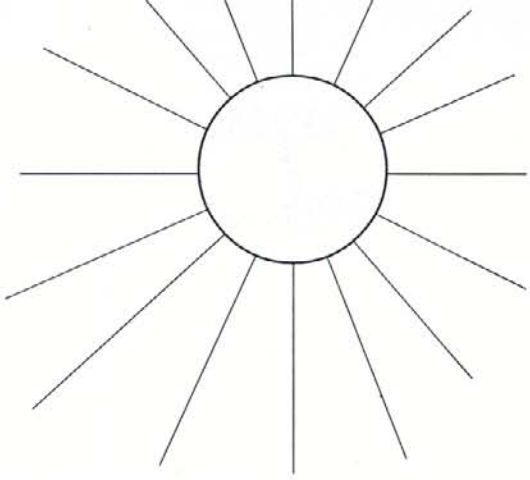
Cycling into the Solar Age

Tackling the problem of oil depletion



by Alan Parker

THE era of cheap oil is almost over. The world's largest oil fields have almost certainly all been discovered (Fleay 1995). Oil is being used up four times faster than it is being discovered and cheap ("conventional") oil is almost exhausted. With most recently-discovered fields far below the oceans, in cyclone areas or subject to arctic winter conditions, future oil will be far costlier.

We know (Graph 1) that the demand for oil will grow exponentially as oil field discoveries slow. We do not know how to cope with mass starvation when there is no more affordable cheap oil for producing and transporting food in the developing world.

We *need* a new Solar Age so that, when cheap oil runs out (between 2005 and 2020), the world's 8 billion population can survive. Internationally we *need* an agreement on oil conservation, like the one we have to stop making ozone-depleting substances. All countries *need* to develop renewable energy resources, new green products and processes (Weizacker and Lovins, 1997).

There is also a need to revive sustainable and (indirectly) solar powered technology like the bicycle. The threefold mechanical advantage of pedalling over walking enables 10 times the area to be accessed by bicycle as on foot. When the solar revolution arrives, it will ride in on a bicycle.

Population growth now drives oil demand

Cheap oil drives the world's transport systems, economic growth, national development, agriculture and food distribution. In the past, the developed nations drove oil demand – over half consumed by a fleet of 650 million road vehicles, including 500 million cars in the OECD.

The world's population of 5.6 billion uses an average 4.2 barrels (6,300 litres) of oil per capita per year. However, the three billion people in the poorer developing countries use only one barrel each while the richest billion people in the OECD countries consume 15 each. Fortunately the population of the car and human population of the OECD is stabilising and oil is being used more efficiently, so OECD demand is not increasing. Future oil demand will be driven by population growth, 95% of it in the developing world – 85 million more people each year and 400 million new middle class consumers by 2010 (Pauli 1997).

Graph 2 shows that demand for oil has levelled off in Europe and North America. In the former USSR, it is expected to increase when economic growth resumes. Most significant is the large increase in demand in Asia and the rest of the world. Graph 3 shows the link between demand for oil, population and economic growth in Asia, which is now the economic growth centre of the world.

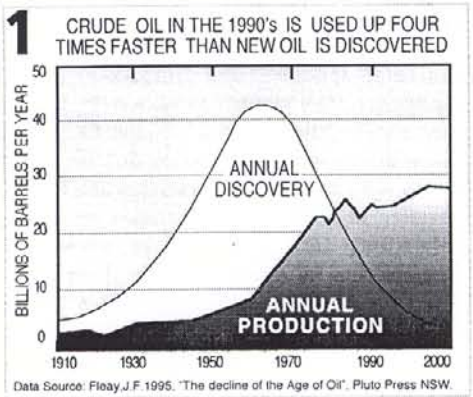
Low oil prices have contributed to rapid Asian economic growth. Most oil from Asia's western perimeter has been used and supplies of coal are starting to run low in some regions, particularly the Indian subcontinent. Past profligate use of fossil fuels by the industrialised world means Asia will face an energy crisis a few years after the 190 power stations under construction in India, China and Indonesia come on line.

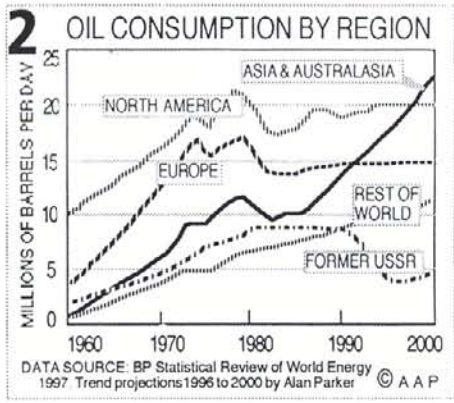
No oil depletion plan

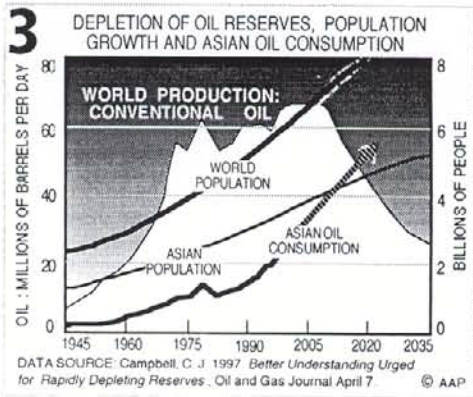
In mainland Asia, Taiwan and Indonesia, most of the fastest growing cities (notable excepting Singapore and Hong Kong) have let their passenger transport systems become more and more car dominated: road based public transport is inefficient and cycling or walking is hazardous and unpleasant. Far too much is spent on imported fuels, far too little on modern mass transit and often nothing at all on bicycle and pedestrian infrastructure. The immediate consequences and the long term hidden public health costs of road accidents and urban air pollution are horrendous.

