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***Managing social adjustment to peak oil***

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1. Modern economies evolved on the basis of availability of a cheap source of energy - oil - cheap to extract, cheap to use; oil permeates every corner of our daily lives – as source of energy and component of manufactured goods.
2. No major industrial society can survive today without oil – food, transport, heating, plastics, cars, drugs, prosthetics, computers, housing.
3. As recent Queensland Task Force on oil vulnerability reminded us “crude oil literally greases the wheels of our economy. Its impact in every aspect of our lives is unparalleled by any other commodity in our society. By the time we notice the rising cost of fuel at the service-station bowsers as we fill our vehicles, the ripples from the rising cost of a barrel of oil are already moving through our food chains, agricultural industries, medicine, clothing, housing and transportation. If it can be synthetically produced commercially (rubber, chemicals, plastics, dyes, inks, fibres, adhesives, paints) it will today, probably derive from the oil and gas industry. Crude oil is a society universal – an energy carrier, a lubricator, a chemical feedstock – our society depends on every part of the oil refractory column.”
4. There is, as yet, no easy substitute – everything else is either more expensive or harder to use, or both.

5. Australian oil production is in decline - we now import over 60% of our crude oil needs; we are exposed to increasing oil prices.
6. Of the world's 42 top oil producing nations, production wells in 15 are already in decline.
7. Global oil production is forecast to peak and then begin terminal decline – “big rollover” where demand will exceed supply – predictions vary about imminence of problem; some think it is already happening; others put it within the next 10-15 years; others still up to 40 years hence; but all agree that it is a real problem.
8. It means that before oil runs out it will become too expensive to use for many purposes, especially private transport; of course, it is the least well off in the community who are most vulnerable to such price increases – and often the ones out-of range for public transport.
9. By strange confluence of forces, global warming means we *should* be reducing our use of fossil fuels: the first comprehensive analysis of the climate effect from the transport sector as a whole on a global scale showed that road transport is a substantial – 42% - and growing source of global warming. In Australia fuel use in transport is a substantial source of greenhouse gas emissions, accounting for 14 per cent of Australia's emissions in 2005<sup>1</sup>, and is growing rapidly with a projected increase of 67 per cent over 1990 levels by 2020.
10. Place this in the context of W.A having the highest level of vehicle ownership (over 750 per 1000 people) and the fastest rate of growth in Australia. The average Australian household spends about \$2500 a year on fuel.
11. Even if we ignore the global warming imperative to decrease oil use, even the most unvarnished optimists recognise that new fields in prospect will not cover the

shortfall if we continue business as usual; it is estimated that exploration is turning up one new barrel of oil for every six we consume.

12. Major oil finds appear to have peaked in 1964; 90% of current production comes from fields found more than 20 years ago.
13. Just as oil supply is looking uncertain, global demand is rising faster than it has done for a decade.
14. Oil futures prices indicate that the market view is that current high prices are not temporary aberrations.
15. As former UK environment minister put it, the implications of this are “mind blowing” yet most of us are still behaving as if oil is in limitless supply or that there is a technological fix which will seamlessly replace oil. As the very cautious government sponsored report of the Future Fuels Forum put it last year, “in the event of a decline in international oil supplies, technology alone will not be sufficient to meet the fuel supply gap. Reduced travel across freight and passenger transport will be necessary.”
16. Dr Campbell gave a presentation to the **UK House of Commons All Parliamentary Committee** in July 1999. "*The Imminent Peak of World Oil Production*", in which he said, *There are colossal economic and political consequences. Indeed the very future of our subspecies - Hydrocarbon Man - is at stake.*
17. As more than one commentator has argued, it's time to plan now for a world without oil or with a much reduced supply; to behave prudently and to give meaning to the 'precautionary principle.' We should use future oil requirements as a yardstick to decide on worth of all new developments, processes, industries, planning decisions.

18. In fairness to future generations, we cannot continue to consume oil at current rates, especially as demand is rising in developing economies and as the deleterious effects on our climate are now understood.
19. Worth remembering too that oil energy and nitrogenous fertilizer produced from natural gas underlies the green revolution; has supported a population explosion.
20. We face a stark choice – either we can continue down the existing path of rising oil consumption, trying to capture all remaining oil supplies (but without avoiding the exhaustion of global capacity) or we can switch to renewable sources of energy, improve energy efficiency and steadily reduce oil use.
21. Requires huge new investment in energy generation and transport technologies.
22. Some believe the market will sort it out – oil prices will rise and other forms will come on stream. Everything will then be more expensive and may not work as well and it will be those with least purchasing power who will bear the brunt of such a rough process of adjustment.
23. It is often the outer suburban regions where those on lower incomes live which have the poorest public transport services. Such households spend a significant proportion of their income running two or more vehicles – and they have to drive further. Rising fuel prices will disproportionately affect such households; while wealthier households in inner-urban areas, well serviced by public transport, may be less vulnerable.
24. Concern that capital costs, technological uncertainties, start-up and lead times and the energy inputs needed, means alternatives are unlikely to be available in the volumes and prices required to replace declining cheap oil.

