The Peak

A presentation by Frank Davis

&

Powerswitch.org

"Oil Supply, at current rates of production, will last for another 40 years..."

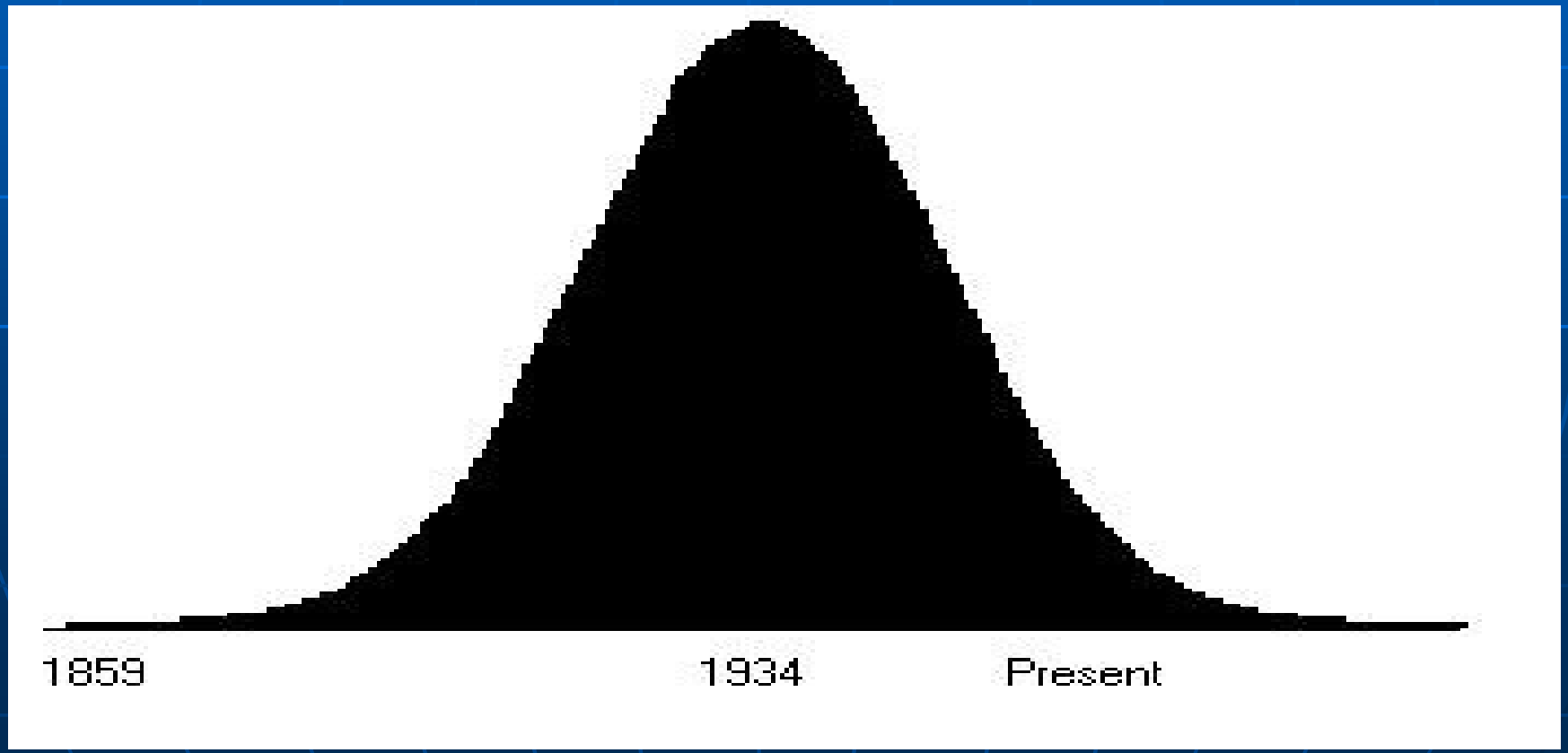
Lord Browne of Madingley
Group Chief Executive - BP

In a nutshell…

1. Finding less and less oil each year is a problem because it is so useful.
2. Every single item you use in any one day uses oil or used it during production/distribution.
3. We use globally about 31 billion barrels per year - in 2005 we found 5 billion.
4. The last year that we found more oil than we used was 1981.
5. 33 of the world's top 45 oil exporting countries produce less oil year on year.
6. At the moment oil supply satisfies demand.
7. This will not be true in the near future.
8. If demand exceeds supply – prices rise.
9. When this happens every sector of the economy will suffer.
10. We can choose to use less energy or try to find a replacement – nothing else

American Discovery

Oil Discovery was found to follow a bell shaped curve.

