

# Preparing for Peak Oil

Local Authorities and the Energy Crisis



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**Prepared by  
The Oil Depletion Analysis Centre  
and Post Carbon Institute**

## **About The Oil Depletion Analysis Centre**

**[www.odac-info.org](http://www.odac-info.org)**

The Oil Depletion Analysis Centre (ODAC) is an independent, UK-registered educational charity working to raise awareness and promote better understanding of the world's oil depletion problem. The website ([www.odac-info.org](http://www.odac-info.org)) provides a wealth of information and a newsletter giving a weekly roundup and analysis of energy issues.

## **About Post Carbon Institute**

**[www.postcarbon.org](http://www.postcarbon.org)**

Post Carbon Institute ([www.postcarbon.org](http://www.postcarbon.org)) aims to help communities everywhere understand and respond to the challenges of fossil fuel depletion and climate change.

It conducts research and provides resources to help communities make a smooth transition to the post carbon world.

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**William Rees-Mogg** offers a stark and troubling prediction



## Are these the last days of the Oil Age?

The Times, 16 July 2007

**World will  
face oil  
crunch 'in  
five years'**

Financial Times  
10 July 2007

**Oil industry  
'sleepwalking  
into crisis'**

**ENERGY** Former Shell chairman says that diminishing resources could push price of crude to \$150 a barrel

The Independent on Sunday  
16 September 2007

Scientists challenge major review of global reserves and warn that supplies will start to decline in four years' time

**A WORLD  
WITHOUT OIL**

The Independent  
14 June 2007

**Oil futures approach \$140 as  
fears grow of shortages by 2012**

Financial Times  
21 May 2008

**“Shell estimates that after 2015 supplies of easy-to-access oil and gas will no longer keep up with demand.”**

Jeroen van de Veer, CEO of Shell, 22 January 2008

**“Underpinning the long-term price of oil is the fact that the world is consuming over 30 billion barrels a year and replacing only a fraction of this with new discoveries.”**

James W. Buckee, President and CEO of Talisman Energy Inc., 13 March 2007

**“We’re seeing the beginnings of a bidding war for Middle Eastern oil between east and west.”**

Dave O’Reilly, CEO of Chevron, 15 February 2008

**“In the longer run, unless we take serious steps to prepare for the day that we can no longer increase production of conventional oil, we are faced with the possibility of a major economic shock – and the political unrest that would ensue.”**

Dr. James Schlesinger, former US Energy Secretary, 16 November 2005

**“We should not cling to crude down to the last drop – we should leave oil before it leaves us. That means new approaches must be found soon....The really important thing is that even though we are not yet running out of oil, we are running out of time.”**

Fatih Birol, Chief Economist, International Energy Agency, 2 March 2008

**“The easy, cheap oil is over. Peak oil is looming.”**

Shokri Ghanem, head of Libya’s National Oil Corporation, 8 June 2008



## 1. Executive summary

Global oil production will almost certainly ‘peak’ and go into sustained decline within the next few years. In addition to the challenge of climate change, we will soon have to contend with a rapidly growing deficit in fuels for transport. This will cause big spikes in energy prices – including natural gas and electricity – with potentially devastating economic and social impacts. This has severe implications for the provision of services by local government.

This issue is usually described as ‘peak oil’. It is rarely acknowledged by national governments, but is rapidly gaining credibility among local authorities around the world – and on financial markets. Forecasters differ about the exact date of the peak, but there is a growing consensus that it will happen in the next ten years. To many experts the soaring price of crude suggests that we may be at peak oil now.

The purpose of this report is to summarize which local authorities are doing what, and to draw together the most promising policies for tackling peak oil, so that all British local authorities can benefit from best practices being developed both at home and abroad. Almost every area of policy is affected, from transportation to land use planning to social services. The report is especially relevant for councils affected by the planned expansion of Britain’s airports: mass air travel is likely to be an early casualty of peak oil.

The policies suggested to mitigate peak oil are usually complementary to those required to combat global warming, but there are also important distinctions that may affect the decisions made by local authorities. This is particularly true of natural gas, where supply difficulties are also expected soon. Whatever the motivation of a particular council – climate change or peak oil – many of the suggested policies can also reduce expenditure almost immediately simply by saving energy.

A review of peak oil initiatives across the United States, Canada, and Britain suggests local authorities should consider the following actions:

- Conduct a detailed energy audit of all council activities and buildings.
- Develop an emergency energy supply plan.
- Introduce rigorous energy efficiency and conservation programmes.
- Encourage a major shift from private to public transport, cycling and walking.
- Expand existing programmes such as cycle lanes and road pricing.
- Reduce overall transport demand by using planning powers to shape the built environment.
- Promote the use of locally produced, non-fossil transport fuels such as biogas and renewable electricity in both council operations and public transport.
- Launch a major public energy-awareness campaign.
- Find ways to encourage local food production and processing; facilitate reduction of energy used in refrigeration and transportation of food.
- Set up a joint peak oil task force with other councils and partner closely with existing community-led initiatives.
- Coordinate policy on peak oil and climate change.
- Adopt the Oil Depletion Protocol.

*For more details see section 18. Policy summary*

**...global oil production will almost certainly go into sustained decline within the next few years...**

## 2. What is peak oil?

People often ask when the world's oil is going to 'run out', but this is the wrong question. 'Peak oil' refers to the moment at which global oil production will reach its maximum level, and then go into sustained decline. This is expected to happen at the 'midpoint of depletion' – when roughly half the oil that will ever be produced has been consumed, and the other half is still underground. This is a pattern which has already been observed in over sixty of the world's 98 oil producing countries. British oil production peaked in 1999 and daily output has already fallen by well over half.<sup>1</sup> Britain became a net importer of oil in 2006.<sup>2</sup>

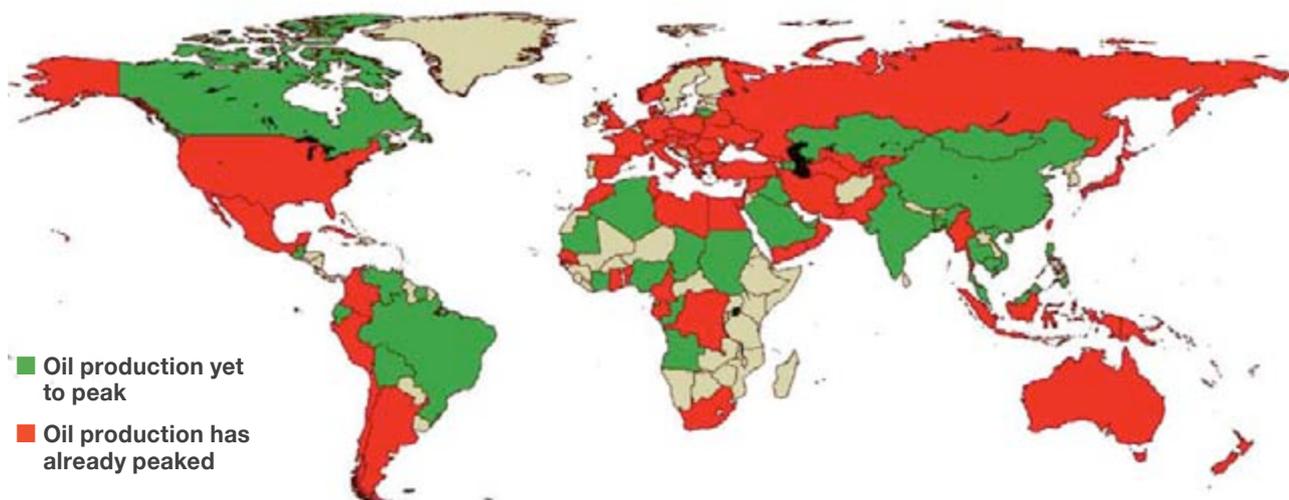


Figure 1. Post peak oil producing countries. Of the world's 98 oil producing countries, production has already peaked in more than 60. Source: [www.lastoilshock.com](http://www.lastoilshock.com). According to analysis by the oil consultancy Energyfiles.com, another 14 countries could peak within the next decade.

**“If by 2015 Iraqi production does not increase exponentially, we have a very big problem, even if Saudi Arabia fulfils its promises...the gap between supply and demand will widen significantly.”**

Fatih Birol, Chief Economist,  
International Energy Agency,  
June 2007

Oil production in a given country tends to go into decline at about the half-way point because of falling pressure in the underground reservoirs, and because oil companies usually discover and exploit the largest oil fields first. Most evidence suggests that this point is now rapidly approaching for the world as a whole. In Figure 2 it is clear that the amount of oil consumed to date is approaching half the total volume of oil discovered so far and likely to be discovered in the future.

Many forecasters expect global oil production to peak between now and 2020, and an increasing number expect peak oil to occur within the next five years. The International Energy Agency has forecast a global oil supply “crunch” from 2012. Some analysts even believe the peak may already have happened, since global oil production has been essentially flat between early 2005 and mid 2008 (figure 3), despite the soaring oil price. The *BP Statistical Energy Review* stated oil production fell by 0.2% in 2007.

A report commissioned by the US Department of Energy entitled *Peaking of World Oil Production: Impacts, Mitigation & Risk Management*<sup>5</sup> makes clear that there is little chance of mitigating the impact of peak oil unless a crash programme is instigated at least a decade before the event. This will require big changes to infrastructure, some of which must be delivered by governments, both national and local.