25. We need to make sure that people are more energy aware – preferably before high prices and economic and social dislocation force us to confront reality. Need to recognise that in the past every gain in energy efficiency has been undercut by increases in the use of energy – bigger houses with air conditioning, more cars, more fridges etc. (Rebound effect).
26. Remains a taboo subject for political leaders – as one newspaper headline put it – “The world is running out of oil – so why do politicians refuse to talk about it?” Lack of discussion and preparation for “peak oil” is as alarming as the rising prices. Instead they make reassuring noises about keeping oil prices low. Only in Queensland has there been any systematic analysis of the problem by a Taskforce whose report was released last year - the national political response was a deafening silence.
27. “Every generation has its taboo, and ours is this: that the resource upon which our lives has been built is running out. We don’t talk about it because we cannot imagine it. This is civilisation in denial” As Jung put it, “people cannot stand too much reality”.
28. But you can’t solve a problem until you know you have one –we need reliable information and a rational debate.
29. Current debates that quibble over fluctuations in the petrol price at the bowsers will matter little as the full impact of peak oil is felt.
30. Need solutions which cover five main areas of public policy:
  - Charging something closer to the real costs of transport and oil and protecting the least well off from the full impact of such increases;
  - Reducing car use and road freight transport – rail and ships;
  - Making vehicles more efficient;

- Developing and using alternative fuels;
  - Reforming transport and energy policy to allow shift way from oil and car dependence.
31. Examples of policies which should be considered are:
- changing the basis for vehicle charges to “pay-as-you-go” user charges;
  - removing taxation measures which encourage motor vehicle use and the purchase of 4 wheel drives and other high consumption vehicles over more efficient vehicles;
  - providing incentives for the purchase of fuel-efficient, low-emission vehicles and the replacement and/or recycling of the existing inefficient vehicle stock – e.g. “feebates”<sup>1</sup> ;
  - leading by example in aggressively reducing both fuel and carbon intensities of the public vehicle fleet;
  - using policy settings to increase the use of more efficient mass transit, rail, and air transportation; should be encouraged through national and local policies;
  - upgrading transportation infrastructure to improve efficiency and providing incentives for “teleworking”.
32. Most of Australia’s petroleum use is in transport (80%), so alternative transport strategies are vital to any program to reduce oil use. Alternative fuels – biofuels and hydrogen, not adequate at this stage. Also produce perverse effects; increased production of grains for biofuels is contributing to dramatic increase in food prices; biggest effect on the poor who consume most of their income on food purchases.
33. Another part of the problem is that many alternative technologies have much lower “power density” than oil and gas; solar, hydrogen, wind require huge areas to

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<sup>1</sup> “Feebates” are based on the fuel consumption specifications of vehicles -in some places, the “feebate” relates to the licence, in others to the tax on the vehicle at point of sale (<http://www.theaustralian.news.com.au/story/0,25197,23922964-7583,00.html> and <http://mpr.ub.uni-muenchen.de/3461/> and the CSIRO’s ECOS on-line magazine available at [www.publish.csiro.au](http://www.publish.csiro.au) : [www.publish.csiro.au/paper/EC121p24.htm](http://www.publish.csiro.au/paper/EC121p24.htm).

produce relatively small amounts of energy. No other energy source has the combination of oil's high energy density, high energy profit ratio (energy released/energy invested in production) and utility in transport.

34. Need to seriously analyse the problem and examine policy options – and forcing those who would deny the problem to confront some of the consequences of failing to do so. Need also to develop a more sophisticated understanding of how we can change people's behaviour in the desired directions.
35. Alternatives – gradual, managed change – increases in oil prices, changes in pattern of use, greater efficiency, innovation **or** “oil shock” with market instability, rapid increases in prices, economic and social disruption, international tensions and conflicts over oil and gas.
36. Must have a comprehensive energy strategy which incorporates clear assessment of future oil availability and cost, one which also recognises the greenhouse polluting effects of oil use.
37. Arguments about what needs to be done often stress obligation – we need to, we should, they should, the government should etc – the path from prescription to realisation is not suggested; often sounds paternalistic - “don't need a dryer – that's the sun's job.”
38. Everyday experience of many Australians is of congested roads, pollution and poor public transport. Adverse consequences for health and wellbeing: children more likely to be overweight – asthma and breathing problems on the rise.
39. Recent survey has shown that motorists are more worried about petrol prices, traffic congestion and road rage than their greenhouse emissions or declining oil supplies, even though they are aware their cars contribute to the problem; survey by

Pricewaterhouse Coopers –German motorists more likely to change driving behaviour to save money or drive more safely than to cut back greenhouse emissions; Tragedy on the commons – don't believe their behaviour will make a difference; see it as someone else's problem.