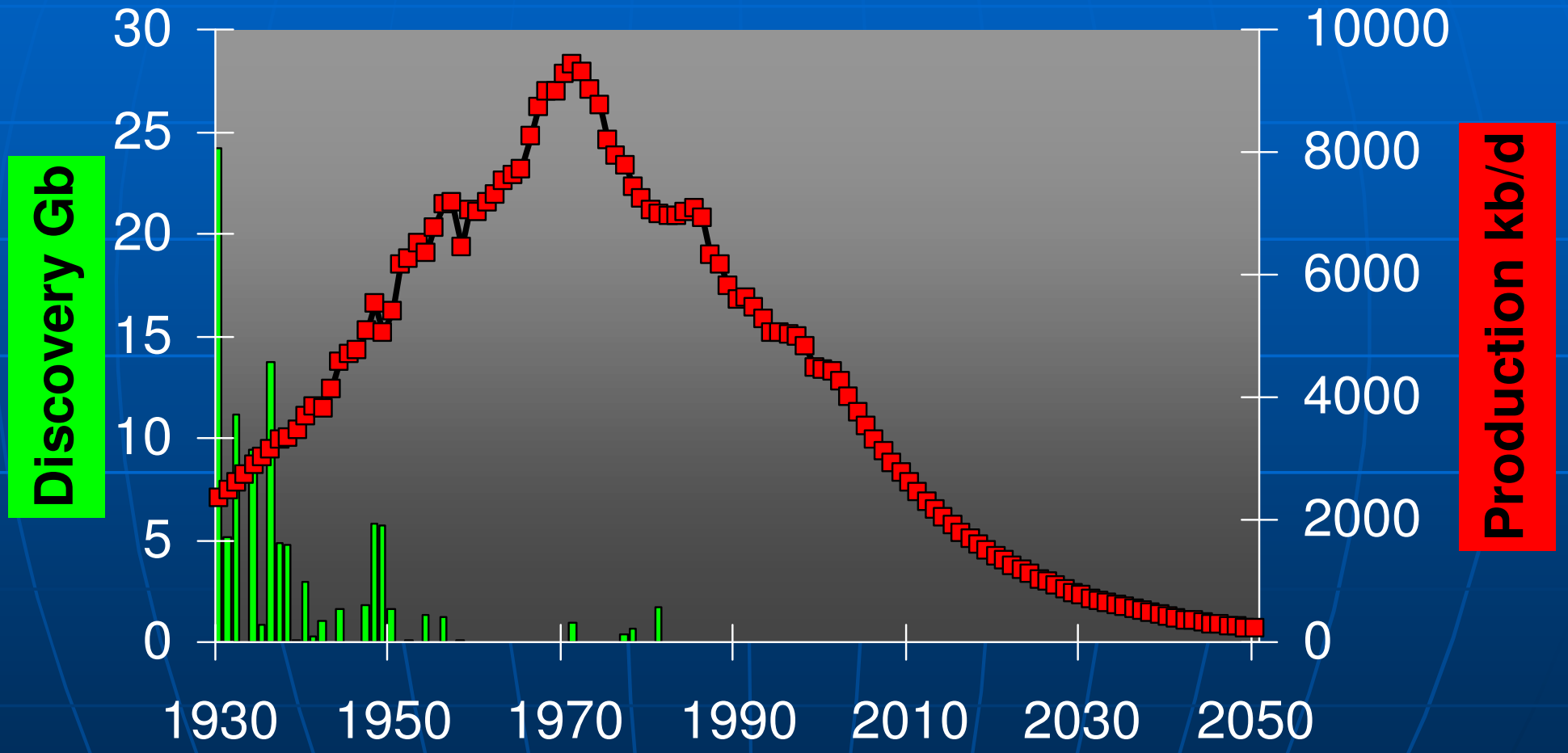


Production Peak

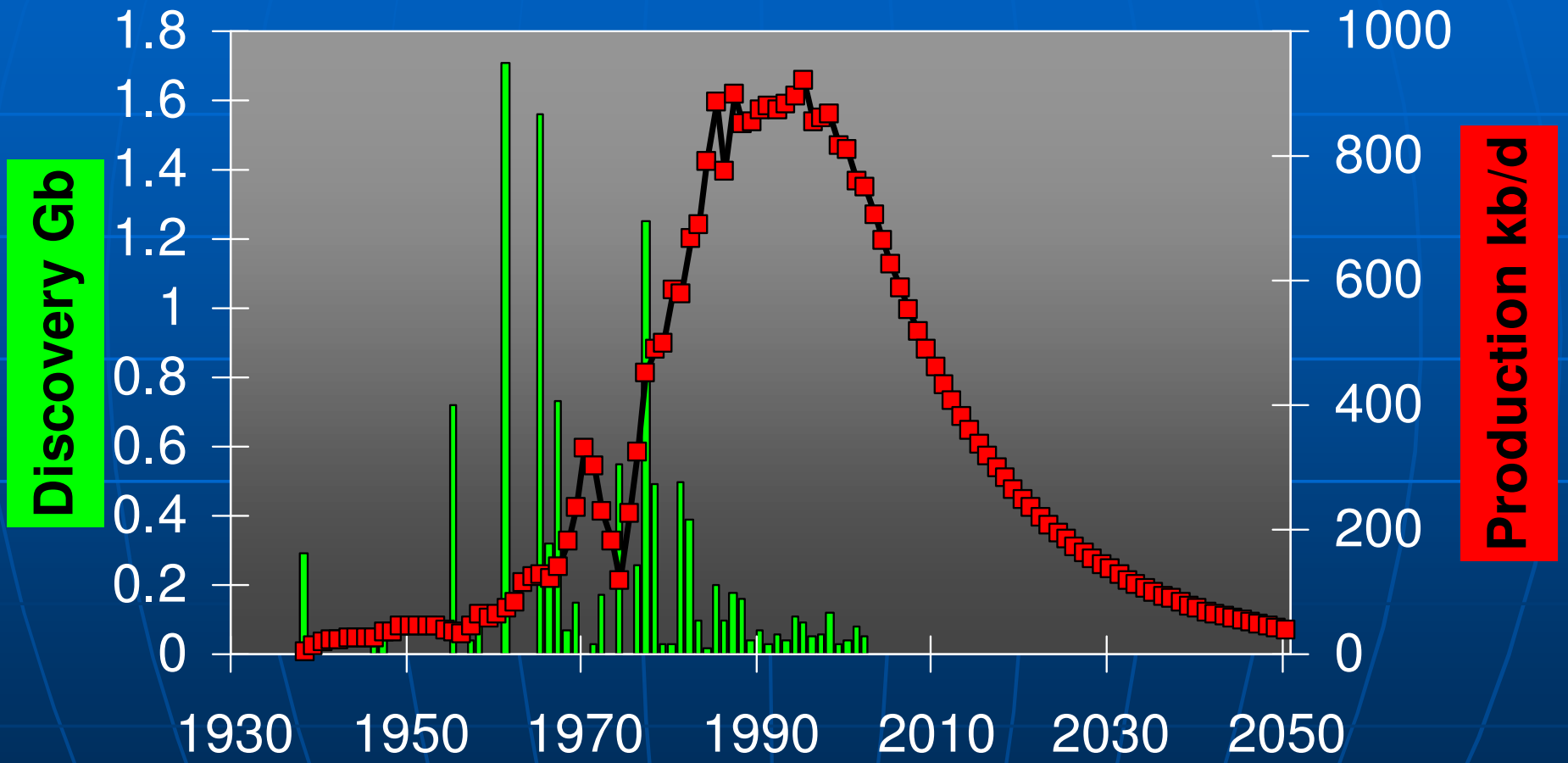
- M. King Hubbert in 1956 predicted a production peak in USA in 1971.
- The two peaks would be separated due to timescales needed to bring new discoveries on-line.

