

# LEADERSHIP AND CLIMATE CHANGE

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STEPHEN KEIM SC\*

## I. INTRODUCTION

The 1973 Oil Crisis is commonly credited with causing a sustained period of stagflation.<sup>1</sup> Increasing oil prices and rises in the price of grain during 2008 are already leading to social and political disruption in many countries including Australia.

The cost of limiting the growth in carbon emissions will have economic and social impacts. Reducing current greenhouse gas emissions by more than 50% before 2050 provides more significant challenges. The impact on prices of goods and on the competitiveness of particular industries of such reductions will be profound.

The adjustments required to make significant emission reductions may have to take place in a world which is adjusting to 'peak oil'.<sup>2</sup> Weaning economies off the export and use of coal for static electricity production at the same time as one's access to petroleum is limited by an inability to increase world oil production will be a singularly difficult task.

Many consider that the hole in the Intergovernmental Panel on Climate Change (IPCC) doughnut is the failure of that organisation to address the increased likelihood of large scale increases in world sea levels through the melting of polar ice caps.<sup>3</sup> The threatened loss of the world's most expensive urban landscapes may destroy economic confidence<sup>4</sup> well before millions of Bangladeshis are forced to flee, permanently, their homes.

Adjustment to climate change will be needed at the same time that emissions reductions are required to prevent more climate change. Most frightening is the prospect that, at any point in time in the foreseeable future, the oceans will store more than 50 years of climate change impacts resulting from the emissions that have already occurred.<sup>5</sup>

Preventing and coping with climate change will require social and political leadership of the highest calibre. The need for such leadership will not subsist for five or six years, the period of the last world war. It will not subsist for a decade, the approximate period of the worst years of the Great Depression. The need will subsist for at least 50 years, perhaps, double that.

The leadership which is needed is not leadership which creates a false crisis and then responds to it: the leadership of the war on terror. It is not leadership just at the political level. It will be needed in all aspects of our society, in government, in educational institutions, in industry, and in the organisations that constitute civil society.

We, who are used to pusillanimous leadership from our politicians, will be tempted to despair at such a great need and wonder from where such leadership may come.

The purpose of this paper is to seek inspiration. Who, I ask, are the role models to whom we should look to respond to our society's needs in this prolonged period of challenge? What should we demand from the leaders that we have? Who, from the past and present, can provide the inspiration that might allow each of us to provide some of the leadership our societies need to restrict, and cope with, the threat of climate change.

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- \* Stephen Keim Senior Counsel, Chambers, 2 July 2008, Notes for a Paper presented to the ALTA Conference, Cairns, 7 July 2008.
  - 1 A recent article looking back to 1973 may be found here: Ben Stein, 'Can the Fed Answer All the Alarms?', *New York Times* (New York), 22 June 2008, 1. <<http://www.nytimes.com/2008/06/22/business/22every.html?ei=5087&em=&en=a767a1d9eee63c38&ex=1214280000&adxnml=1&adxnmlx=1214219266-fXNEQXf7cNqDunib5J8PHQ>> at 2 December 2008.
  - 2 See Robert Bryce, *Gasoline's Cheap Again but Peak Oil Still Looms Large*, posted on 26 November 2008 at <<http://www.energytribune.com/articles.cfm?aid=1032>> at 2 December 2008.
  - 3 See, eg, David Wheller, 'The IPCC Debate on Sea Level Rise: Critical Stakes for Poor Countries', 7 February 2007 on AdmiNet (Club des Amis des Webmestres de l'Administration) at <<http://www.cawa.fr/the-ipcc-debate-on-sea-level-rise-critical-stakes-for-poor-countries-article00916.html>> at 2 December 2008.
  - 4 A discussion of impacts on the US and global economic systems in the context of peak oil appears in David Strahan, *The Last Oil Shock: A Survival Guide to the Imminent Extinction of Petroleum Man* (2007) 176.
  - 5 Mark Bowen, *Censoring Science* (2008) 257-259.

