in which we can have more confidence, and that which describes the interaction of scientists with each other and the rest of society. While I may have no problem with the geological science of carbon storage, I do disagree

with the allocation of resources to make the study. Geological work on ‘hot rocks’ would be more worthwhile, and thus should be preferentially subsidized.

This is not to gloss over the complexity of theory development in the natural sciences and the disagreements that occur that can be partly based on values, ideology, personality, nationality and even ethnicity. For example, a study of black carbon soot over Tibet by several ‘Chinese’ scientists and James Hansen (Baiqing Xu et al, 2009) was careful in its apportioning the dominant cause to activities on the Ganges plain. Scientists emphasizing carbon dioxide emissions may be less aware of rural processes, and underrate, for example, the importance of carbon soot emissions from inefficient stoves or methane emissions from irrigated rice fields. Much of the emphasis on consensus has been overdone, but it is largely a reaction to the obscuration of the deniers. It can be difficult to reconcile values and ideology in social science, and the differences between social and natural science can give rise to misunderstandings. So it is important to avoid allowing such differences to stifle useful action. It is very unlikely that universities will be able to immediately set up holistic or integrated teams, hence my process term *integrating multi-disciplinary teams*. In the end, each university will develop its own range of approaches.

Team Targets and Techniques

What communication strategy should we use to gain much wider support for radical action on net carbon emissions? Should we approach the most senior financiers and deniers, or a lower level below CEO, or wavering doubters about them if they can be identified? Or is it best to approach senior management and directors in the relatively low fossil fuel using sectors such as computers and banking? Should concerned academics first focus on their more denying, doubtful and idling colleagues, and what part could students play? Or should they approach pop and film stars for support?

University teams should consider whether they should preferentially target the public deniers in think-tanks and the media, the financiers, the wavering deniers and real sceptics if they can be identified, the doubters, the idlers, some of whom may in reality be private doubters or deniers, or some or all of these. Whoever is chosen, it could be best to try to approach the most powerful, but teams may decide to try for the mid-level people or even the masses. The teams could consider setting up one *exciting* national website, linked internationally. The usual institutional websites are not exactly mind-catching. If teams are experimenting in sub-teams and many universities, evaluations should soon ascertain which methods are most effective. The best starting option is probably for different teams to try different approaches, especially where values and ideological differences are irreconcilable.

It may be that any quiet private dialogue will be first conducted where some contact with business or other relevant organizations already exists, rather than by targeting specific types of people. Any individuals who have good contacts in business, whether through research, high school or relatives, will be important. Contacts low in an organization may lead to contacts higher up. All dialogue should be reported, generalizing to protect names if necessary.

Mark Diesendorf (2009) has written of organization, strategies, planning and tactics that can be used in coalitions, alliances and networks, some of which are relevant to academic groups. He also includes the pitfalls of such cooperation, and provides a wide range of examples from around the world.

Some appear to take the view that we should just target politicians. Many climate scientists have conducted visits to the Federal Parliament but not so many, it seems, have addressed boardrooms or conducted small group dialogue with business. Others are working with schools and community groups. Unions are another organization type that should be addressed. One wonders whether such groups and organizations in mining and industrial areas may not be a worthwhile target. More effort can also be put into updating curricula in schools, colleges and universities. A number of websites

have appropriate suggestions for low-carbon activities, but booklets could be disseminated more widely. Each university team separately, and in coordination nationally, could send a short sharp policy petition to the national government, and individual members of parliament.

The National Tertiary Education Union in Australia has recently called on universities to include greater consideration of the effects of disciplines and graduates on climate change in all curricula. This should be strongly supported and internationalized.

Another strategy is to work in swinging electorates where denier organizations backed by political parties, think-tanks and elements of the media have sown doubt and confusion previously at the 'community' level.

Because most people tend to think in the short-term, teams might start dialogues and presentations by discussing other medium to long-term issues for families such as schooling prospects for grandchildren, population structures and sizes, and superannuation and pensions, as an introduction to discussing the long-term climate and technological future.

Teams could work with shareholder organizations to help them raise important questions at AGMs.

Coal corporation managers should be offered encouragement, not to conduct carbon capture and storage, but to redirect all available finance to renewable energy in the way that AGL in Australia has. BP and Shell long had small renewable energy programmes, albeit probably partly greenwash (Dinyar Godrej, 2006) before they foolishly dumped them recently.

One approach would be to study the regional, occupational, age, gender, and wealth distribution of people with various denying, resisting, doubting and idling characteristics. This would help us focus our educational efforts and other methods. Books by Drew Weston and Thomas Frank on the US political condition appear useful.

Many see population growth as a major contributor to global warming, and thus may wish to address this issue. This is a regional problem, being of no significance in Japan for example, but of significance in the USA and northern India. Both have high growth rates, and although those in the USA have a much higher per capita net GHG emissions rate, many in northern India are migrating to cities where their rate jumps.

An area that gets very little press is behavioural change. Given the slow change towards incentives for renewable energy and other technological change, should we not be promoting behavioural change more? A carbon pollution price with limited technological change will force the poorest to use less energy. This will be more palatable if we all practice behavioural change. This includes actions such as only using air conditioning at the very hottest times, walking and bicycling where possible, wearing extra jumpers rather than turning on the heater, and moving towards a vegan diet.

