SUMMARY

Oil is “the lifeblood of modern civilisation”. This paper provides an overview of the global oil market. In particular, it examines the outlook for oil supply and demand over the next five years, and the economic consequences.

Low-cost reserves of oil are being rapidly exhausted, forcing oil companies to turn to more expensive sources of oil. This replacement of low-cost sources of oil with higher-costs sources is driving the price of oil higher.

While the world will not run out of oil reserves for decades to come, it cannot indefinitely continue to produce oil at an increasing rate from the remaining reserves. Forecasts indicate that world oil production capacity will not grow or fall in the next five years while demand will continue to rise.

If oil production capacity does not rise as fast as demand, the buffer of spare production capacity disappears. In such a ‘supply crunch’ the price of oil ‘spikes’ to high levels. High oil prices can induce global recessions.

Organisations including the International Energy Agency and the US military have warned that another supply crunch is likely to occur soon after 2012 due to rising demand and insufficient production capacity.

There is a risk that the world economy may be at the start of a cycle of supply crunches leading to price spikes and recessions, followed by recoveries leading to supply crunches.

New Zealand is heavily dependent on oil imports and will remain so for the foreseeable future. While there is potential to substantially increase domestic production, domestic oil production cannot insulate New Zealand from global oil price shocks because New Zealand pays the world price for goods like oil.

Key export-generating industries in the New Zealand economy including tourism and timber, dairy, and meat exports are very vulnerable to oil shocks because of their reliance on affordable international transport.
Introduction

The US Department of Energy (DoE) calls oil “the lifeblood of modern civilisation”.1 Around 86 million barrels (13.7 billion litres) are consumed each day. Oil supplies 37 percent of the world’s energy demand,2 including 40 percent of New Zealand’s energy demand.3 It powers nearly all of the world’s transportation, without which production and trade would grind to a halt. Studies have shown that GDP growth is very strongly related to increased use of oil.4

When the price of oil increases, the cost of nearly all economic activity rises. This often induces recessions. High oil prices have been associated with three major periods of economic recession in the past 40 years, including the lead-up to the recent global economic crisis.5

The world’s oil production capacity may not be sufficient to match growing demand in coming years. The potential for short-falls arises from geological, infrastructure, and political/economic constraints limiting the ability of world oil production capacity to grow while demand continues to rise. If oil supply cannot meet demand a price spike may be triggered, with major detrimental effects on economies, especially those heavily dependent on oil imports like New Zealand.

Oil market basics

Costs of Production by Resource

Not all oil is the same. The source and the quality vary. The graph on the left shows approximate oil reserves divided by type of reserve and production cost.

Estimates of the total amount of oil are hotly debated. The typical estimate is that there were originally between two and three and a half trillion recoverable barrels of conventional oil.6

So far, about 1.3 trillion barrels of oil – mostly the cheapest, most easily accessible, highest quality oil – have been produced, leaving about 1.7 trillion more barrels of conventional oil in the ground. It is estimated that a further six trillion barrels of non-conventional oil could be produced from sources such as tar sands, bitumen, and gas or coal-to-liquids.7

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Not all the oil that is thought to be in the ground has been found. The key measure of discovered oil is "proven reserves" (also called "proved reserves"), which is the amount of oil in a given field that the owner is 90 percent confident is present and can be extracted with existing technology. As of 2009, the official total of proven reserves worldwide, including non-conventional reserves, stood at 1.25 trillion barrels of conventional oil and 150 billion barrels of Canadian oil sands. At the rate of production forecast by the United States Energy Information Agency, proven reserves would be sufficient to meet world demand for another 25-32 years, providing that oil production capacity can continue to expand.

Few big oil reserves have been found in recent decades. Oil companies must drill more wells in increasingly difficult and expensive locations to find the remaining undiscovered reserves. Oil discovered per new well is declining. In 17 years between 1963 and 1980, 15,000 wells found nearly 1.5 trillion barrels of oil. In 22 years between 1980 and 2002, 60,000 more wells found half as much new oil. It now takes approximately 10 wildcat wells on average to discover the same quantity of reserves as a single wildcat well would discover 50 years ago.

The diagram to the left illustrates the world’s oil reserves, along with the average daily additions to and the consumption of those reserves.

On average, discoveries add 30 million barrels per day (mb/d) to proven reserves. Technological improvements, which mean that a higher percentage of the oil in reserves can be extracted than in the past, add another 25 mb/d. Discoveries and technological improvements are not enough to offset the drain on those reserves of 86 mb/d. Net reserves are decreasing by about 30 mb/d, meaning there is enough oil with current reserves, rate of production and rate of discovery to last about 80 years.

