Become a Peak Oil Expert in 10 minutes!

This activity takes about 15 minutes including facilitation pieces

or more depending on how far you want to go with the review at the end.

Why? It was designed for a 20-30 min slot at the beginning of Transition 'Launch' Training in order to:

- Refresh and deepen participants' understanding of the context of peak oil
- Practice communicating effectively one to one
- Create the 'teaching ourselves', 'unleashing the collective genius' spirit of Transition.

Use it as an energiser for meetings and workshops, awareness-raising events or school classrooms. It is best to have a group of 12 but does work with fewer if you choose which cards carefully. It has worked with over 120 delegates in one conference hall. It creates quite a buzz - whoever knew peak oil could be such fun?!

How? Print in colour on white card. Each image has accompanying notes on reverse. One card per person.
Suggested session structure: 2-3 minute introduction; 10 minute activity; 2-3 minutes debrief.

1. Introduction (2-3 minutes). Explain these slides collectively build on a story but each works on its own. Ask if anyone is totally graph or data phobic; offer them slides 4, 6 or 7. There are advanced cards for people who want a challenge.

"have a look at your card and the explanation on the back. If there is anything you don't understand, please ask".

"when you are ready, stand up, wave your card, find a partner and start your conversation. Explain your concept and listen to theirs. Be brief and clear Just explain the main points; additional points are there to give you clarity and some depth. Don't read verbatim."

"Avoid conversations – when you've finished, wave you card and find another partner." "I'll help you move if I have to!"

2. Activity (10 minutes - extend this time to suit your group, if you can. 10 minutes is fine for Transition Training but you'll want to take longer with groups for whom this subject is new, or graphs and data are challenging, or who English don't speak so well.)

Encourage mingling. Break up conversations or huddles of more than two.

Do so in an efficient but playful way. Maintain the buzzy dynamic energy.

Get ready to be the one everyone wants to sit next to at a dinner party!

3. Debrief (2-3 minutes – again allow longer for some groups).

What was it like to go through all that information? Encourage people to feel the impact of this information on them personally – express fear, anxiety, etc. If you are feeling this, so will those you are communicating with. Use this to understand why people react to this information in the way they do, eg our collective culture of denial.

Any slides really stand out? Often worth making sure everyone sees slide 6 and 2 (and/or 2a).
Slide 2 encourages us to challenge projections we are given by 'experts'. Use it to instill a sense of purpose. Do we have to accept these projections? Isn't it our job to shape the future to something better? Instead of the stark picture presented, can we see it is an opportunity for something new and better?

From geology to economics. Observe how these slides take the Transition story from peak oil into economics. It is often suggested that the 'economics' bit of Transition is a new, separate add-on to peak oil and climate change. This is not strictly true; in many ways it is a development of the peak oil conversation, as we now understand better how peak oil impacts our economic system.

'Isn't Peak Oil dead?' is a question many Transitioners are now challenged with. Hopefully these slides demonstrate not; just that the picture is complex, particularly with the added interaction of the long recession and rapid up-scaling of 'extreme energy' sources in US. In fact, it is because of peak oil that these things are happening in the way they are. In this way it is quite consistent with Transition's early analyses back in 2006-2008.

How can you be sure this is correct? Invariably someone will be worried about being picked up on the accuracy of a figure or reliability of a single source of data. This will happen to all of us!

Top tip 1: never claim to be the expert.

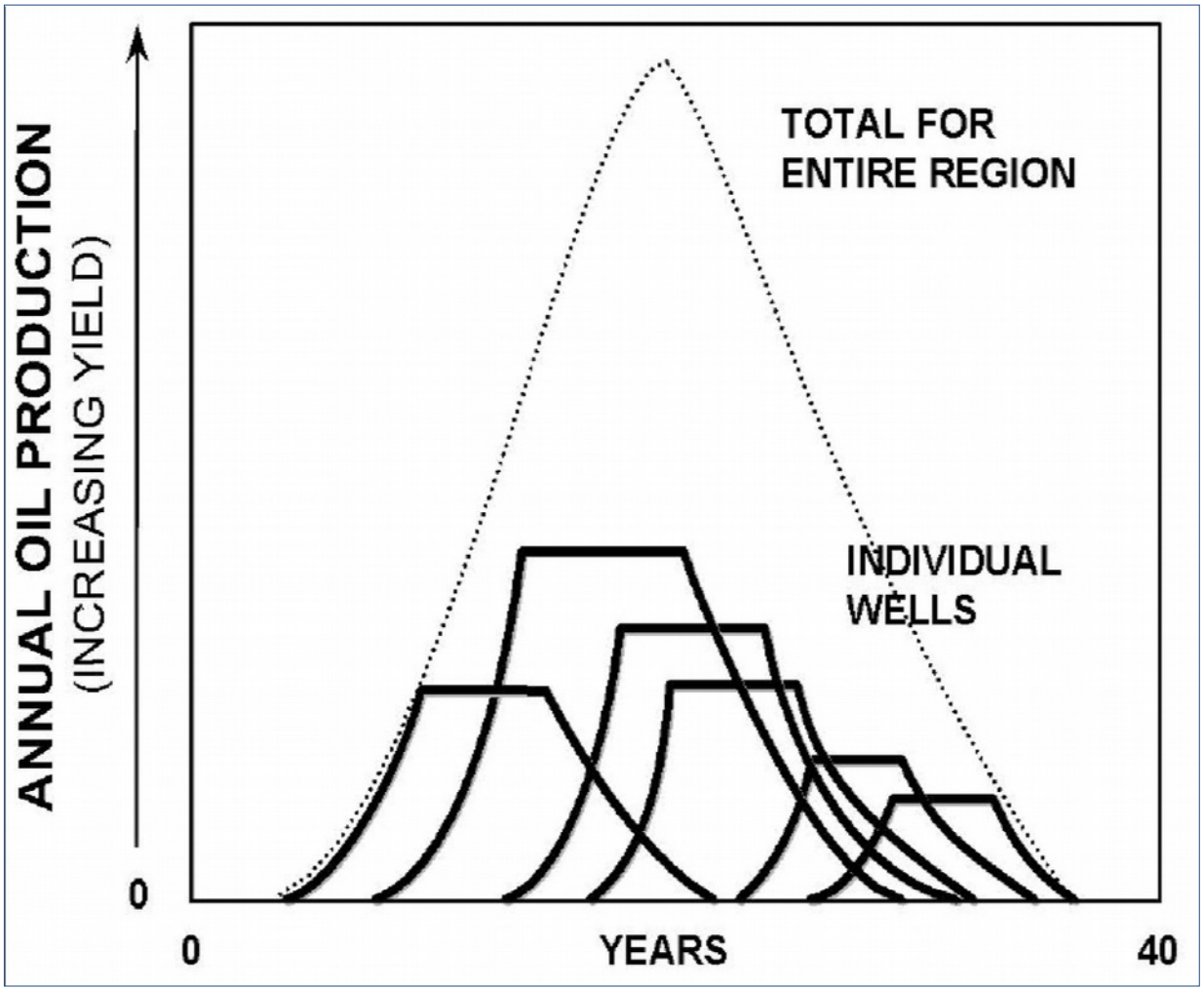
Top tip 2: don't get pinned down to one specific item of data. Observe the general backdrop of information that is all pointing the same way; that we can no longer operate under the assumption that an ever increasing supply of cheap energy will always be available to us.

