

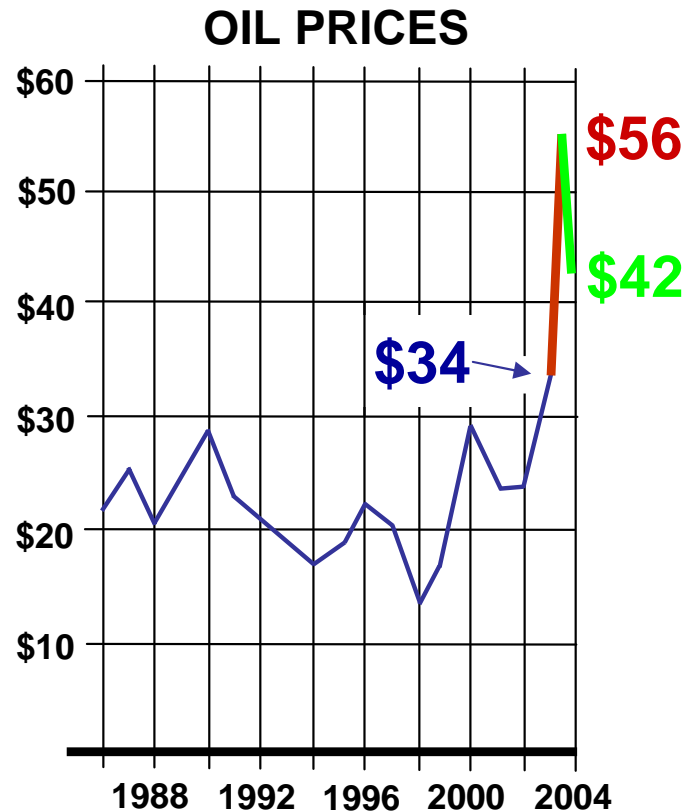
What Is Going On In The Global Oil Sector...?!

R. Oğuz Çapan

Oil & Gas Production Engineer & Consultant

oguz.capan@solar-ltd.com

(This Presentation is based on developments up to
December 17th, 2004.
It will be revised if and when new developments call for it.
You can download it from www.solar-ltd.com)



Oil prices went up by 70% during the first three quarters of 2004...

Soon after, they fell by 20%...

Price fluctuations are normal in the global oil markets, but not at these levels and frequency...

So, what is happening...?

According to the market analysts:

Terrorism and Iraq war is creating obstacles (or at least fears of it) against the production and transportation of oil & oil products;

Repeated hurricanes in the Gulf of Mexico is upsetting oil field operations there;

Labor strikes in Venezuela and the North Sea are upsetting oil field operations;

At the same time, demand for oil is rising rapidly and the oil and product stocks in the US is falling;

All these are creating opportunities for speculators to manipulate prices as they wish. So we saw peaks of \$56 in October 2004.



According to the same market analysts, even if these negative factors are not eliminated in 2005, high oil prices will reduce the demand for it, and thus prices will settle back in \$35 - \$40 band. (Actually we saw \$42 this week...)

But there are much more serious factors with permanent affects that seem to escape the Market Analysts these days...



Short-Term Energy Outlook – December 2004

December 7th , 2004 Release (Next Update: January 11th, 2004)

OPEC (and world) production capacity remains about 0.5-1.0 million barrels per day above current output levels, implying a global utilization rate of about 99%.

According to the December 7, 2004 dated report of US DOE's (Dept. Of Energy) EIA (Energy Info. Admn.), while the capacity utilization in all sectors affecting the supply of oil and refined products have reached above 90%, the rapidly rising demand in 2004 has been met just barely...

Actually, this situation in capacity utilization plays a major role in the effectiveness of the other factors the Market Analysts have been concentrating on...

In this presentation, I will try to concentrate on the capacity utilization factor in the following related sectors that I believe the Market Analysts have been overlooking:

Global Oil Tanker Capacity

Global Refinery Capacity

Global Recoverable Oil Reserves

But first allow me to introduce the oil professionals and academicians I have referred to...

(In other words, I feel it is important to declare that the views presented in here are not mine alone...)

Dr. Colin Campbell, served as Chief Exploration Geologist In TEXACO and BP, was the Executive V.P. In French oil conglomerate TOTAL-FINA, and formed ASPO (Association For The Study Of Peak Oil).

Jean H. Laherrère, was the Head of the "Oil Exploration Technologies Dept." of French TOTAL, and his teams discovered the largest oil fields of North Africa. He is currently associated with The Petroconsultants based in Switzerland.

Kjell Aleklett, Prof. Of physics and the Head of the Hydrocarbon (oil & gas) Working Group at the Uppsala University of Sweden.

Kenneth S. Deffeyes, Physics Prof. Emeritus at Princeton.

David Goldstein, Physic Prof. And Vice Provost of California Institute of Technology.

Matt Simmons, founder of "Simmons & Company International" of Houston, the largest banking & finance group in the world concentrating on oil & gas projects. He oversaw the financing of over 500 oil & gas projects with a total value of \$58 billion. He has taught at the Harvard School Of Business, and served as Energy Advisor in the George Bush White House.

Yes, let us get started by looking at one of the critical factors in the global oil supply chain:

“What is the situation in the global tanker sector?”

