

# Factoring in peak oil

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- raw material



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➤ incredibly energy dense

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This equates to either paying 2.5p/hour for the work (petrol £5/gallon) or paying over £1,000/gallon for the petrol (min. wage £5/hr)

# Values

Basic education (global)  
Cosmetics (US)

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Basic health & nutrition (global)	\$13 billion
Pet food (US & Europe)	\$17 billion

# Energy basics

Energy is defined as “the ability to do work”

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If there is **no** energy in a system, no work will be done

If the energy is **expensive**, the work will be expensive...

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In every case, the energy return or  
**'net energy'** will differ

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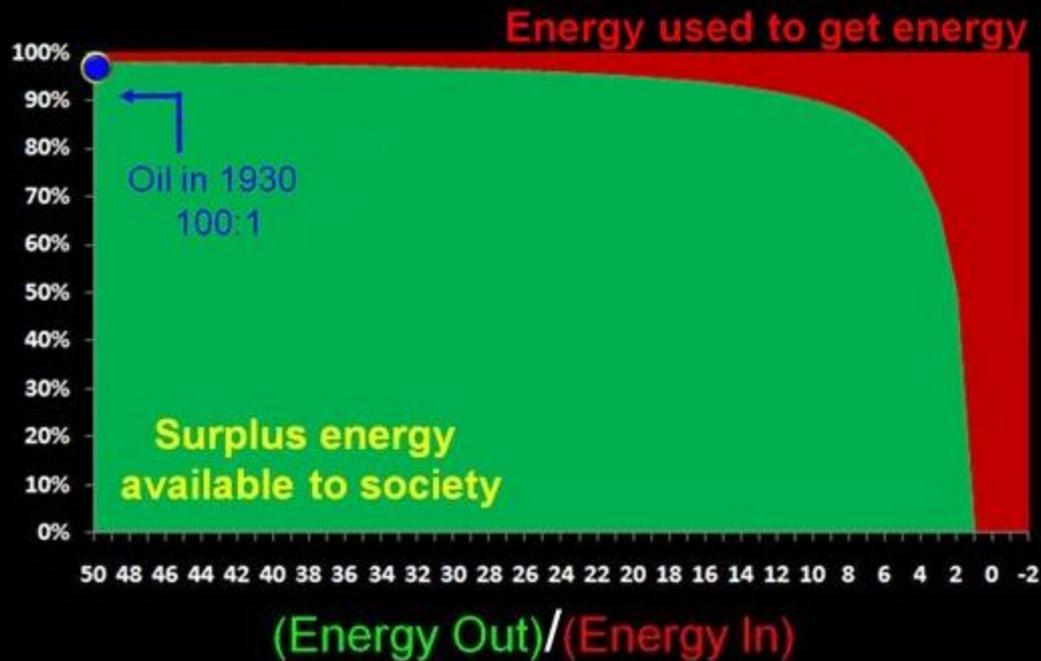


The amount of energy **spent** on getting the fuel:

Exploration, drilling, pumping, transportation and refining

# The Net Energy of oil is falling

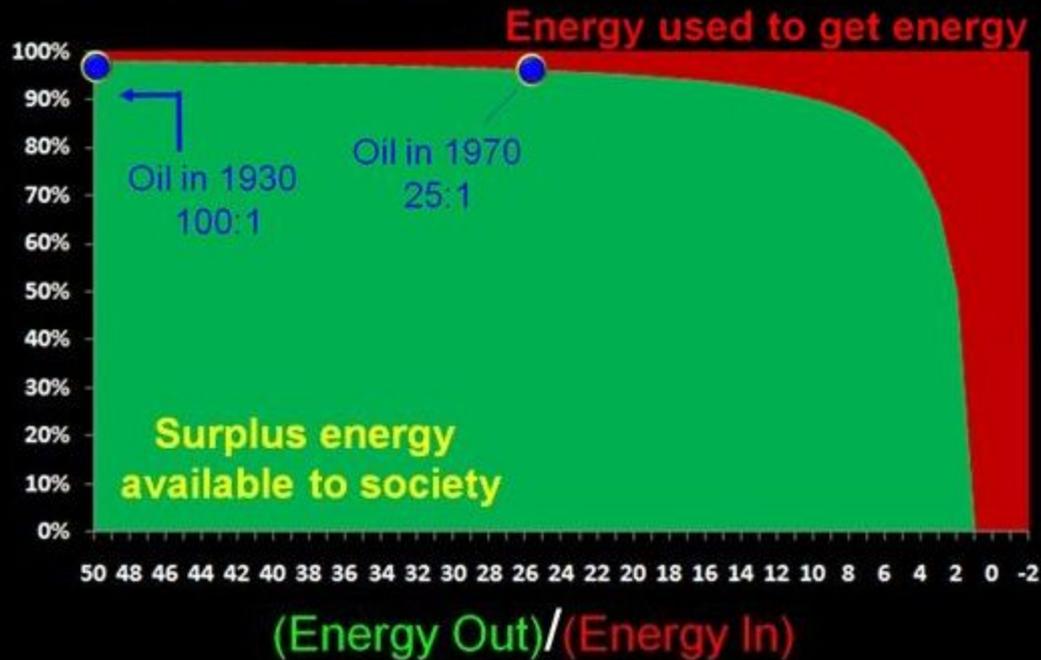
## The Energy Cliff - Oil



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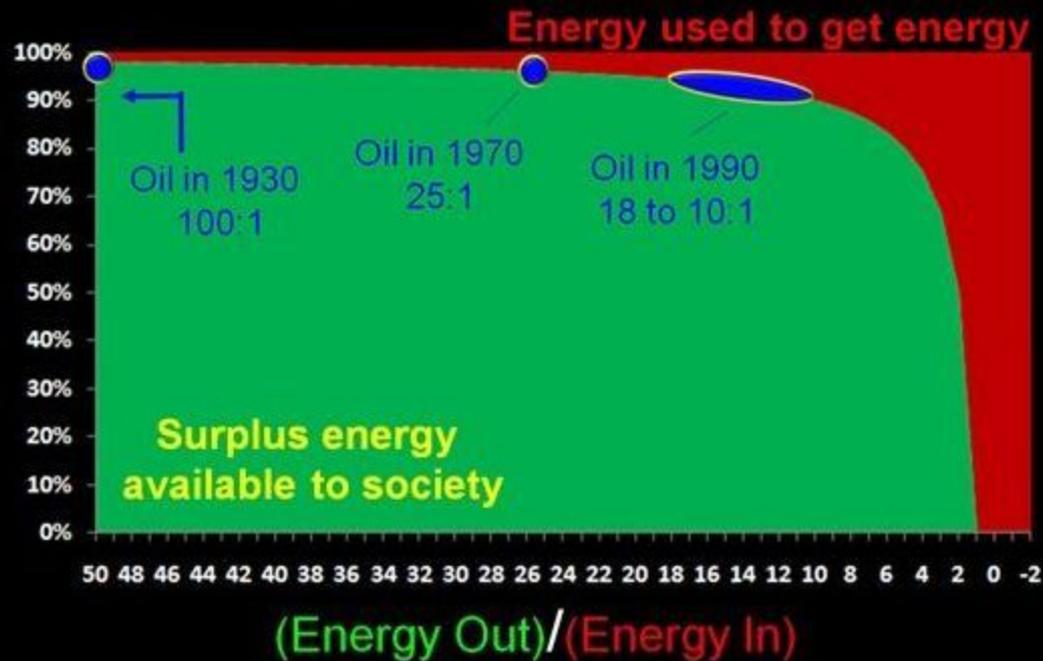
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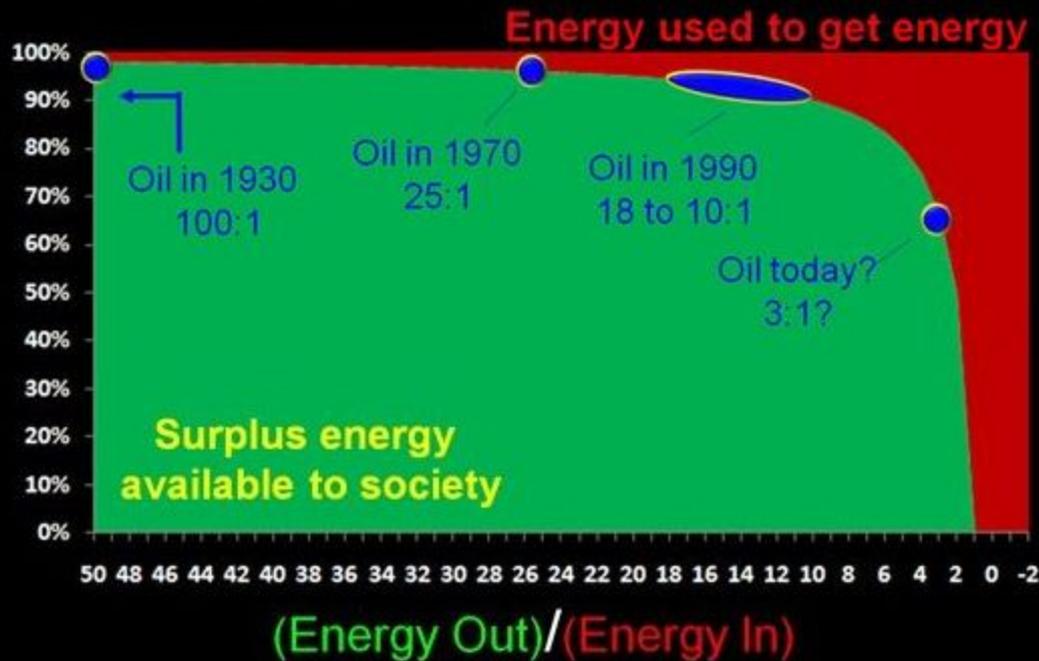
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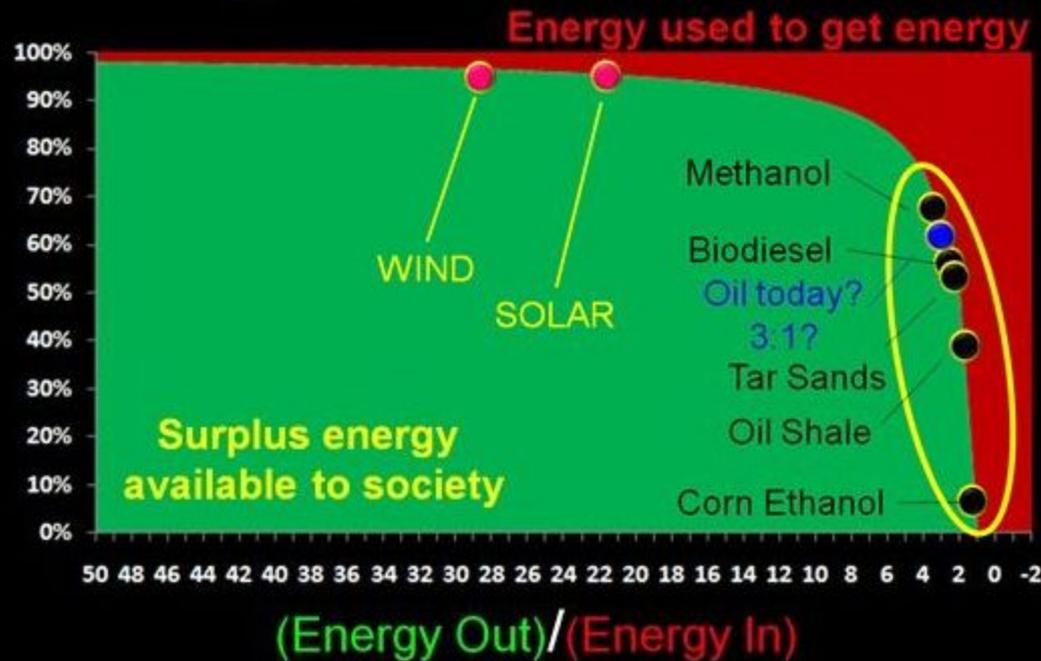
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## The Energy Cliff - Oil