Despite industrialisation and a rising middle class, around 70% of Asians still live in rural areas or urban slums, relying on oil for lighting, cooking, heating, farming, public transportation and essential services. Like the poor in Africa and Latin America, they need oil the most. Doubling, or in poorer villages quadrupling, current bicycle ownership and improving bicycles, freight tricycles and bicycle/trailer systems available in rural areas would slow petrol consumption and imports while improving the quality of rural life (Parker 1995). This would help stem the flow of rural poor into urban slums. Another billion bicycles, (doubling the world fleet), in the countries with the lowest per capita oil reserves (see chart 4), would make a major contribution to oil conservation.

Oil, crucial to food production, will become even more so when global warming impacts. Climate change is likely to do more damage to cereal production (wheat, maize, soya beans and rice) in the developing world (10%) than in the developed world (5%). Scarcity will increase cereal







prices and deaths from hunger are likely to increase. (Houghton 1994). Lacking resources for costly controls, poorer countries will also bear the brunt of other climate change effects – more extreme floods, droughts, cyclones and rising sea levels.

Western-style motorised mobility is degrading cities in developing Asia, Africa and Latin America. It could also result in a billion starvation victims unless countries free themselves from oil dependence. How many regional wars, civil wars and revolutions it will create is impossible to predict. The cold war's end is the prelude, not to world peace, but to a long period of resource scarcity and environmental degradation (Pauli 1997). There is need for an independent UN expert agency to audit oil reserves. Oil companies exaggerate oil reserves and their estimation methods are often flawed, preventing governments of the developing world knowing exactly when the oil crunch will hit (Campbell 1997).

Oil-dependent industrial economies

Though rapidly depleting its significant remaining reserves Australia shows no real commitment to achieving ecologically sustainable development (ESD). The government has dumped the "greenhouse-friendly" ethanol fuel development program and effectively abolished the Energy Research and Development Corporation. Australian petrol prices are among the lowest in the world, encouraging waste. Chart 6 shows the price of petrol as compared to other liquids in Australian supermarkets.

On current trends, by 2002 half our oil will be imported at a cost upwards of $3.5 billion – a huge blow to balance of payments. A likely response will be to boosting the oil-from-shale industry, reducing imports but doubling greenhouse gas emissions from oil production (Le Cornu 1989).

The government ignores the lead time in implementing the large-scale use of renewables so, when the final crisis comes, renewable fuel sources will be insufficiently developed. This is one reason why Australia will refuse to sign the climate treaty agreement in Japan this year.

Australia should have begun oil conservation and transport demand management years ago – leaving more Bass Strait oil left as a strategic reserve – instead of squandering oil in an orgy of motorised mobility.

Most other OECD governments will be implementing petroleum conservation measures in line with a commitment to reduce greenhouse gas emissions. These are overdue: in 1997 more countries are locked into oil dependence than ever before.

Too-low oil prices have stifled investment in renewable energy and energy efficiency. The Climate Treaty meeting in Japan will commit governments to introduce oil conservation programs. Diagram 5 shows how political factors determine oil prices. There is nothing wrong with politics fixing the price – if it is to conserve the resource. The weakness of the Climate Treaty is that it cannot ensure that the world's poor get their fair share.

Managing the transition to a solar economy

Achieving ESD globally is about bridging the technological and political gap between the age of oil and the solar age. Cheap oil has powered industries which now offer the means to develop the new clean and renewable energy technology that can substitute for oil. However, unless every country treats oil conservation as virtually a national emergency measure, the end of cheap oil will mean misery for at least a billion people. The remaining "good oil" must be used sensibly to make things that are really needed when the world population reaches 8 billion. Amongst the thousands of items on the shopping list for a solar age are the following:

- One trillion solar-electric roof tiles
- 50 billion new energy efficient electric light bulbs
- Five billion bicycles; durable high quality new designs for transport applications
- Three billion "ozone friendly" refrigerator/freezers, mostly solar powered
- Two billion solar flat-plate water heaters with a range of backup systems
- One billion heat pumps, mostly solar powered
- 100 million energy efficient hyper trucks and hyper buses
- 10 million medium and large wind power generators
- Five million small hydro-electric power plants for rural villages and isolated farms
- 100,000 light rail vehicles with regenerative braking systems
- 10,000 wave power units
- 100 computer chip and solar cell manufacturing plants worth over $1 billion each

The potential world market for new green products that use or collect renewable energy is so big it will make today market for white-goods seem very small. The profits are limitless and greenhouse emissions will be hugely reduced.

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