Top tip 3: Will it actually make any difference to the person challenging you if that specific data can be proved or not? What is behind their question? Where are they in their relation to this information and their willingness to embrace change? Is there are different way to answer their question? This line of questioning creates fodder for later bits of the Launch Training, ie awareness-raising and inner work.

Will you use all these slides in your work as Transition activists, eg. if giving a 10-20 minute presentation? Hopefully not. But which ones might you use? A combination of 6 and 2 or 2a which ones are very effective in introducing peak oil to beginners.

Now you're ready! Go wow the world!

Peak oil


ANNUAL OIL PRODUCTION
(INCREASING YIELD)
0
TOTAL FOR
ENTIRE REGION
INDIVIDUAL
WELLS
0
YEARS
40

Peak oil - What is it?

Peak oil is the point at which we can no longer increase the amount of crude oil we extract, and petroleum production goes into irreversible decline. **It is not when the oil runs out.**

Typically, an oil province peaks when it has extracted roughly ½ of all the oil that is ever going to be extracted from it.

Every oil province has followed this pattern, so it follows that at some point a global oil production will follow a similar pattern.

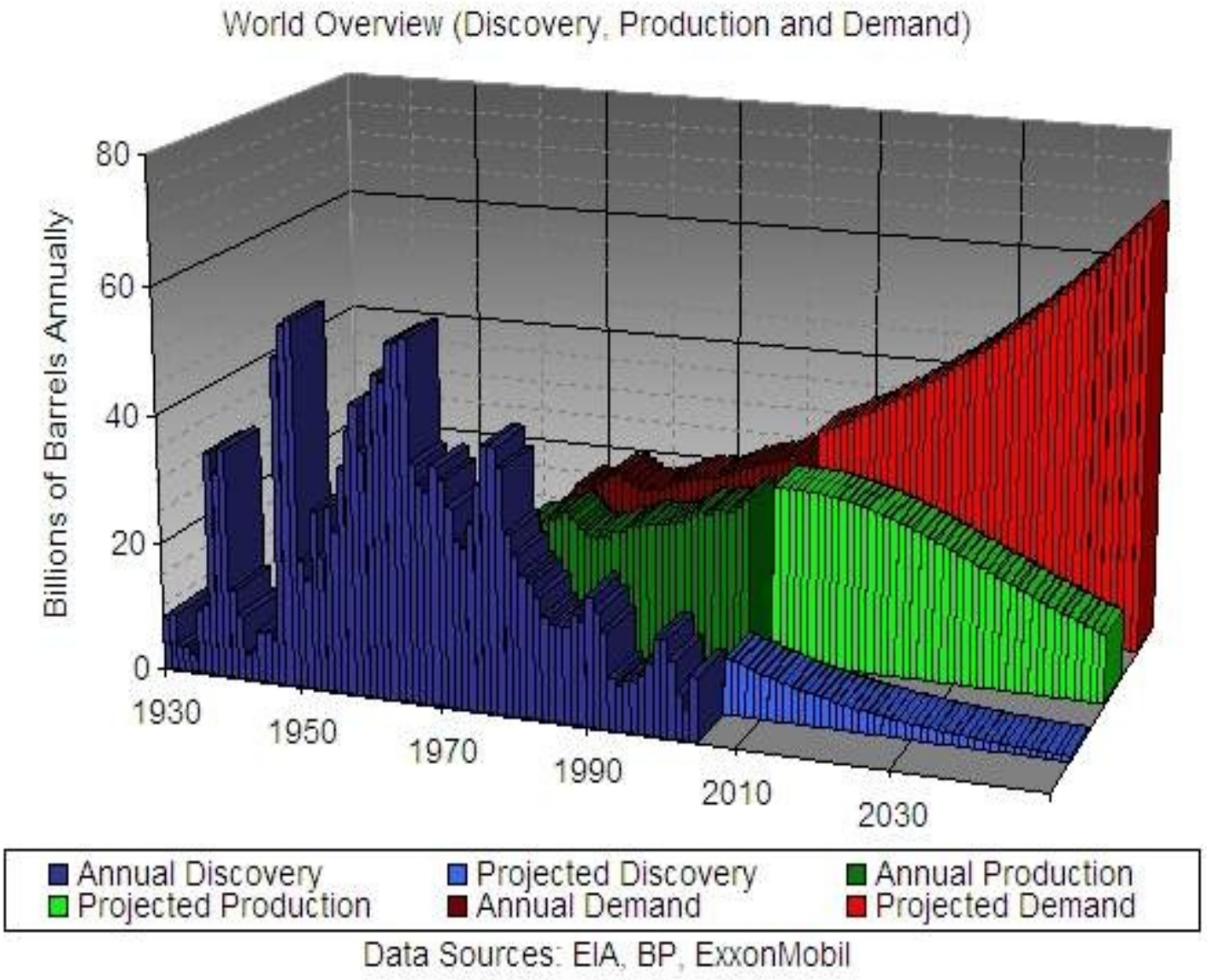
This slide illustrates why the sum total of a collection of oil fields in a region, when added together, creates a peak at about the half way point in production.

Source: Liverpool University School of Management

The bell-shaped curve it creates is often referred to as 'Hubbert's Peak' or the 'Hubbert Curve', named after American geophysicist M. King Hubbert, who created a method of modelling the production curve and is credited for first proposing peak oil as a theory in 1956.

Source: wikipedia

Global oil discovery, production and demand 2



Global oil discovery, production and demand

To produce oil, you first have to discover it.

World discovery peaked in the late 1960's and has been falling ever since. Despite rapidly improving and sophisticated technology, there is no prospect of it ever increasing.

At the same time production has been rapidly rising to meet demand.

Demand is projected to go on rising, especially in rapidly industrialising countries like China and India while production begins to drop off.