OPEC

The Organisation of Petroleum Exporting Countries (OPEC) sets a high base price for oil by keeping some of the cheapest to produce oil off the market. Its twelve members claim 77 percent of proven oil reserves and nearly half the world’s production capacity. Member countries have production quotas that are intended to keep oil at a stable price which maximises their returns without damaging demand.
In theory, OPEC can utilise its spare capacity if demand gets too high, preventing price spikes. However, the true size of OPEC’s spare capacity is doubted by many analysts and the 2004-2008 price spike occurred despite relaxations of OPEC’s quotas.

**Running out of low-cost oil**

The price of a product is determined by the price point where supply equals demand. The price at this point is the cost of producing the most expensive unit produced (plus profit).

While around 35 Mb/d of oil comes from easily accessible onshore reserves with extraction costs of between $15 and $35 US per barrel, the price is set by the need to get the last few million barrels from deep offshore wells at a cost of around $75 a barrel.

Newly discovered oil is rarely cheap to extract and is getting more expensive. It is typically in deep offshore reserves or unconventional deposits. These deposits are more expensive to extract oil from because they require additional inputs and special equipment. Refining oil from tar sands, for example, requires huge amounts of water and land, while deep sea drilling requires rigs worth over half a billion dollars each. Additionally, extracting unconventional oil deposits is often very carbon-intensive, resulting in greater cost as countries introduce carbon-pricing schemes.

By keeping some of the cheapest oil off the market with its quotas, OPEC forces more expensive reserves to be used to meet demand, increasing the price of oil and their profit.

The price of oil will continue to rise as the world is forced to turn to more expensive sources of oil for the marginal supply even if demand remains constant as low-cost reserves are exhausted and more expensive sources replace them.

*Cost driver 1: Exhaustion of low-cost reserves - as inexpensive oil reserves are exhausted, more expensive reserves have to be produced to replace them*

**Production constraints**

There is no immediate danger of the world’s oil being exhausted. The problem is one of cost and of production rate. The production rate of any non-renewable resource, oil included, cannot increase indefinitely until the resource is completely exhausted. Rather, production will increase to a peak, and then begin to decline long before the resource is exhausted.

Geological and infrastructure constraints mean that, as reserves of oil are used up and demand increases, oil production capacity will not be able to continue to expand indefinitely.

**Geological constraints**

An oil deposit consists of drops of oil in porous rock stored at high pressure. When an oil well is drilled into the field the pressure difference forces oil up the well to the surface and the pressure in the reservoir begins to fall.

The oil reservoir is analogous to a shaken bottle of fizzy drink. Punch several holes in the top and the internal pressure will force the contents out at a maximum rate determined by the

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14 When OPEC changed its quota system in the late 1980s, linking members’ production quotas to their reserves, most members suddenly doubled or tripled their official reserves. Despite large annual production, most OPEC members report the same proven reserves each year – see *Statistical Review of World Energy 2010*. BP http://www.bp.com/productlanding.do?categoryId=6929&contentId=7044622 (2010). For examples of oil analysts doubting OPEC reserve figures see Matt Simmons ‘Twilight in the Desert’ (2005) and Nick R. Owen, Oliver R. Interwildi, David A. King ‘The status of conventional world oil reserves—Hype or cause for concern?’. *Energy Policy* 38 (2010) and ‘Key oil figures were distorted by US pressure, says whistleblower’ The Guardian http://www.guardian.co.uk/environment/2009/nov/09/peak-oil-international-energy-agency (2009)

number and size of the holes. But soon the falling internal pressure causes the flow to begin to slow until it eventually stops with much of the contents remaining in the bottle.

Oil companies can restore pressure in oil reservoirs by pumping down other material to replace the oil that is extracted but this is expensive and is only a partial solution.

The bulk of the oil always remains in the ground and the extraction rate tails off at a predictable rate (the ‘depletion rate’) after reaching a high early on in production, as modelled in the graph to the left.

We could think of a region’s or the world’s oil reserves as a warehouse full of fizzy drink bottles of different sizes, pressure, ease of accessibility, and thickness of plastic representing different oil fields. The objective is to get as much fizzy drink coming out of the bottles at once as possible. Extraction logically starts with the biggest and best bottles, punching lots of holes to get the liquid flowing. The flow from the first holes starts to ebb away.