# The Net Energy of Alternatives

## The Energy Cliff - Renewables



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# Energy invested varies

## Bio-ethanol:

8 to 10:1 (Brazilian sugar)

c. 1:1 (Louisianan sugar)

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## Hydro:

11.2 to 276:1 (mega-dams problematic)

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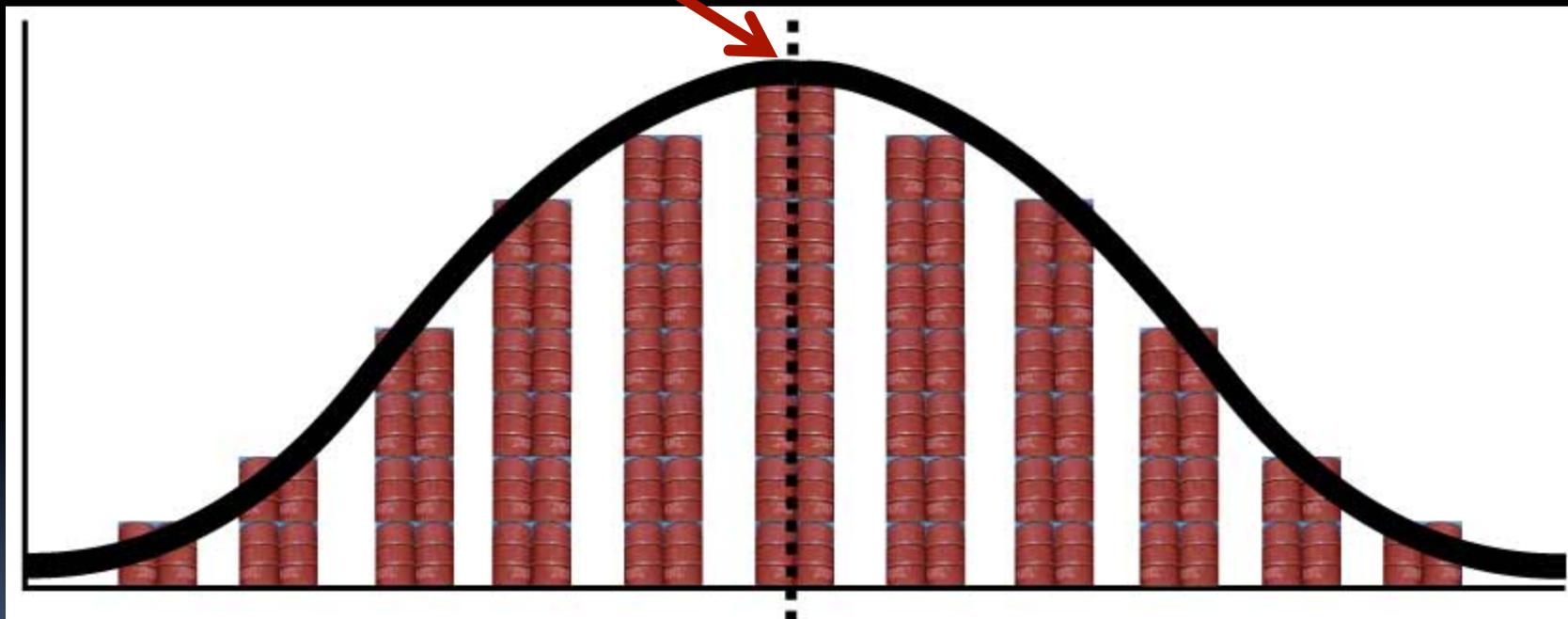
But in just 150 years, we have used half of the world's known conventional reserves