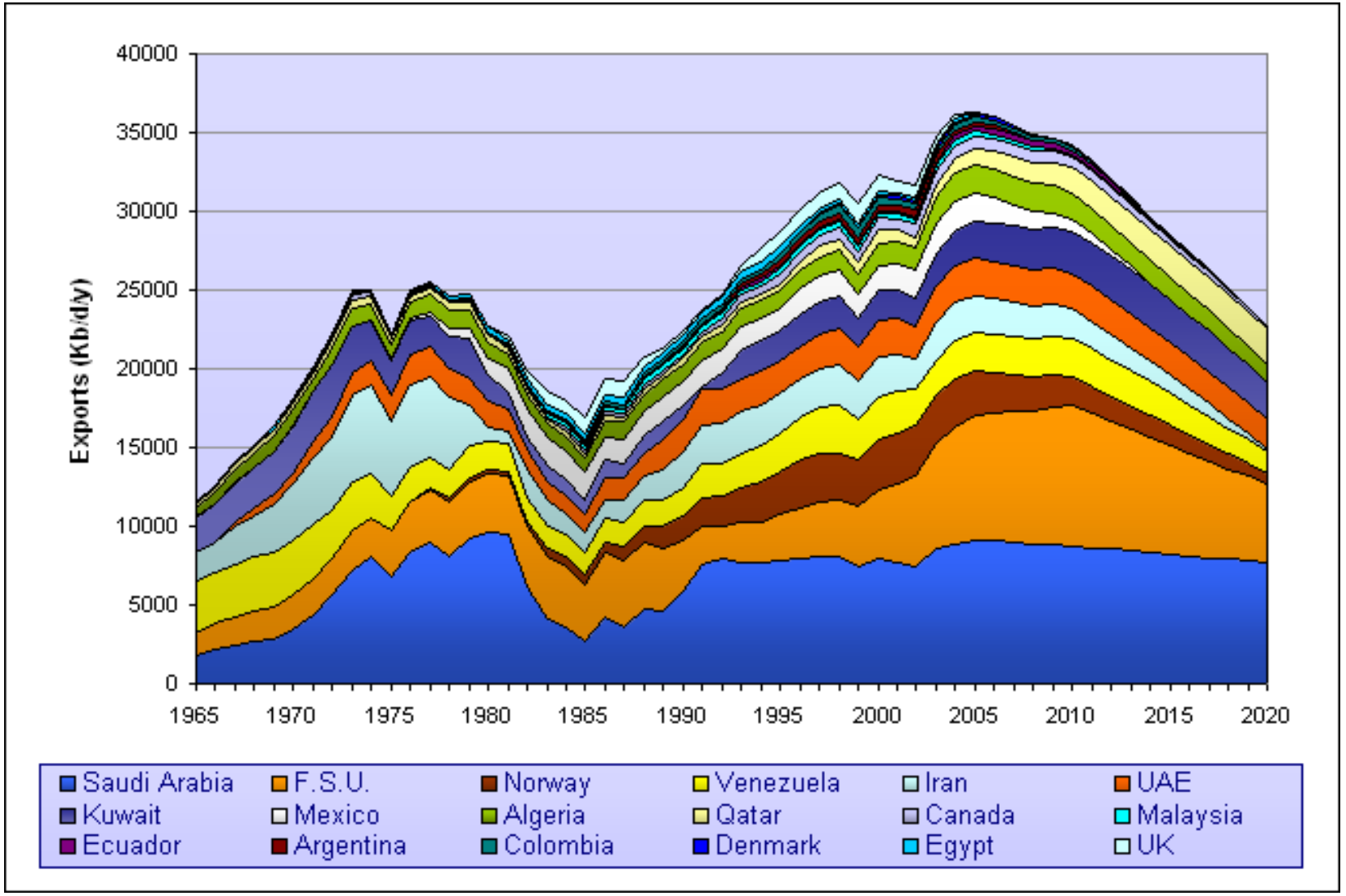
This is leading to rapidly fluctuating oil prices, such as we had in 2008.

Data: Exxon Mobile, BP, and International Energy Agency.

Note the date line (x-axis) on this slide. The shading change, marking the difference between projected and historic figures, is around 2007.

What has happened since then? Other slides in this presentation address some of this.

Exports from oil producers



Exports from oil producers

... and when will Peak oil happen to you?

Oil exporting nations are using their oil for their own internal consumption at an ever increasing rate.

Oil is often very cheap, like in Saudi Arabia were it is about 30p per gallon, so there is no incentive to conserve.

As their economies and populations grow, they have less oil to export.

Global Oil exports peaked in 2005, and has been slowly declining. For instance Saudi Arabia's internal consumption rose 5% every year from 2003-2010. This is bad news for people in countries which import vast amounts of oil to keep the economy going.

This is only one of a series of complex factors that are going to magnify and hasten the effects of peak oil, especially for oil importers, and contribute to increased volatility in the price of oil.

A ‘transition’ from conventional oil to ‘extreme energy’?

A new ‘transition’ from conventional oil to new ‘extreme energy’?

We have recently seen a rapid increase in the exploitation of ‘unconventional’ oil and gas.