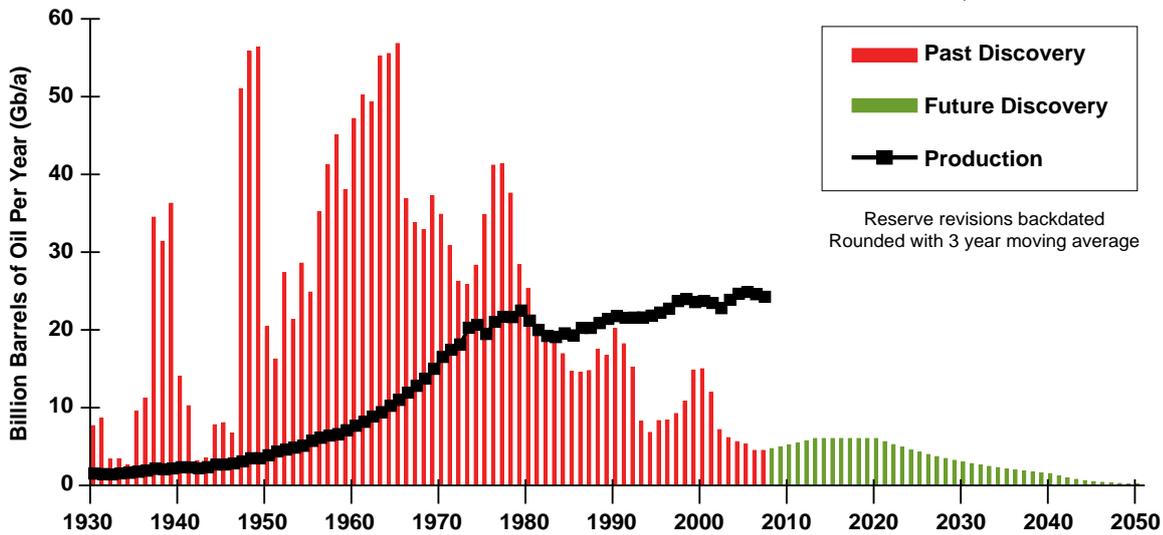


Figure 2: Global discovery and production of 'conventional oil'. Global oil production is thought to be approaching its peak because the amount of oil consumed to date (the area under the 'production' graph line) is almost equal to half the total oil discovered so far and likely to be discovered in future (the red and green bars). Source: Colin Campbell, *Oil Crisis*.<sup>3</sup>

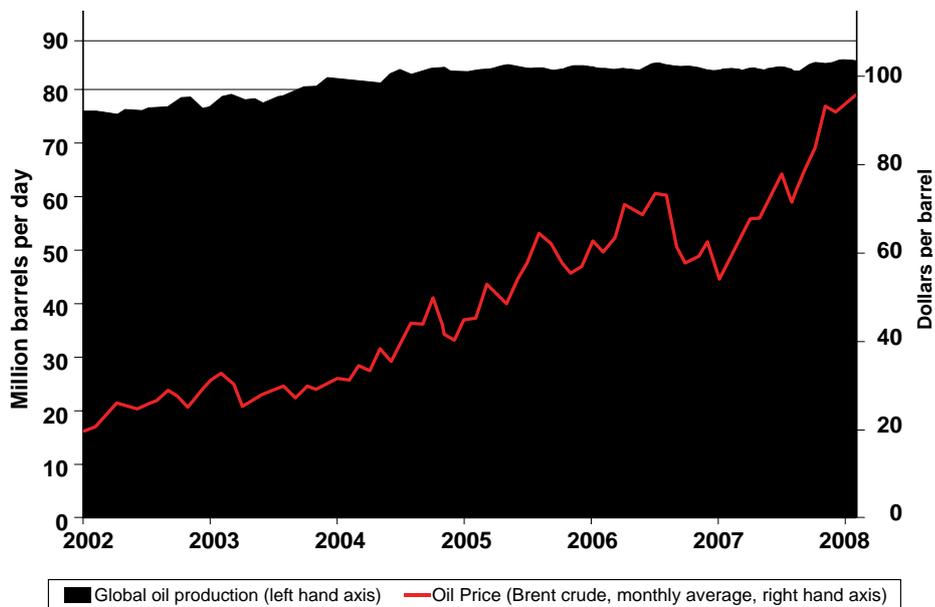


Figure 3. Global production of oil – including biofuels and so-called 'non-conventional' sources – has scarcely risen since early 2005, while the price of oil has soared from \$10 per barrel in 1998 to \$140 per barrel in June 2008. (The oil price in this chart is lower than reported in the media because it is based on a monthly average). Sources: U.S. Energy Information Administration, Argus Media.<sup>4</sup>

Just as the oil and gas industry faces its stiffest test, its ability to combat depletion has been weakened by another problem – a serious shortage of workers. A recent report reveals that in the last twenty years the oil and gas industry has laid off more than 500,000 workers, and that it will take at least ten years to rectify the problem through recruitment and training. The report notes that “the oil and gas industry is confronted with a shortage of brawn and brains so severe that it threatens to stall exploration and production growth around the world...[T]he oil and gas industry has stretched its resource base to breaking point.”

### 3. Natural gas and electricity

Global gas production is unlikely to peak before 2020, but regional shortages could emerge much sooner, and the British gas supply in particular is becoming increasingly vulnerable. Britain used to be entirely self-sufficient in gas, but in 2004 became a permanent net importer<sup>7</sup>, and now has one of the highest rates of gas depletion of any producing country<sup>8</sup>. The government forecasts that the UK will have to import a third of its gas by 2010, and 80-90% by 2020.<sup>9</sup> But it is uncertain whether adequate supplies will be available.

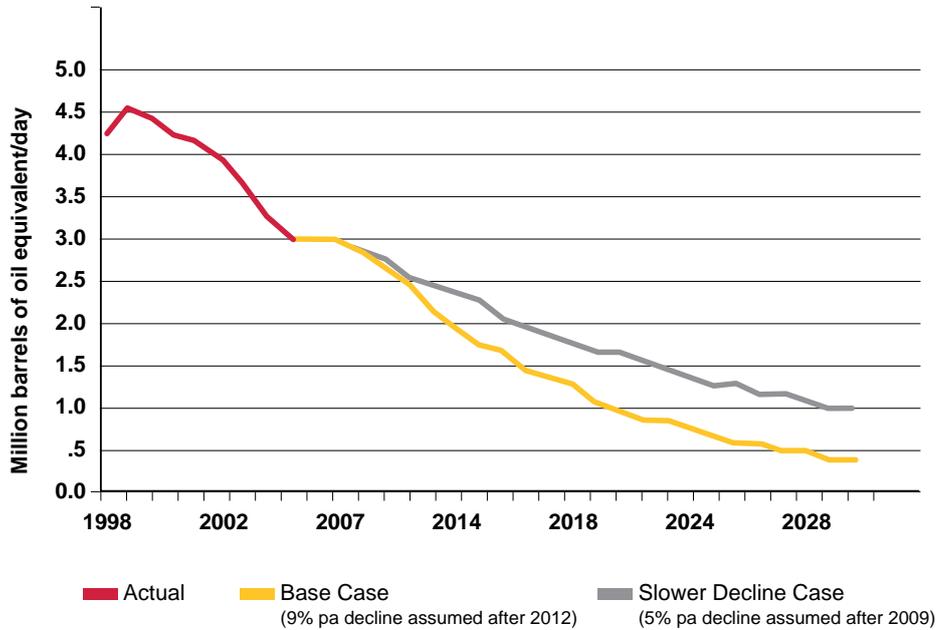


Figure 4. Forecast natural gas production from the British North Sea. Source: Department for Business, Enterprise and Regulatory Reform (BERR), 2007.<sup>10</sup>

**By 2020 Britain will have to import up to 90% of its gas – if supplies are available.**

A fifth of Britain's gas is supplied by pipeline from Norway, which plans to expand its production substantially. But recent remarks by Norwegian executives make clear that Britain – which buys much of its gas on a short term basis – is regarded as a less important customer than European countries which have committed to long term contracts. A senior Norwegian executive recently said 'The UK is a secondary priority. Like it or not, that is a fact.'<sup>11</sup> In other words, in cold conditions, when Britain most needs additional gas, Norway is least likely to be able to supply it.

In any event, because Norway can sell to either Britain or Europe, gas prices in Britain must match those on the continent for us to have any chance of securing supplies, and European gas prices are contractually linked to the price of oil.

Part of the current UK gas supply relies indirectly on gas from Russia, and there are plans to import supplies directly after 2010. But this reliance may be misplaced, since Russia has twice cut off gas supplies to Ukraine in the depths of winter, leading to shortages in Europe. Equally worrying, gas output from the four giant fields that dominate production in Western Siberia – which

in turn supplies a quarter of Europe’s gas – are in long term decline, and Russia has been forced to secure gas from central Asian producers to meet its obligations.<sup>12</sup>

Government projections for the British gas supply rely critically on a massive increase in imports of liquefied natural gas (LNG), delivered by tanker from North Africa and the Middle East (figure 5). However there is currently much more regassification capacity in consuming countries around the world than there is LNG production capacity, and limited supplies naturally flow to where the price is highest. Britain received only one LNG delivery during the winter of 2007-8, despite UK gas prices at near record highs, with tankers heading for the US or Spain instead.<sup>13</sup> LNG supplies are expected to remain ‘tight’ from now on.<sup>14</sup>

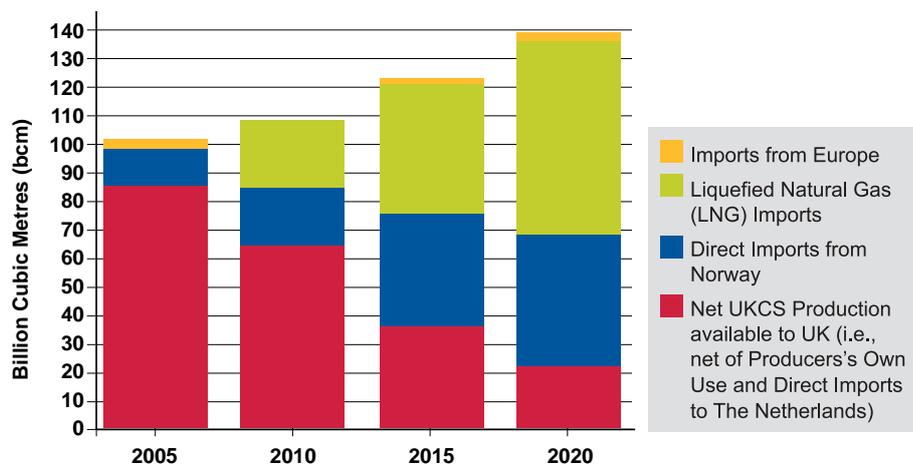


Figure 5. Future British gas supply by region of origin. According to this government forecast, half our gas will soon come from LNG imports. Source: Department for Business, Enterprise and Regulatory Reform (BERR) [2007].<sup>15</sup>

In addition to oil and gas supply issues, 25% of Britain’s electricity generating capacity will be retired by around 2020, as 8GW of coal-fired power stations are closed to comply with the EU Large Combustion Plant Directive passed in 1988, along with 10GW of aging nuclear capacity.<sup>16</sup> Neither the coal nor the nuclear power stations seem likely to be replaced seamlessly, and the default position is to build yet more gas-fired power stations. Gas already provides 40% of our electricity, and any increase would only worsen our vulnerability to interruptions in the gas supply. In this context, some energy experts predict gas shortages will cause power cuts by early in the next decade.<sup>17</sup> Even if power cuts can be avoided, because so much gas is burned in electricity generation the price of power will rise in line with gas and oil (figure 6).