In fact the American production peak occurred in 1970…

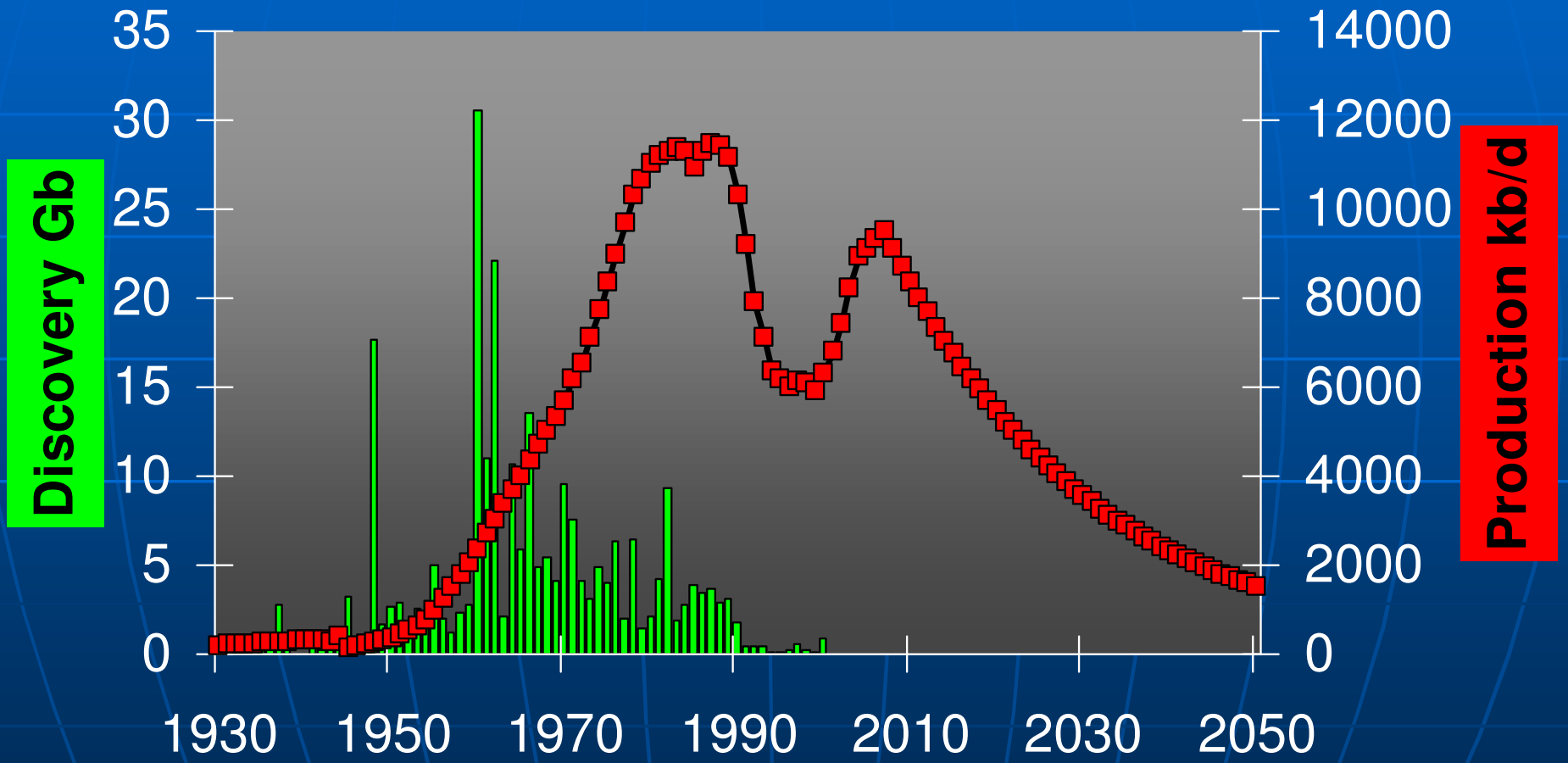
Production Peak – American Lower 48 (40 years)