**And this half has been relatively easy to access**

# The easy half

over time well-pressure drops and it becomes harder to extract what's left

Half-way point



1<sup>st</sup> half

2<sup>nd</sup> half

# Conventional vs. non-conventional

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Conventional oil flows naturally  
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These conventional (or cheap) reserves, which we've been using for 150 years, are becoming depleted

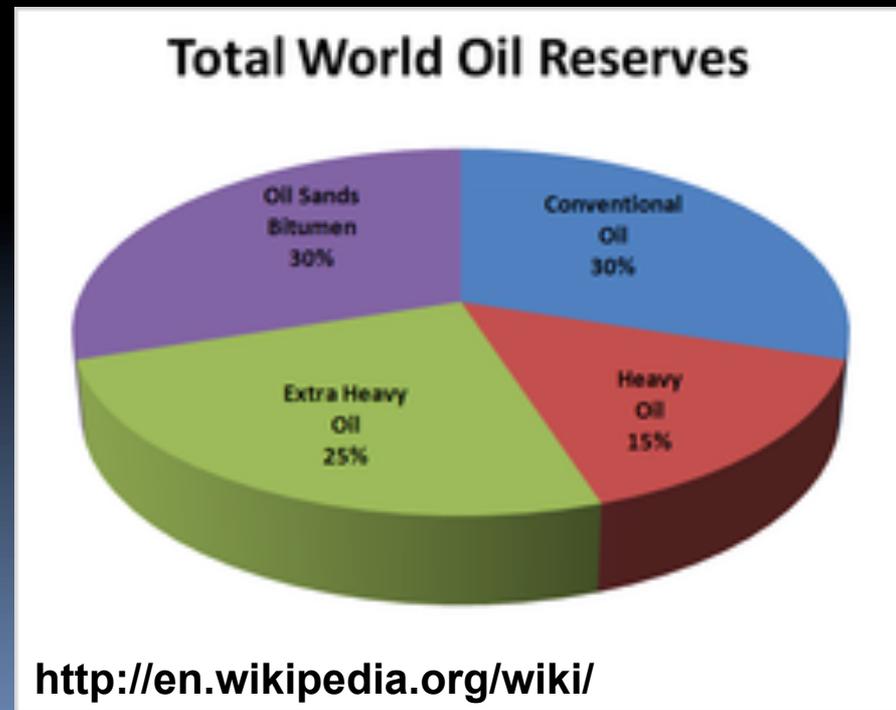
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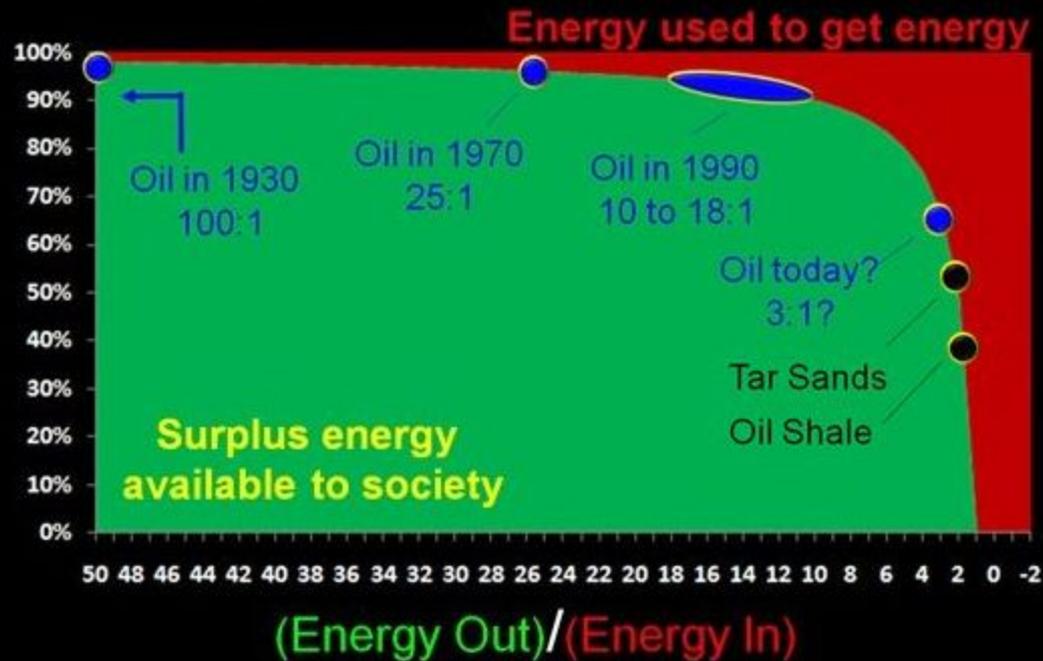
However, there are also billions of barrels of **non-conventional oil**