The three people discussed in this paper provide some of the qualities needed to provide the inspiration we require. One reason why the misinformation campaigns of the fossil fuel industry have been so successful among our politicians is the difficulty of imagining a threat to society as profound as climate change. Tim Flannery, Al Gore and many like them have assisted politicians to understand the enormity of the threat. Nicholas Stern and, more recently, Ross Garnaut have allowed us to imagine that responding to the threat of climate change can be successful.

We need to go further. We need to imagine the sort of people that we need to get that response going. Even more importantly, we need to imagine the sort of people to lead when the going gets tough; when there is much more to be done; when the bad news and the difficulties still outnumber and outweigh the happy stories and the signs of improvement.

This paper is a tiny step along the path of that imagining.

## II. MEASURING THE TRUTH: DAVE KEELING

On 20 June 2005, Charles David Keeling died at his Montana home of a heart attack. In a speech marking Dave Keeling's passing and honouring his scientific work, the director of his institution, the Scripps Institution of Oceanography, compared Dave's measurements of background levels of carbon dioxide in the atmosphere to Tycho Brahe's measurement of the planets and Albert Michelson's measurements of the speed of light.<sup>6</sup> Brahe's work had paved the way for the work of Isaac Newton and Galileo Galilei. Michelson's work made possible the theoretical contribution of Albert Einstein to our understanding of the universe. Dave Keeling's work has given us a chance to prevent extinction for many species, including our own.

It was Dave Keeling's love of the outdoors and the environment that led him to the field in which he made his great scientific contribution. As a postdoctoral student at the California Institute of Technology (Caltech) in the mid-1950s, Dave was committed to his work as a chemist but he spent as much time as he could find climbing mountains and exploring woodland rivers. He chose research projects that would keep him in direct contact with wild nature. Measuring the level of carbon dioxide in the open air was a pretty good decision in that regard.<sup>7</sup>

Prior to Dave Keeling taking up the task, a group of Scandinavian scientists had attempted the task of measuring CO<sub>2</sub> concentrations in the atmosphere and been discouraged by the widely fluctuating readings as pulses of the gas from natural or artificial sources came by the measuring instruments. One commentator had described the task as 'almost hopeless'.<sup>8</sup>

In tackling the task, Dave Keeling had to create his own tools. No instrument available to purchase had the necessary accuracy to make the kind of fine measurement that was necessary. Months of hard work and ingenuity, therefore, went into solving that initial problem.<sup>9</sup> While still based at Caltech, Dave used his newly made instrument to measure levels of carbon dioxide in pristine locations around California including Big Sur, an area that was both mountainous and coastal. He began to get the same reading from a number of locations and on different days. Having achieved a degree of stability in his measurements, when fluctuations occurred, he was able to track down the source of the interfering concentrations. He was scrupulous and tireless in this pursuit. At last, he knew that

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6 The speaker was Director of the Scripps Institution of Oceanography at the University of California, San Diego, Charles Kennel. For a report of the speech, see Charles Kennel, 'Climate Science Pioneer: Charles David Keeling' (Press Release, 22 June 2005) <<http://scrippsnews.ucsd.edu/Releases/?releaseID=687>> at 2 December 2008.

7 Spencer R Weart, *The Discovery of Global Warming* (2003) 20.

8 Ibid 21. The commentator Weart cites is Carl-Gustav Rossby, 'Current Problems in Meteorology' in Bert Bolin (ed), *The Atmosphere and the Sea in Motion* (1959), 15.

9 Ibid 25.

measuring the background level of carbon dioxide in the atmosphere was possible. But this was only the beginning.

Roger Revelle, a former director of the Scripps Institution of Oceanography and the person who recruited Dave Keeling to that institution, later, said of him:

Keeling's a peculiar guy. He wants to measure CO<sub>2</sub> in his belly. And he wants to measure it with the greatest precision and greatest accuracy possible.<sup>10</sup>

Newly ensconced at Scripps, Dave lobbied hard to get the funding necessary to construct the new generation of precision instruments necessary to achieve the level of accuracy that would make his readings useful to science. He succeeded and, in September 1957, had one such instrument set up in Antarctica and, in March 1958, another set up atop the volcanic peak of Mauna Loa in Hawaii. Even in such pristine locations, sources of error were lying in wait: petrol-driven machinery in Antarctica and vents in the side of the volcano on Mauna Loa. But they were no match for Dave Keeling who chased them down.