Scale

And this university-led effort will have to happen on some scale, with backing from national research and professional organizations, to help create a peer effect. If many universities in each nation were to support one or more teams that would work on local conditions, we might be able to counter the widespread negative influences. Some universities are more capable than others in this area, but I think that all will have something to offer, especially on a local level and in private discussions. Nearby universities could cooperate by one offering team members in areas where the other one is weak.

Universities can cooperate across the globe, particularly between developed and developing nations. Where governments have found it hard to negotiate, university teams may be able to contribute. Even in high schools, multi-disciplinary teams could be formed to discuss the issues with influential parents.

Funding and Recognition

Although voluntary work can have some effect, and should be offered moral support, new funding and a revolution in recognition by universities of such 'extension' work is required to make a new programme highly effective. This is a global emergency! A beginning needs to be made in reducing the 'publish or perish' syndrome. If research-funding bodies backed by government are not forthcoming, universities should appeal for private donations, as they regularly do for medical research. If this can help start a new movement, public funders might be more generous. Universities will surely rise to the occasion.

Other Alternatives Strategies

Alternatives include videos, independent newsletters and newspapers, public debates and challenges, direct action and court cases. Teams could put more effort into documentaries and public presentations or debates that closely compare alternative climate and technological futures. Videos must be spot on and also emotional as well as informative, telling an individual story. Much of the recent spate of climate change videos that followed *An Inconvenient Truth* have not been well focused.

Probably even the better media effort is ineffective as it doesn't address the main denier arguments directly, with sufficient evidence, together with socio-technical solutions, and may omit the emotional and/or personal touch. However, most mass media organizations are unwilling to run effectively presented, consistently accurate scientific accounts of climate change and mitigation strategies. We read of the need to tailor scientific messages to suit the media, but less of the atrocious contribution that some media are making, and the weak contribution even from the best, notwithstanding some excellent individual shows. Alternative media outlets are needed. Universities across nations should be able to combine to produce an alternative mass or semi-mass media. Integrating multi-disciplinary teams, coordinated across all national universities, might consider setting up an alternative print outlet to the public. Academics could start a print and online newsletter that could evolve into a national university newspaper. Or with staff contributions, the present student newspapers could be written as a paper for the whole population, combined into one weekly that students could place on line and sell on the streets.

Leading protests or direct action against coal, such as James Hansen has done, may be effective. Each university would devise its own strategy in detail, but a national strategy would also be needed. Alternative strategies must be sought in our decade of need.

If the industrial and financial managers and owners as well as their supported think-tank researchers and journalists fully understand the climate future, but remain intransigent, we must try harder to educate the population at large with a view to strengthening the political movement; but such a clear difference between the top and bottom seems unlikely. This should not be seen as a class or a left/right issue, for all classes will eventually suffer. We can imagine energy and food riots blocking city streets, millions of environmental refugees, not to mention high energy storms, droughts, forest fires, floods and the loss of ports and beaches. War, including nuclear war, has been discussed in relation to peak oil and climate change by Pat Murphy (2008).

We could also challenge the most egregious influential and powerful deniers to public face-to-face debate, even at the risk of giving them some credibility. A filmed critique at the hands of a competent

climate scientist - led team would do them no good. An effective ‘debate’ took place between environmental journalist, Professor George Monbiot and mining geologist, Professor Ian Plimer on Australian ABC in December 2009. Plimer could not answer Monbiot’s questions. We should have more of these interactive exposes. However, given this experience, deniers are less likely to be willing to expose themselves. A video could be made in which a list of names, organizations and funders of people who were invited but declined to come, together with videoed visits to leaders offices and homes inviting them to come out, accompanied by good science and change strategies.

It may be that the courts would be an effective forum for a science–denier debate if a suitable case can be brought against the fossil fuel, transport, mining and construction corporations. Courts provide a venue for extensive debate, not available in the mass media. A case was brought by an Inuit village that is being undermined by warming. It was dismissed, but it might be appealed. Those suffering bushfires and drought might bring a class action case in Australia. The Bolivian Government has called for the establishment of an international court to try climate crimes. The US Republican Party could be among those liable to prosecution if such a court could ever see the light of day. Mark Diesendorf (2009) describes the costs and benefits of several other methods.

When conditions deteriorate further, the case for more extreme challenges against the financiers and deniers will grow to the extent that alternative ‘traditional’ media such as radical news sheets will surely appear on the streets, and direct action will become a daily occurrence. Radical socialists are already sensing the beginning of a new era of revolution, while some of the rich are discussing violent strategies for survival in northern Canada. The future will not be pleasant if we do not act in a radical non-violent way now. If we can get our backsides and brains off our seats we might even experience a new wave of cultural rejuvenation. Or are we to commit collective suicide, while universities, where it is said many of our best brains lie, practice specialized research as usual. Let’s hope we do not need an even greater climate disaster in the USA to alert the most powerful among us, as it may be too late.

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The most intelligent deniers might ask themselves: what has the future ever done for us?

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