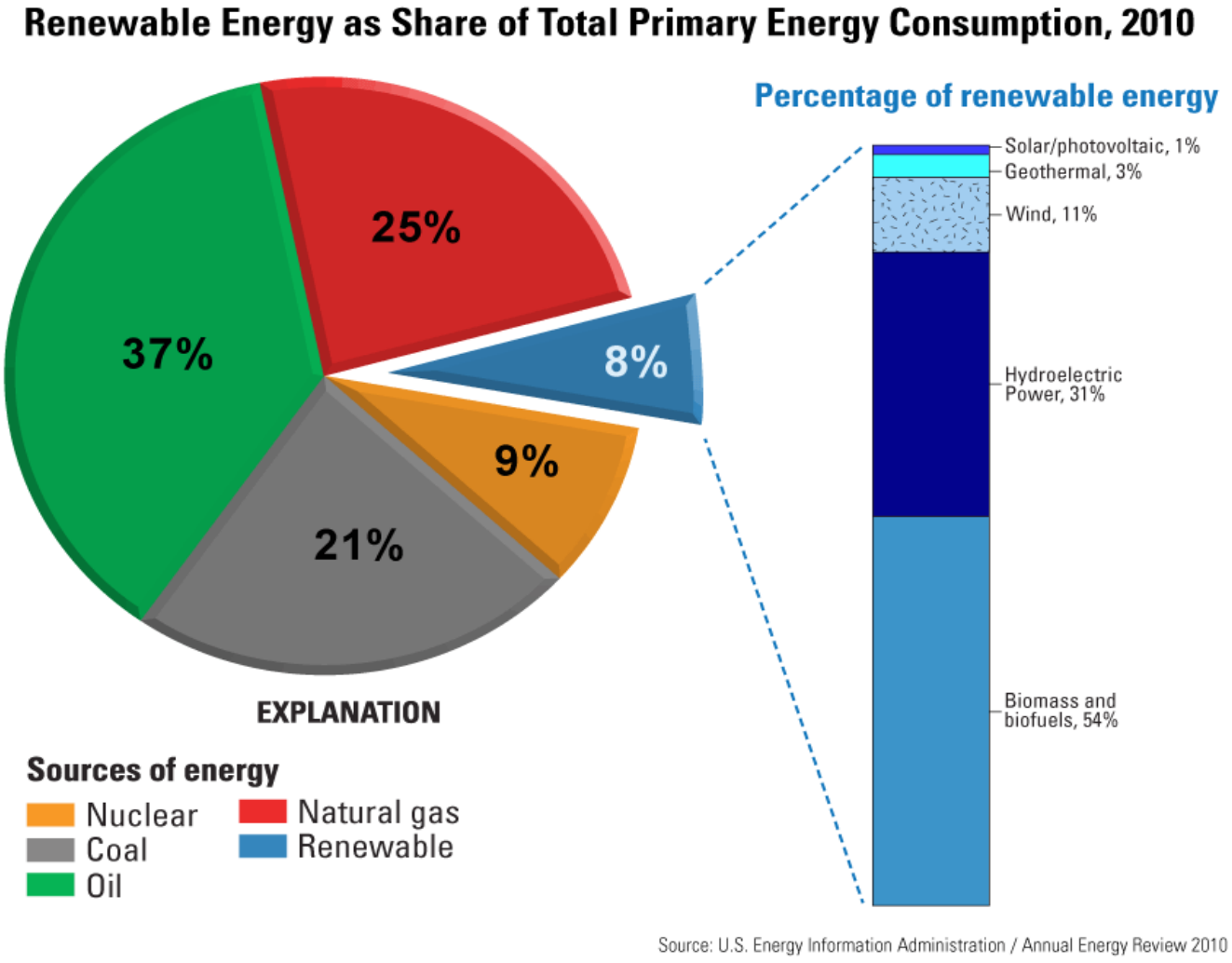
There are three main types of ‘extreme energy’ –

- hydro-fracking,
- tar sands
- drilling for crude oil in technically difficult and risky environments such as the Arctic ocean and deep water, (BP’s Deepwater Horizon well is shown here on fire)

The oil and gas industry presents these as the only way forward to keep our economies going.

These ‘unconventional’ sources are significantly more polluting in terms of CO2, and cause serious additional environmental impacts. These include: the contamination of drinking water by fracking; pollution to the oceans caused by deep water and arctic drilling, and vast ecological destruction in the case of the tar sands.

Where we get our energy from



Where we get our energy from (US)

This slide shows that fossil fuels still supply the vast majority of our energy.

Even if we were to double the amount of energy we get from solar and wind for instance, which would be a massive achievement, it would still only create 4% of current energy requirements.

Source: US Energy Information Administration

Why is oil so important?

How many men does it take to push a car?

Why is oil so important?

The phenomenal energy in petrol

A tank of petrol contains 8,000 human hours work – that's 8 hrs/day, 7 days a week, 52 weeks a year, for 3 years.

Most of us take for granted the amount of energy we have at our disposal instantly, everyday. No human society has ever had anything near this amount of energy before the discovery of fossil fuels and oil in particular.

Source: wikipedia

Suggested follow-on activity to do with this slide – very effective with students and young people who are about to enter the workplace: Ask them how much it costs to fill their car. Then ask how much they hope to be paid per hour when they start working full-time. Scale this hourly rate up to the value of a tank of petrol (ie x 8000). Do they still think that tank of petrol is expensive?

What do we use Oil for?

Transition Training 2009

Why is oil so important?

What do we use oil for?

Our entire way of life, and virtually everything we use, is reliant on oil.

Transport is only the beginning of our oil use.

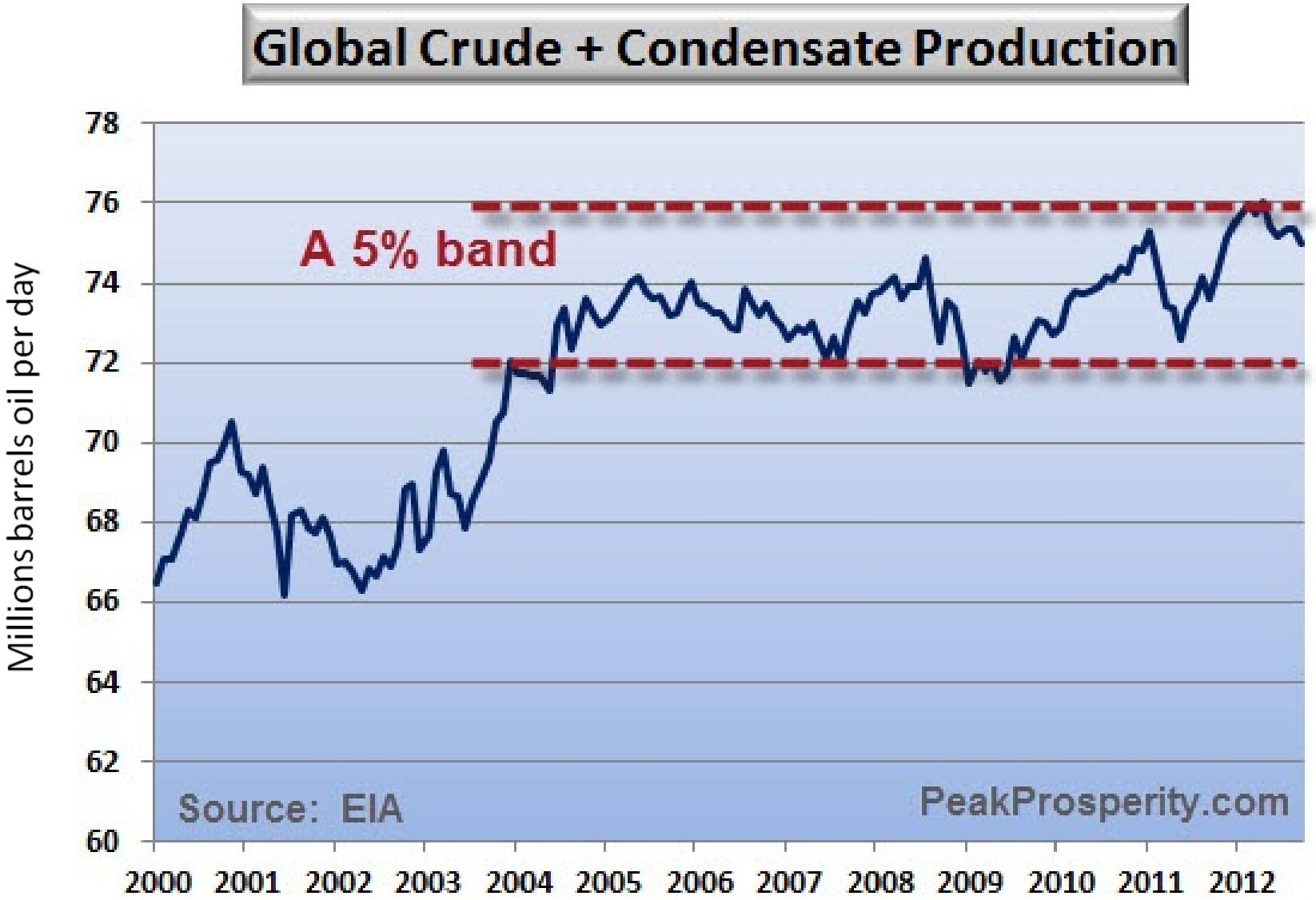
Many products are derived from oil, or use oil or gas as their raw material. Plastics, synthetic fibres, drugs, laminates, paints, ink…the list is endless.