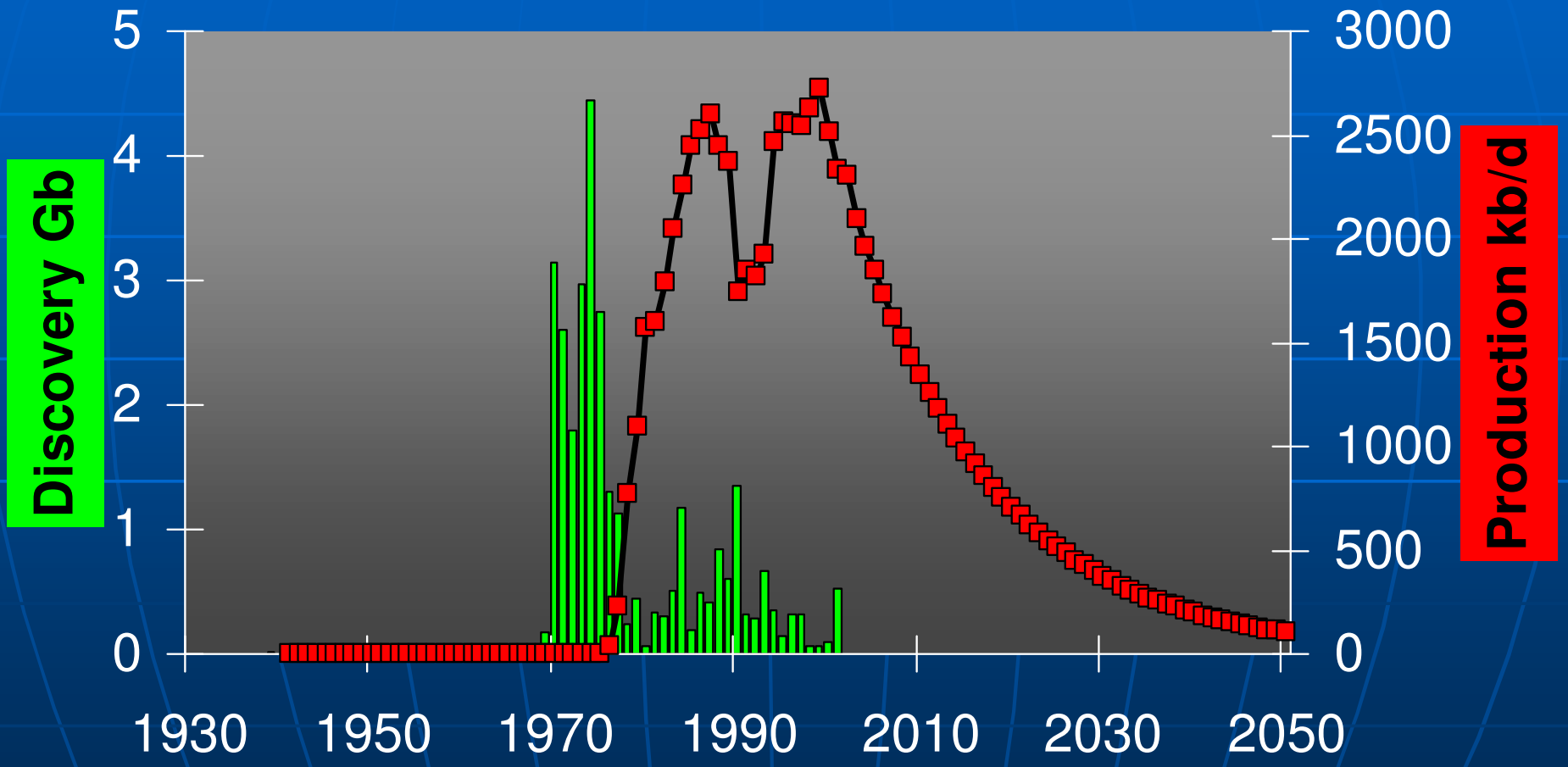
Production Peak – Egypt (30 years)



Production Peak – Russia (27 Years)