Thus was born the famous Keeling curve, showing extensive seasonal variations but a steady increase in the base level. With a short break in 1964, when the funding ran out briefly, the Scripps Observatory has maintained the Mauna Loa readings to this day. They show that the steady increase has taken the level from 315 ppm (parts per million) in 1958 to over 380 ppm today.<sup>11</sup> Dave Keeling's dedication to measuring CO<sub>2</sub> levels, and getting it right, has produced the most uncompromising evidence of all that our addiction to burning fossil fuels is fundamentally changing the thin layer of gases upon which life on earth depends.

In a paper submitted on 25 March 1960, the combination of Dave Keeling's visceral understanding of the importance of measuring CO<sub>2</sub> levels, his tireless devotion to technical accuracy, and his keen scientific instincts combined to point the way to knowledge that many are still trying to absorb. He wrote:

Where data extend beyond one year, averages for the second year are higher than for the first year. At the South Pole, where the longest record exists, the concentration has increased at a rate of about 1.3 ppm per year. Over the northern Pacific Ocean the increase appears to be between 0.5 and 1.2 ppm per year. Since measurements are still in progress, more reliable estimates of annual increase should be available in the future. At the South Pole, the observed rate of increase is nearly that to be expected from the combustion of fossil fuel (1.4 ppm) if no removal from the atmosphere takes place ...<sup>12</sup>

Dave Keeling's search for truth is carried on by his son, Ralph Keeling, the current director of Scripps CO<sub>2</sub>.

### III. TELLING THE TRUTH: DR. JAMES HANSEN

Mark Bowen's book about Jim Hansen and the attempts to silence him begins as follows:

One sweltering June afternoon in 1988, an understated Iowan named Jim Hansen turned global warming into an international issue with one sentence. He told a group of reporters in a hearing room, just after testifying to a Senate committee, it's time to stop waffling ... and say that the greenhouse effect is here and affecting our climate now.<sup>13</sup>

Jim Hansen's approach to life is reflected in his approach to science. It is about the relationship between the truth, the evidence and what we would like the evidence to be. He attributes his approach to a quote from the famous, Nobel Prize-winning physicist, Richard Feynman:

<sup>10</sup> Ibid 36.

<sup>11</sup> Scripps CO<sub>2</sub> Program: Home of the Keeling Curve (2008) Scripps Institution of Oceanography <<http://scrippsco2.ucsd.edu/home/index.php>> at 2 December 2008.

<sup>12</sup> CD Keeling, 'The Concentration and Isotopic Abundances of Carbon Dioxide in the Atmosphere' (1960) 12(2) *Tellus* <[http://scrippsco2.ucsd.edu/publications/keelling\\_tellus\\_1960.pdf](http://scrippsco2.ucsd.edu/publications/keelling_tellus_1960.pdf)> at 2 December 2008.

<sup>13</sup> Bowen, above n 6, 1.

The only way to have real success in science ... is to describe the evidence very carefully without regard to the way you feel it should be. If you have a theory, you must try to explain what's good about it and what's bad about it equally. In science you learn a kind of standard integrity and honesty.<sup>14</sup>

Jim Hansen commenced employment as a postdoc at NASA's Goddard Institute for Space Studies (GISS) in New York in January 1967.<sup>15</sup> He is still there and has been the director of GISS since 1981. His early work at GISS involved using the light-scattering effects of particles in the atmosphere to identify aspects of the atmosphere of Venus.<sup>16</sup> This equipped Jim to work on the heating of earth's atmosphere by sunlight as part of GISS's work in developing a computerised weather model, which also commenced in 1967 as part of an international program called the Global Atmospheric Research Program.<sup>17</sup>

Jim Hansen suggested that GISS develop a Global Climate Model (GCM) in 1975. Funding was not available until the following year.<sup>18</sup> In an era of off-the-shelf computer models for flood studies, waste-water analysis and even cyclone frequency, the use of computer modelling seems almost a substitute for scientific endeavour. The impression is very misleading. The world's climate system is extremely complex. A large number of factors impact on the system, producing complex and dynamic interactions.<sup>19</sup> Each of those factors were only to be effectively incorporated into the model by a painstaking combination of measurement, analysis using the principles of theoretical physics and chemistry, and meticulous checking of the model results against climate in the real world.<sup>20</sup> Hansen places particular emphasis on the importance of real-world data. He said in 2007:

Even now I argue that the record of the history of the earth is much more useful in ... giving us an understanding of what the [human] impact is going to be ... than models per se.<sup>21</sup>

As part of this affinity with real-world data, Jim's group began assembling a global database of temperature readings going back to the late 1800s.<sup>22</sup> This would not only inform the theory on which the model was developed but also allow detailed checking of its accuracy as development proceeded.

Jim Hansen is best known for his courage in speaking out about climate change and for alerting Congress, the United States and the world about the dangers of continued use of fossil fuels. His ability to speak out, however, is the product of his scientific contribution to the study of the subject. By 1988, the GCM developed by Jim's team at GISS was retroactively able to predict temperature changes by applying what was now 30 years of data from Dave Keeling's Mauna Loa facility. The departures from straight-line changes, associated with the cooling caused by volcanic interruptions, allowed calibration and confirmation of the accuracy of the modelling. The advanced ability to model real-world climate and, thereby, make accurate predictions of future changes based on differing scenarios of CO<sub>2</sub> levels was assisted by the use of some advanced mathematical physics to reduce the amount of computation time. Jim's group used the mathematics developed by Akio Arakawa to allow the model to use larger grids in simulating the earth and predicting its climate. This not only allowed the work to proceed when funding restrictions prevented

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14 Ibid 53.

15 Ibid 191.

16 Ibid 198.

17 Ibid 198.

18 Ibid 200-01.

19 The Goddard Institute for Space Studies (GISS) has published a discussion of Global Climate Modelling at Global Climate Modelling (2007)

<<http://www.giss.nasa.gov/research/modeling/gcms.html>> at 2 December 2008. The article contains references to the technical papers discussing various versions of the models.

20 Weart, above n 8, 20.

21 Bowen, above n 6, 208.

22 Ibid 208.

the acquisition of modern computing capacity. It also allowed detailed modelling of past climate and accurate prediction of future climate to be carried out.<sup>23</sup>

For another 20 years, Jim Hansen has worked over 80 hours per week, improving the GCM; incorporating new data including the detailed information about palaeo-climate from ice cores and cores taken from the bottom of freshwater lakes and the ocean floor; and refining the predictions of past and future climate.

Despite all this, as I mentioned, it is not for his science but his willingness to speak the truth about the results of the science to legislators and the public for which Jim Hansen is famous.

It wasn't the first time that Jim Hansen had given evidence to a Congressional Committee. However, 23 June 1988, 20 years and two weeks ago, was a very hot day in a very hot and dry year in the northern United States and across northern Europe and Asia. Thoughts of 1934 and the Dust Bowl were not far from many people's minds.<sup>24</sup>

It was on that day that Jim Hansen told the sweating crowd in the Senate Committee room that he was 99% sure that humans were already heating the planet. He said: 'The greenhouse effect has been detected, and it is changing our climate now.'<sup>25</sup>

The comments caused a sensation.<sup>26</sup> They were widely reported. Almost single-handedly, Jim Hansen had made 'global warming' a term that we could all recognise and understand.

Jim Hansen suffered as a result of his 1988 comments. It was not only politicians and the fossil fuel industry who criticised his outspokenness. Many of his fellow scientists did not approve of his preparedness to communicate with the public without the usual set of qualifications and caveats which form such an essential part of science-speak. Ironically, many of the scientific colleagues who so criticised Jim had a far less complete knowledge of what the science was revealing than he did, coming as they were from the limited perspective of their particular specialties.<sup>27</sup> Many have gradually caught up with his understanding over the ensuing two decades.

Eventually, Jim Hansen went back to concentrating on his scientific work and left the public statements on global warming to others.