GLOBAL OIL TANKER CAPACITY



Short-Term Energy Outlook – December 2004

December 7th , 2004 Release (Next Update: January 11th, 2004)

World petroleum demand growth for 2004 has been revised downwards slightly from the previous *Outlook* to 2.6 million barrels per day over 2003 levels, but still shows a strong 3.3-percent growth for the year. **Global oil demand growth is expected to slow to 2 million barrels per day (2.5 - percent growth) in 2005** as global economic growth slows toward more sustainable rates, influenced in part by high world oil prices.

A major part of this additional 2 million barrels per day demand for oil during 2005 will occur in China and USA. And almost all of it will be supplied by Saudi Arabia.

(IEA – International Energy Agency, Paris)



Therefore, global tanker capacity to transport this additional oil will be as critical a factor as the ability to produce it for fully meeting the market demand for oil.

GLOBAL OIL TANKER CAPACITY

A serious capacity shortage in cross-ocean oil tanker capacity has already occurred in the second half of 2004, as conclusively shown by the sharp rise in the daily rental fees charged for VLCC class of super tankers (Very Large Crude Carrier):

1995-2003 average was around \$ 35 000

In late 2004 it increased to \$ 135 000

(Jefferies & Company tanker company, Houston, Texas)



It is very clear that
additional oil tanker capacity is needed immediately
to transport this additional oil
from Saudi Arabia to China and USA...

GLOBAL OIL TANKER CAPACITY

A VLCC class super tanker's capacity is 2 million barrels. Which is equal to the additional amount to be carried each day in 2005.

It takes about 40 days for a super tanker to travel from Persian Gulf to China, Japan, or to USA. Therefore, for a tanker to arrive each day at these markets, we need 40 super tankers traveling across the oceans, a day apart from each other.

Any given day, there will be an additional 40 super tankers returning empty. And accounting for operational factors like loading/unloading time and bad weather, it is clear that the total number of supertankers required to deliver this 2 million barrel each day comes to about 90...

In fact, it has been estimated that it will take an investment of \$25 billion to meet the additional tanker demand until the year 2010.

(Neela Banrjee, NYT 11/02/2003)



"A super tanker ordered today
will be delivered in four years..."

(Peter Evensen, V.P. of Teekay Tanker Company)

GLOBAL OIL TANKER CAPACITY

This surely is an exciting time for tanker owners... After all, their profits has increased about 400% in 2004... Therefore, one might think that they would be racing with each other to capture more of the market share by building up their capacity...

But we see no such activity. They are more concerned about replacing the older "single-walled-hulls" tankers with new "double-walled-hulls" tankers as required by the new international regulations to reduce oil spills in tanker accidents.

So, why there is no rush to build new super tankers? Very Simple:

Because oil refineries no longer have the capacity to process this additional oil the new fleet of tankers would deliver to them...!



In other words, it would not make any sense to expect the tanker companies to rush to increase their capacity until refineries increase their own capacity first...

Yes, now let us move a step further:

“What is the situation
in the
oil refinery sector?”

GLOBAL OIL REFINERY CAPACITY

US Refinery capacity utilization reached well over 90% during 2004. Even then, the US had to import refined products to meet the demand.

The last new refinery construction in the US was completed in 1976. Since then, all that was done was the implementation of new technologies in existing refineries to increase their efficiencies and capacity.



One new refinery with 250,000 barrel per day capacity has to be constructed every year in the US just to meet the demand. This will require an investment of \$90 billion until year 2010.

USDOE - EIA (US Dept. Of Energy – Energy Information Administration)

GLOBAL OIL REFINERY CAPACITY

But, just as the tanker companies are in no rush to increase their capacities,
there is no significant move to increase refinery capacity
in the USA and other developed countries...

Because, the large oil companies that own most of the refineries know better
than anyone else that...

any new and significant oil production increase
they will be able to realize from now on
will last only for short few years,

and

thus, large investments in new refineries
that will have a much longer pay-back periods
make no sense...

Yes... We started with tankers, continued with refineries, and now we have arrived at the fundamental issue:

“What is the situation
in the
recoverable oil reserves?”

RECOVERABLE OIL RESERVES

Oil consumed has far exceeded oil discovered each and every year since 1980. (Reports by EIA, IEA, ASPO, BP, ExxonMobil)

“There are discoveries made all the time, but they are smaller and smaller...”

(Jim Meyer, Director of “Oil Depletion Analysis Center”, London)

Actually, the 10 largest oil companies have drastically curtailed their exploration budgets since 2002, because they lose money in exploration:

In **1999** they spent **\$6,5** billion, discovered **\$18,0** billion worth of oil;
In **2002** they spent **\$7,2** billion, discovered **\$ 5,5** billion worth of oil.

This negative trend widened in 2003 and 2004...

(Wood Mackenzie)

These companies have concentrated on increasing production from their existing fields rather than looking for new ones. Thus, the funds they diverted to their budgets to expand the existing fields rose by 42% between 1998 and 2003 to \$50 billion.

(Wood Mackenzie)

In other words, while not able to discover new large reserves, the existing reserves are being consumed at increasing rates.

RECOVERABLE OIL RESERVES

On the other hand, the most important factor in evaluating the stock market value of an oil company is the amount of its recoverable oil reserves. Thus, those companies that have a negative “reserve replacement ratio” (production exceeding new discovery) are assumed to be on the decline, and the value of their shares drop.