**“Even if gas generating capacity gets built in time...there is a quantifiable risk that this plant may be commissioned just in time for a world gas supply crunch that will leave large parts of the global market physically unsupplied, storage emptied and power plants unable to run.”**

Hugh Sharman, energy consultant, Incoteco

## 4. Economic impacts

When oil production starts to decline, the economic impacts will be dramatic. Economic growth is largely dependent upon a growing oil supply. The International Energy Agency has forecast oil demand to expand at a rate of 1.3% annually over the period 2004-2030<sup>18</sup> But after the peak, many forecasters expect global oil production to fall at 2-4% a year, meaning that the deficit between the oil we want and the oil we get will expand by 3-5% a year. Within 10-15 years of the onset of decline we could have just half the oil supply that projections say is required to sustain economic growth.

This is likely to lead to large spikes in the oil price – along with the price of gas and electricity, which are closely linked on financial markets (figure 6). This in turn could cause deep recessions. The price of oil has already risen twelve-fold in a decade, and analysts Goldman Sachs – the first to forecast \$100 oil – now predict the price could spike to \$150-\$200 per barrel.<sup>19</sup> Other analysts such as CIBC argue that such high prices could persist even in the face of a recession in the West, because of booming consumption of subsidised fuel in the developing world and among oil producers such as OPEC and Russia.<sup>20</sup>

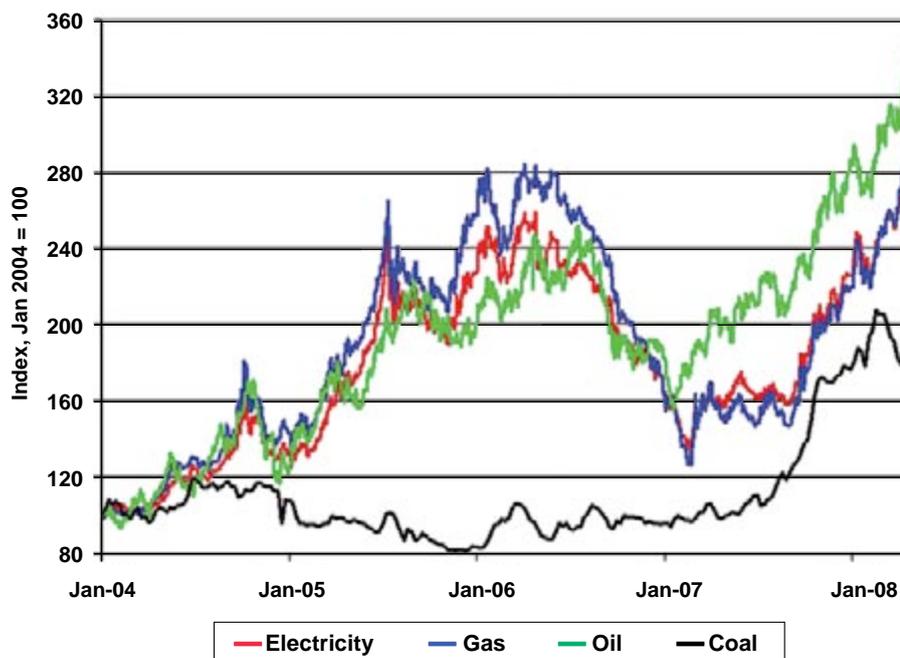


Figure 6. UK gas and electricity prices are closely correlated with the oil price. Source: John Hall Associates.

Just as energy prices have begun to soar, Britain has changed from being a net exporter to a net importer of oil (2006) and gas (2004). As the quantity and price of energy imports balloon, Britain's trade balance will inevitably suffer. That in turn is likely to further weaken the value of the pound and stoke inflation.

Because rising oil prices are both recessionary and inflationary, they pose a major dilemma for monetary policy. Should central banks cut rates to stave off recession, or raise them to prevent runaway inflation? We face the risk that neither threat is defeated and both take hold simultaneously. Even at \$120+ oil these impacts were already being felt. In May 2008 Bank of England governor Mervyn King declared that the 'NICE' (non-inflationary continuous expansion) decade was over.<sup>21</sup> As oil prices continue to rise, there is a real danger of a return to the 'stagflation' of the 1970s, only very much worse.



Interruptions to the fuel supply, such as the 2000 protests, could become more frequent.

After oil production peaks there could also be damaging short term interruptions to the oil supply for unexpected reasons. The petrol protests of 2000 illustrated the extreme vulnerability of the 'just-in-time' economy to such events, when a relatively minor problem caused panic-buying that drained the national fuel supply within days. People couldn't get to work, emergency services were close to collapse, and supermarkets quickly ran out of staple food items such as bread and milk. In a period of growing international shortage such spasms are perhaps increasingly likely. The Grangemouth refinery strike of 2008 served as a timely reminder of the power of such oil 'outages' to threaten the economy.

## 5. Local authority finances

The budgets of British local authorities are already being squeezed by soaring energy costs both directly and indirectly, and this is only likely to continue.

Councils consume millions of litres of petrol and diesel along with large amounts of gas and electricity, and these costs are all being forced up by crude oil. For example, North Yorkshire County Council's direct energy spending rose by almost half between 2003/4 and 2007/8. These costs may still be a relatively small proportion of the total budget (in North Yorkshire's case amounting to less than £1.5m out of a total budget of £875m), but given the constraints on budgets overall, every increase in energy bills will probably force councils to make compensating cost savings elsewhere.

Many councils are also directly exposed to the rising price of asphalt for road maintenance, which is derived from crude oil and has also increased dramatically in price. Authorities that have contracted out to the private sector will also be squeezed, since the price of these contracts is often indexed to the underlying costs of the contractor. In any event, when the contracts are renewed they will reflect higher oil and asphalt prices. There is already a collective deficit of £1 billion on the road maintenance budget, and government has set a target for local authorities to eliminate this by 2010. \$200 oil would make that substantially harder to achieve.



The oil price has driven increases in the cost of asphalt.

Other bought-in services – where contract prices are also frequently linked to underlying costs – are also likely to become more expensive as fuel prices rise, and it is these indirect costs that may have the greatest impact on council budgets. In addition to road maintenance cost inflation is likely to affect contracts covering everything from catering to stationery supplies. It may be particularly significant in the provision of adult care homes, where the frail and elderly need to be kept especially warm.

Local authorities have relatively little control over many of these indirect costs, but fortunately there is much that councils can do to mitigate the impact of peak oil, both on their direct expenditures and on services more generally. This is particularly true in the vital areas of transport and waste (sections 11 to 15 below).

## 6. Airport and major road expansion

Britain's policy of airport and major road expansion is predicated on the assumption that air and road travel will continue to grow over the next thirty years at similar rates to the last thirty years. It has already been pointed out that these policies are inconsistent with climate change imperatives, but with the advent of peak oil, such transport growth is likely to become economically, if not physically, impossible. Investments in expanded airport and road capacity will have been wasted.



By mid-2008, soaring fuel prices had already plunged the global airline industry into crisis. The International Air Transport Association (IATA) warned that even on conservative assumptions about the oil price, the industry's fuel bill would rise by \$40 billion to \$176 billion for the year. This has forced major airlines to shrink their operations by grounding planes and laying off staff, simply in order to survive. However 24 went out of business in the first half of the year, and if the oil price remains above \$135 per barrel, the industry as a whole will lose over \$6 billion in 2008.<sup>22</sup>

Airlines are uniquely exposed to peak oil. While ground transport can in theory be entirely electrified and run on renewable sources of power, aviation depends critically on energy-dense, liquid fuels, and no alternative to jet kerosene made from crude oil is immediately available.<sup>23</sup> In these circumstances, further expansion of airport capacity looks particularly foolhardy.

**Desperate times  
for airlines as oil  
price pushes losses  
towards \$6bn**

*The Guardian*, 3 June 2008

## 7. Peak oil and climate change

Declining oil supplies could at least help with climate change if the right policies are enacted. However, much of the current alternative fuels direction is likely to lead to worsening climate change. The ‘clean’ alternative transport fuels commonly advocated as a response to climate change are likely to prove inadequate, while other replacement fuels which will fill some of the yawning post-peak fuel deficit are likely to worsen global warming

The liquid fuels deficit is unlikely to be filled by biofuels since there is not enough land, at least in populous industrialised countries. A report from the International Energy Agency has shown that to replace 5% of Europe’s diesel and petrol consumption with biofuels would require 20% of its cropland. In other words, if we devoted all our cropland to biofuel production, we would only produce a quarter of the road fuel we currently consume.<sup>24</sup>

Even using the widely touted ‘second generation’ biofuels – those that are claimed not to compete with food production because they use straw or wood as feedstock – there is insufficient land. According to one analysis, replacing current world transport fuel demand with wood-based biofuel would take a land area greater than China.<sup>25</sup>

Neither is hydrogen likely to fill the gap. To be made ‘cleanly’ and in bulk, hydrogen must be produced by electrolysis of water – a process that takes enormous amounts of energy – using non-CO<sub>2</sub>-emitting sources of electricity. A recent book on peak oil concluded that to fuel Britain’s road transport with cleanly produced hydrogen would require 42 Sizewell B nuclear power stations, a solar array covering every inch of Lincolnshire, or a wind farm bigger than the entire northwest region of England.<sup>26</sup>

Synthetic fuels can be made from coal using the ‘Fischer-Tropsch’ process, but these fuels produce twice as much CO<sub>2</sub> as conventional oil on a lifecycle basis (when both production of the fuel and its consumption in a vehicle are included). So in some post-peak scenarios, it could be that we suffer both fuel shortages and rising CO<sub>2</sub> emissions.

It is widely believed that the world has plenty of coal, and that there will be no shortage during our lifetimes. However, some recent analysis<sup>27</sup> suggests that official global reserve numbers may be substantially overstated, and that coal production could peak as early as 2025 – much sooner than most people expect, but far too late to prevent runaway climate change. In theory carbon capture and storage (CCS) could help cut emissions from coal-fired power stations and Fischer-Tropsch coal-to-liquids plants, but the technology is a long way from commercialisation, and will not be introduced without a major increase in the cost of carbon under emissions trading schemes such as the EU ETS.

The alternative energy sources that are both clean and theoretically capable of replacing crude oil – wind, photovoltaic, biogas – are likely to take decades to implement fully.

Along with its potential to worsen the carbon intensity of the transport fuel mix, peak oil is also likely to severely hamper our ability to combat climate change through its impact on the economy.