e.g. heavy oils, tar sand & oil shales



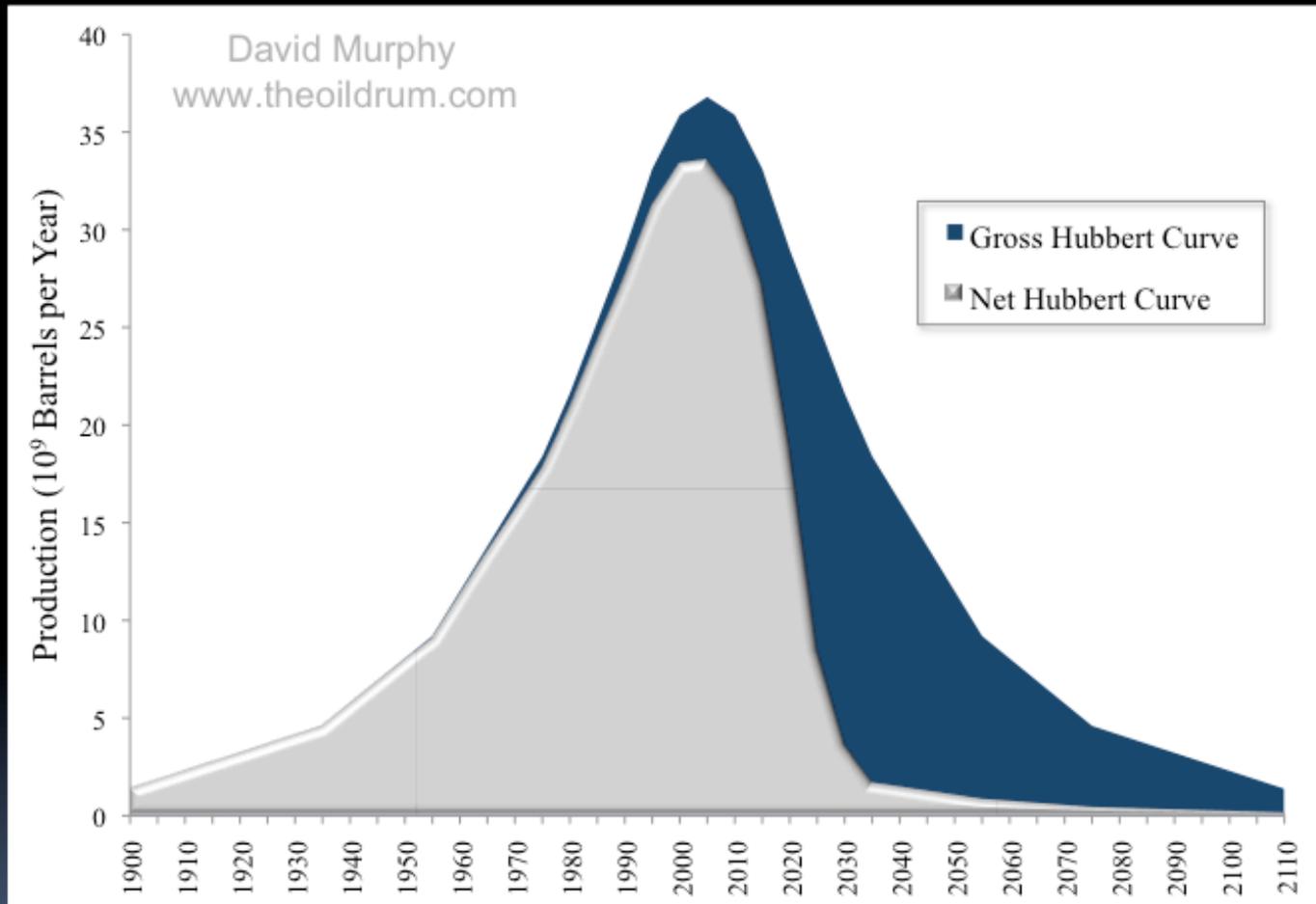
# Conventional vs. non-conventional

## The Energy Cliff - Oil



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# Peak oil - gross and net



# Peak oil and economy

Oil provides the energy for growth in the economy, population, consumption, societal complexity...

These are just an expression of how we choose to use plentiful, cheap energy - they are not 'destined' !

How will employment, food production & our exponential debt-based money system work without cheap energy?

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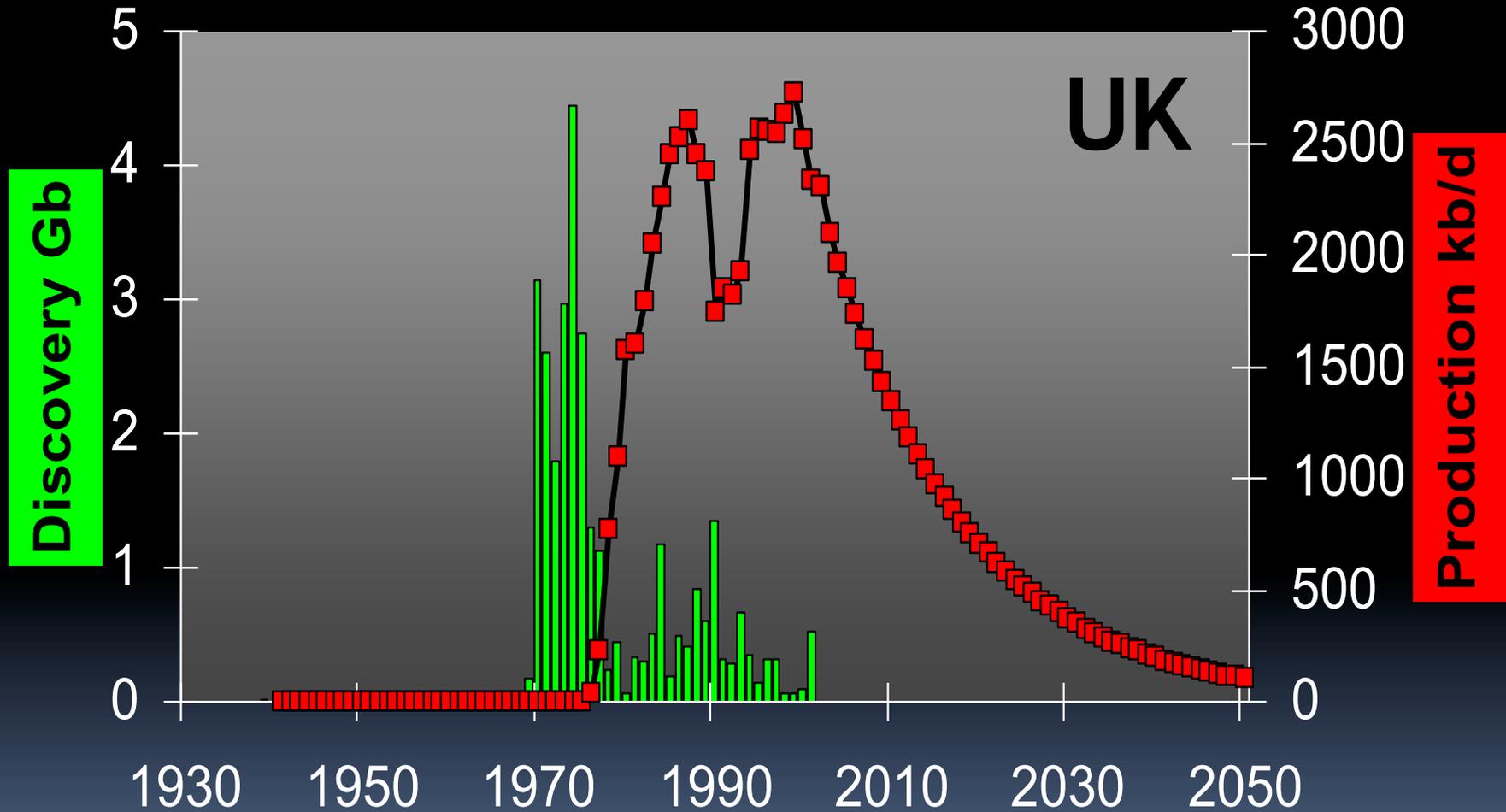
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**You cannot consider the future of war and politics without factoring in peak oil (energy)**