This is the main reason behind the rush to merge among the giant oil companies within the last decade.

BP-AMOCO, EXXON-MOBIL, TOTAL-ELF merges are good examples.



Another solution was to buy other’s reserves (such as the purchase of Siberian oil fields by the western oil companies).

RECOVERABLE OIL RESERVES

You may be saying, "But the press is full of news about new giant fields being discovered?". Well, let's look into some of these giant new discoveries:

"The giant discovery of **Sakhalin-5** field in eastern Siberia excited BP."
([The Guardian, October 7th. 2004](#))

The most optimist reserve estimates of this "giant" field is 4.4 billion barrels. This is roughly equal to 2 months of global oil consumption...

(4.4 billion barrels) \div (84 million barrel/day consumption) = 54 days

Situation in Kazakhstan, Alaska, Nigeria and the Gulf of Mexico is not much better...

For instance, the giant **Kaşagan** field expected to go on production by 2008 in Kazakhstan is estimated to have 9 to 13 billion barrels of oil. Which is about 3 to 5 months' worth of global oil consumption...



Similarly, the much argued over **Alaska's ANWR** area is estimated to have 8 to 15 billion barrels of recoverable oil reserves. This would be equal to 3 to 6 months' worth of global oil consumption... (Or about 13 to 25 months' of USA oil consumption)

RECOVERABLE OIL RESERVES

Especially with the rising oil prices, any new discovery, regardless of its size, would of course be very exciting to those who discovered it.

But, such “giant” new discoveries are far from comforting – let alone exciting – the consumers...

RECOVERABLE OIL RESERVES

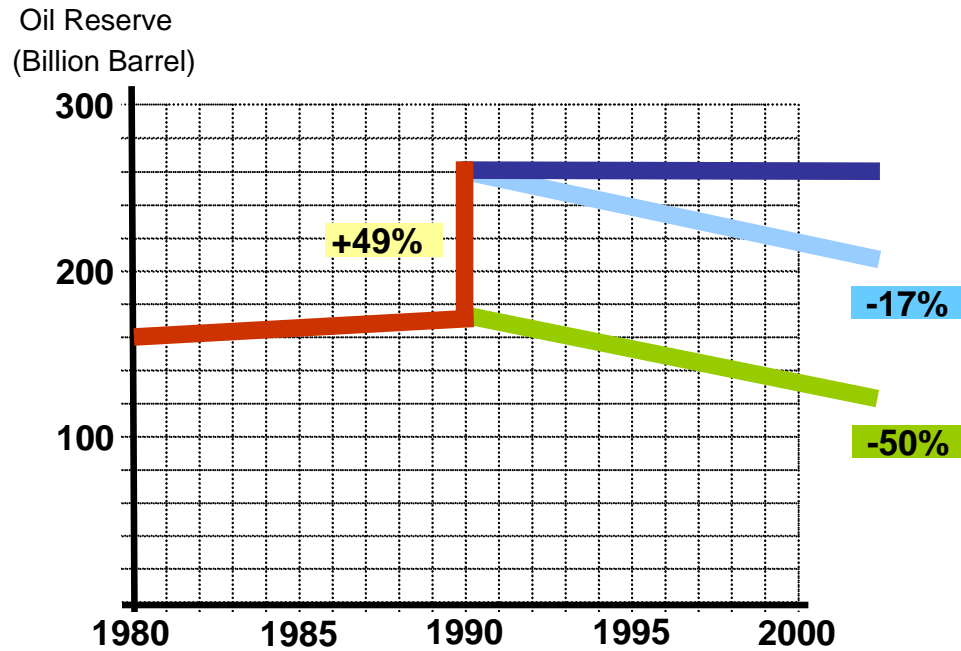
Again, you may be saying, "All this is fine, but how about the Persian Gulf? After all, most of the world's oil is there..."

True...

So, let's now look into
the situation in the Persian Gulf...

What Is Going On In The Global Oil Sector...?!

Oil Production/Reserve “Accounting” – SAUDI ARABIA



Year	Cumulative Production (Bil. Barrels)	Official Reserves (Bil. Barrels)
1980		166,48
1981		168,03
1982		167,85
1983		165,32
1984		168,85
1985		171,71
1986		171,49
1987		169,18
1988		169,59
1989		172,58
1990	2,34	257,56
1991	5,30	260,00
1992	8,34	260,34
1993	11,34	260,34
1994	14,30	261,20
1995	17,30	261,20
1996	20,30	261,20
1997	23,35	261,50
1998	26,42	261,50
1999	29,28	261,50
2000	32,34	261,50
2001	35,27	263,50
2002	38,06	261,70
2003	41,29	261,75

In 1990, the officially reported oil reserves suddenly jumped by 49% to 257 billion barrels.

As if this was not enough, produced oil from that date on has Never been deducted from this official reserve numbers...

When we account for the production after 1990, the correct reserve number would be 17% below what is reported today...