**Replacing world transport fuel demand with wood-based biofuel would take a land area greater than China.**

**Many of the policies required for peak oil and climate change are complementary – but not all.**

## 8. Security of food supplies

Modern agriculture is utterly dependent on fossil fuels not just to power tractors and combine harvesters, but also for oil-and-gas-based fertilizers and pesticides. Irrigation, transport, and refrigeration also consume large amounts of energy. In the industrialised world it takes ten calories of fossil fuel to produce each calorie of food energy,<sup>28</sup> so the impact of peak oil on agriculture is likely to be profound.

Some writers such as Richard Heinberg<sup>29</sup> argue that the only option is to shift to a system of local, organic food production, whereas others question whether this approach could ever match the yields of energy-intensive farming or feed a soaring global population.



A more immediate problem is the increasing diversion of food crops into biofuels around the world, which is partly responsible for soaring grain prices. The cost of wheat rose by 130% in the year to March 2008, causing a sharp increase in world food prices – including here in Britain.<sup>30</sup> This in turn sparked food riots – sometimes fatal – in Mexico, Haiti, Egypt, and elsewhere, and led major grain producing countries such as Kazakhstan and Indonesia to ban exports.<sup>31</sup> Even more alarmingly, the UN World Food Program has warned that it may be forced to ration food aid to the world's hungry, and World Bank president Robert Zoellick has warned that unless the rich countries provide more funds, “many more people will suffer and starve”.<sup>32</sup>

The dash for biofuels is being driven by hefty subsidies in the US and policy targets in the EU and Britain, and is usually justified as a way of reducing greenhouse gas emissions. However, several studies have shown they are often much more damaging to the climate than crude oil.<sup>33</sup>

In addition to their impact on food supplies and the climate, biofuels are incapable of replacing oil because there simply is not enough land (section 7). Nevertheless when global oil production begins to fall the pressure to produce fuel from crops is only likely to intensify, with potentially catastrophic effects on the food supply.

Britain is currently self-sufficient in wheat, but very little else. However, even Britain's trade surplus in wheat is likely to disappear once a bioethanol refinery currently under construction in Hull comes into operation in 2009.<sup>34</sup>

**In the industrialised world it takes ten calories of fossil fuel to produce each calorie of food energy**

**When global oil production begins to fall the pressure to produce fuel from crops is only likely to intensify**

**Poor go hungry while rich fill their tanks**

*The Guardian*, 11 April 2008

**Rush for biofuels threatens starvation on a global scale**

*The Times*, 7 March 2008

**Death toll rises in Haitian food price protests**

*Reuters*, 7 April 2008

## 9. National governments

### Europe

Most European governments continue to ignore or deny the issue of peak oil – publicly at least. So far only Ireland has developed policies around an explicit recognition of the challenges of oil depletion, while France and Germany have acknowledged peak oil but are doing little in response.

Within Ireland's coalition government, the minority Green Party is driving a combined climate and peak oil strategy. This includes major investments in public transport, along with a sustainable biofuels obligation from 2009. The government is also considering the introduction of a system of energy rationing.

In France, a report from the government body responsible for energy and raw materials, DIREM, concludes that peak oil will arrive between 2013 and 2023. Modelling by Germany's BGR (Federal Institute of Geosciences) suggests a date of 2017. Neither country has yet produced specific policies to tackle peak oil.

Sweden announced in 2005 that it wanted to be independent of oil by 2020.<sup>35</sup> However since the election of a centre-right government in September 2006, that target has been dropped.

The British government has so far made no effort to determine the date of the oil peak, despite being urged to do so as part of the Energy Review.<sup>36</sup> In general, ministers dismiss the idea of peak oil and Gordon Brown has recently claimed that "...the world's oil and gas resources are sufficient to sustain economic growth for the foreseeable future."<sup>37</sup>

However, councillors are entitled to question the reliability of the government's views on this issue, since its oil price forecasts look badly astray. The 'central price assumption' of the Department of Business, Enterprise and Regulatory Reform (BERR) is that oil will cost \$65 per barrel in 2010 and \$70 in 2020 (figure 7), and even BERR's 'high-high' scenario forecasting \$150 in 2014 now looks optimistic. Back in the real world, in mid 2008 crude had already reached \$140, and City analysts Goldman Sachs – the first to predict \$100 oil – now forecast spikes of up to \$200.<sup>38</sup>

In June 2007 British members of parliament set up the All-Party Parliamentary Group on Peak Oil & Gas, to investigate the date of peak oil, and its potential impacts and solutions. The group currently consists of 25 MPs and seven peers, but has no statutory powers.

### United States

Although the federal government itself does not officially recognise peak oil as an imminent threat, the Government Accountability Office (GAO), the investigative arm of the US Congress, produced a report on the issue in early 2007. The GAO report, *CRUDE OIL – Uncertainty about Future Oil Supply Makes It Important to Develop a Strategy for Addressing a Peak and Decline in Oil Production*,<sup>40</sup> warned that peak could occur any time between now and 2040, and that the US government was totally unprepared. The report concludes:

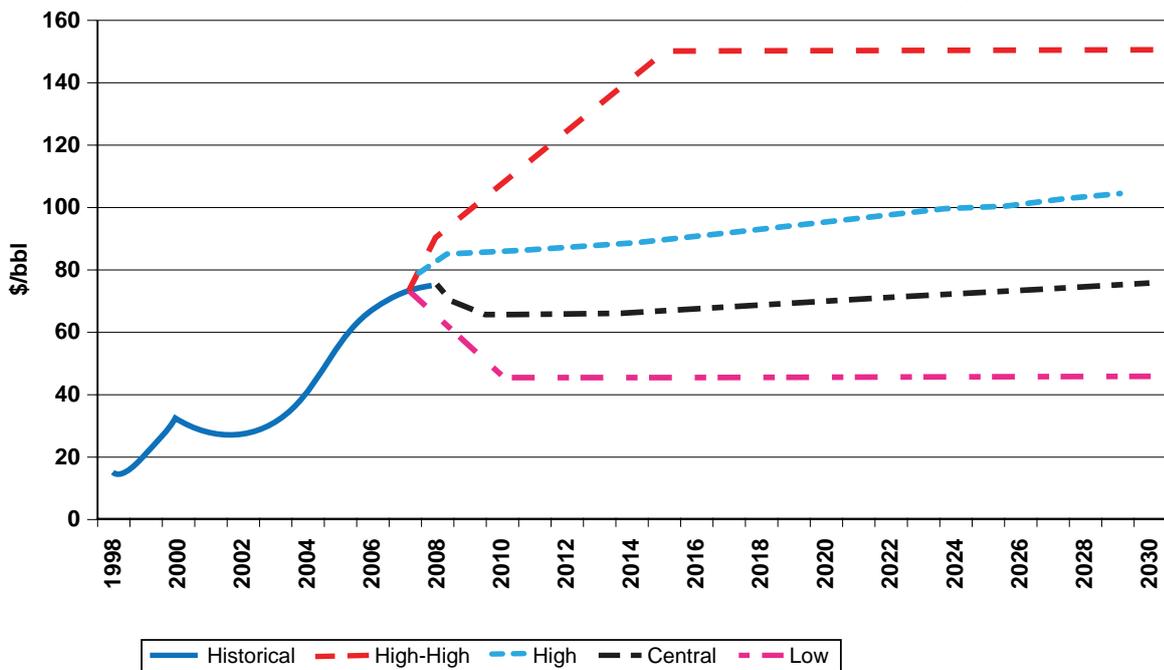


Figure 7. The government’s central oil price forecasts of \$65 per barrel in 2010 and \$70 in 2020 look badly astray. Source: BERR, May 2008.<sup>39</sup>

“The prospect of a peak in oil production presents problems of global proportion whose consequences will depend critically on our preparedness. The consequences would be most dire if a peak occurred soon, without warning, and were followed by a sharp decline in oil production because alternative energy sources, particularly for transportation, are not yet available in large quantities. Such a peak would require sharp reductions in oil consumption, and the competition for increasingly scarce energy would drive up prices, possibly to unprecedented levels, causing severe economic damage.”

### Australia

In Australia, the state government of Queensland is developing an Oil Vulnerability Mitigation Strategy and Action Plan with three broad elements: reducing the consumption of liquid fossil fuels; encouraging the development and use of alternative fuels; and preparing for demographic and regional changes as Queenslanders alter travel, work and living habits in response to rising fuel prices.



## 10. British towns and cities

### Local government, climate change and peak oil

Some of the most forward-thinking British local authorities are now starting to consider the potential impact of peak oil on their services and communities. But policy-making is at an early stage, and nothing like as advanced as for climate change. Most of the necessary policy changes are compatible with those required to combat global warming, but there are also important distinctions that local authorities need to consider. Some of those differences are highlighted by the strategies pursued in Woking and London, two local authorities that are widely seen as beacons of climate change mitigation.

#### Woking

(pop. 90,000)

Woking Borough Council in Surrey has achieved major cuts in the energy consumption and greenhouse gas emissions of its buildings largely by converting to Combined Heat and Power (CHP) – small, local gas-fired power stations, which provide both electricity and heat to buildings nearby.

CHP is highly efficient because it exploits the large amounts of heat that are normally wasted in electricity generation to provide space heating and hot water. Woking says this approach has cut gas consumption by as much as 30%, and emissions by even more – an outstanding achievement.

But although Woking has cut its gas consumption, its *dependency* upon gas is now even higher than before because a far greater proportion of its total energy comes from this single source. Woking is proud that it now generates 82% of its own electricity, and distributes it through a private wire network. This is presented as ‘local’ energy, but 71% of the power is generated by the gas-fired CHP, and government forecasts show that up to 90% of Britain’s gas supply will be imported by 2020.<sup>41</sup> Only 11% of Woking’s power comes from renewables such as solar panels.<sup>42</sup> So Woking has reduced its reliance on the national electricity grid at the expense of extreme vulnerability to any interruption to the gas supply (section 3).

Some NGOs urge local authorities to copy this approach as one of the best ways of fighting climate change.<sup>43</sup> While such a strategy certainly exploits gas more efficiently, it also relies overwhelmingly on the assumption that natural gas will be plentiful and affordable for years to come – an assumption that is probably false.