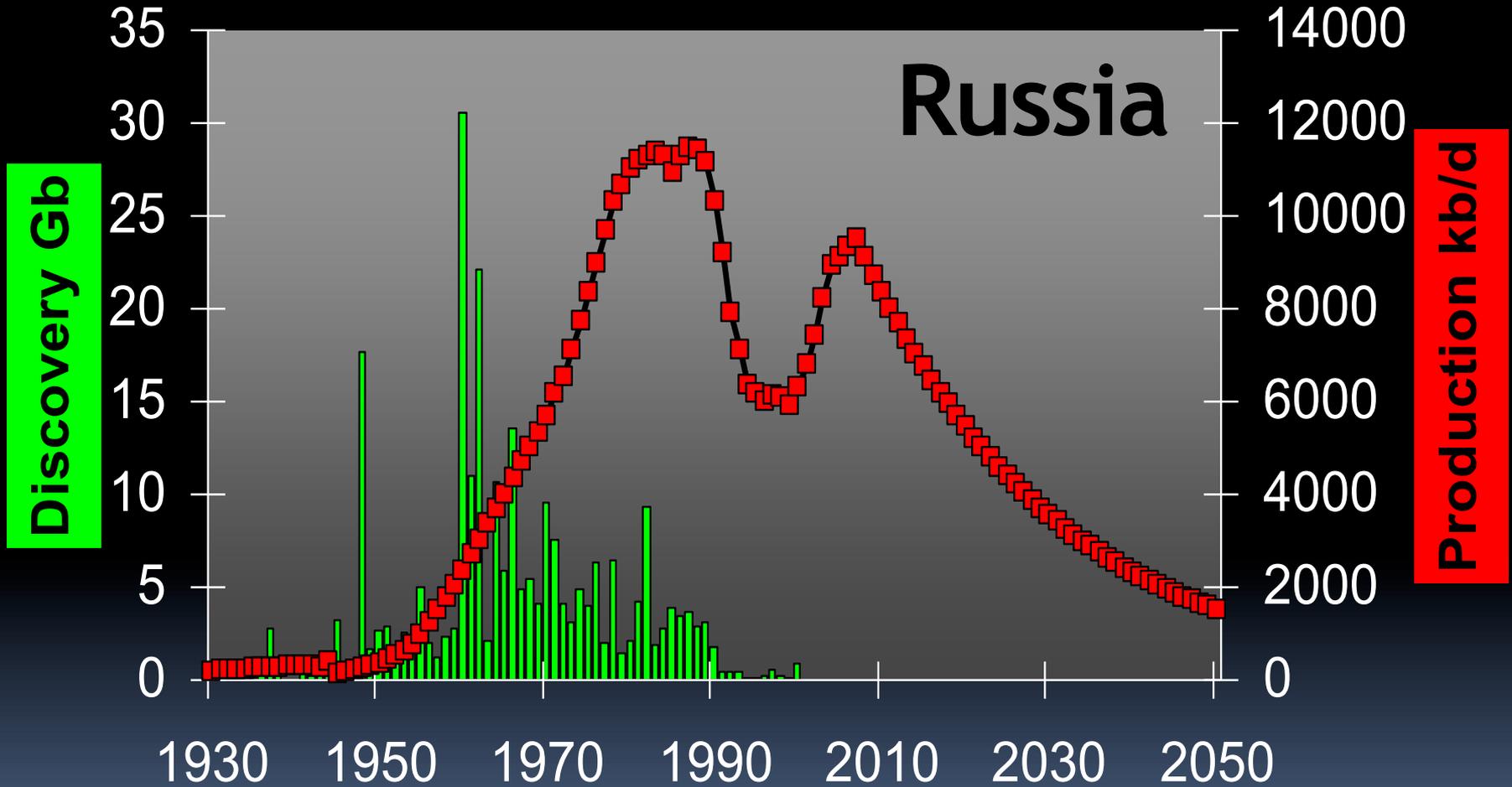
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1988: Piper Alpha disaster



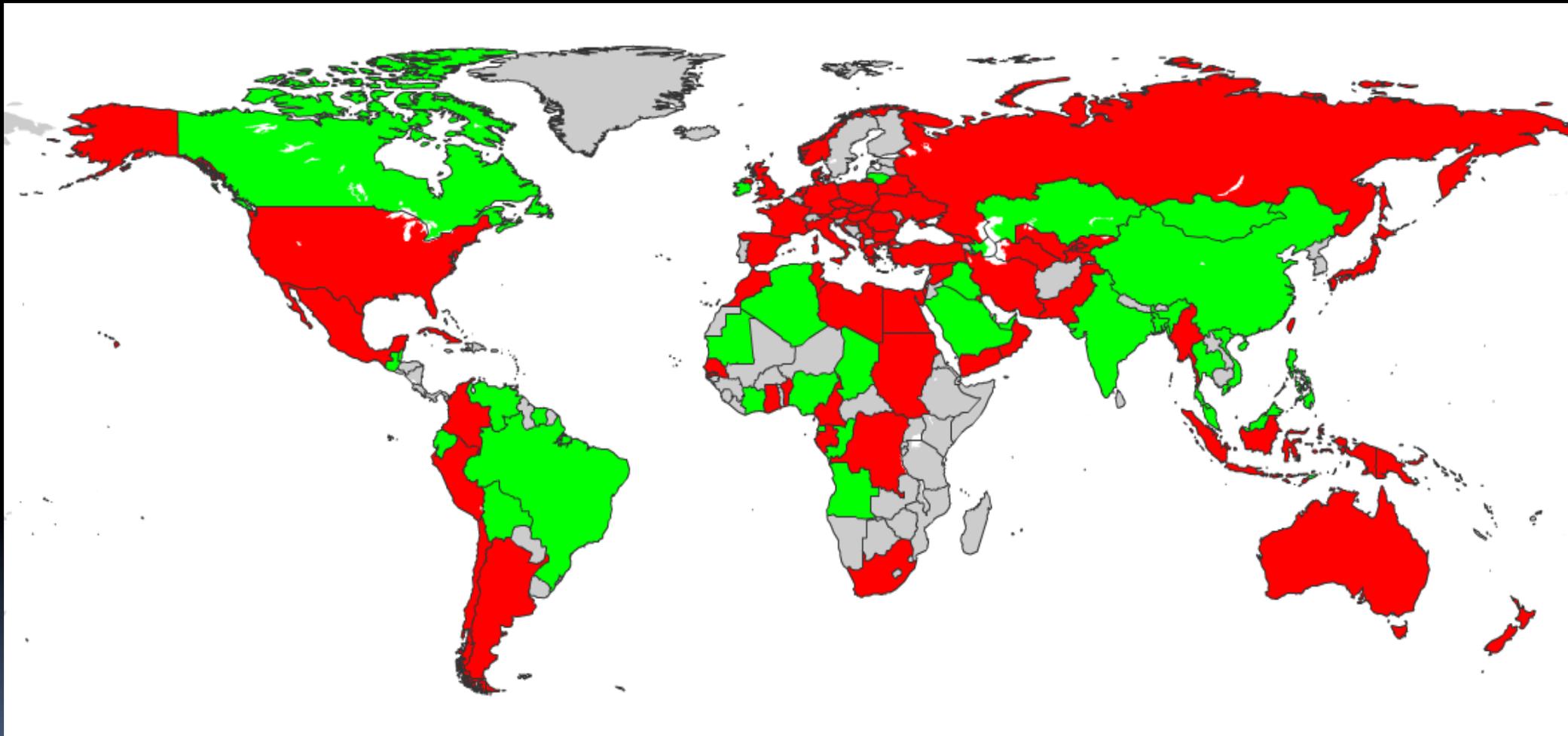
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1991: Breakup of Soviet Union