Modern agriculture, the result of the so-called 'Green revolution', depends on oil. Fertilisers and pesticides are made from oil and natural gas, tractors and machinery use it. Irrigation requires huge amounts of energy and then there is the transportation (food miles); processing; storing; cooking; packaging, and retailing.

Industry, including even the service sector, use huge amounts of energy.

Source: Transition training and theoilrum.com

Oil Supply Limits Economic Growth**



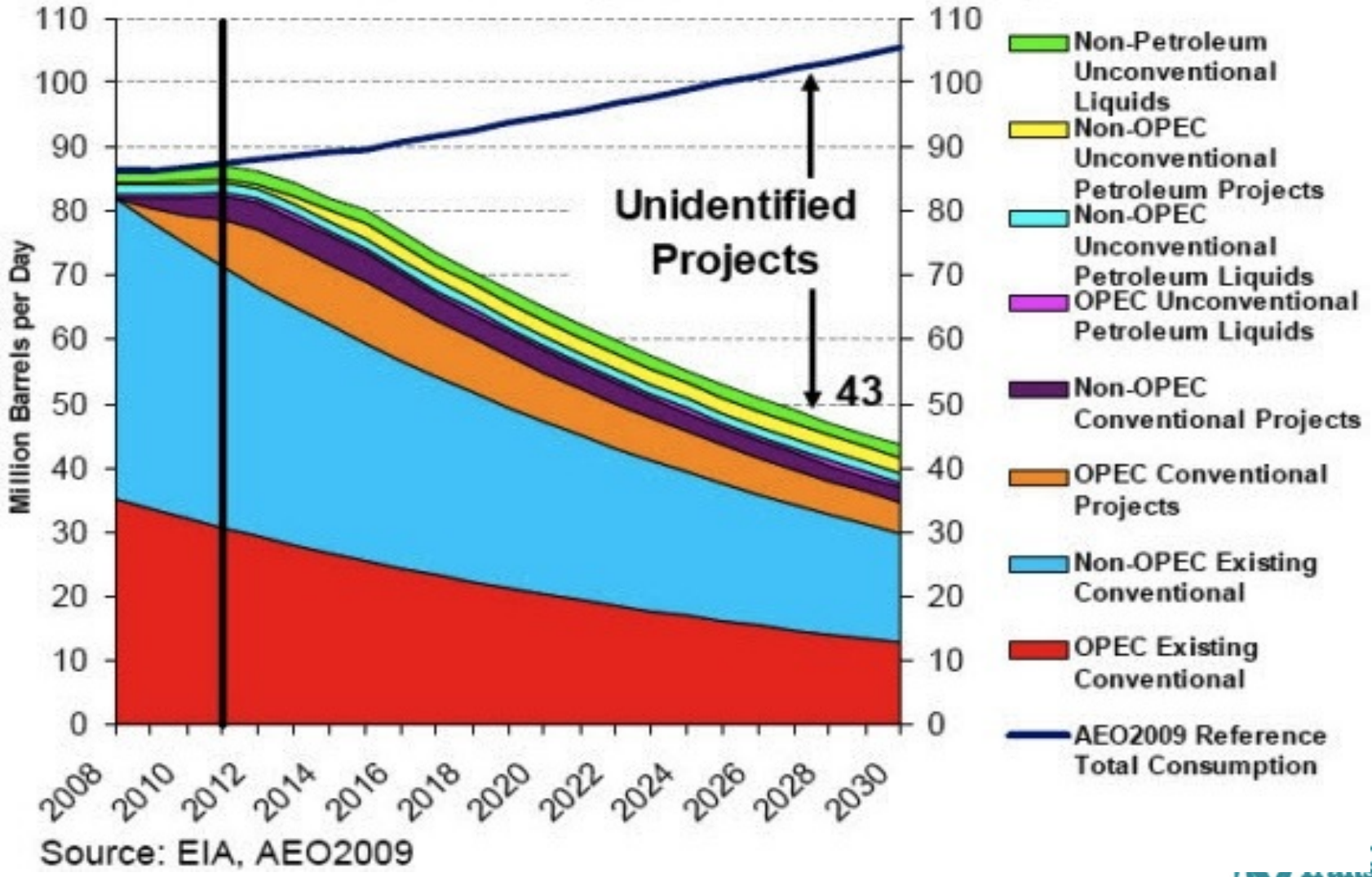
Oil supply limits economic growth

- This slide shows that global economic growth cannot happen now that oil production can no longer rise with demand.
- The saw tooth pattern happens when demand exceeds production, causing an oil price spike, leading to recession, reducing demand, and bringing oil price down again. As production picks up the production ceiling is hit, and price spikes again.
- Individual countries such as Brazil or China are able to sustain growth using their market power to obtain energy, and because their infrastructure is more energy efficient.
- Increasingly experts are considering that we may be at the end of global economic growth.

Sources: New Economic Foundation 2012 report: The Economics of Oil Dependency; A Glass Ceiling to Recovery.

Peakprosperity.com, International Energy Agency

The world's liquid fuel supply
What's in the pipeline ?



Source: EIA, AEO2009

The world's liquid fuel supply
What's in the pipeline ?

Can we depend on an ever increasing supply of oil?