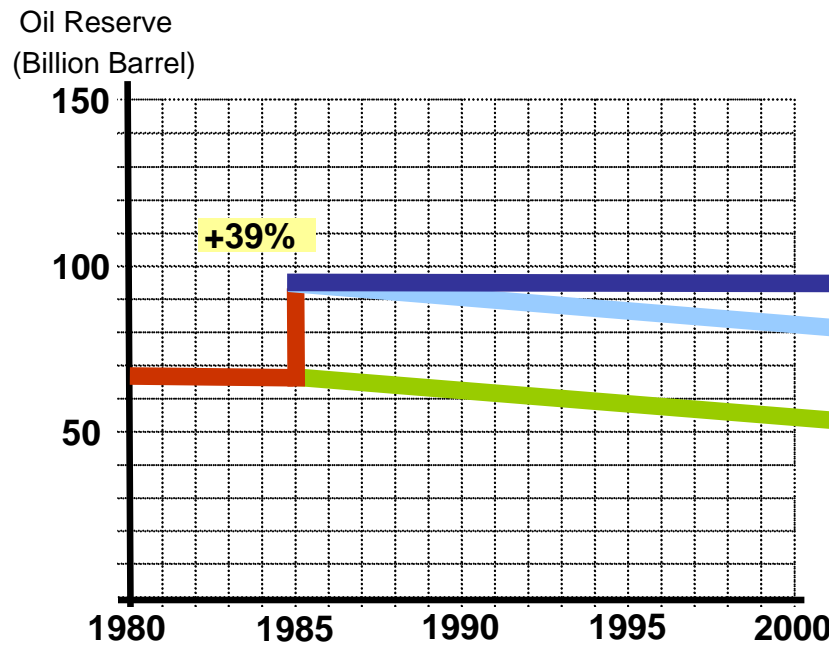
$$257,56 - 41,29 = 216,27 \quad (-17\%)$$

If we do the same adjustment by taking the reserve number before the questionable increase in 1990 as the base, the correct reserve number would be 50% below what is reported today...

$$172,58 - 41,29 = 131,29 \quad (-50\%)$$

What Is Going On In The Global Oil Sector...?!

Oil Production/Reserve "Accounting" – KUWAIT



	Cumulative Production (Bil. Barrels)	Official Reserves (Bil. Barrels)
1980		68,53
1981		67,93
1982		67,73
1983		67,15
1984		66,75
1985	0,37	92,46
1986	0,89	92,46
1987	1,47	94,52
1988	2,01	94,53
1989	2,67	94,53
1990	3,09	97,13
1991	3,16	97,03
1992	3,55	96,50
1993	4,23	96,50
1994	4,96	96,50
1995	5,72	96,50
1996	6,47	96,50
1997	7,20	96,50
1998	7,96	96,50
1999	8,65	96,50
2000	9,41	96,50
2001	10,14	96,50
2002	10,83	96,50
2003	11,63	96,50

Same thing has happened in Kuwait...

In 1985, the officially reported oil reserves suddenly jumped by 39% to 92 billion barrels.

Kuwait too did not bother to deduct its production from its reserve since that time...

When we account for the production after 1985, the correct reserve number would be 16% below what is reported today...

If we do the same adjustment by taking the reserve number before the questionable increase in 1985 as the base, the correct reserve number would be 43% below what is reported today...

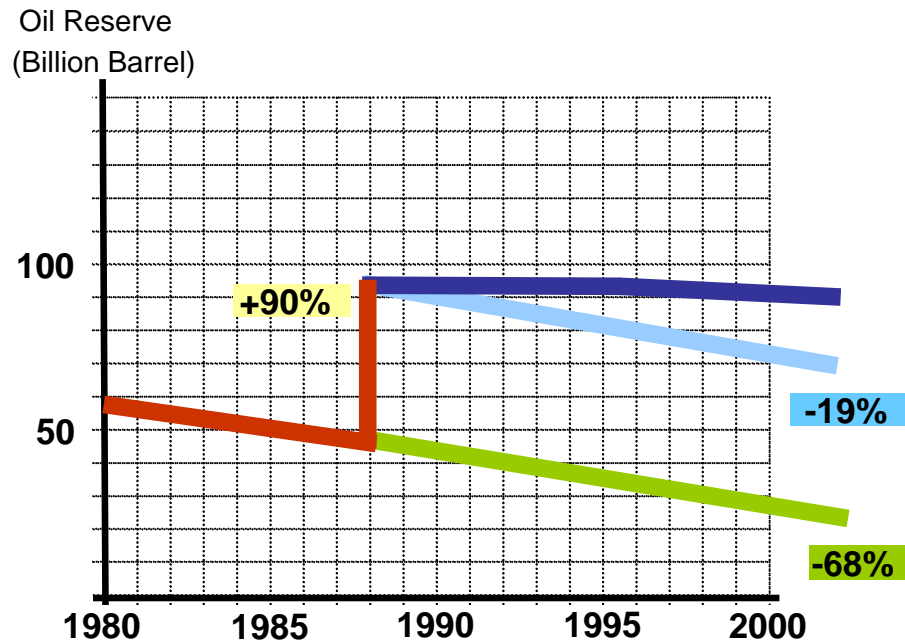
$$92,46 - 11,63 = 80,83 \quad (-16\%)$$

$$66,75 - 11,63 = 55,12 \quad (-43\%)$$

0%

What Is Going On In The Global Oil Sector...?!