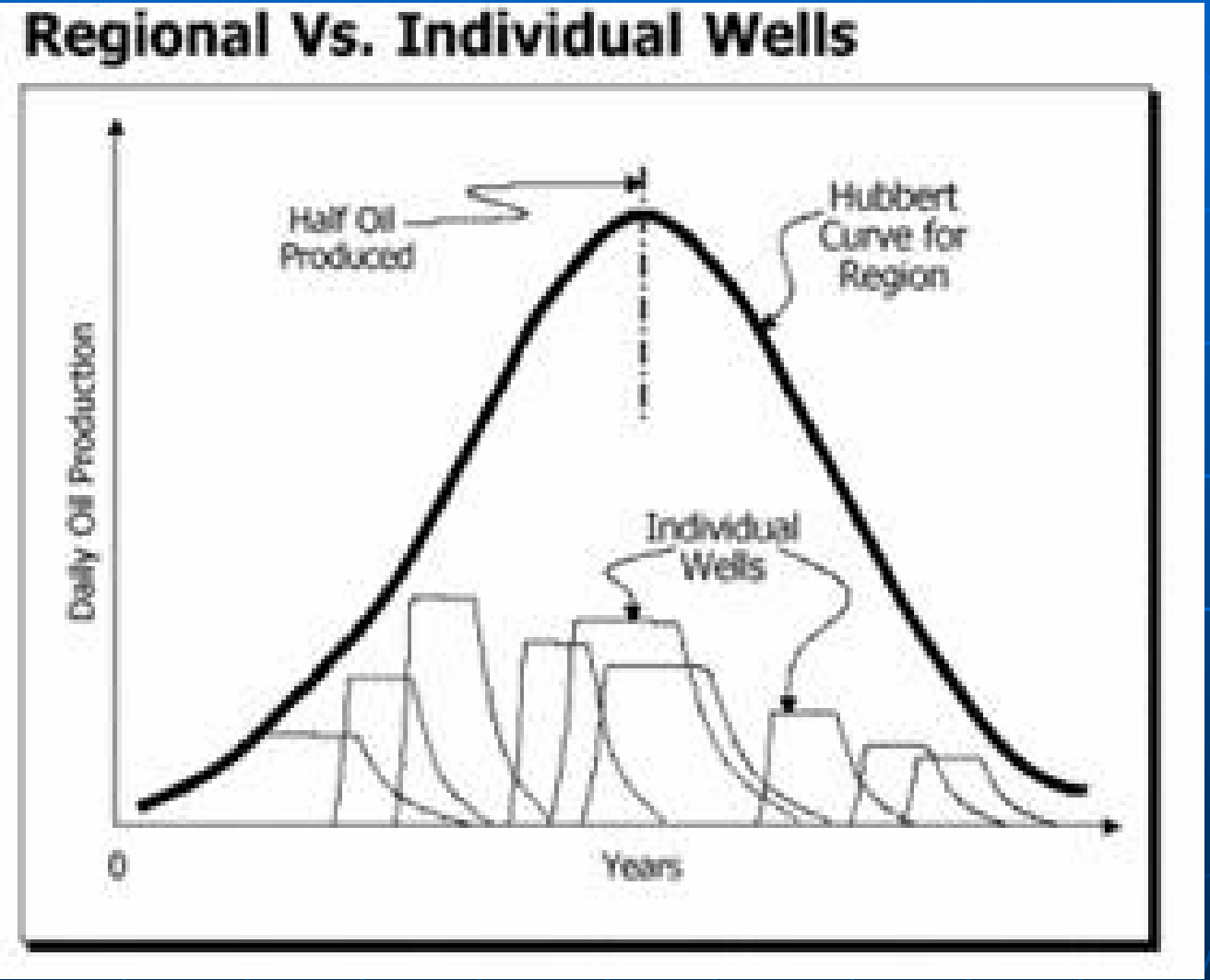


Production Peak – UK (25 Years)



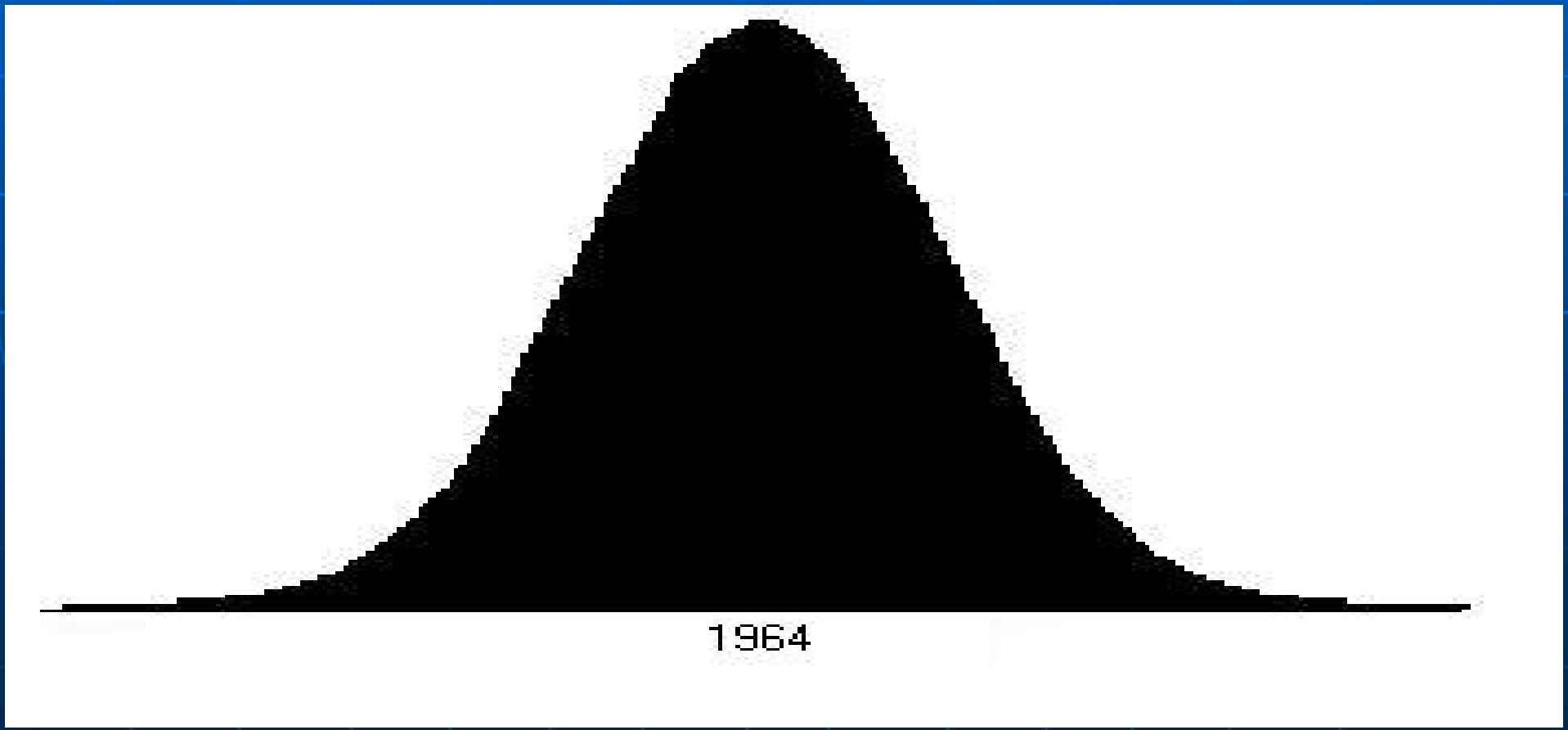
33 of the top 45 oil-producing countries have now peaked.

Where does the curve come from?



So what about global discovery ?

- When did Global oil discovery peak ?



Can we expect a global production peak ?

- And, if so, when ?
- Opinions vary (as ever).
- 33 of the World's 48 producers have peaked

November 25th 2005 (December 16th 2005)

2006 - 2010

2015

2035

Opinion seems to be settling on 2008

In the Financial Times of 24 January 2006, Jeroen van de Veer Royal Dutch Shell Chief Executive wrote,
"My view is that "easy" oil has probably passed its peak"

Can we expect a global production peak ?