There is a relationship between our economic system and the geology of oil production. This makes the peak in production a complex interrelationship between many factors, and therefore hard to predict. The narrative of peak oil has become more complex and harder to understand and communicate as we have learned more about these relationships.

Although we recognise that proposing a geological peak of oil production is too simplistic, there appears to be an insurmountable supply problem.

Conventional oil fields are currently depleting at the rate of 6.7% a year.

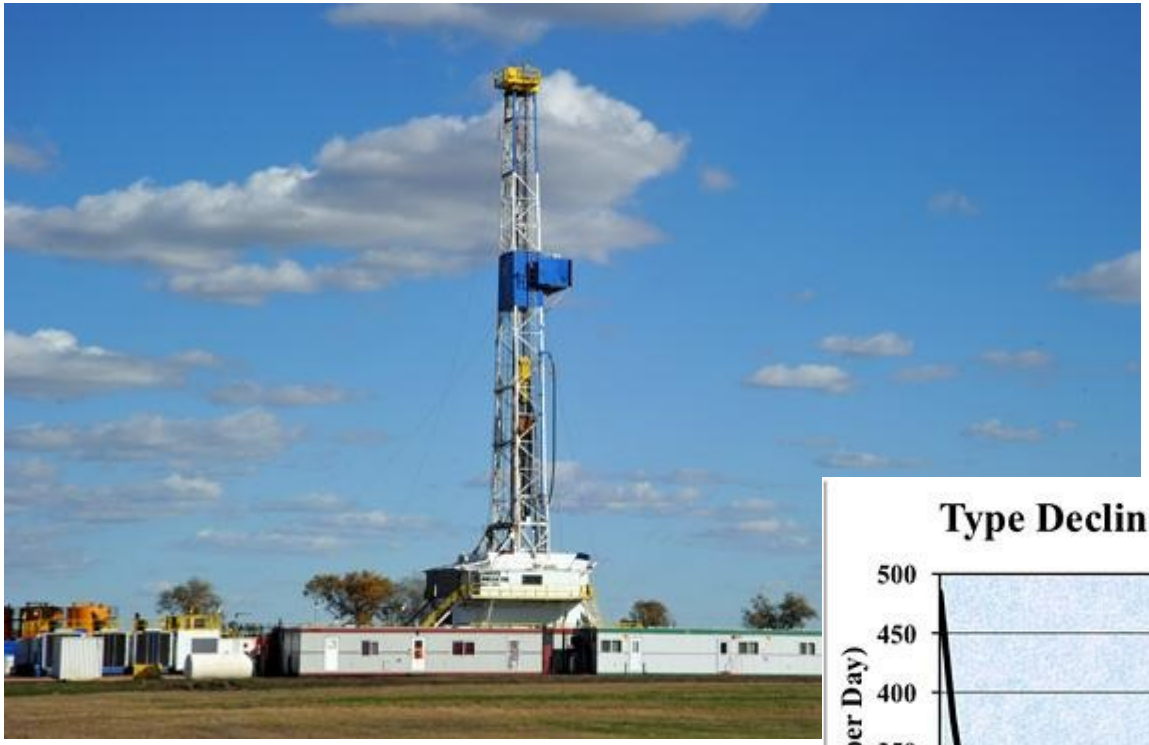
So just to keep production flat requires us to add around 5.7 million barrels of oil production every year.

This is the equivalent of a new Saudi Arabia every two years.

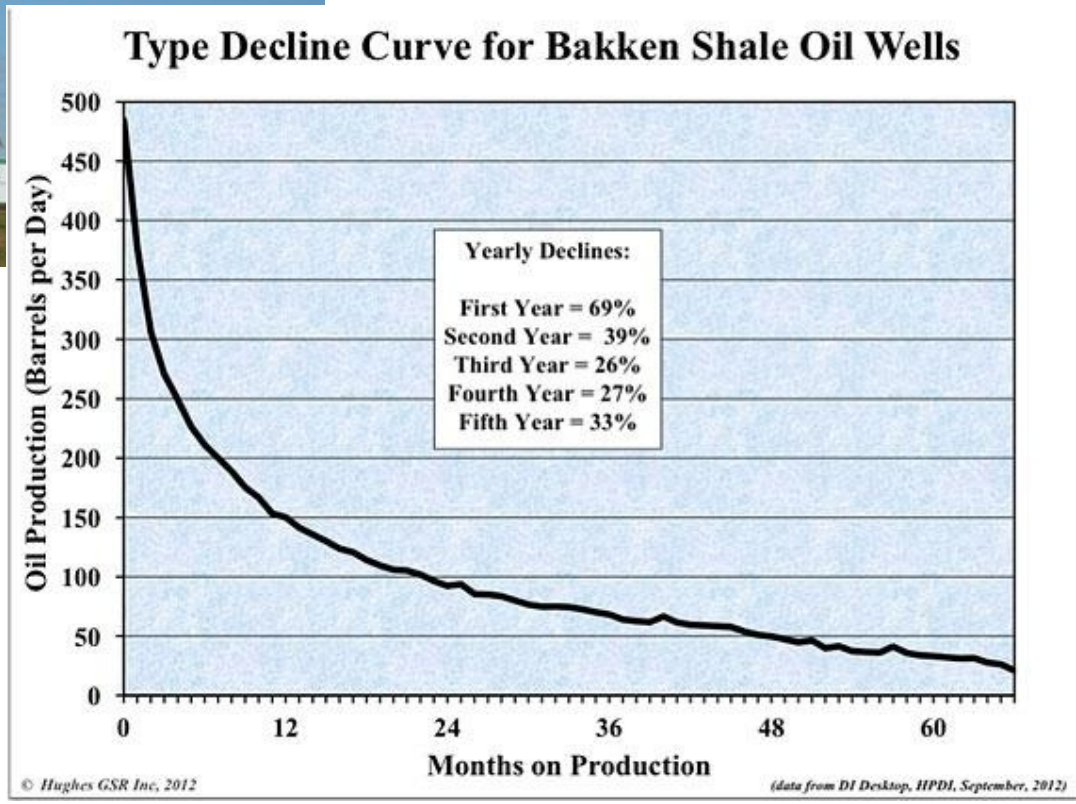
The yawning gap in the graph demonstrates this. We don't know where this additional production will come from.

Source: International Energy Agency. This graph was put on the International Energy Agency web site and controversially taken down shortly after.

Hydrofracking



Hydro Fracking well in the Bakken Formation, USA



Hydrofracking

Hydrofracking or 'fracking' uses water, horizontal drilling and a cocktail of over 500 chemicals (many of them known carcinogens) and explosives.