Oil Production/Reserve "Accounting" – IRAN



	Cumulative Production (Bil. Barrels)	Official Reserves (Bil. Barrels)
1980		58,00
1981		57,50
1982		57,00
1983		51,00
1984		55,31
1985		48,50
1986		47,88
1987		48,80
1988	0,82	92,85
1989	1,84	92,85
1990	2,97	92,86
1991	4,18	92,85
1992	5,43	92,86
1993	6,72	92,86
1994	8,04	92,86
1995	9,37	89,25
1996	10,72	88,20
1997	12,06	93,00
1998	13,38	93,00
1999	14,68	89,70
2000	16,03	89,70
2001	17,39	89,70
2002	18,65	89,70
2003	23,03	89,70

Iran did the same thing...
 In 1988, the officially reported oil reserves suddenly jumped by 90% to 92 billion barrels...!

Iran also did not bother to deduct its production from its reserve since that time...

When we account for the production after 1988, the correct reserve number would be 19% below what is reported today...

If we do the same adjustment by taking the reserve number before the questionable increase in 1988 as the base, the correct reserve number would be 68% below what is reported today...

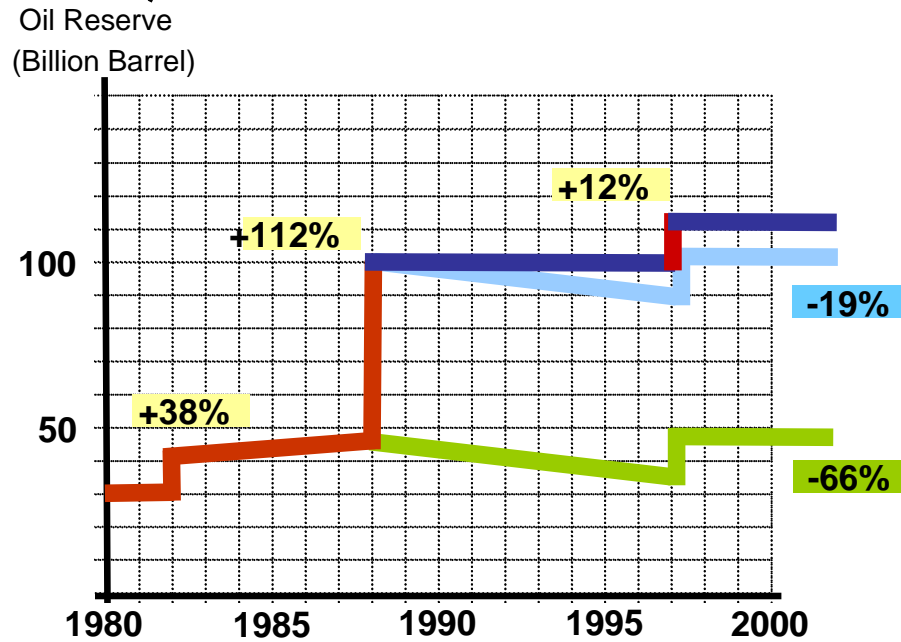
$$92,85 - 20,03 = 72,82 \quad (-19\%)$$

$$48,80 - 20,03 = 28,77 \quad (-68\%)$$

3%

What Is Going On In The Global Oil Sector...?!

Oil Production/Reserve "Accounting" – IRAQ



Cumulative Production (Bil. Barrels)	Official Reserves (Bil. Barrels)	Change (%)
	31,00	
	30,00	
	29,70	+38%
	41,00	
	43,00	
	44,50	
	44,11	
	47,10	+112%
0,98	100,00	
2,04	100,00	
2,78	100,00	
2,89	100,00	
3,05	100,00	0%
3,24	100,00	
3,44	100,00	
3,64	100,00	
3,85	100,10	+12%
4,27	112,00	
5,06	112,50	
5,97	112,50	
6,91	112,50	0%
7,78	112,50	
8,52	112,50	
9,00	112,50	

Saddam Hussein was not to be overdone and raised his reserves three times:

- by 38% in 1982
- by 112% in 1988, and
- by 12% in 1997

As others, he too did not account for his production and kept his reserve numbers constant down to decimal points all these years.

When we account for the production after 1988, the correct reserve number would be 19% below what is reported today...

If we do the same adjustment by taking the reserve number before the questionable increase in 1988 as the base, the correct reserve number would be 66% below what is reported today...

$$100,00 - 9,00 = 91,00 \quad (-19\%)$$

$$47,10 - 9,00 = 38,10 \quad (-66\%)$$

RECOVERABLE OIL RESERVES

Such huge and sudden reserve increases could not possibly have happened, because:

Almost all of the drilling and construction work in these countries are done by western contractors (Halliburton, Baker Hughes, Schlumberger, Bechtel, Etc.).

And we see no signs of a comparable explosion of action in their annual activity and financial reports that such giant discoveries would have caused...

Officials of these countries have been using the new technologies to explain such reserve increases (such as 3D seismic and horizontal drilling).



But the wide use of these technologies occurred years later even in the western oil fields...! Such an excuse can not be accepted...

RECOVERABLE OIL RESERVES

So, why did the OPEC members did such a thing...?

Since 1970s OPEC has set a “production quota” system by which the members are assigned a “production ceiling” determined according to the size of their oil reserves. In other words, more reserves a member has, more that member can produce...

We have always known that most OPEC members have notoriously produced more than their assigned “quota” to meet their national budgetary needs.