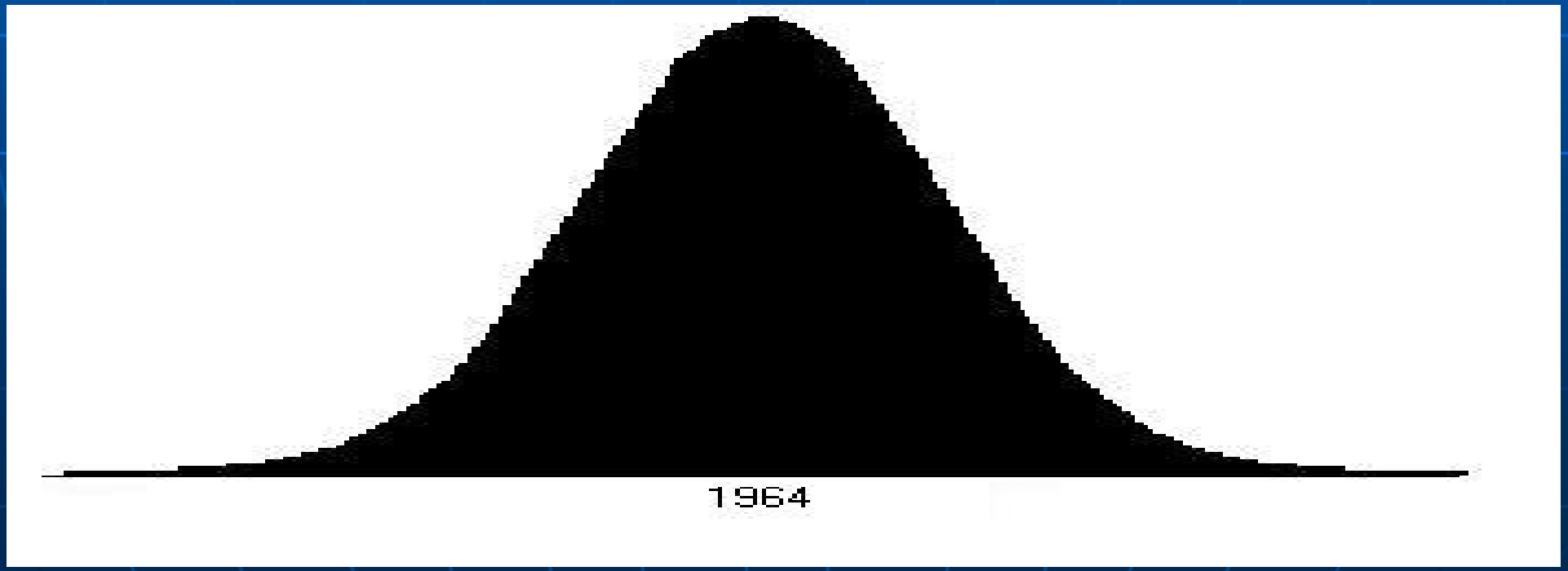
- 1955 – Austria
- 1966 – Germany
- 1970 – Venezuela, Libya, Ukraine, Bahrain
- 1971 – US48
- 1973 – Canada, Turkmenistan
- 1974 – Iran
- 1976 – Romania
- 1977 – Indonesia
- 1978 – Algeria, Trinidad, Brunei
- 1981 – Tunisia
- 1982 – Chile
- 1983 – Peru, Albania
- 1986 – Brazil, Cameroon
- 1987 – Russia, Netherlands, Hungary
- 1988 - Croatia, France
- 1991 – UAE, Turkey
- 1992 – Pakistan
- 1993 – Papua
- 1995 – Egypt
- 1996 – Gabon
- 1998 – Argentina, Angola, Uzbekistan, Sharjah
- 1999 – UK, Colmbia, Yemen
- 2000 – Australia
- 2001 – Norway, Oman, Congo
- 2004 – Mexico, Nigeria, Qatar, India, Malaysia, Ecuador, Denmark, Italy
- 2005 – Vietnam, Sudan, Thailand

- 2009 - Chad?
- 2010 - Azerbaijan?
- 2013 – Saudi Arabia?
- 2015 – Kuwait?

Why does it matter ? (1)

There's between 1,000,000,000,000 and 2,000,000,000,000 barrels of oil left.

1.1 trillion barrels - industry journal World Oil
1.2 trillion - BP
1.3 trillion – Oil and Gas Journal



What do we use now ?

- 86,400,000 barrels per day.
- With projected growth of 3.5% per
- year.
- 31,557,600,000 barrels per year.

but…

- 2003 was the first year since the 1920s where no single discovery >500,000,000 barrels – 6 days

2004

- Use 30,133,125,000 barrels
- Discovery 7,000,000,000 barrels
- 2005 – 5,000,000,000 barrels

So using 4 to 6 times more than we discover…

The last year in which the world discovered more oil than it used was

1981

Percentages

80-95% of all transport is fuelled by oil products
50-75% of all oil is used for transportation
99% of all lubrication is done with oil products
95% of all goods in the shops get there using oil
99% of our food involves oil or gas for fertilizers, agrochemicals, tilling, cultivation and transport

All petrochemicals are produced from oil

Oil is the most important source of primary energy on the planet accounting for 36.4% of all energy

Are the reserve figures accurate ?

- Nobody knows – normally a state secret

  Petroleum Intelligence Weekly reported (20.1.06) that it had seen internal Kuwaiti records showing that Kuwait's reserves were about 48 billion barrels, compared to the officially stated 99 billion barrels

- OPEC in 1980s resized reserve estimates by >70%
- Shell in 2003 resized stated reserves downwards

Are the reserve figures accurate ?