However, after five years of inaction — indeed, positive subversion by the administration of George W Bush — and 17 and a half years after his 1988 Senate testimony, Jim Hansen decided it was time again to take up the cudgels in public. On 6 December 2005, at a meeting the American Geophysical Union (AGU) in San Francisco, he delivered a speech. Fittingly, he had been invited by the AGU to give a speech in memory of Dave Keeling, the first of our three subjects for today's talk.

In his Keeling speech, Jim Hansen said:

Earth's climate is nearing, but has not passed a tipping point, beyond which it will be impossible to avoid climate change with far ranging consequences. ... The Earth's history suggests that with warming of 2-3degrees C ... sea level will [rise about] 25 metres. ...

23 An abstract of the paper by J Hansen et al, which made predictions based on three different future scenarios, may be found at 'Global Climate Changes as Forecast by Goddard Institute for Space Studies Three-dimensional Model' (1988) 93 *Journal of Geophysical Research* 9341  
<[http://pubs.giss.nasa.gov/abstracts/1988/Hansen\\_etal.html](http://pubs.giss.nasa.gov/abstracts/1988/Hansen_etal.html)> at 2 December 2008. The link provides a further link to a PDF file of the 1988 paper.

24 Bowen, above n 6, 221.

25 Andrew C Revkin, 'Years Later, Climatologist Renews his Call for Action', *New York Times* (New York), 23 June 2008  
<<http://www.nytimes.com/2008/06/23/science/earth/23climate.html?em&ex=1214452800&en=21575e6ee46489ed&ei=5087%0A>> at 2 December 2008.

26 For a contemporary report, see Philip Shabecoff, 'Global Warming has Begun, Expert Tells Senate', *New York Times* (New York), 28 July 2008  
<<http://query.nytimes.com/gst/fullpage.html?res=940DE7DF133AF937A15755C0A96E948260>> at 2 December 2008.

27 Bowen, above n 6, 231.

Real world data suggest substantial ice sheet and sea level change in centuries, not millennia.<sup>28</sup>

Thus a new period of speaking out by Jim Hansen was commenced. It has not stopped. The Keeling speech, and later press releases by GISS confirming that 2005 was the hottest year on record for the Earth, triggered the most blatant attempts yet by the Bush White House to prevent earth scientists, including Jim, himself, from telling the public the results of their work. Jim spoke out and exposed that censorship, giving rise to Congressional investigations and forcing Bush's political appointees in government institutions, at least, to retreat to the more clandestine methods they had previously used to muzzle scientists. Jim's bravery encouraged (literally) other scientists in various institutions across the United States to speak about the censorship and political pressure they had been experiencing.<sup>29</sup>

And through it all, Jim Hansen has continued to communicate to the public the reality that his work, the work of his team, and the work of climate scientists around the world has revealed: the reality of the great danger that global warming presents and the reality of the steps which must be taken now to avert at least some of the danger.

On the 20<sup>th</sup> anniversary of his 1988 Senate testimony, on 23 June 2008, Jim Hansen was invited back to Capitol Hill to commemorate his earlier momentous testimony. In his written abstract of his speech, he said:

Changes needed to preserve creation, the planet on which civilization developed, are clear. But the changes have been blocked by special interests, focused on short-term profits, who hold sway in Washington and other capitals. ... But more warming is already "in-the-pipeline," delayed only by the great inertia of the world ocean. And climate is nearing dangerous tipping points.

Climate can reach points such that amplifying feedbacks spur large rapid changes. Arctic sea ice is a current example. ... ominous tipping points loom. West Antarctic and Greenland ice sheets are vulnerable to even small additional warming. These two-mile-thick behemoths respond slowly at first, but if disintegration gets well underway it will become unstoppable. In my opinion, if emissions follow a business-as-usual scenario, sea level rise of at least two meters is likely this century. Hundreds of millions of people would become refugees.<sup>30</sup>

Jim Hansen continues to fearlessly speak to us the truth.

#### IV. THE TRUTH IS OBVIOUS: EDDIE KOIKI MABO

My third subject of today's talk may be thought an unusual person to follow two distinguished climate scientists. His achievements, however, and his world view, also provide us with guidance as to the leadership we require to mitigate and adapt to climate change.