But we now also know that they artificially increased their reported oil reserves to be able to increase their quotas as well...

RECOVERABLE OIL RESERVES

Unfortunately OPEC members were not alone in this:

SHELL admitted early in 2004 that it made mistakes in evaluating its global oil reserves and reduced them by 20%. This caused its top management to resign.

Some are arguing that SHELL is just the tip of the iceberg and that there will be more "ENRON cases" coming up in the oil sector.



OECD's IEA (International Energy Agency), has always used such reported reserve figures in its evaluations and reports without questioning them...

But in its November 2004 report, IEA finally expresses concerns and recommends that more care should be taken in evaluating reserve numbers from now on...

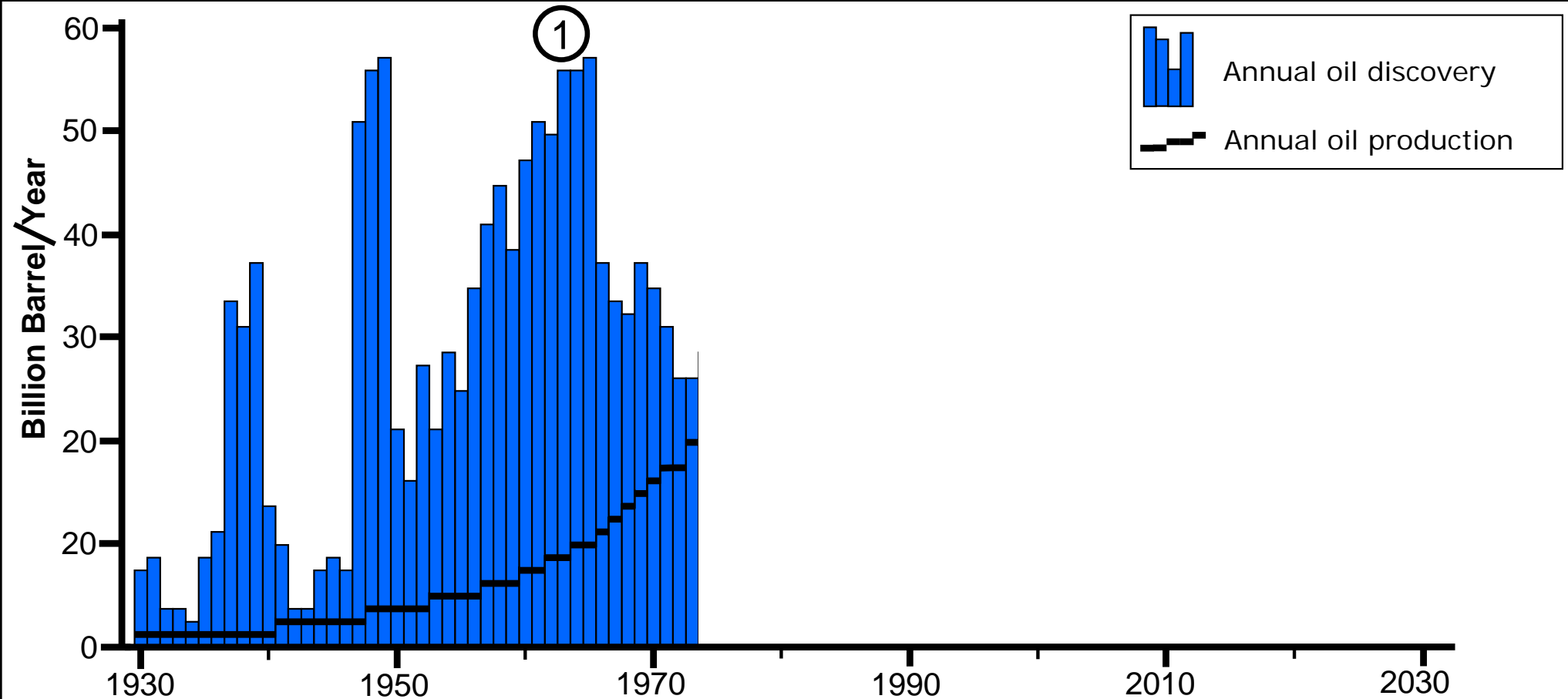
RECOVERABLE OIL RESERVES

Yes, it is very clear that the reported amount of remaining reserves of recoverable oil is very questionable...

Now, let us look into
at what rate, and for how many years
we will be able to produce our
remaining oil reserves...