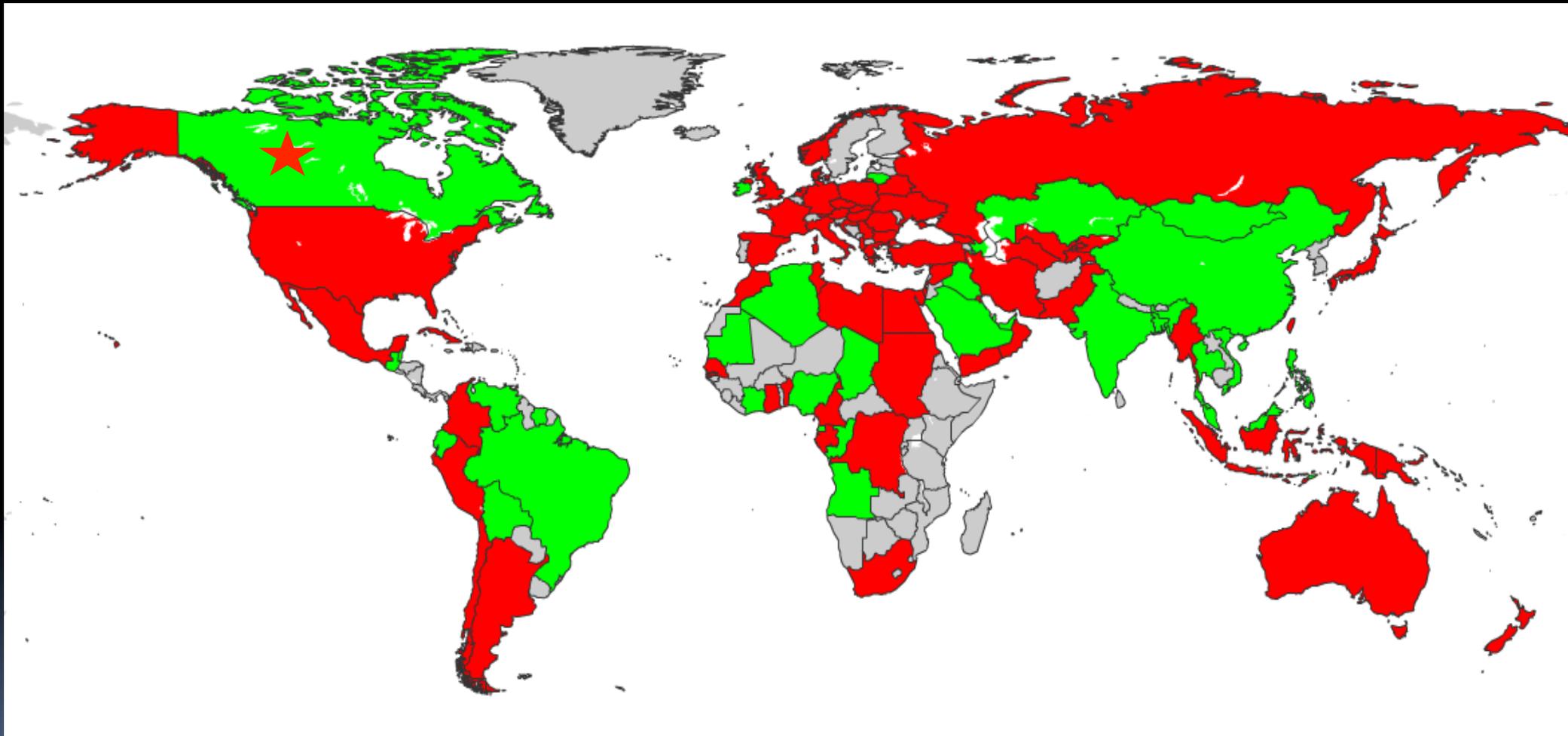




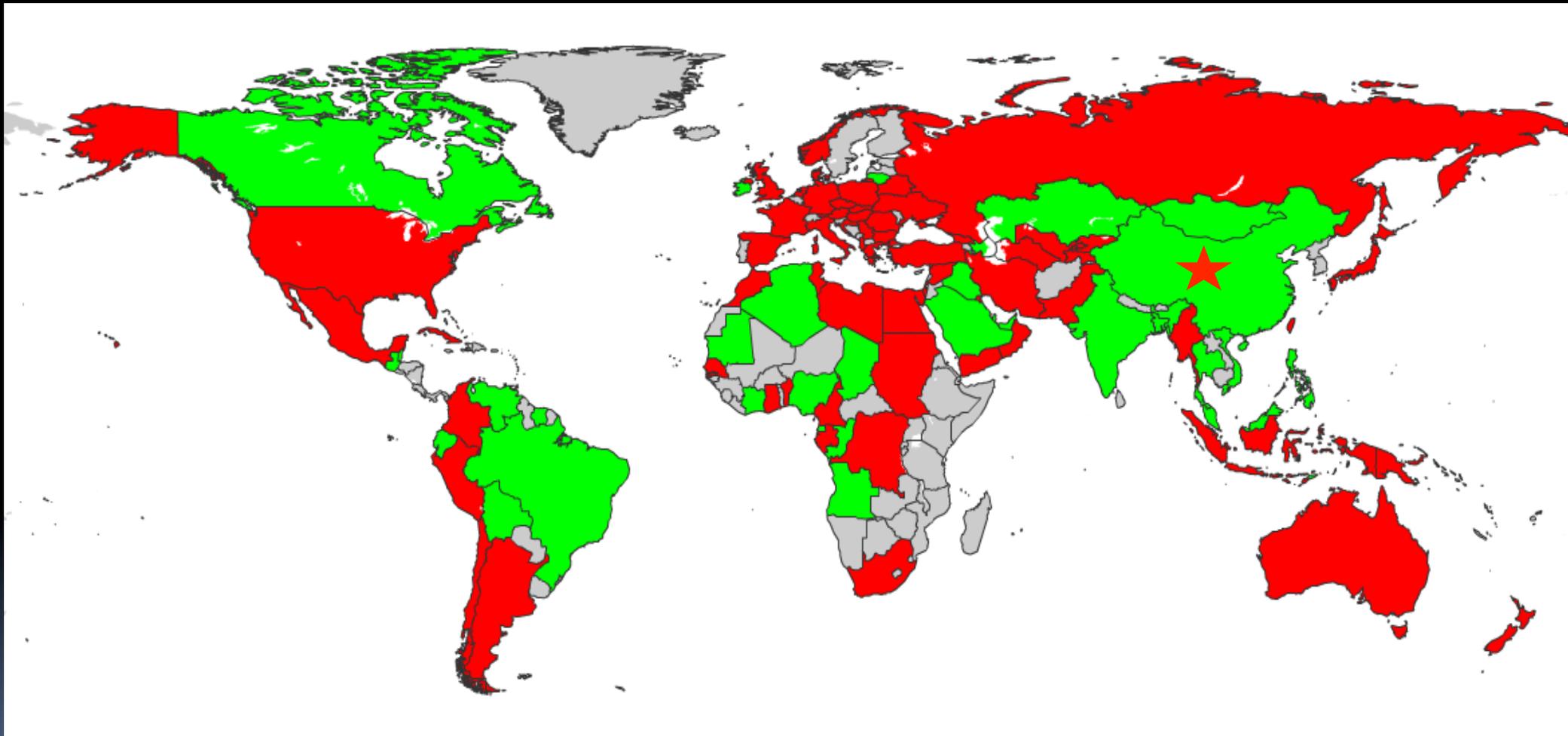
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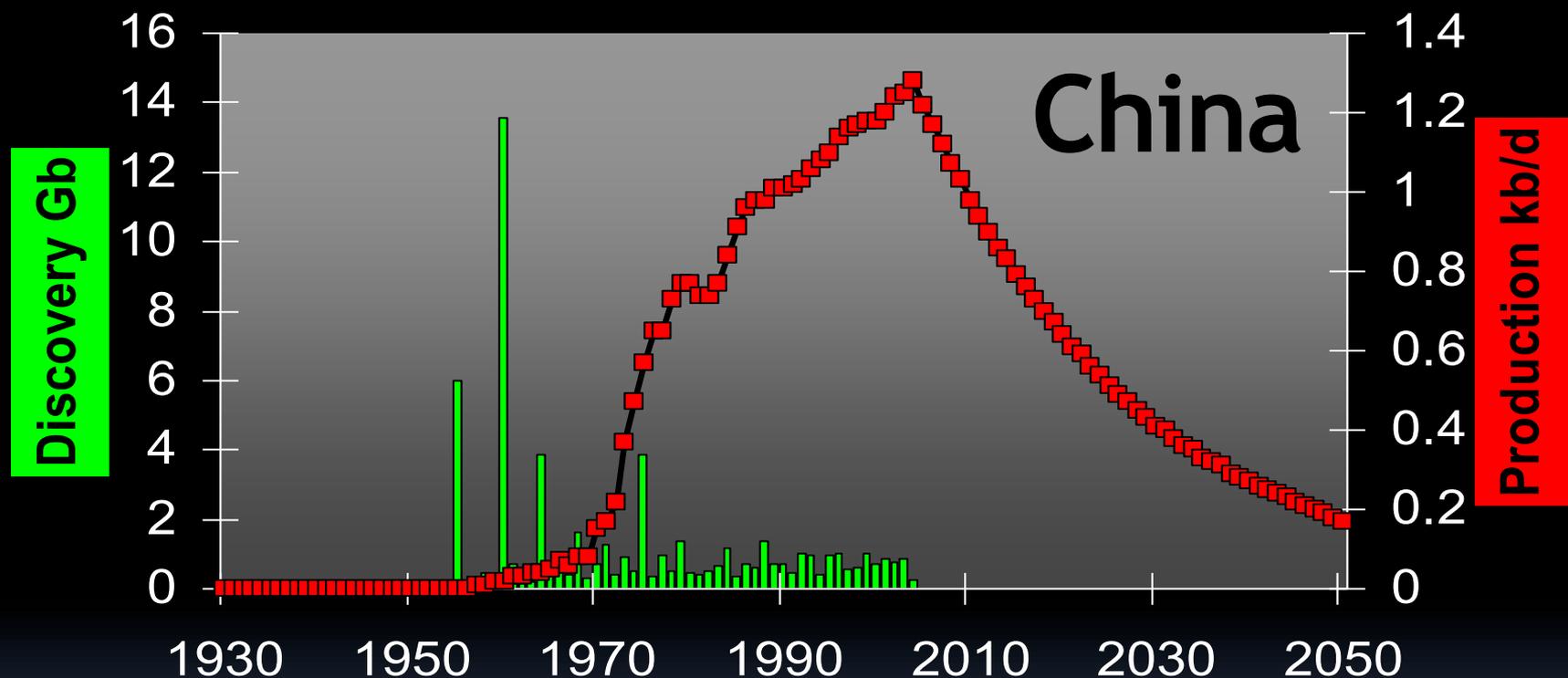


# Post-peak oil producers (64)



# Peak oil and economy

2010: China became world's biggest energy consumer



And relies on imports for 50 percent of its supplies of oil\*  
which brings us to another problem...

# Who gets what's left?

What if oil exporters stop exporting?

- altered global balance of power
- inequalities shift - access to food & fuel, trade, military might

Military and government think tanks are considering how "peak oil" might change the global economy and influence the future **but there is no public debate**