The obvious solution is to punch more holes in more bottles to make up for the slackening pressure coming from each. That means punching more holes in lower quality, less accessible bottles; working flat out just to maintain current production let alone increase it.

Eventually, the number of new holes that need to be punched and the declining quality of the remaining bottles mean it is not possible to make up for the reduced rate at which liquid is coming from the existing holes by making new ones. Total output will begin to drop.

An International Energy Agency (IEA) study of the world’s 800 largest oil fields found that “most of the biggest fields have already peaked and that the rate of decline in oil production is now running at nearly twice the pace as calculated just two years ago”. These oil fields are the big, easy to access bottles in the fizzy drink analogy. New production is not coming online fast enough to replace their decline and keep ahead of demand.

While there is still plenty of oil in the reserves, the difficulty is extracting it at ever-higher rates. To do so requires more wells taking oil from less accessible and lower quality reserves.

Infrastructure constraints

The US military’s Joint Forces Command recently wrote:

“The central problem for the coming decade will not be a lack of petroleum reserves, but rather a shortage of drilling platforms, engineers and refining capacity. Even were a concerted effort begun today to repair that shortage, it would be ten years before production could catch up with expected demand…. A severe energy crunch is inevitable without a massive expansion of production and refining capacity.”

This quote points to the key infrastructure problem constraining the ability for the world’s oil production capacity to grow. New oil rigs, engineers, and refineries are not being added fast enough, constraining the ability to add new oil production capacity for years to come. This is reflected in the fact that the cost per foot of oil well drilled tripled in real terms between 2002 and 2007.

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Security problems plague oil infrastructure in many countries, further raising the cost of production and constraining output. Oil pipelines in Nigeria are subject to frequent attacks by armed groups claiming to represent the dispossessed local population and ordinary people trying to get fuel. Oil installations in the Middle East have been targeted by Islamist groups. Attacks on infrastructure in Iraq since the 2003 invasion has resulted in lower production, which remains below previous levels.\textsuperscript{19}

Nearly 65 percent of the world’s oil production takes place in 30 countries that are not democracies.\textsuperscript{20} These countries tend to be less stable, increasing the chance of disruption to oil infrastructure. The large oil producers nearly all rate very poorly on the Corruption Perceptions Index.\textsuperscript{21} Corruption is an obstacle to oil infrastructure investment in many of these countries.

Natural disasters and accidents also hamper oil infrastructure. For example, hurricanes in the Gulf of Mexico can force oil rigs to close down temporarily. Hurricane Katrina damaged and destroyed billions of dollars worth of oil infrastructure.\textsuperscript{22}

Man-made disasters like the Deepwater Horizon sinking can have similarly large ramifications. Along with the loss of the oil rig and the cost of the emergency response, the disaster resulted in a temporary ban on new deepwater oil drilling in US waters.

All these infrastructure issues lead to greater expense and make adding to production capacity more difficult as oil production becomes increasingly reliant on less favourable reserves.

From 2011, almost no new net capacity will be added and there will be a total net decline of about 0.7 Mb/d in capacity between 2011 and 2015.\textsuperscript{23} This means the maximum amount of oil that can be produced will begin to fall.

This is not due to lack of investment. It is because remaining oil reserves are becoming more difficult and costly to access. The average size of new discoveries is falling meaning more wells are needed to extract the same amount of oil. More footage of oil wells are being drilled than at any time since the early 1980s exploration boom (sparked by the 1970s oil shocks)\textsuperscript{24} and at greater cost but they are failing to find sufficient new oil to replace rapidly depleting production from existing wells and increase total oil production capacity.


\textsuperscript{22} Pipeline Damage Assessment From Hurricanes Katrina and Rita in the Gulf of Mexico, Minerals Management Service http://www.boemre.gov/tarprojects/681/44814183_MMS_Katrina_Rita_PL_Final%20Report%20Rev1.pdf (2007)


\textsuperscript{24} US Energy Information Agency figures http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?s=EERTW0_XWF00_NUS_MF&f=M (2010)
Supply crunch/price spike

The projected track of global oil production capacity over the next few years effectively functions as a ‘cap’ on global oil supply. The other half of the equation is demand. If demand rises to meet the cap on production, a supply crunch ensues.