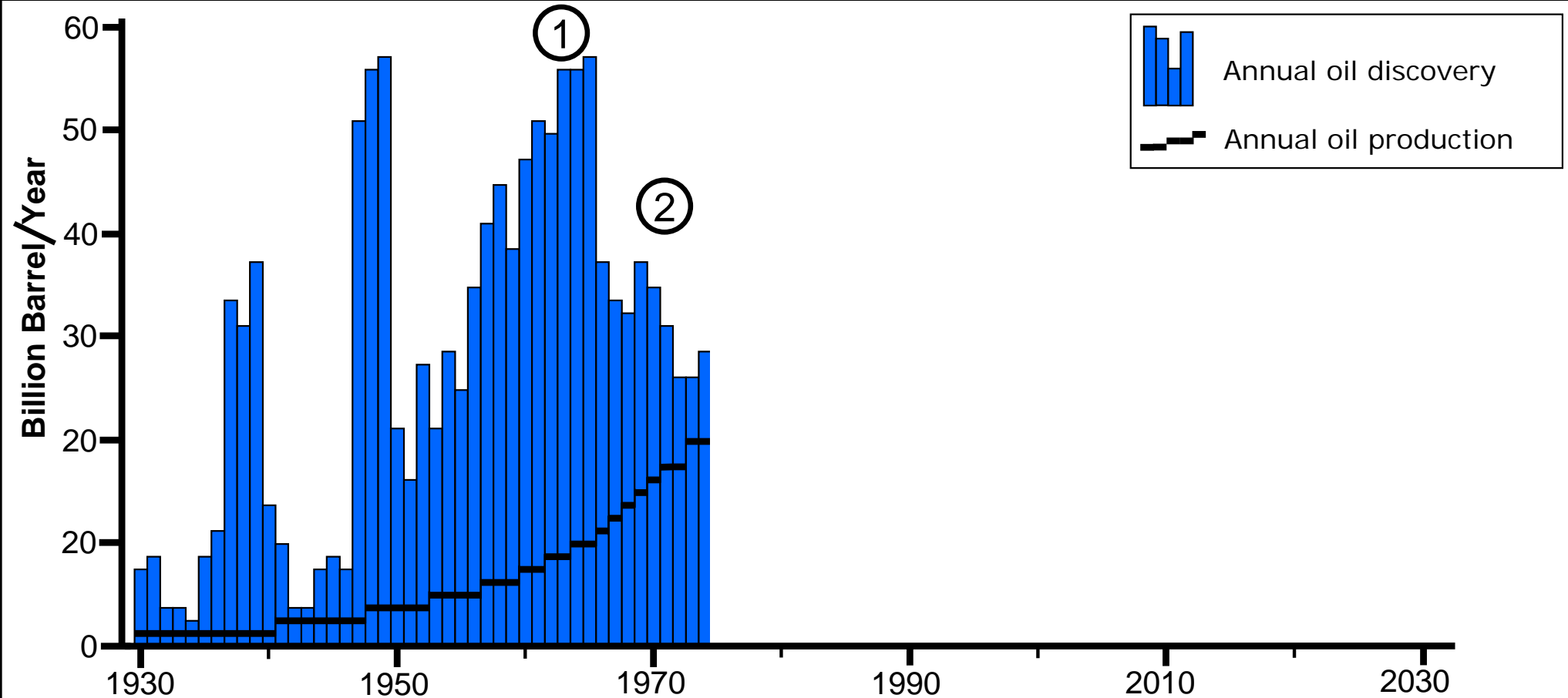
But first,
since it will help us better understand the situation we are in now,
let us briefly review the historic developments of the
“discovery-production-price” relationship...

What Is Going On In The Global Oil Sector...?!



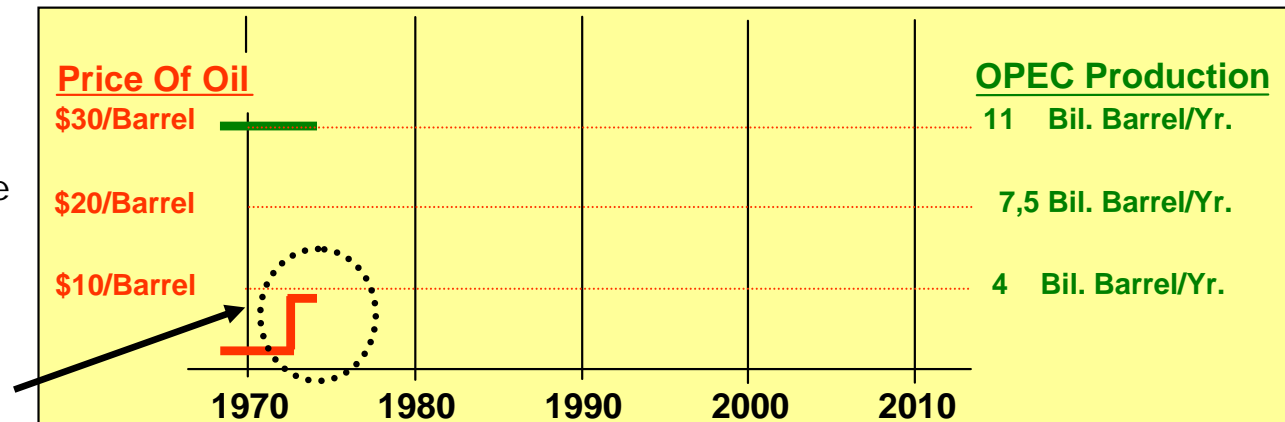
- ① During 1950s and mid 60s giant oil fields were discovered in the Persian Gulf area (mainly Saudi Arabia) Oil reserve discovery reached the all time peak between 1963-65. Consumption of oil also increased rapidly during the same period.

What Is Going On In The Global Oil Sector...?!