Many of you, of course, and especially those of you who are from North Queensland, will know Eddie Mabo's story much better than I can tell it. Nonetheless, it is such a story that it is certainly worth the attempt.

Eddie Koiki Mabo was born on Mer, or Murray Island, in 1936. His mother died soon after Eddie's birth. Eddie was raised by his mother's brother and his wife. As a result of a teenage prank, the Island Council exiled Eddie from his home island and he went to work on pearling boats and, later, in Townsville, on the railways.

In 1967, Eddie got a job as a gardener at James Cook University in Townsville. He took advantage of working at a centre of learning by sitting in on lectures and reading books in

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<sup>28</sup> Ibid 4.

<sup>29</sup> Ibid 257-259.

<sup>30</sup> Andrew C Revkin, 'Are Big Oil and Big Coal Climate Criminals?' *New York Times* (New York) 23 June 2008 <<http://dotearth.blogs.nytimes.com/2008/06/23/are-big-oil-and-big-coal-climate-criminals/>> at 2 December 2008.

the library. His interests included discovering what the world of learning said about his people and his culture.

The truth for which Eddie Mabo is famous comes from a much repeated anecdote of a conversation between university gardener Mabo and history professors, Noel Loos and Henry Reynolds. Loos tells the story as follows.

[W]e were having lunch one day in Reynolds' office when Koiki was just speaking about his land back on Mer, or Murray Island. Henry and I realised that in his mind he thought he owned that land, so we sort of glanced at each other, and then had the difficult responsibility of telling him that he didn't own that land, and that it was Crown land. Koiki was surprised, shocked and even ... I remember him saying 'No way, it's not theirs, it's ours.'<sup>31</sup>

From that point onward, Eddie Mabo threw himself into campaigns for Aboriginal and Torres Strait Islander land rights. A strong speech at a Land Rights Conference held at James Cook University in 1981 about his understanding of land ownership and land inheritance on Mer convinced at least one lawyer in the audience that a test case was worth bringing. Eddie Mabo, along with other Torres Strait Islander elders, became a plaintiff in the case which, in most people's minds, is simply called *Mabo* or *Mabo (no.2)*.<sup>32</sup>

The case was commenced in the High Court in 1982. It was remitted to the Supreme Court of Queensland for a finding of facts. Justice Moynihan's decision on the facts was not particularly favourable to Eddie Mabo, personally, and he is reported to have been very disappointed and discouraged for one of the few times in his life.<sup>33</sup>

Eddie Mabo did not live to see the landmark decision of the High Court that found that the common law recognised native title of Aboriginal and Torres Strait Islanders.<sup>34</sup> He died of cancer aged 56 on 21 January 1992. The High Court handed down its decision on 3 June the same year.

It takes a strong vision and a great sense of belief in oneself and one's culture to conclude that the science of anthropology, the makers of maps, and the law of the country in which you live have simply got it wrong, and to retain the belief that the land on which you were raised remains your land. It takes a strong personality to tell the world of learning that they are wrong and you are right. Such strength of vision and personality and self-belief will be needed to deal with the danger our past use of fossil fuels has already created and to avert even greater danger.

It also takes great persistence to strive for 11 years, and even with one's dying breath, to make that vision a reality. Eddie Mabo had that persistence.

Eddie Mabo knew an important truth and let no-one take it from him. He gave that truth to all of us.

## V. THE QUALITIES OF LEADERS

### A. Vision

Dave Keeling had an unusual vision: that background levels of carbon dioxide were measurable and that measuring it accurately was important. It turned out to be a crucially important insight.

Jim Hansen's vision was more complex. He could envisage the importance of real-world data of the past to predicting the futures among which we must choose. He found ways of solving the problems of theoretical physics that modelling real-world complexities

31 'Eddie Mabo Biography', Biography Base  
<[http://www.biographybase.com/biography/Mabo\\_Eddie.html](http://www.biographybase.com/biography/Mabo_Eddie.html)> at 28 June 2008. Listen also to Noel Loos recounting the incident at <<http://www.abc.net.au/ocal/photos/2008/05/22/2252297.htm>> at 2 December 2008.

32 *Mabo v Commonwealth* (no.2) (1992) 175 CLR 1; 1992 HCA 23.