When gas supplies peak, either regionally or globally, the results for a predominantly CHP-based strategy could be disastrous. A document on Woking’s website claims that when fossil fuels become ‘scarce or non existent’, its CHP could be fuelled by ‘biogas, biomass or even hydrogen’. However, a recent book on peak oil shows that once gas peaks, Britain could not remotely replace its gas consumption with locally grown biomass: even if the whole country were able to cut its gas demand by as much as Woking (30%), using all of Britain’s arable land to grow biomass would replace less than half our much-reduced gas consumption.<sup>44</sup>

## London

(pop. 7,510,000)

Under Ken Livingstone as Mayor, London adopted Woking's CHP strategy in order to meet stiff emissions reduction targets for the capital – a 60% cut by 2025.<sup>45</sup> But this has also increased the city's vulnerability to interruptions in the gas supply, and to a potential European gas supply crunch early in the next decade.<sup>46</sup>

Another plank of London's transport and emissions policy is the introduction of hydrogen-powered buses. Since the hydrogen is derived from natural gas it is similarly vulnerable to gas supply disruptions. Moreover, since the process of extracting and compressing the hydrogen is energy intensive, it would be more energy efficient to fuel buses on natural gas or renewable electricity directly. This might also result in lower greenhouse gas emissions.



One London policy that is entirely appropriate to peak oil is the congestion charge. Such demand management measures will need to be made tougher and more widespread if local authorities are to encourage a shift to more sustainable forms of transport. London's £400m program to build a network of high quality 'bicycle highways' also helps to build resilience to peak oil.



**Councils need to consider not only carbon emissions but also threats to the energy supply.**

## 11. Towards a local authority response to peak oil

While the approach taken in Woking and London has either achieved or promises much in terms of carbon reduction, it also highlights the risks of failing to incorporate peak oil and gas into energy planning. It is important that other local authorities examine these examples carefully and select those parts that make sense both for climate change and peak oil and gas.

In an era of high and volatile energy prices and potentially growing energy shortages, a different approach is needed. Councils need to consider not only carbon emissions but also threats to the energy supply. The most resilient communities will be those that manage progressively to reduce fossil fuel dependency – particularly in transport. Local authorities can help achieve this by:

1. auditing and minimising the transport energy consumed across council services;
2. encouraging a major shift from private to public transport, cycling and walking;
3. promoting the use of locally produced, non-fossil transport fuels such as biogas and renewable electricity in both council operations and public transport; and
4. reducing overall transport demand by using planning powers to shape the built environment.

In this context, councils should aim progressively to reduce fossil energy consumption in absolute terms, while developing sustainable, local energy supplies. This is an ambitious vision, with implications for everything from transport to planning. But in many cases existing policies can be strengthened to increase resilience to peak oil, and in the area of waste policy, what is currently seen as a problem may turn out to be a major opportunity.

## 12. Transport

British local authorities' powers over transport are weaker than they were historically, and weaker than those of their counterparts in Europe. However, they have been somewhat restored by recent legislation, and the 2008 Local Transport Bill will further increase councils' ability to control the provision of bus and tram services, discourage car use, and encourage walking and cycling. These are essential steps to building a transport system that is resilient to peak oil.

### Deterring private car use

Broadly speaking, the introduction of the congestion charge in London has been a great success, reducing traffic by 20%, encouraging greater use of public transport, and generating over £100m per year to reinvest in transport. It has also improved air quality and reduced the number of accidents and injuries. The number of bicycles entering the charging zone has risen by half since the scheme was introduced.<sup>47</sup> The extension of road pricing throughout

British cities, and eventually nation-wide, would provide a powerful means to discourage travel habits that are unlikely to survive peak oil, and encourage those that will.

The referendum defeat of a similar congestion charging proposal in Edinburgh in 2005 suggests there is still considerable public opposition, but this should weaken as awareness of peak oil spreads. Councillors will find it easier to win support for such measures if their communities understand the risks of relying mainly on private transport in the face of peak oil, and the benefits of the investment in public transport that could be financed by road pricing. In this context a combination of local leadership and public awareness campaigns will be vital.



A dozen other authorities are considering congestion charging,<sup>48</sup> but only Manchester and Cambridge have produced definite proposals. The Manchester plan, approved by the government in June 2008, would mean a £2.8 billion package of improvements to the city's tram, bus and rail network. Substantial central government funding is available for such schemes, and the Local Transport Bill means that soon they will no longer require approval from the Secretary of State.

Another useful way of deterring car use and raising funds for public transport is to tax car parking spaces. Nottingham's Workplace Parking Levy proposal was approved in December 2007 with overwhelming (68%) support among residents, and will provide funds to extend the city's tram and bus networks.<sup>49</sup>

Yet another – short term – approach would be to facilitate local car pooling, to raise average occupancy and thus reduce car use and fuel consumption. However, if drivers are to accept money from passengers there may be problems with insurance cover – which local authorities could work with insurance companies to resolve.

**Peak oil implies a major shift from private to public transport, cycling and walking.**

**Walking and cycling have the unique advantage of near-total immunity to peak oil.**

## **Changing the balance**

Congestion charging raises funds that can be invested not only in public transport (see above and below) but also to change the balance of incentives positively towards walking and cycling. Walking and cycling confer not only health and traffic benefits, but also the unique advantage of near-total immunity to peak oil.

Walking can be encouraged by reallocating road space from cars to people, as demonstrated by Birmingham's award-winning city centre pedestrianisation.

Cycling in Britain peaked in the 1930s, and today only 2% of journeys greater than one mile are by bicycle. Cycle use is lower in Britain than in many European countries with similar climates and levels of car ownership, such as Germany and Denmark. There is clearly room for a major increase in pedal-power in British towns and cities.

Cycling has traditionally been strong in the university towns of Cambridge (25% of all trips to work) and Oxford (15% of all peak time trips), but York and Hull have also introduced successful pro-cycling policies. York for instance has installed 140km of cycle routes, 1000 cycle parking spaces in the city centre, secure cycle racks at all its Park & Ride sites and improved road surfacing. Over the past five years the number of people entering the city by bicycle during the morning rush-hour has risen 15%.<sup>50</sup>



Cycling could also be promoted by following the example of some European cities which provide fleets of bicycles for public use, either free or to rent. Such schemes have been successfully introduced in Paris – where cycling rose by almost 50% in five years<sup>51</sup> – as well as in Copenhagen, Lyons, Amsterdam, Vienna, Oslo, Brussels, Stockholm, Helsinki, and Barcelona.

## **Public transport**

Local authorities may have less direct control over public transport than historically, but the 2008 Local Transport Bill will strengthen councils' powers – through Quality Partnership Schemes, Quality Contracts, and the spread of Passenger Transport Authorities. Armed with these enhanced powers, the question now is what kind of public transport should councils strive to develop?



## Trams

Trams are the unsung success story of public transport in recent years. Many British cities already have light rail systems – including London, Manchester, Sheffield, Tyne and Wear, Birmingham and Nottingham – while London and Edinburgh have further projects in progress. Passenger numbers have more than doubled in the last decade.<sup>52</sup>

Trams are popular with travellers because they are quick and reliable, and with planners because they are extremely efficient, both in terms of energy and transport. At five minute frequencies, trams can move as many people as an eight-lane highway<sup>53</sup> and displace large amounts of car traffic.

Trams are also good for peak oil and climate change. Powered by electricity, they are largely insulated from interruptions to the oil supply and will continue to work for as long as the government manages to keep the lights on (section 3). They also have the potential to be completely carbon-neutral if combined with renewable generation.

Trolleybuses are another tried-and-tested technology, used in 340 cities around the world. They offer many of the advantages of trams, but since they need no rails are much cheaper to install. Both trams and trolleybuses are widely used on the continent, meaning that many European cities are already better placed to withstand peak oil than most in Britain.

## Buses

Bus travel in Britain is in long term decline, and in most regions passenger numbers are lower today than in 1985 when the system was deregulated. However, buses will remain the work horse of local public transport, especially in rural areas, and it is therefore vital that councils find ways to reverse the decline, and to build robust networks that will help mitigate the impact of peak oil on their communities.

It is an achievable goal; two cities that have bucked the general decline in bus use are London and Brighton & Hove. In the capital, a major increase in bus funding via Transport for London has led to huge growth in the number of passenger journeys: up from 1.3 billion in 1998/9 to 2 billion in 2006/7. In Brighton, passenger journeys have jumped from 30 million in 2000/1 to well over 36 million in 2005/6, and passenger satisfaction has soared from 56% to 80%. At the same time the number of cars entering the city has fallen by 10%.<sup>54</sup>



The means of achieving these encouraging results are not complicated. In London and Brighton investment has been directed to making buses more frequent, cheaper, cleaner and generally more convenient for passengers. Some of the specific measures include expanding and enforcing bus priority lanes, integrating buses with rail services, improved bus shelters, real-time bus service information and staff training.

Although regions with good public transport will be more resilient to peak oil than those without, they are still vulnerable to the rising price of diesel and potentially worsening fuel shortages. To develop genuine resilience, it is vital that as well as expanding and improving bus networks, councils also find alternatives to diesel. It is here that transport and waste policy could converge to provide an elegant solution.

### 13. Fuelling the future

Local authorities are under intense pressure from the EU Landfill Directive to cut the amount of biodegradable municipal waste that goes to landfill. Councils must cut this waste by 25% from 1990 levels by 2010, 50% by 2013, and 65% by 2020, and failure to meet the targets will incur swingeing penalties.<sup>55</sup> However this may not be a problem but an opportunity.

When wet organic waste decomposes in the right conditions it produces ‘biogas’, partly composed of methane, the main component of natural gas. Biogas can be harvested from landfill or produced using anaerobic digesters to process food scraps, crop waste, animal slurries and sewage. It has the lowest greenhouse gas emissions of any biofuel, and can in fact produce *negative* emissions of as much as minus 200% compared with fossil fuels, since the methane is a powerful greenhouse gas that would otherwise be released to the atmosphere.<sup>56</sup> Anaerobic digesters also produce valuable fertilizer as a by-product. In addition to all of that, biogas is in many ways a good alternative transport fuel – particularly for buses and heavy vehicles - that could provide a measure of resilience against peak oil.

The huge potential of biogas has already been demonstrated in Europe. In the city of Lille in northern France, 120 of the city’s 400 buses run on biogas made from locally sourced food waste, with one new gas-power bus commissioned every week. By 2012 all buses will run on a mix of one-third natural gas, two-thirds biogas.<sup>57</sup> The biogas is produced by an anaerobic digester at the bus terminus, which fuels not only the buses but also the lorries that collect the waste. This means there is a high degree of insulation to short term interruptions in the oil supply. In Switzerland<sup>58</sup> there are 3500 vehicles running on biogas, and there are also major programmes in Sweden<sup>59</sup> and Germany.<sup>60</sup>

**Biogas as a transport fuel helps achieve benefits for climate change, the local environment, health, waste and peak oil resilience in a single policy.**



The city of Lille has 120 biogas buses. Picture appears courtesy of Maxime Lerouge, Lille Métropole Communauté Urbaine.