Growing demand

The recent global recession led to global oil demand falling temporarily but as the world’s economies have returned to growth so has the demand for oil.\textsuperscript{25} The United States Energy Information Agency (EIA) predicts oil demand will rise in 2011 to reach a new high of over 87 Mb/d.\textsuperscript{26} This will be driven by China, India, and the Middle East, whose combined demand grew by an average of four percent a year over the last decade.\textsuperscript{27}

Demand is rising particularly fast, outstripping increases in production, in many oil exporting countries. As a result, former exporters like China, Indonesia, and the United Kingdom are now net importers of oil, and exports from other producer nations are falling. Between 2000 and 2009, Middle East oil production rose by 0.9 mb/d while its oil consumption rose by 2.3 mb/d.\textsuperscript{28}

The supply of oil available to satisfy demand from countries that are dependent on oil imports is being squeezed by domestic demand in oil producing nations. Between 2007 and 2009, oil exports fell 4.8 percent while world consumption fell only 1.8 percent.\textsuperscript{29}

Cost driver 2: Increased demand - necessitating extracting more expensive oil, which raises the point where supply equals demand to a higher price level. Decreasing exports - due to increased demand in oil producing countries.

Decreasing supply buffer

The world’s excess oil production capacity compared to demand is central to determining the price of oil: the smaller the supply buffer, the greater the risk of short-falls. Markets factor in the risk of short-falls through higher prices.

In a ‘supply crunch’, the difference between demand and maximum production capacity disappears (due to rising demand and/or falling production capacity), resulting in sharply escalating prices known as a ‘price spike’.

A range of expert analyses forecast that production capacity will fall or, at best, not grow as fast as demand in coming years. As a result, the supply buffer is diminishing and another supply crunch appears inevitable. The question is when:

- The US Joint Forces Command forecasts that: “by 2012, surplus oil production capacity could entirely disappear, and as early as 2015, the shortfall in output could reach nearly 10mb/d.”\textsuperscript{30}


\textsuperscript{26}International Crude Oil and Liquid Fuels Supply, Consumption, and Inventories, EIA http://www.eia.doe.gov/emeu/steo/pub/cf_tables/steotables.cfm?tableNumber=6 (2010)


\textsuperscript{28}ibid

\textsuperscript{29}ibid

The next oil shock?

2010/04 October 2010

- The UK Industry Task Force on Peak Oil and Energy Security predicts: “as early as 2012/2013 and no later than 2014/2015, oil prices are likely to spike, imperilling economic growth and causing economic dislocation.”

- Lloyds of London says: “an oil crunch is likely in the short to medium term” and “appears likely around 2013.”

- A German military report states: “some probability that peak oil will occur around the year 2010 and that the impact on security is expected to be felt 15 to 30 years later…[there will be] *partial or complete failure of markets… [including] shortages in the supply of vital goods could arise.. A restructuring of oil supplies will not be equally possible in all regions before the onset of peak oil.”

- The IEA writes: “current global trends in energy supply and consumption are patently unsustainable…the era of cheap oil is over.”

The point at which the supply buffer is expected to disappear causing the next supply crunch is linked to economic growth. If the global economy rebounds strongly from the recession, then oil demand will rise to hit maximum production capacity quickly. If the recovery is slower, or there is a double-dip recession, then it will take longer for rising demand to evaporate the supply buffer. Below are three models produced by the McKinsey Global Institute:

Cost driver 3: Reduced supply buffer - when production capacity doesn’t increase as fast as demand, the supply buffer decreases, which increases the risk of temporary or long-term short-falls in supply. Markets factor in the risk of short-fall through higher prices.

Economic implications

Oil is not an ordinary good. Short-falls in supply meeting demand have severe consequences. The United States DoE states:

“A shortfall of oil supplies caused by world conventional oil production peaking will sharply increase oil prices and oil price volatility. As oil peaking is approached, relatively minor events

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33 Military Study Warns of a Potentially Draastic Oil Crisis, Der Spiegel, http://www.spiegel.de/international/germany/0,1518,715138-2,00.html (2010)


will likely have more pronounced impacts on oil prices and futures markets. Oil prices remain a key determinant of global economic performance, and world economic growth over the past 50 years has been negatively impacted in the wake of increased oil prices.\textsuperscript{36}

The smaller the supply buffer the greater the risk that a small shock will cut production, at least temporarily, to the point where demand exceeds supply and oil buyers can't get sufficient product.

A well-functioning market factors in risk: the smaller the supply buffer, the greater the risk of a short-fall, and the higher the price.