April 6 OPEC is powerless to bring down oil prices that are closing in on their record $70 a barrel high, United Arab Emirates' oil minister Mohammed bin Dhaen al-Hamli said.

April 8 Christophe de Margerie, head of exploration at the French oil company Total, said …

There is no prospect of reaching the lofty peaks that economists at the International Energy Agency, predict will be needed to satisfy world demand for oil.

Are the reserve figures accurate ?

Table 1: Selected Reported Reserves (Gb) with Suspect Increases								
Year	Abu Dhabi	Dubai	Iran	Iraq	Kuwait	Saudi Arabia*	Venezuela	Spurious Amount
1980	28	1.4	58	31	65.4	163.35	17.87	0
1981	29	1.4	57.5	30	65.9	165	17.95	0
1982	30.6	1.27	57	29.7	64.48	164.6	20.3	0
1983	30.51	1.44	55.31	41.00?	64.23	162.4	21.5	11.3
1984	30.4	1.44	51	43	63.9	166	24.85	0
1985	30.5	1.44	48.5	44.5	90.00?	169	25.85	26.1
1986	31	1.4	47.88	44.11	89.77	168.8	25.59	0
1987	31	1.35	48.8	47.1	91.92	166.57	25	0
1988	92.21?	4.00?	92.85?	100.00?	91.92	166.98	56.30?	192.11
1989	92.21	4	92.85	100	91.92	169.97	58.08	0
1990	92	4	93	100	95	258.00??	59	88.3
TOTALS: Declared Reserves for above Nations (1990) = **701.00 Gb** - Spurious Claims = 317.54 Gb								

Why does it matter ? (2)

- As we descend from the peak, every missing barrel will have to be replaced by alternatives – or reduce demand – or go short.
- Expect price to rocket upwards
- Expect impact on all aspects of the economy-food, transport, heating, health…
- Expect panic in the financial markets and industry
- Depression - 1929 ?

Peak or Plateau

- There may be a period of economic instability – oil price rises and falls back, then rises again.
- Oil supply limited by abnormal factors – weather, lack of refinery capacity etc Then recovers.
- May indicate a plateau – heralding the downslide.

Why Oil ?

- It's liquid at room temperature
- Easily transportable
- Easily transferable
- Carbon so uses in organic chemistry (Petrochemicals)
- Massive EROEI

How much energy do we get from 1 gallon ?
How much to heat 1 room ?

Why Oil ?

- Can you see anything around you that is not made from oil, or did not use oil in its manufacturing?
- If it is not made from oil, did it rely on oil to get there?
- Did the people who made it use oil to get to their work?
- We are ignorant of how dependent on oil we have become
- More importantly, we are ignorant of how interdependent we are in a society, and how much those interdependencies rely on oil.

EROEI ?

- Energy Recovered over Energy Invested
- Energy Recovered/Energy Invested
- ER/EI

> 100 in Texas in 1920s and 30s

Alternatives

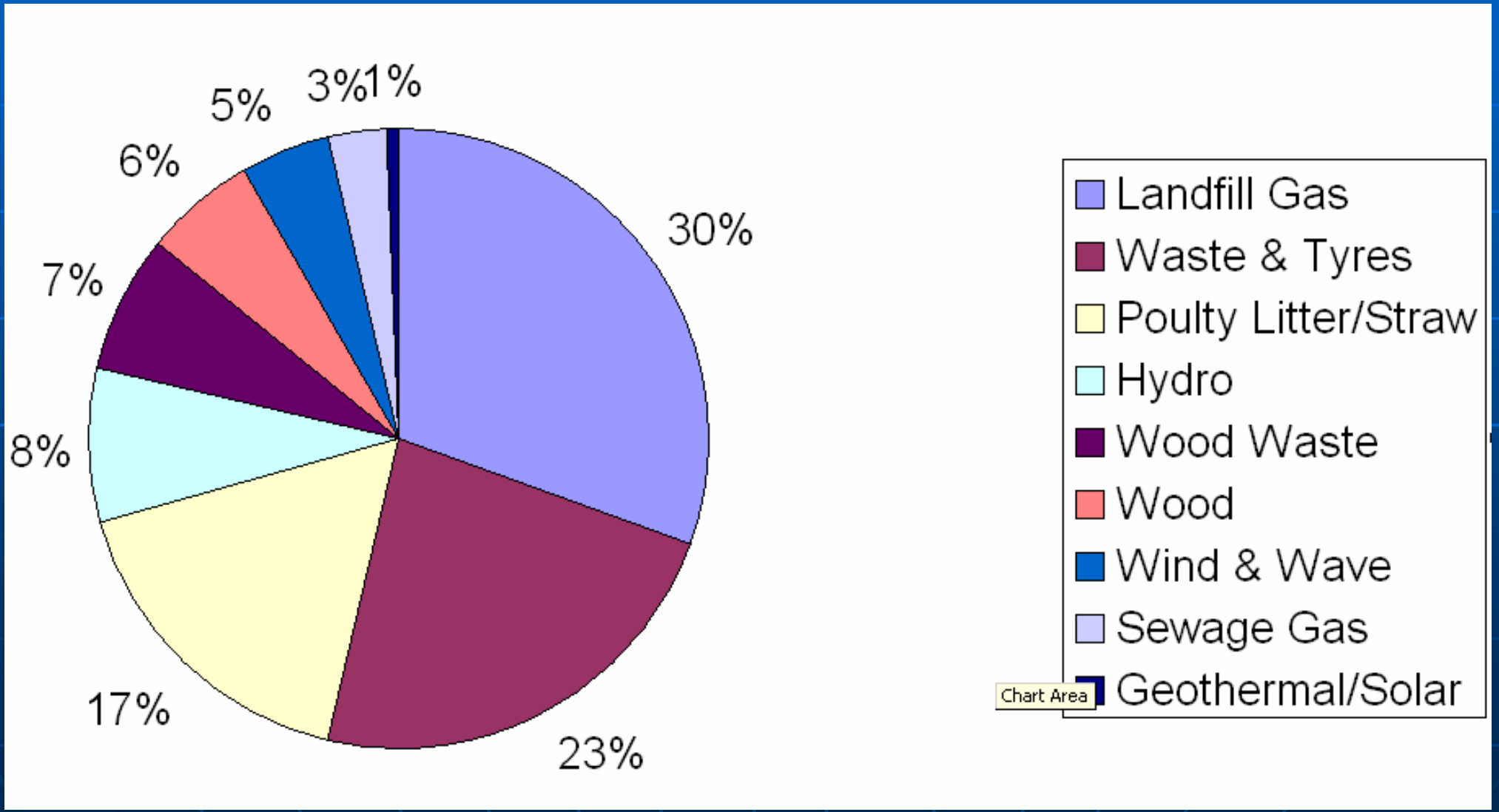
- Fossil Fuels – Gas, Oil Shale/Sand, Coal, Gas Hydrates
- Hydrogen
- Nuclear – Fusion, Fission
- Renewables – Bio fuels, Biomass, Wind, Tidal, Hydro, Solar, Geothermal