**Biogas could provide around 16% of Britain's transport fuel demand – three times more than is used in public transport today.**

**Since some waste is inevitable, it should be put to good use.**

Some British local authorities (Norfolk, South Staffordshire) have commissioned anaerobic digesters as part of their waste strategy, but none has yet exploited the full transport potential of biogas – which is considerable. According to a report by Environmental Protection (formerly the National Society for Clean Air), Britain produces some 30 million dry tonnes of food waste and agricultural manure per year, and this could produce over 6 million tonnes of oil equivalent in biomethane. That equates to about 16% of total transport fuel demand, while public transport consumes less than 5%. In other words, Britain could fuel a public transport network three times bigger than today's on food and agricultural waste alone.<sup>61</sup>

There are a number of obstacles to the immediate exploitation of biogas in public transport in Britain, but these are expected to be resolved relatively soon.

For instance, methane as a transport fuel has a massive duty advantage over diesel (10 pence per litre equivalent for gas against 50 pence per litre for diesel in 2008<sup>62</sup>), which makes biogas very competitive, even when the cost of building the digester and additional fuelling infrastructure is taken into account. However, in *public* transport the effect is blunted by Bus Service Operators' Grant (BSOG), under which the government refunds almost all the fuel duty paid by bus operators, so removing any incentive to switch to lower duty fuel.

The government has conducted a consultation on this issue, and plans to reform the BSOG within about two years<sup>63</sup>. The eventual aim is to devolve control over the grant to local authorities, meaning that councils operating Quality Contracts or within Passenger Transport Authorities could insist that transport operators use biomethane as part of their contract.

Another obstacle is the fact that burning biomethane for electricity generation earns Renewable Obligation Certificates, which penalises the use of biogas in transport relative to generation. However, the government is being lobbied to change this, and Cenex, the government-funded Centre of Excellence for Low Carbon and Fuel Cell Technologies, is launching the Biomethane Resource Toolkit, a computer programme to allow local authorities to evaluate the relative value of biomethane projects easily and accurately.<sup>64</sup>

Despite these temporary obstacles local authorities should explore local biogas for their own operational vehicles, since councils pay fuel duty and the BSOG distortion does not apply. It is also becoming much easier to convert fleets because of the availability of 'dual fuel' commercial vehicles such as the Volkswagen Caddy which run on either methane or petrol.



'Dual fuel' commercial vehicles are now available, which can run on both methane and petrol.



Councils should of course seek to minimise waste before exploiting it for energy, but since some waste is unavoidable, it should be put to good use. In an age of soaring oil prices and potentially growing fuel shortages, biomethane should be a useful additional energy source.

Hardstaff is a medium sized logistics company based in Nottingham that is converting most of its 200 lorries to 'dual fuel', and is in the process of replacing 25-30% of its diesel consumption with biogas.<sup>65</sup> The company was partly motivated to change to biogas by the huge reductions in CO<sub>2</sub> – which help customers reach their climate change targets – but also the cost savings associated with using methane as a vehicle fuel. Even though the liquefied biogas is delivered by tanker from a landfill site south of Guildford to the company's refuelling sites in Nottingham, Rochester, Uttoxeter and Burton-on-Trent, the fuel works out approximately 25% cheaper than diesel fuel, and the company expects the investment to pay for itself in two years. The company's Managing Director Trevor Fletcher sums up: "biogas is not only a genuinely renewable alternative to diesel; it's also cleaner, quieter and cheaper. It is an ideal fuel for transport, and using it to generate electricity would be a waste. There are lots of other ways to make clean electricity, but there is nothing to match biogas as a transport fuel."

Any local authority which adopts a similar approach to biogas in public transport and its own operations will have achieved some measure of resilience against peak oil, while simultaneously cutting greenhouse gas emissions and improving local air quality.

**"Biogas is not only a genuinely renewable alternative to diesel, it's also cleaner, quieter and much cheaper."**

Trevor Fletcher, chief executive, Hardstaff Group

## 14. North American towns and cities

In the US and Canada, officials at the local and state/provincial level generally have a greater degree of control over land use, transport and economic activity than their counterparts in Britain. Nevertheless British local officials and planners can learn much from the experiences of those American and Canadian local governments that have already begun responding to peak oil.



MAX (Metropolitan Area Express) serves the Portland, Oregon metropolitan area. Three MAX lines run on 44 miles of track and serve 64 stations.

### Portland, Oregon

(pop. 197,300)

The most advanced US or Canadian city in terms of preparation for peak oil is Portland, Oregon. The Portland City Council established an ad hoc Peak Oil Task Force, which issued its final report, 'Descending the Oil Peak: Navigating the Transition from Oil and Natural Gas', in March 2007.<sup>66</sup> The task force and its various committees met over the course of six months, involving 40 meetings with dozens of policymakers, experts, stakeholders and interested citizens.

The final report includes recommendations to reduce oil use and strengthen the community's ability to respond to social and economic stress. The report, which can be viewed online, is packed with detailed plans to reduce Portland's exposure to peak oil in the areas of transport, infrastructure, town planning, food production and distribution and social cohesion.

The key priorities identified by Portland are:

- Reduce total oil and natural gas consumption by 50 percent over the next 25 years.
- Inform citizens about peak oil and foster community and community-based solutions.
- Engage business, government and community leaders to initiate planning and policy change.

**POST CARBON CITIES**, a program of the Post Carbon Institute, helps local governments understand and respond to the twin challenges of peak oil and climate change through publications, presentations, and consultations. Program Manager Daniel Lerch wrote the first major guidebook for local governments on peak oil, *Post Carbon Cities: Planning for Energy and Climate Uncertainty* (Post Carbon Press, 2007), which is now being used by towns and cities throughout North America as a blueprint for reducing reliance on fossil fuels and preparing for climate change. The programme website [www.postcarboncities.net](http://www.postcarboncities.net) has many resources which will also be helpful to British local government elected officials and staff.

- Support land use patterns that reduce transportation needs, promote walkability and provide easy access to services and transportation options.
- Design infrastructure to promote transportation options and facilitate efficient movement of freight, and prevent infrastructure investments that would not be prudent given fuel shortages and higher prices.
- Encourage energy-efficient and renewable transportation choices.
- Expand energy-efficiency programs and incentives for all new and existing buildings.
- Preserve farmland and expand local food production and processing.
- Identify and promote sustainable business opportunities.
- Redesign the safety net and protect vulnerable and marginalized populations.
- Prepare emergency plans for sudden and severe shortages.

Each of these 11 major recommendations is accompanied by a series of action items detailing how it can be implemented.

So far more than fifteen local governments in the US and Canada have taken some kind of official action in response to peak oil.<sup>67</sup>

### **Burnaby, British Columbia**

(pop. 197,300)

Stuart Ramsey, Transportation Planner for the City of Burnaby, learned about peak oil in 2004 and soon began talking about it with colleagues and elected officials. After a screening of the film “The End of Suburbia”, the Mayor and the Chair of Burnaby’s Transportation Committee asked staff to produce a report on peak oil.

The resulting 17-page document<sup>68</sup> has raised awareness about energy supply issues internally and has been used to provide background on related City Council decisions. It has also helped further discussion of energy issues in the regional government of the Vancouver metropolitan area (the offices of which are located in Burnaby).

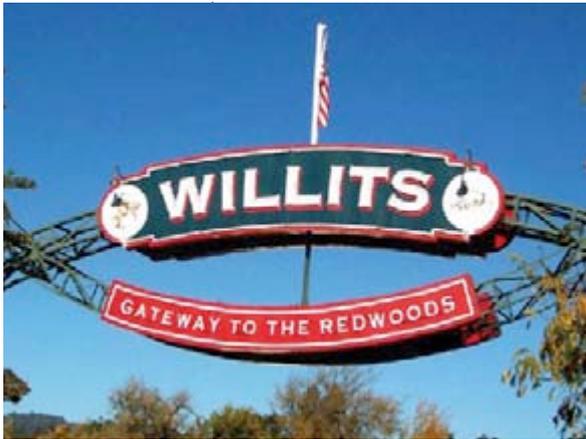
“Since our report, ‘peak oil’ has entered our lexicon and comes up regularly in staff discussions. We also include it in other reports to Council – for example, in favour of cycling infrastructure, or against freeway widening – since the original report provided the background.”

– Stuart Ramsey, Transportation Planner, City of Burnaby, British Columbia

## Willits, California

(pop. 5,100)

Willits initiated some of the first local efforts in the US specifically related to peak oil. The local grassroots group Willits Economic Localization (WELL), a member of the international Relocalization Network,<sup>69</sup> conducted a study of the community's energy consumption in early 2005. Among WELL's conclusions were that cooperative ownership of the electric utility might reduce prices for the community, and that wood had potential as a significant local energy source.



Following publication of the energy study, City Council member Ron Orenstein set up a committee that reviewed all municipal electricity expenses for a year and developed suggestions for powering City facilities with solar power. By late 2006, the City had used this information to acquire grants to install a solar energy system to power the water treatment plant and sell excess electricity back to the electric utility. This initiative alone will eliminate 30% of the City's electricity bill, paying for itself in a matter of years.

Some of the Willits group's initial analyses focused on determining how much community money was leaving the area to pay for energy; for the greater Willits community of 13,000, the figure turned out to be \$30 million, half of which was for transportation fuel. With this data they were able to make a compelling case for efforts to stimulate local businesses and to boost local tax revenues. They also used it to tie their efforts to local issues such as the need for good local jobs.

“As an elected official, I had to be very interested and concerned with the financial aspects of the [solar-powered water treatment] project to make sure that it paid for us to do this. Being environmental and keeping the Earth clean is OK, but it still needs to make financial sense.”

– Ron Orenstein, Council member, City of Willits, California

## **Selected US and Canadian towns and cities responding to peak oil**

### **San Francisco, California**

(pop. 744,500)

First major US city to pass a resolution recognizing the issue of peak oil, April 2006. Established a Peak Oil Preparedness Task Force January 2008.

### **Austin, Texas**

(pop. 690,500)

Passed resolution June 2007 creating an Energy Depletion Risks Task Force to assess the City's exposure to diminishing supplies of oil and natural gas and make recommendations. Task force started work September 2007.

### **Hamilton, Ontario**

(pop. 519,700)

Commissioned report to consider how future energy constraints might affect the city government's long-range planning, energy use and provision of public services.