40. Monbiot has suggested that, the production of CO<sub>2</sub> by the land transport systems should be easier to solve than other problems – “Everyone can see how inefficient the transport system is: thousands of people, one to each overpowered car, heading in the same direction every day, then heading back again. The technologies and economic policies to address it have been available for decades.” A rational, efficient system producing 10% or less than current emissions would save billions – real problem neither technological nor economic, it's political – psychological.
41. Argument – whether to seek to change/influence values, attitudes and behaviour or hope for a technological fix to solve the problems.
42. Common response seen in an e-mail to on line site discussing climate change: “Changing behavior individually is hard enough. Changing behavior on a societal scale is basically impossible. Calamitous events can't even do that (usually), and the slow-burn of climate change doesn't give itself over well to that sort of incitement. This is why technology is the only key. Instead of asking the social engineering question of "how can we limit energy consumption?" ask the scientific question "how can we produce vast amounts of energy as much, as economically, and as cleanly as modern and future science will allow? Instead of asking how we can use less, he should be asking how we can produce ever more, cleaner energy.”  
Unvarnished optimist: problem is that there are no such technological fixes on the horizon.
43. Many commentators however, do underestimate just how hard it is to change people's attitudes and behaviour, especially when it involves motor vehicles which

are such symbols of affluence and status and which hold out the promise of independence and flexibility.

44. In general, the car is a very attractive mode of transportation. Compared to other travel modes, the car is fast, comfortable, and convenient. Cars provide carrying capacity and privacy. For many people their car is also a status symbol and a way to express themselves. Just watch “Top Gear” on SBS.
45. However, massive car use causes serious problems, and not just in consuming oil. At a global scale, car traffic significantly contributes to global warming (U.S. Department of Energy, 2002). Worldwide the transport sector consumed 28% of the total energy in 2004, resulting in large emissions of greenhouse gases such as CO<sub>2</sub>, methane, and NO<sub>x</sub> (Energy Information Administration, EIA, 2004).
46. Local air pollution is another recognized consequence of increasing car use that results in health problems and odour nuisance (e.g., Whitelegg, Gatrell, & Naumann, 1993).
47. The growth in car use decreases the quality of life in urban areas due to noise, traffic accident risks, and encroachment on land that destroys historical/cultural, aesthetic, and restorative qualities. Moreover, in densely populated areas, the accessibility of various destinations is impaired due to congestion and lack of parking space. For a range of reasons we need to move away from private vehicle use.
48. But, cars confer the illusion of autonomy – songs of the open road; names of vehicles – Pathfinder, Explorer etc – speak of a freedom which is not to be found on many of our highways.
49. Conversely, trains and buses often associated with poverty and exclusion – those who cannot travel by car.

50. Need to present and design bus/train travel as better than private transport: swifter, more relaxing and more reliable. Cheaper. Dedicated bus lanes; more appropriate junctions, especially for long distance travel – not city centres.
51. Also need some form of carbon rationing system – powerful financial incentives (congestion charges; hire cars, car clubs; improved car efficiency).
52. Governments need to insist on higher standards of efficiency in design and operation. Confronted with the twin disasters of climate change and an impending oil peak it is hard to see how anyone could justify the assertion that the need to drive a car which can accelerate from 0 to 100 KPH in 4.5 seconds overrides the Ethiopians need to avoid recurrent famines or the whole world's need to avoid the catastrophe we'll suffer if petroleum peaks before we've made the necessary adjustments.
53. Speed and acceleration of cars is a form of profligacy at which future generations will goggle; manufacturers insist on sustaining performance; fuel efficiency has actually deteriorated in the U.S. (17% worse than the model T Ford). So little attention paid to fuel economy – difficult to find reliable figures (official figures appear to inflate actual performance) Rocky Mountain Institute Hypercar.
54. Commonly cited technological fix is suggestion that we should switch to alternative fuels: biofuels, hydrogen most often mentioned. Problems with biofuels – finite amount of agricultural land and of the water required to irrigate it “When biofuels are widely deployed, they will help precipitate a global humanitarian disaster” – formula doesn't compute.
55. Push people into starvation as price of food rises beyond their means since the market responds to money not need. In a contest between cars and food, the cars will

win. Already happening with move to use grains for feed animals to feed the wealthy; those who buy meat and dairy products have more purchasing power than those who buy only subsistence crops.