Wells are drilled, water and chemicals are injected, and the explosives set off to break open rocks that are 'tight' and non-porous to allow the oil or gas to flow out of them.

Some of the water and chemicals are pumped back up, and the oil or gas is recovered from the wells.

Each fracking event requires several million gallons of water, the chemicals, and hundreds of truck movements every day.

The holding ponds for the contaminated water have been known to cause severe health problems to humans and animals. Many environmental concerns remain unanswered.

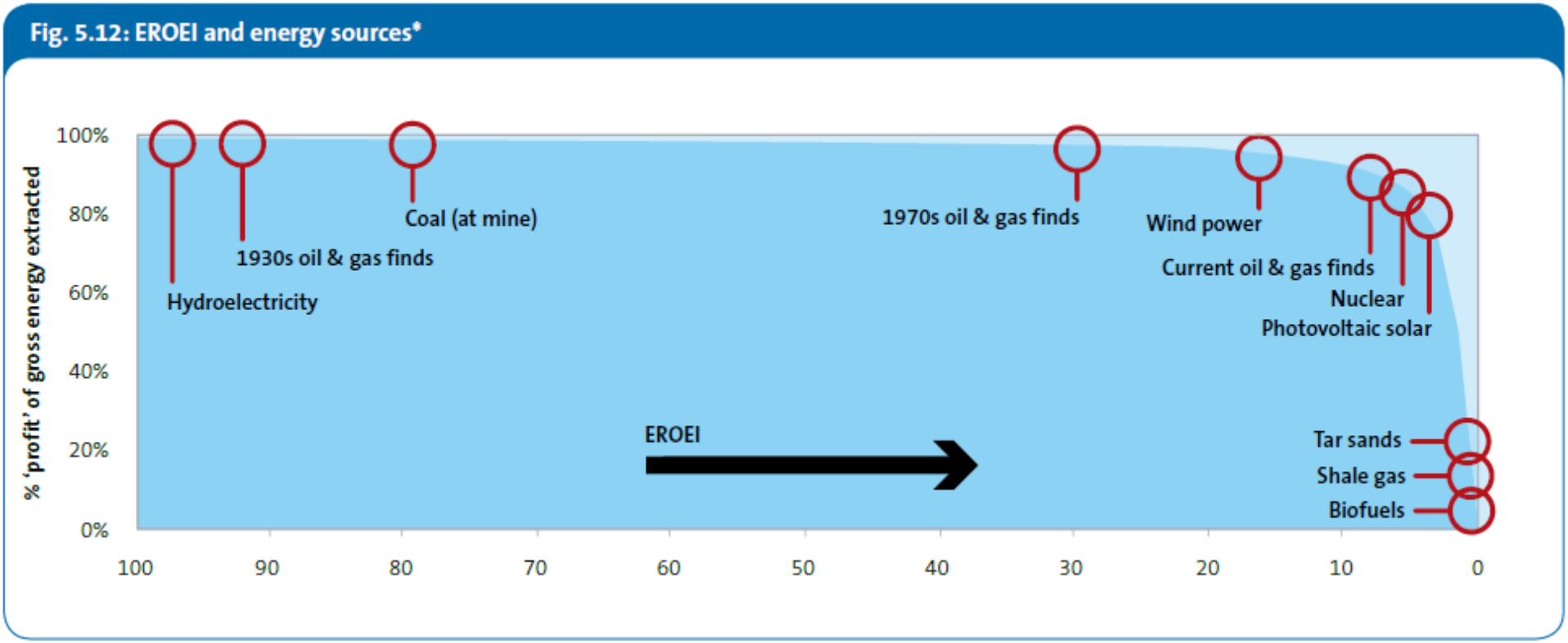
Wells peak immediately and generally decline by 69% in the first year, so the only way to keep production increasing is to keep drilling.

50 wells have been drilled in Europe and none so far yielded commercially extractable hydrocarbons. (Is this a ponzi scheme in the making?)

Source: http://slate.me/WPBLUg

The Net Energy Cliff

EROI – Energy Returned On Energy Invested



The Net Energy Cliff

EROI – Energy Returned On Energy Invested

Early fossil fuel extraction found the easy, high return energy first. This is expressed in the Energy Returned to Energy Invested equation (EROI). Think of it working like a financial return on investment; you want the maximum return on what you invest.

In the early days of oil production the EROI ratio averages 100:1. This meant lots of surplus energy was available to society.

However, this ratio has been reducing. We now have to spend lots more energy (and money) to extract the same amount of energy. We are getting a much poorer return on our investment.

More worryingly still, the newer forms of 'extreme energy' (tar sands, fracking, and deep water exploration) return a very low net energy; around 3:1.

It has been proposed that anything lower than 5:1 net energy is not enough to run an advanced, complex society like ours.

The conclusion being reached is that it doesn't matter how much energy there is in extreme energy, if the net return is this low, it is essentially worthless to us.

Source: Tullett Prebon report; *Perfect Storm*, *Energy, Finance, and the End of Growth*, Tim Morgan 2013

Net Energy and Economic Growth

Fig. 5.14: High EROEI

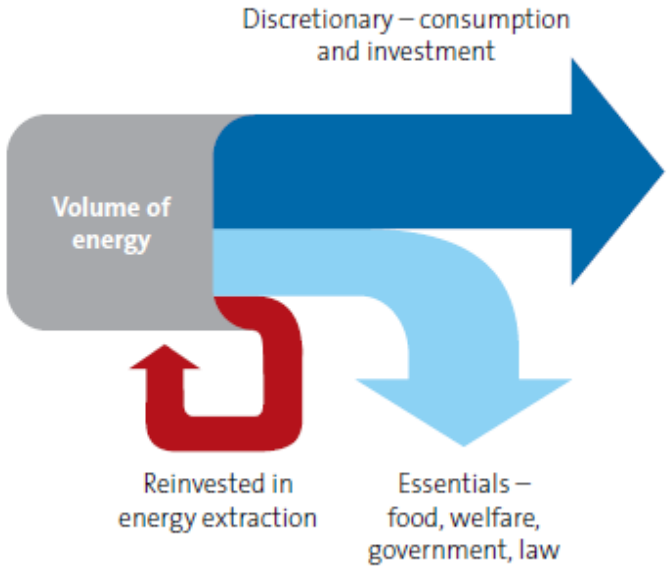
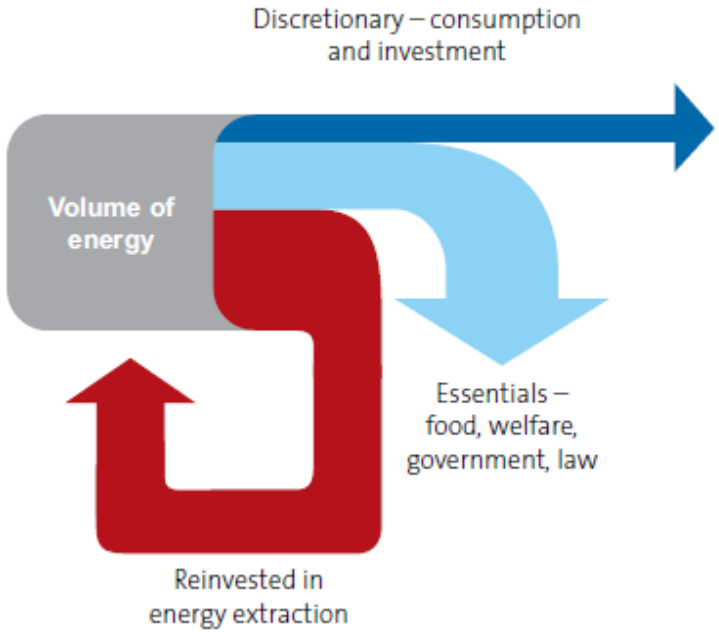