In all cases, think of what we can't use them for – Transport, Fertilisers, Insecticides

Pharmaceuticals etc

Renewables UK 2004

3.1% of Energy supply



The Way Forward

1. Business as usual – (Crisis ? – What Crisis?)
2. Last Man Standing – (I'll make sure I get mine !)
3. Powerdown – (The Cuban Alternative)

It's unlikely that there will be a Deus Ex Machina

A technological solution discovered tomorrow may take decades to apply globally and the carbon cost of doing so may be counter productive

Kubler-Ross stages :- Denial,Anger,Fear,Bargaining.Acceptance

The Way Forward ?

The Way Forward ?

The Way Forward ?

With the fall of the Soviet Union, Cuba lost more than 50 percent of it's oil imports, much of its food and 85 percent of its trade economy

There were frequent blackouts in its oil-fed electric power grid, up to 16 hours per day.

The average daily caloric intake in Cuba dropped by a third.

According to a report on Cuba from Oxfam, "In the cities, buses stopped running, generators stopped producing electricity, factories became silent as graveyards.

Obtaining enough food for the day became the primary activity for many, if not most, Cubans."

The Way Forward ?

So Cubans started to grow local organic produce out of necessity, developed bio-pesticides and bio-fertilizers as petrochemical substitutes, and incorporated more fruits and vegetables into their diets.

Since they couldn't fuel their aging cars, they walked, biked, rode buses, and car-pooled.

"There are infinite small solutions," said Roberto Sanchez from the Cuban-based Foundation for Nature and Humanity.
"Crises or changes or problems can trigger many of these things which are basically adaptive. We are adapting."

Cubans are also replacing petroleum-fed machinery with oxen, and their urban agriculture reduces food transportation distances, refrigeration and storage costs.

Today an estimated 50 percent of Havana's vegetables come from inside the city, while in other Cuban towns and cities urban gardens produce from 80 percent to more than 100 percent of what they need.

My (minimum) Conclusions

The oil peak will happen. We should plan ahead.

It will not be painless. Great change is likely.

It will affect all sectors of the economy. Some of which may disappear entirely.

Technological rescue should not be relied upon.

More efficient energy use is essential.

Political will must exist to oversee the changes at a local, national and international level.

"Oil Supply, at current rates of production, will last for another 40 years…"

Lord Browne of Madingley
Group Chief Executive – BP

"Nobody made a greater mistake than he who did nothing because he could do only a little" – Edmund Burke

"The only future we have is the one we make !"

"It's OK to take a step back when you're on the edge of a cliff"

Further Reading

The Party's over	Richard Heinberg	1905570007
Powerdown	Richard Heinberg	1902636635
Hubbert's Peak	Kenneth Deffayes	0691116253
Beyond Oil	Kenneth Deffrayes	0809029561
The Long Emergency	James Howard Kunstler	1843544539
Half Gone	Jeremy Legget	1846270049
The Limits to Growth	Donella Meadows et al.	1844071448
The Final Energy Crisis	Andrew McKillop	0745320929
Energy Beyond Oil	Paul Mobbs	1905237006
The Oil Factor	Stephen and Donna Leeb	0446694061
Twilight in The desert	Matthew Simmons	047173876X
The End of Oil	Paul Roberts	0747570817
Out of Gas	Daniel Goodstein	0393326470
Blood and Oil	Michael Klare	0805073132
Crossing The Rubicon	Michael Ruppert	0865715408
A Thousand Barrels a second	Peter Tertzakian	0071468749
High Noon for Natural Gas	Julian Darley	1931498539

DVD The End of Suburbia DVD Fuelling the Future
DVD Peak Oil – Imposed by Nature

LogicaCMG November 2006

£7.9bn cost to UK economy

2010

Optimistic case: It will be possible to meet peak demand with a 15.5 per cent contingency. This is below the 24 per cent long term contingency that has historically been used, but within the short term 10 per cent contingency. It is acceptable given the relative short term and advances in energy technology and the current operational regime.

Conservative case: There will be a gap of nearly 5 per cent in energy supply and no contingency at peak demand. This is equivalent to an area the size of Wales losing all electricity for several days in winter, with a cost to the UK economy of £7.9bn. As there is no contingency this effectively raises the gap to nearer 15 per cent - equivalent to the great storm of 1987.