Oil demand is relatively inelastic – i.e. consumers cannot quickly find alternatives to oil in sufficient quantities that allow them to carry on as usual if the oil price rises or supply is interrupted. Consumers have little alternative but to keep consuming. This forces consumers to cut down on other expenditure. It is also highly inflationary – consumers pay more not only for oil products but also for products that need oil products for their manufacture and transportation. Falling consumer demand and higher prices may lead to recession.

Between 2004 and 2008 oil prices rose culminating in the 2008 supply crunch, where oil prices rose dramatically to USD$147 a barrel –over twice the previous record of USD$70 a barrel set during the Hurricane Katrina disaster in 2005, itself a 30 percent increase on the previous high of USD$55 a barrel set in late 2004.\textsuperscript{37} The price of oil and the financial crisis hampered economic activity to the point that the world economy entered recession. It was only when the recession caused demand for oil to ease that the supply crunch ended and the price fell.

This may have been the first in a cycle of supply crunches and recessions following the same pattern: as demand rises faster than production capacity, the world’s oil supply buffer is whittled away. The supply crunch raises the price. Once the price reaches a certain level it tips economies into recession. This lowers demand, recreating the supply buffer, and results in a lower price. This enables economies to recover, which increases their oil demand, which decreases the supply buffer, and so on. Once production capacity starts to fall, rising demand will eat up the supply buffer at lower and lower levels.

Rather than a single oil shock as supply fails to meet demand and begins to fall, the DoE predicts an ‘undulating plateau’:

“Once maximum world oil production is reached, that level will be approximately maintained for several years thereafter, creating an undulating plateau. After this plateau period, production will experience a decline.”\textsuperscript{38}

Oil writer David Strahen describes the economic ramifications:

“What will almost certainly follow is a period of extreme oil price volatility, as demand repeatedly hits the ceiling of production capacity, whether that is determined by short-term events above ground or the fundamental geology. This is likely to set off recurrent economic slow-downs or recessions, which in turn could have the effect of smearing out what would otherwise be a relatively sharp oil production peak into a more extended corrugated plateau... Paradoxically, the very worst short-term outcome might be not a sudden shock, but a milder recession. If this were to create some spare oil production capacity by depressing demand, the economists would claim it was all back to normal.”\textsuperscript{39}

The DoE warns: “The problems associated with world oil production peaking will not be temporary.”\textsuperscript{40}

\textsuperscript{39} David Strahan ‘The Last Oil Shock’ (2008)
\textsuperscript{40} Peaking of World Oil Production, DoE http://www.netl.doe.gov/publications/others/pdf/oil_peaking_netl.pdf (2005)
To put it another way, because oil is central to the global economy, the world’s maximum capacity to supply oil acts as a cap on world economic output, one that the global economy may hit repeatedly in coming years.

The problem can be self-compounding due to oil infrastructure investment being cancelled because of recession and lower oil prices. Early in 2009, Cambridge Energy Research Associates reported that investment in oil infrastructure sufficient to produce 7.6 Mb/d was at risk of being cancelled due to the reduction in oil prices associated with the global recession.41

Added to this is an underlying increase in the oil price due to the exhaustion of cheap oil reserves and their replacement with more expensive sources.

Rather than a single sharp period of economic decline following the point where oil production starts to fall, what analysts are calling a ‘corrugated plateau’ or ‘undulating plateau’ could take place: a cycle of successive periods of growth, supply crunch/price spikes, recessions, and recovery leading to the next supply crunch, all underlain by a rising cost base driven by the exhaustion of cheap reserves.42

New Zealand’s oil potential and domestic implications of oil shocks

New Zealand’s annual oil production in 2008 and 2009 was 55,000 barrels per day.43 Consumption was 148,000 barrels per day.44 Proven reserves total 189 million barrels.45

There are thought to be potentially large, unfound oil reserves. A 2009 study by the Institute of Geological and Nuclear Sciences estimates that there is a 90 percent chance that reserves totalling 1.9 billion barrels of oil remain in New Zealand and a 50 percent chance there are 6.5 billion barrels.46 Most of these estimated undiscovered reserves are in difficult to access deposits under deep water in the Great South Basin and the Deepwater Taranaki basin.