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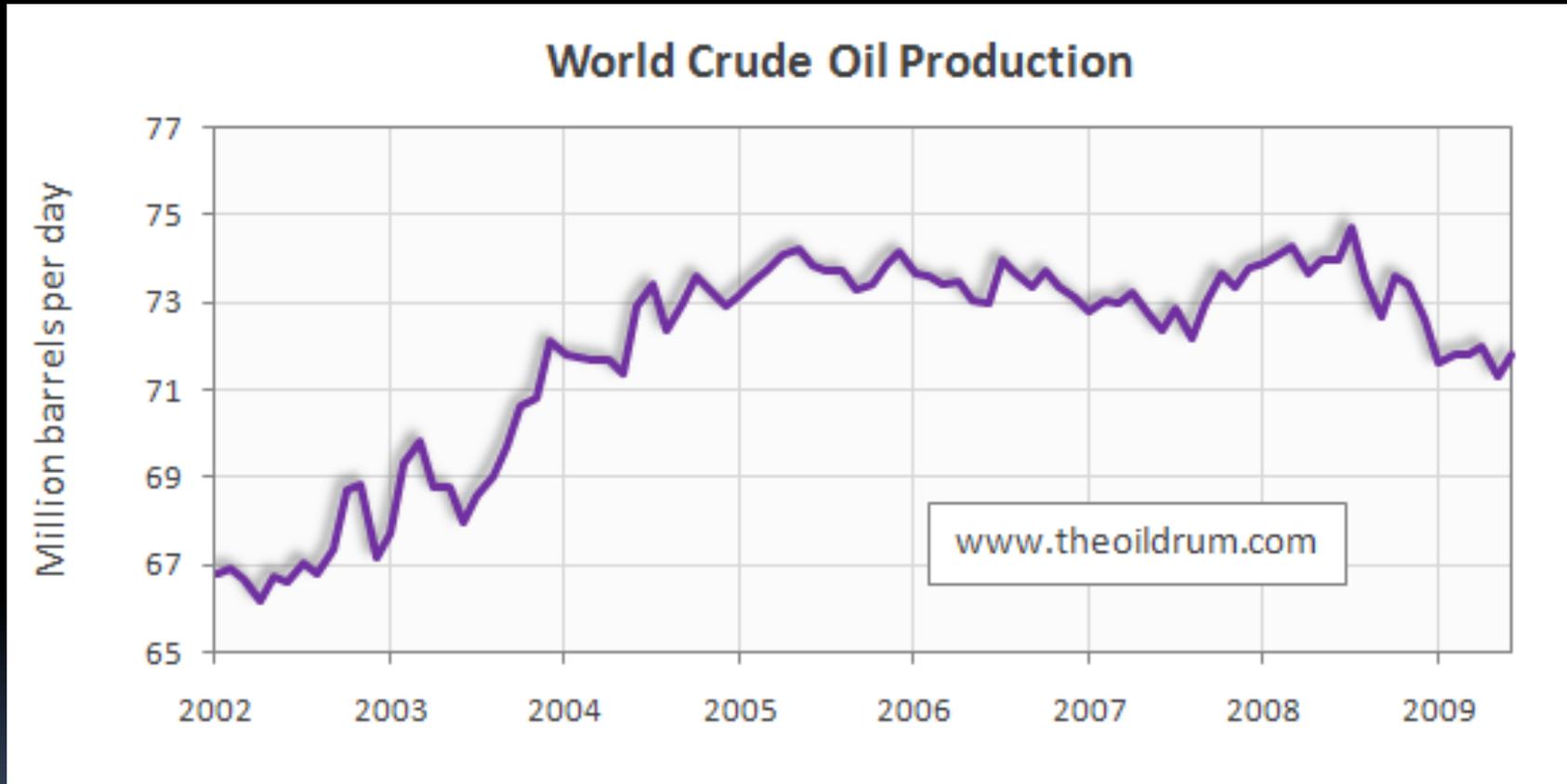
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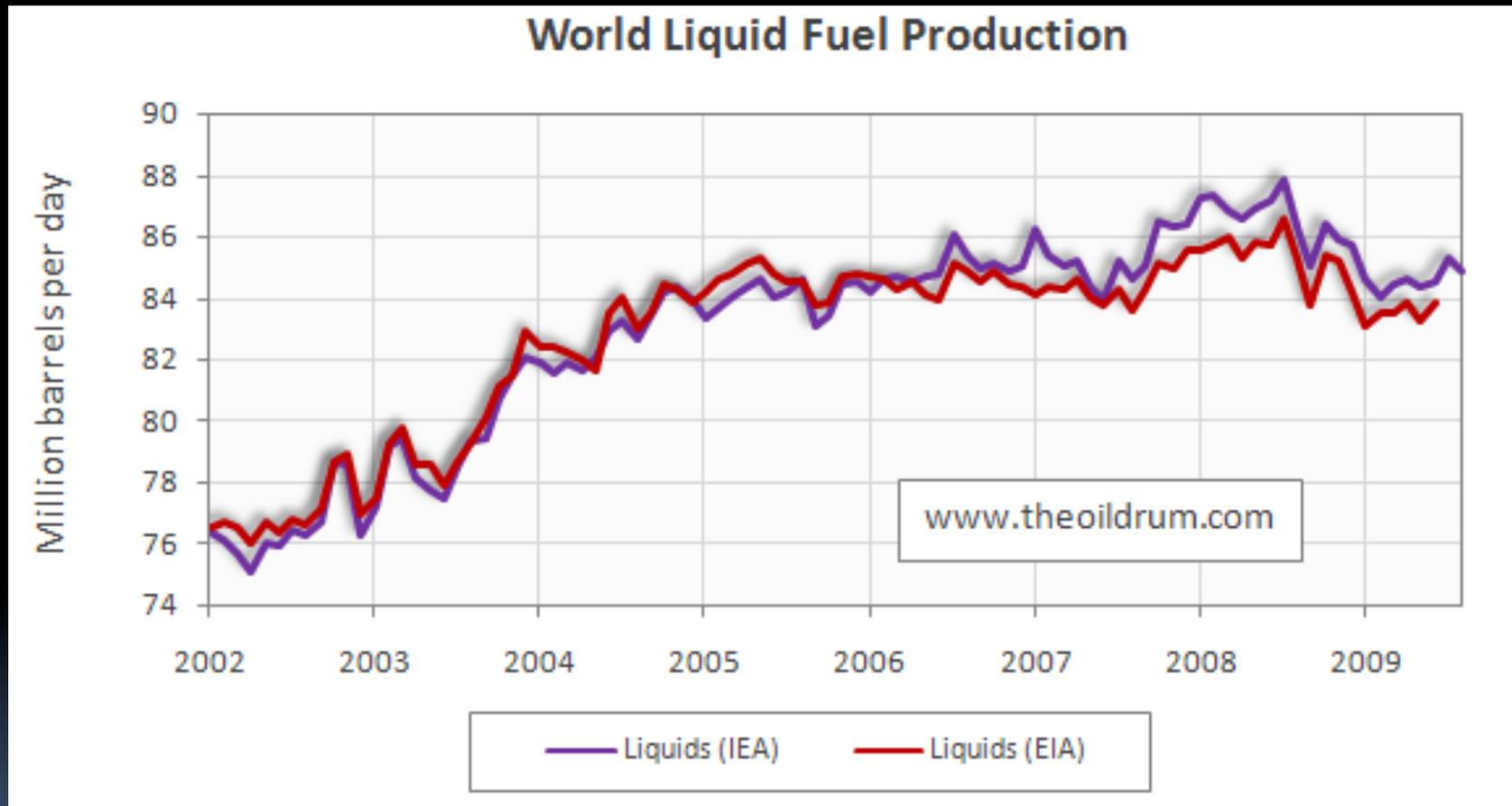
Industrial civilisation was built on cheap energy and we're not even discussing how this low-energy future might work

- Can we feed 7 billion people without cheap oil?
- Can global trade continue in its current form without cheap oil?

# Oil production - conventional



# Oil production - all liquids



# Oil Top 10

Billion barrels (1 January 2011 est.)

1 Saudi Arabia	262.6	6 Kuwait	104
2 Venezuela	211.2	7 United Arab Emirates	97.8
3 Canada	175.2*	8 Russia	60
4 Iran	137	9 Libya	46.4
5 Iraq	115	10 Nigeria	37.2

*(\*includes oil sands )*

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\*\* Libya's high quality oil fields are under-developed compared to other countries' fields, like Saudi, which are showing depletion. There's a much higher probability for oil companies to make a lot of money in Libya than elsewhere

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13 United States	20.7	33 Syria	2.5
31 United Kingdom	2.9	95 Israel	0.0019
		Afghanistan, N. Korea	0

# Conclusions - economy

When economies grow, energy demand grows

Our energy comes mostly from fossil fuels

'Green' alternatives cannot match the net energy returns from oil

Therefore, less available energy in future - less complex society

What does this mean?

Shouldn't we plan for this?

# Conclusions - conflict

Rising prices lead to civil unrest

Fears over employment, pensions & welfare

Resource wars over oil reserves & pipeline routes

But politicians are not talking honestly about this inevitable decline

The psychological impacts of decline will be worsened by not preparing now - denial

We continue to seek economic growth

We continue to explore for fossil fuels

We're not waking up

# Thank You