33 'Eddie Mabo Biography', Biography Base  
<[http://www.biographybase.com/biography/Mabo\\_Eddie.html](http://www.biographybase.com/biography/Mabo_Eddie.html)> at 28 June 2008.

34 *Mabo v Commonwealth* (no.2) (1992) 175 CLR 1; 1992 HCA 23.

threw up. And he could see ways to apply other scientists' advances almost before they were made.

Eddie Mabo's vision was home-grown and tenacious. He saw what his people had told him about land ownership on Mer. He kept that vision in his heart and no 'clever person' would persuade him that he and his people were wrong. Eventually, enough 'clever people' shared his vision.

### *B. Persistence*

The persistence of Eddie Mabo is obvious. It would have been so easy for him to say: 'I guess you're right' to those who contradicted him. But he kept on reading books and kept on talking about his vision. And when he found a means of bringing a case and lawyers to help him, the task had just commenced. He saw it through. Only his life gave out.

Dave Keeling also persisted until his heart stopped beating. He needed persistence even to construct the instrument and chase down the interference to establish that carbon dioxide could be reliably measured. Even when the importance of the Keeling curve had been established, he realised that the continued accuracy and reliability of the data he could provide had lost none of its importance and he kept on providing it.

And Jim Hansen keeps on persisting. Two weeks ago, he repeated and expanded upon his warning of 20 years before that. That repeat warning is backed by a new scientific paper in press. The importance of what he has to say does not alter the quality of the science which allows him to say it.

### *C. Courage*

Courage may well be the most important quality in the leadership we require to grapple with and restrict the impacts of global warming. And our three iconic figures have, in their lives and their work, displayed no lack of courage.

Every time Jim Hansen speaks, the attack dogs of the fossil fuel industry, in their various disguises, launch fresh attacks on his integrity and his credibility. Yet, he keeps coming back to speak again.

For Dave Keeling, it was the courage to pursue an idea that others thought was impossible to achieve and few, if any, thought was important. And he never ceased pursuing it.

Perhaps Eddie Koiki Mabo was the most courageous of all. His was the courage of a person whose idea was thought ridiculous even by his well qualified friends. His was the courage of the downtrodden to persist against the ridicule of the dominant culture. And his was the courage to persist when, to all but yourself, the cause looked hopeless. But Eddie displayed that courage. And he succeeded.

Even as the debate on the shape and timing of a promised emissions trading system in Australia starts to get a little rough,<sup>35</sup> the need for long-term leadership becomes even more obvious. The leadership required will include the qualities of courage, vision and persistence displayed throughout their lives by the three exemplars about whom I have spoken today.

## VI. EPILOGUE

While today's talk is about leadership and inspiration in a world facing climate change, there is a deeper point to make. Just as Tim Bonyhady and Peter Christoff's book on *Climate Change Law*<sup>36</sup> indicates that there is enough law on the subject to fill an undergraduate or master's course, there is enough history of climate change science to fill

<sup>35</sup> 'Libs Unlikely to Back Emissions Scheme', *Sydney Morning Herald* (Sydney), 29 June 2008  
<<http://news.smh.com.au/national/lib-s-unlikely-to-back-emissions-scheme-20080629-2ymk.html>> at 2  
December 2008.

<sup>36</sup> Tim Bonyhady and Peter Christoff, *Climate Law in Australia* (2007).



similar units in our history schools (and our science faculties). Our sociology departments should be investigating our lemming-like behaviour and trying to find explanations for our failure to demand more of our politicians and less of our fossil fuel industry. Hopefully, our marketing schools in our business faculties will be drawing the attention of their students to the remarkable way in which the denialist industry uses the tactics and strategies, and even the same consultants, as our tobacco industries used for so many years.<sup>37</sup> Hopefully, they will collaborate with our ethicists wherever in our universities they may be found.

The threat of climate change is part of our history as well as something that may destroy our future. It is a proper subject for study in all of its aspects.

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<sup>37</sup> A recommended textbook would be the following: Guy Pearse, *High and Dry: John Howard, Climate Change and the Selling of Australia's Future* (2007).