56. Currently cheapest is palm oil – not only humanitarian but also environmental disaster (deforestation in Malaysia, Indonesia – loss habitat animals, eviction of human beings); destruction and burning of forests releases carbon; potential carbon saving is tiny.
57. Pursuit of the development of biofuels environmentally very damaging; recent reversals in EU. In March 2007, EU leaders committed to raising the share of biofuels in transport from current levels of around 2% to 10% by 2020, following growing concerns over rising oil prices, energy security and climate change. Jean Ziegler, the UN special rapporteur on the right to food, was correct when he called biofuels a 'crime against humanity'.
58. Drivers are already taking the food from people's mouths to maintain their unsustainable behaviour - witness last year's tortilla riots in Mexico (the corn was used for ethanol rather than tortillas because the people who buy ethanol have much more money than the people for whom tortillas is a staple food).
59. Hydrogen fuel cells: major problems, time and money to overcome; electric cars with swappable batteries – renewable energy (off-peak) source to re-charge.
60. Behaviour change – most of the means of persuading drivers to use other modes of transport are – by comparison to the billions spent on building roads and bridges – simple and cheap. One of the biggest problems, Sloman found is that people don't know about existing services; advertising can help correct people's misconceptions about alternatives: people overestimate the time a journey by public transport would take by 70% and underestimate car journeys by 26% (Lynn Sloman (Car Sick))

61. Local bus and train services can also be greatly improved; In Australia public transport systems have been blighted by lack of investment and lack of imagination – parts of Holland, Germany, Switzerland, Denmark includes several different kinds of transport – taxi buses, using vehicle tracking systems, GPSs and call centres – kind of shared taxi service which you book in advance and which comes to your door, but which picks up other passengers along the way (see US example). There are “bell buses” which run on quiet routes to regular timetable, but only if someone has phoned to request the service; integrated systems – buses meet trains, carry bicycles etc; walking buses- driver and conductor.
62. Can also reduce need to travel for shopping – home deliveries; working from home (isolation – many don’t want to).
63. Car sharing; Liftshare – would be boosted by a carbon rationing system; gluing communities back together.
64. Need govts trying to decide how best to run a public transport system, not how to best accommodate the private car. Means confronting a lobby – can’t underestimate how hard it will be to get people out of their cars.
65. None of these obstacles is technical or economic. They are social and political. Overcoming them only requires sufficient will! But no one has really addressed the problem of how you get governments to act for the longer term – to eschew being NIMTOs – “not in my term of office”.
66. Worth noting that many of the proposals to cut car use have additional benefits of improving air quality, reducing death and disability from road trauma and producing more healthy and connected communities.

67. Reform of transport and energy policy needs leadership and commitment from the national government, especially to inform the debate and conduct the necessary public policy research.
68. Pleased that State Government has made a strong commitment to rail freight and passenger services and has set target to reduce road freight in metropolitan area. Have planned to shift away from car-dominated transport system to one in which public transport and non- motorised transport options are suitable for many trips. The construction of cycleways and the travelsmart household program are both excellent initiatives as is the State Transport Energy Program but more needs to be done.
69. Some of these solutions are likely to place a greater burden on the least well off – when designing such policies need to consider how inevitable cost increases are distributed across different household groups. This is likely to include questions about whether or not such policies are ‘regressive’. If a uniform carbon tax were levied, for example, because the poor spend a higher share of their income on energy (although they actually consume less) than rich households, they would be harder hit (proportional to their income).
70. Recent proposal from U.K. is to design a system of carbon “credit cards” – each resident would be given a card which represented a free annual carbon allowance (based on country level greenhouse gas emissions quotas) Every time a purchase is made for goods such as food, petrol, electricity and air travel, for example, consumers would pay for the goods and also have the carbon associated with the item debited on their card.
71. A carbon exchange could be created, such that someone with a lean carbon budget could sell his or her unused credits to someone with a more carbon rich lifestyle; also lead to purchase of goods and activities with lower carbon footprints. Lower income households would fare better (although some may not) because they have

much lower carbon emissions; credits become income. The richer you are, the harder the scheme would hit you – unless you change your consumption patterns. There has, however, been virtually no research into how people would respond to carbon allowances and that much more of this remains to be done.

72. Similar effects can be achieved with a carbon tax and rebates – low carbon household would benefit most.
  
73. In moving to a world in which the unfettered consumption of oil is not longer possible, policy makers need to consider how they can change values, attitudes and behaviours to minimise the disruption that would otherwise flow. At the same time, they need to ensure that such policies never lose sight of the needs of those on low disposable incomes or with limited access to alternative services. We can no longer afford a psychology of denial, which projects the future as no more than repeated instances of the present; where things might change, but I will not.