New Zealand’s geographical position is a serious challenge to increasing oil production. A report by Lincoln University’s Centre for Land, Environment and People (LEaP) states:

“New Zealand’s isolation from the rest of the world acts as a major constraint in the attraction of international explorers. Exploration and mining companies operating in New Zealand have to bear the cost of getting equipment to and from New Zealand as well as shipping crude oil to international refineries.”47

In addition to petroleum oil reserves, New Zealand has a vast resource of lignite coal, which can be converted into petroleum products. Solid Energy and several other companies are proposing lignite to liquids plants or underground coal gasification projects to create oil products.48 However, the IEA estimates lignite to liquids production costs are US$60-$110 per barrel,49 so high oil prices are needed to make lignite to liquids viable.

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47 Impacts of Oil Prices on New Zealand Tourism, LEaP http://hdl.handle.net/10182/1379 (2009)
If New Zealand can increase its oil production, it could be a major economic boon in the long-run. The Ministry of Economic Development projects oil exports to reach $30 billion per annum by 2025.  

However, becoming self-sufficient would require a massive increase in New Zealand’s oil production and refining capacity, and, as with any region, New Zealand would not be able to sustain high production rates as reserves were depleted.

No large-scale coal to liquids projects or commercial production wells of, as yet undiscovered, conventional oil reserves are planned to come online within the next five years.

In the medium term, New Zealand will remain heavily dependent on imported oil. Domestic production at any level cannot insulate New Zealand from global short-falls or price rises. New Zealand pays the world price for oil, whether that oil is produced domestically or not because oil producers will not sell their product in New Zealand if they can get a higher price overseas.

New Zealand would be affected by oil supply crunches both directly and indirectly via the effect on trading partners.

Direct effects include higher transport costs and an increased balance of payments deficit due to the increased cost of importing oil. Transport costs constitute a significant expense for exporters, especially exporters of bulk goods like timber, meat, and dairy.

Indirect effects would be felt through lower consumer demand in the markets for New Zealand’s export goods, leading to lower prices.

The LEaP report cited above details the economic consequences of oil shocks on the $9 billion a year international tourism industry, which it states is “highly dependent on affordable oil”:

- Tourism Businesses: face an increase in their operating costs due to higher oil prices and reduced demand in response to oil shocks and price increases.
- Destinations and communities: face reduced visitation resulting in compromised regional development.
- Tourists: reduced experience due to higher proportion of holiday budget being spent on transportation.
- Government: reduced income from tourism as a result of reduced arrivals and reduced expenditure by tourists.  

As a country that is reliant on oil imports and heavily dependent on cheap oil for its major sources of income, New Zealand is highly exposed to oil shocks. Domestic oil production is insufficient to meet New Zealand’s oil needs. Equally, increasing domestic oil production would not protect New Zealand from either the direct or indirect effects of price spikes caused by global supply crunches.

**Conclusion**

The global economy is heavily dependent on affordable oil.

It may seem counter-intuitive that, when oil reserves and production capacity are higher than ever, the future of the oil market appears bleak. The problem is that production capacity is not expected to keep up with demand. That fact leads to severe economic consequences.

To replace the declining production from existing oil wells and increase production, oil companies are forced to extract oil in more difficult and expensive conditions (deep-water, oil sands, lignite to liquids) from smaller, less favourable reserves. The marginal (price-setting) barrel of oil costs around US$75-$85 a barrel to produce. This will continue to rise with higher demand and exhaustion of reserves.

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50 Our future as oil sheikhs of Pacific, New Zealand Herald

51 Impacts of Oil Prices on New Zealand Tourism, LEaP http://hdl.handle.net/10182/1379 (2009)
Although there remain large reserves of oil which can be extracted, the world’s daily capacity to extract oil cannot keep increasing indefinitely. A point will be reached where it is not economically and physically feasible to replace the declining production from existing wells and add new production fast enough for total production capacity to increase. Projections from the IEA and other groups have this occurring, at least temporarily, as soon as 2012.

The difference between the global capacity to produce oil and global demand is the supply buffer. When the supply buffer is large, oil prices will be low. When the supply buffer shrinks - due to demand rising faster than production capacity or production capacity falling - prices will rise as markets add in the risk that supply will not be available to meet demand at any given point in time.

When a supply crunch forces oil prices beyond a certain point, the cost of oil forces consumers and businesses to cut other spending, inducing a recession. The recession destroys demand for oil, allowing prices to drop. Major international organisations are warning of another supply crunch as soon as 2012.

The world may be entering an era defined by relatively short periods of economic growth terminating in oil price spikes and recession.

New Zealand is not immune to the consequences of this situation. In fact, its dependency on bulk exports and tourism makes New Zealand very vulnerable to oil shocks.

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