Fig. 5.15: Low EROEI



Net Energy and Economic Growth

Although the relationship is complex and not well understood it makes common sense that, as the economy is based on the use of energy, economic growth becomes limited as net energy available decreases.

The visuals show how, as the energy required to find and produce energy increases, the energy available to do everything else decreases.

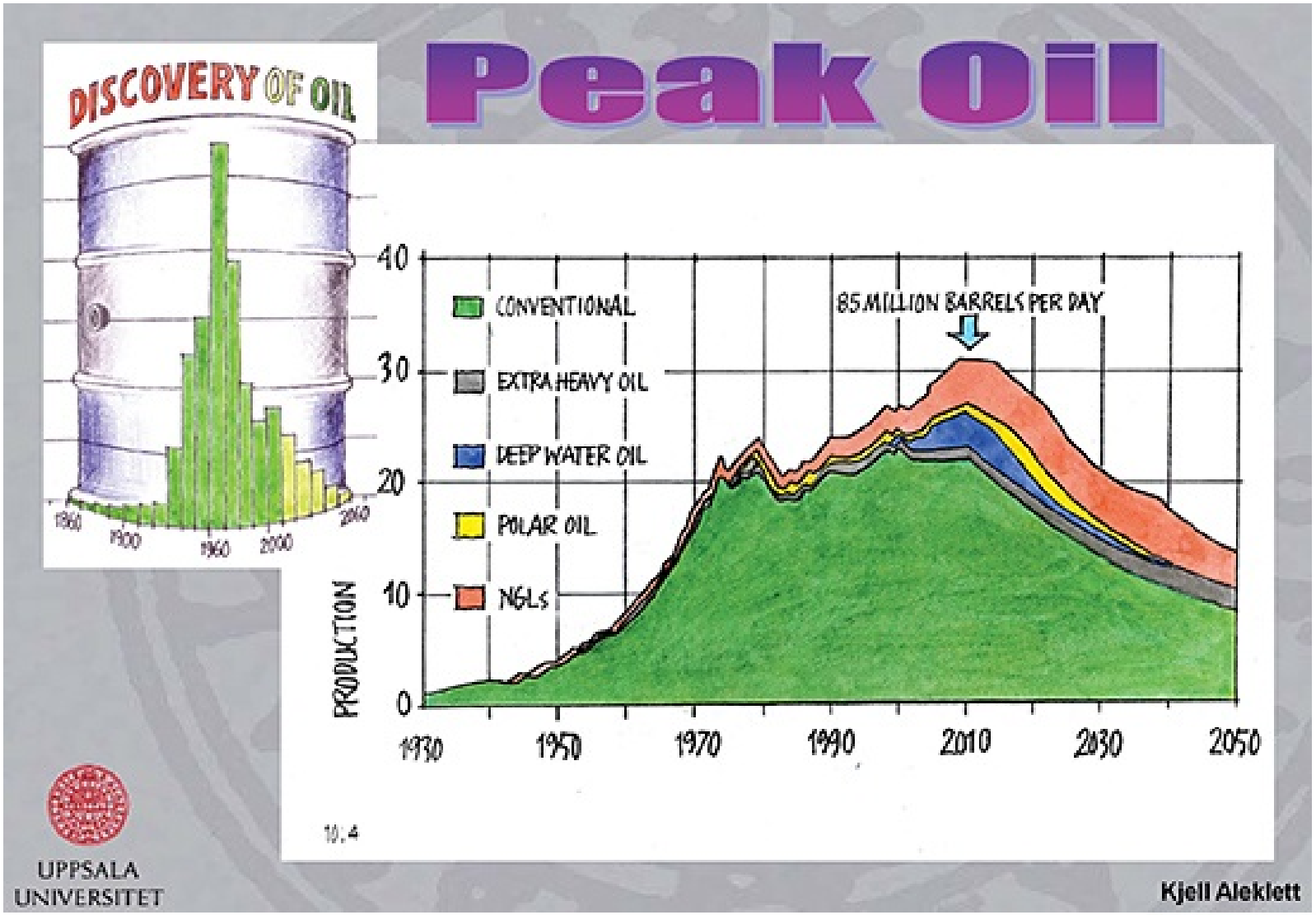
As we are required to maintain the basics of society – for example infrastructure (roads, water, sewage, electricity grid, railways etc) and government - there will be little left over for everything else (also know as discretionary spending).

As Europe and the USA has focussed their economies to supply the more profitable discretionary spending elements, economic growth for those economies may now be impossible.

Uncertainty about government statistics and the use of debt to 'pay' for our lifestyles in the West may mean that we have not experienced any economic growth since the late 1980's. The bursting of the debt bubble in 2007/2008 has brought an end to the illusion of growth that we, as yet, mostly can't see.

Source: Tullett Prebon report; *Perfect Storm*, *Energy, Finance, and the End of Growth*, Tim Morgan 2013

Global oil discovery and production



To produce oil, you first have to discover it.

World discovery peaked in the late 1960's and has been falling ever since. Despite rapidly improving and sophisticated technology, there is no prospect of it ever increasing.

At the same time production has been rapidly rising.

Demand is projected to go on rising with production failing to keep up, especially in rapidly industrialising countries like China and India.

This is leading to rapidly rising oil prices, such as we had in 2008, and then steep drops. Hence world energy supply is becoming increasingly uncertain.

When will peak oil happen? A projected and ever widening energy gap between production and demand is being predicted anywhere from 2011 onwards.

Data: Exxon Mobile, BP, and International Energy Agency.