### **Oakland, California**

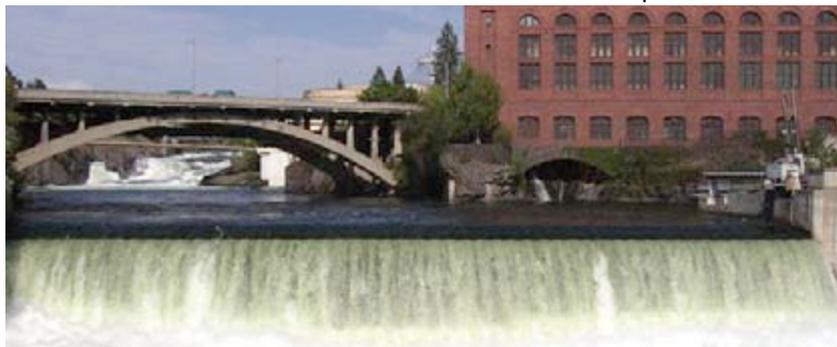
(pop. 397,000)

Passed resolution October 2006 creating a Task Force "to develop an action plan for Oakland to become oil independent by 2020." Task Force presented its final report February 2008.

### **Spokane, Washington**

(pop. 199,400)

The first US city to address climate change and energy uncertainty together, Spokane launched a sustainability strategic planning effort February 2008.



### **Bloomington, Indiana**

(pop. 69,320)

Passed resolution July 2006 acknowledging the challenge of peak oil, supporting adoption of a global depletion protocol, and urging federal and state action on peak oil. City Council created a Peak Oil Task Force December 2007.

### **Westerly, Rhode Island**

(pop. 23,400)

Passed resolution forming a peak oil task force March 2008.

### **Franklin Town, New York**

(pop. 2,500)

Passed resolution December 2005 creating a Citizens' Commission to examine the issues raised by declining energy supplies and rising energy costs. Possibly the first US jurisdiction to address peak oil.

*See a complete and regularly updated list at [www.postcarboncities.net/peakoilresponses](http://www.postcarboncities.net/peakoilresponses).*

## 15. Post Carbon Cities: Five Principles for Local Officials

*(Adapted from **Post Carbon Cities: Planning for Energy and Climate Uncertainty** by D. Lerch, Post Carbon Institute.)*

The following five principles are essential to make a smooth transition to a post fossil fuel world. Local officials should integrate these principles into their short-term and long-range planning:

### 1. Deal with transportation and land use right away.

We've built most of our modern cities and suburbs in such a way that it is nearly impossible to meet even basic needs without using enormous amounts of petroleum-based fuels. Governments of all sizes need to use their land use and transportation planning powers to make walking, bicycling and public transport more convenient and more sensible choices than driving. Until then, most of us will have little choice but to remain dependent on an increasingly scarce, expensive and climate-changing energy source just to get around.

The built-in oil dependency of our cities and suburbs is the biggest obstacle to significantly reducing our energy use. Our dependence will increasingly threaten local economic health as the price of oil rises and becomes more volatile. Those cities and suburbs that have redesigned themselves for the post-fossil fuel world will succeed, while other localities will find it more and more expensive to move people and goods around.

Incorporate peak oil and climate change in your long-range land use and transport planning assumptions now. Don't just tinker with land use regulations and transport funding – take the time and commit the resources to make serious changes:

- **Fundamentally rethink your local land use and transport practices**, from the most mundane regulations to long-range planning processes. Are you encouraging developers to build the best possible buildings and neighbourhoods for a world without cheap oil? Are you discouraging the kinds of developments that will function poorly when petrol is three times as expensive as today?
- **Make land use and transport infrastructure decisions with 100 year timeframes.** What are the energy and mobility assumptions going into your current infrastructure investments? Are you planting the seeds for energy-prudent land use patterns?
- **Organize with neighbouring jurisdictions** to address these challenges at a regional level. Are you coordinating with other cities and suburbs? Are you protecting farmland and industrial areas throughout the region?

### 2. Tackle private energy consumption.

The vast majority of the urban energy footprint comes from private consumption, and a huge part of that comes from heating, cooling, and lighting buildings, and heating water. Reducing government consumption is an important step, but it will do very little to reduce overall community energy vulnerability without similar reductions in the private sector. Local governments do not have direct control over consumer energy use, but they can use their powers to influence the private sector in various ways. Moreover, the personal initiative and leadership of both elected officials and local government staff can carry great influence in the community.

- **Use the tools you already have** to encourage serious energy conservation and efficiency in the private sector. Create strong incentives and support for innovations like zero-energy buildings.<sup>70</sup> Lead by example in your public projects and public-private partnerships.
- **Engage the business community aggressively.** Resource efficiency saves money, and new “green” industrial and business practices are a growing opportunity for economic development. Challenge your local business leaders to reinvent the local economy for the post-carbon world.



### **3. Attack the problems piece-by-piece and from many angles.**

American professors Stephen Pacala and Robert Socolow proposed a multiple-approach strategy for mitigating climate change in 2004,<sup>71</sup> and Canadian architect Bryn Davidson has recently proposed a similar strategy for responding to peak oil. While they differ in their particulars, the authors of both strategies demonstrate that any realistic reduction of carbon emissions or oil consumption requires multiple solutions, because no single solution can alone achieve the vast reductions needed. By combining many solutions, you can reduce your region’s dependence on fossil fuels using existing practices and technologies, to reduce demand and increase supply:

- **Meet your goals with multiple, proven solutions.** Don’t look for a few ‘big fixes’ on energy and greenhouse gases. Instead, pursue many different kinds of solutions at different scales, from promoting individual energy efficiency to rethinking the fundamentals of your regional economy.
- **Enlist the entire community.** Set clear community goals and then spur action from all sides – supply and demand, public and private, household and business – to meet them.

### **4. Plan for fundamental changes...and make fundamental changes happen.**

Peak oil and global warming will fundamentally alter the way our modern globalised world works. Some change in the climate is now inevitable, and a huge amount of change in our energy supply is both inevitable and imminent.

The challenges of energy and climate uncertainty require us to approach how we manage our towns and cities very differently from the way we have in the

past. The current culture of municipal management, planning and development operates on a set of assumptions about energy and climate that must change quickly.

- **Educate and involve your fellow elected officials and staff** about the challenges of energy and climate uncertainty, and the need to change their operating assumptions accordingly. These are the people who will be guiding your community through the coming crises: raise their awareness of the problems and they will be better prepared to come up with the solutions.
- **Educate and involve your stakeholders**, which include business leaders, land developers, planners, architects, landowners, financiers, engineers, community leaders, and citizens. Make sure they understand the seriousness of the challenges at hand, and challenge them to come up with serious solutions.
- **Lead your region's transition** by integrating peak oil and climate change considerations in your own decision-making. See to it that every project you are involved with smoothes the transition and reduces energy and climate vulnerability.

## **5. Build a sense of community.**

The fifth principle is to **build and nurture a greater sense of community in your region**. The towns and cities most likely to weather peak oil well are those with a strong sense of community. Strong relationships tie together individuals, neighbourhoods, places of worship, schools, businesses, and local government. These relationships are the lifeblood of the community – without them, we start to lose civic engagement, community memory, local economic resilience, the willingness to help those not related to us, and many other qualities that make a region work well.

- Allow a mix of uses in both buildings and neighbourhoods;
- protect affordable housing, and allow accessory dwellings ('granny flats');
- develop a community policing program;
- encourage street fairs and farmers markets;
- build public squares to encourage public interaction;
- protect neighbourhood-scale schools, and set up community-school partnership programmes; and
- strengthen neighbourhood and citizen associations.

More than anything else, the resilience that comes from a strong sense of community will help your region meet the challenges of energy and climate uncertainty.

## **16. The Oil Depletion Protocol**

The Oil Depletion Protocol is an **international draft agreement** intended to mitigate peak oil by gradually and collaboratively lowering global oil demand. Local authorities that adopt the Protocol commit to cutting their oil consumption by about 3% each year, or 25% total over ten years. Signing the Protocol signals a council's commitment to reducing the energy vulnerability of its borough, city or county, and provides a series of targets by which to measure progress. It also connects the council to a growing international network of local authorities that have made the same commitment.

Visit [www.oildepletionprotocol.org](http://www.oildepletionprotocol.org) to sign the Protocol.

## 17. Community organizations

British local authorities will increasingly find that communities in their area are already preparing for peak oil through two fast-growing grass roots organizations: the Transition Network<sup>72</sup> and the Relocalization Network.<sup>73</sup>

### Transition Network

The Transition Town movement in Britain started in Totnes, led by Rob Hopkins, a lecturer in permaculture and natural building techniques who developed an “Energy Descent Action Planning” process to help communities prepare for a lean energy future. This includes local food production, local currencies such as the ‘Totnes pound’, and other forms of cooperation. The first transition towns were small towns or rural communities, though it now includes major cities such as Bristol and Nottingham, and the network is growing rapidly. More than 60 Transition communities have already been established, with another 600 in the process of being formed around the world. The movement is avowedly community led, but also keen to involve local councils wherever possible.

*The Transition Handbook: from oil dependency to local resilience* by Rob Hopkins was published in February 2008.

[www.transitiontowns.org](http://www.transitiontowns.org)



### Relocalization Network

The Relocalization Network is a programme of Post Carbon Institute intended to help rebuild communities around the local production of food, goods and energy, and to strengthen regional economies. Set up in 2003, it now includes nearly 200 member groups all over the world that are preparing for an energy constrained future. These groups operate autonomously, while receiving guidance, educational resources, and project and technical support from the Relocalization Network.

[www.relocalize.net](http://www.relocalize.net)

## 18. Policy summary

### 1. Preparing for peak oil

Peak oil means local authorities need to plan for the likelihood of rising oil and energy prices and shrinking fuel supplies. First steps should include:

- **A detailed energy audit of all council activities including transport and buildings.** This will point the way to immediate cost savings, emission reductions and greater energy security, and better prepare the authority for any short term interruptions to energy supplies.
- **An in-depth assessment of the impact of peak oil on the local economy, environment and social services** including food and agriculture, health and medicine, transport, education, waste, water supply, communications, and energy use.
- **The development of an emergency plan** to respond to sudden interruptions in oil supplies and/or sharply rising oil prices, with a particular emphasis on ‘at risk’ communities.
- **Set specific targets for reducing oil and natural gas consumption** in the local government, business and household sectors, by a significant proportion within a defined period.
- Encourage a **major shift from private to public transport, cycling and walking**, through investment in public transport and expansion of existing programmes such as cycle lanes and road pricing.
- **Reduce overall transport demand by using planning powers** to shape the built environment.
- **Shape planning rules to encourage the greatest energy efficiency** in new and existing buildings.
- Promote the use of **locally produced, non-fossil transport fuels** such as biogas and renewable electricity in both council operations and public transport.
- **Prevent infrastructure investments that are not viable in a low energy society.**
- Develop **rigorous energy efficiency and energy conservation programmes** that help businesses and individuals to reduce their oil dependency.
- **Support the growth of businesses** that supply renewable and energy-efficient solutions.
- **Launch a major public energy-awareness campaign** incorporating leaflets, the internet and an expanded network of energy-saving advice centres. The more people understand peak oil, the more likely they are to support or accept demand management measures.
- Find ways to **encourage local food production** and processing; facilitate reduction of energy used in refrigeration and transportation of food.
- **Set up a joint peak oil task force with other councils**, and partner closely with existing community-led initiatives such as the Transition Network and the Relocalization Network.
- Adopt the **Oil Depletion Protocol and Post Carbon Cities’ ‘five principles’.**

## **2. Peak oil and climate change**

Council policies on peak oil and climate change should be closely coordinated and mutually reinforcing. Most policy options will help mitigate both problems, but where priorities conflict, peak oil must be given adequate weight. Councils need to understand and connect these issues in both strategy and internal and external communication, and should propagate this understanding into the wider local, regional and national government strategic framework.

## **3. Education**

Councils need to develop positive ways to educate the public about peak oil, to effect behaviour change and reduce oil dependency throughout business and the community. Local authorities should distribute educational leaflets to households in their area, focussing on positive solutions and the incidental benefits, such as the impact on climate change. The role of institutions and individuals, and the need for immediate action, should all be emphasized.

Where councils already operate a service offering information and advice on climate change and energy saving, its remit should be expanded to include peak oil. If a council does not offer such a service, it should consider setting one up.

Councils also need to conduct an internal education and awareness-raising programme to inform all their councillors, officers and employees on peak oil issues and the available solutions towards reducing oil dependency.

## **4. Expand existing initiatives**

Many initiatives are already underway at the local government level that will help the transition from pre-peak plenty to post-peak scarcity, for example: road pricing, energy efficiency/insulation programs, promotion of renewables, recycling/reuse. These can all be further legitimised as policies that will help mitigate peak oil; if the general public understand peak oil, they are more likely to participate and support local government initiatives in these areas.

## **5. Organization**

Each local authority should consider nominating an officer to develop and coordinate its response to peak oil both internally and in cooperation with other councils. Where possible, councils should set up a task force on peak oil. The council's peak oil task force should partner closely with existing citizen initiatives which are already working on energy planning to foster community-based solutions.

## 19. Conclusion

Global oil production is approaching a peak, followed by a permanent decline. It will radically change the way our societies are run: our transport systems, how we produce food, where we work and live.

There are a great many things that councils must do, and policies that need to be changed, if we are to have any chance of mitigating the economic effects of peak oil. On the plus side, some of these initiatives already exist (recycling, road pricing, etc.) but these efforts need to be significantly expanded, and there remain entire areas of policy that have yet to be addressed.

The continued expansion of road and air infrastructure no longer makes any sense. The current forecasts of a massive increase in air and road travel over the next thirty years are based entirely on historical data, and will soon be rendered meaningless by peak oil. New airport terminals and major road developments run the risk of turning into expensive white elephants. Instead, we must start preparing for a contraction in all travel modes that depend on oil.

Food supplies should be of primary concern. Prices are already soaring globally, partly due to the dash for biofuels. As oil production declines these pressures are only likely to increase, and the dilemmas they pose will only sharpen in the future. In a world of constrained transport, food security will increasingly depend upon local supply. We need to start planning for these changes now.

The most fundamental change needed is in the way people think. Local policy will be fundamental to the transition to a lean-energy future, but councils cannot achieve everything by themselves; the necessary changes will require much greater co-operative spirit within and between communities in future. Hearts and minds are critical; now is the time to change them.



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## Appendix A: Contacts

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## Appendix B: Resources

### Speakers

Please contact ODAC if you would like a presentation on peak oil/gas depletion and related security of supply issues. See contact details in Appendix A.

### Websites

The Oil Depletion Analysis Centre – [www.odac-info.org](http://www.odac-info.org)

Post Carbon Institute – [www.postcarbon.org](http://www.postcarbon.org)

Post Carbon Cities – [www.postcarboncities.net](http://www.postcarboncities.net). Resources for local governments on peak oil and global warming.

Relocalization Network – [www.relocalize.net](http://www.relocalize.net)

Global Public Media – [www.globalpublicmedia.com](http://www.globalpublicmedia.com). Interviews with peak oil experts.

The Oil Depletion Protocol – [www.oildepletionprotocol.org](http://www.oildepletionprotocol.org)

Transition Network – [www.transitiontowns.org](http://www.transitiontowns.org)

Energy Bulletin – [www.energybulletin.net](http://www.energybulletin.net). A clearinghouse for news, research and analysis related to peak oil and its ramifications.

**www.energyfiles.com** – a comprehensive oil and gas production, consumption, and activity forecasting service.

APPGOPO – **www.appgopo.org.uk**. The All Party Parliamentary Group on Peak Oil and Gas.

Powerswitch – **www.powerswitch.org.uk**. Peak oil news and forum.

## **Books**

*Peak Everything* (2007), *The Party's Over* (2 Rev Edition, Nov 2005), *Powerdown* (2004), *The Oil Depletion Protocol* (2006) – Richard Heinberg, published by Clairview.

*The Last Oil Shock: A Survival Guide to the Imminent Extinction of Petroleum Man* (2007) – David Strahan, published by John Murray. Peak oil from a UK perspective.

*Post Carbon Cities: Planning for Energy and Climate Uncertainty* (2007) – Daniel Lerch, published by Post Carbon Press.

*Half Gone* (Rev edition, Jun 2006) – Jeremy Leggett, published by Portobello Books Ltd. Integrates peak oil and climate change.

*Energy Beyond Oil* (2005) – Paul Mobbs, published by Matador.

*The Transition Handbook: from oil dependency to local resilience* (2008) – Rob Hopkins, published by Green Books.

*High Noon for Natural Gas: The New Energy Crisis* (2004) – Julian Darley, published by Chelsea Green Publishing.

## **Presentations**

*Post Carbon Cities: Planning for Energy and Climate Uncertainty* – Daniel Lerch, author of the book of the same title, regularly presents on peak oil and climate change issues to local government officials and staff. His major presentations are available in MS PowerPoint and PDF format on the Post Carbon Cities website: **<http://www.postcarboncities.net/pcc-presentations>**.

*Peak Oil – The Emerging Reality*: Chris Skrebowski, editor of *Petroleum Review* and ODAC Board Trustee, went on a 'peak oil tour' of Australia in August/September 2006. "I aim to show you that: 'peak oil' is real and imminent; that time is short; that adaptation will not be easy."

**[http://www.odac-info.org/sites/odac.postcarbon.org/files/ppt/aust\\_aug2006.ppt](http://www.odac-info.org/sites/odac.postcarbon.org/files/ppt/aust_aug2006.ppt)** (PDF, 1.38 Mb).

*Peaking Of World Oil production, An Overview* – Robert L. Hirsch, lead author of a report on peak oil for the US Department of Energy. October 2006.

**[http://www.pppl.gov/pollimage.cfm?doc\\_ld=44&size\\_code=Doc](http://www.pppl.gov/pollimage.cfm?doc_ld=44&size_code=Doc)** (PDF, 735 Kb).

*Resource Depletion: Modeling and forecasting oil production* – Michael Smith, of Energyfiles. This presentation covers the modelling of oil depletion in general, and Egypt, the UK, and USA specifically, and lists all countries that are past peak. August 2006. “Energy efficiency is not enough as demand grows faster than savings are made. Conservation is a necessity... but it will be painful.” <http://cta.ornl.gov/oilTransitions/Session6/DepletionModellingMichaelSmith.ppt> (PDF, 883 Kb).

*Peak Oil and Transition Towns from Kinsale to Totnes and Beyond?* – Rob Hopkins, of Transition Network. This presentation, for the West Wales Soil Association, covers peak oil, natural gas depletion and solutions. April 2007. <http://transitionculture.org/wp-content/uploads/2007/lampeter-talk-2007-03.ppt> (PDF, 1.94 Mb).

## Videos

**Introduction to Peak Oil video** – Richard Heinberg, author of *Peak Everything*, *The Party's Over*, and *Power Down*, (56 min). <http://tinyurl.com/fxlu5>.

**Peak Moment: Post Carbon Cities** – Peak Moment TV interviews Daniel Lerch, author of *Post Carbon Cities: Planning for Energy and Climate Uncertainty*. (28 min). [http://www.globalpublicmedia.org/people/daniel\\_lerch](http://www.globalpublicmedia.org/people/daniel_lerch).

**Four Corners: Peak Oil** – The Australian Broadcasting Company program ‘Four Corners’ covered peak oil in July 2006. This interactive site includes all six chapters of the series. <http://www.abc.net.au/4corners/content/2006/s1680717.htm>.

**The Portland Peak Oil Task Force** – Two members of the Portland, Oregon peak oil Task Force discuss the history of the Task Force and give useful advice for others wishing to follow suit (28 min): <http://www.youtube.com/watch?v=QNaIzznYj7Y>.

**Peak Oil for Policymakers** – Post Carbon Institute’s Julian Darley and Richard Heinberg present the facts and relevance of peak oil for policymakers at all levels. What is peak oil? What’s the evidence? Why don’t we just drill for more? How does this relate to climate change? And what can policymakers do in the face of these daunting challenges? [http://globalpublicmedia.com/peak\\_oil\\_for\\_policy\\_makers](http://globalpublicmedia.com/peak_oil_for_policy_makers).

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## ***Preparing for Peak Oil* Guidebook**

*Preparing for Peak Oil: Local Authorities and the Energy Crisis* is a guidebook on peak oil for people who work with and for local governments in the UK. It provides a sober look at how this issue is creating new uncertainties and vulnerabilities for cities of all sizes and explains what local decision-makers can do to address these challenges. This book will help local decision-makers as they prepare for the changing energy and climate context of the 21st century.



by **The Oil Depletion Analysis Centre**

[www.odac-info.org](http://www.odac-info.org)

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Recommended price – £3.50