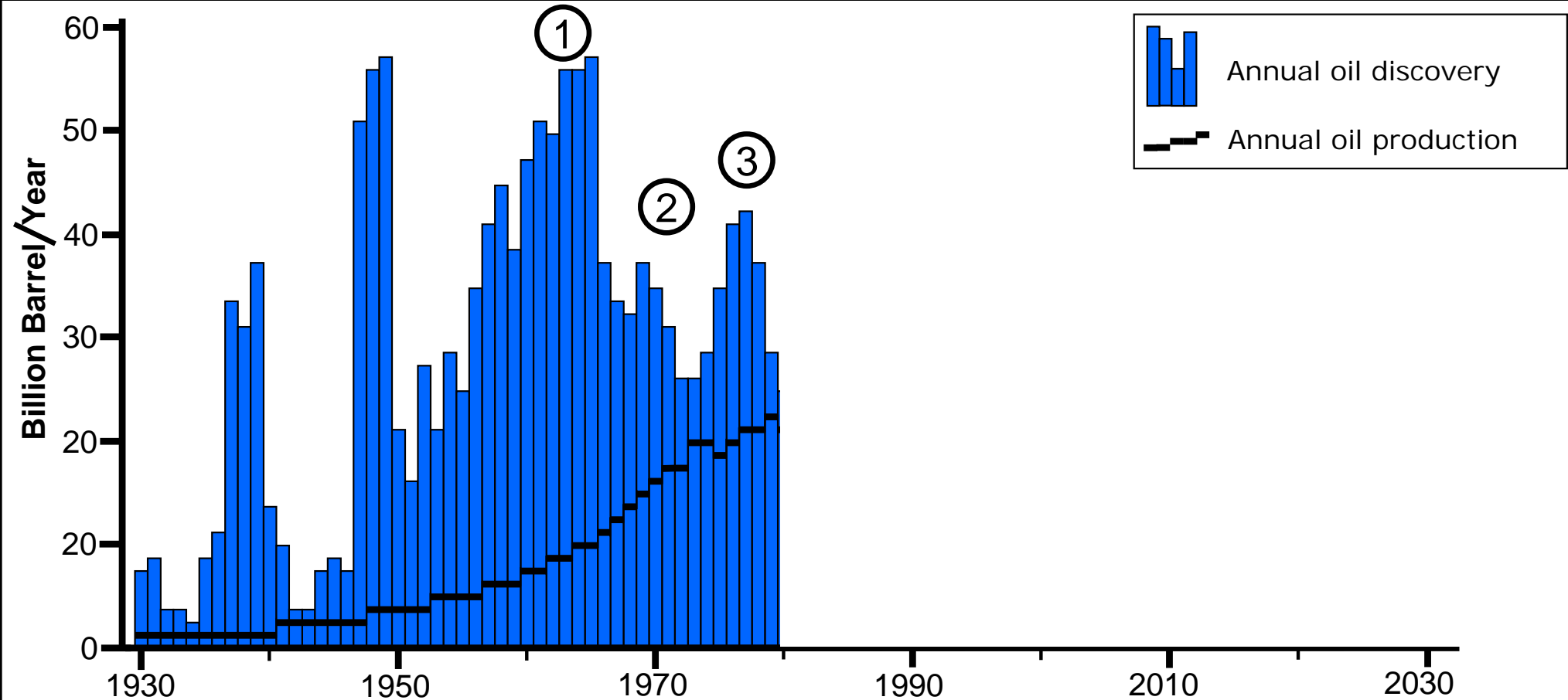
② Drop in the rate of new discoveries during late 1960s started the discussions of whether we still had more giant fields to discover...

Encouraged by these concerns, some oil producers nationalized their oil fields, formed OPEC, and

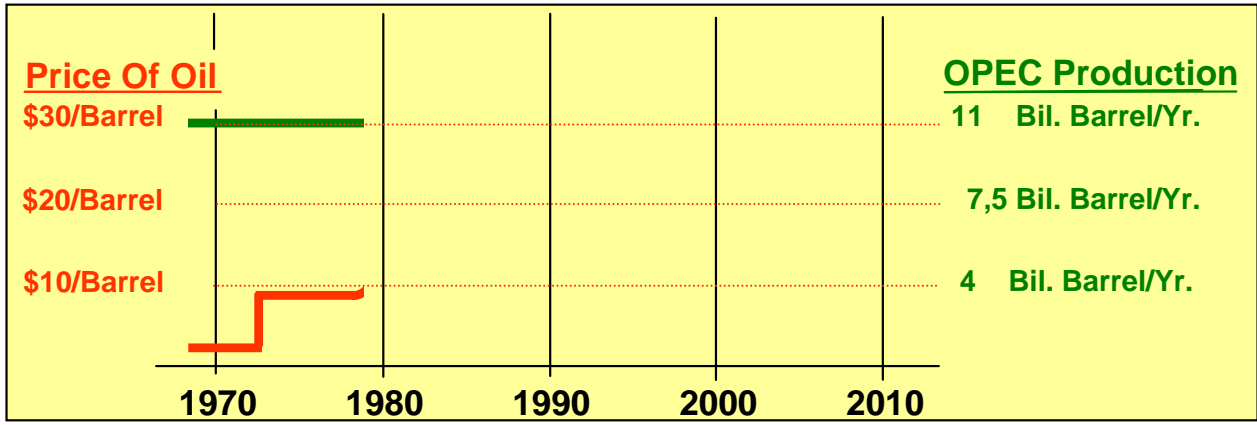


and **suddenly raised the price of oil from \$3 a barrel to \$9 in 1973.**

What Is Going On In The Global Oil Sector...?!

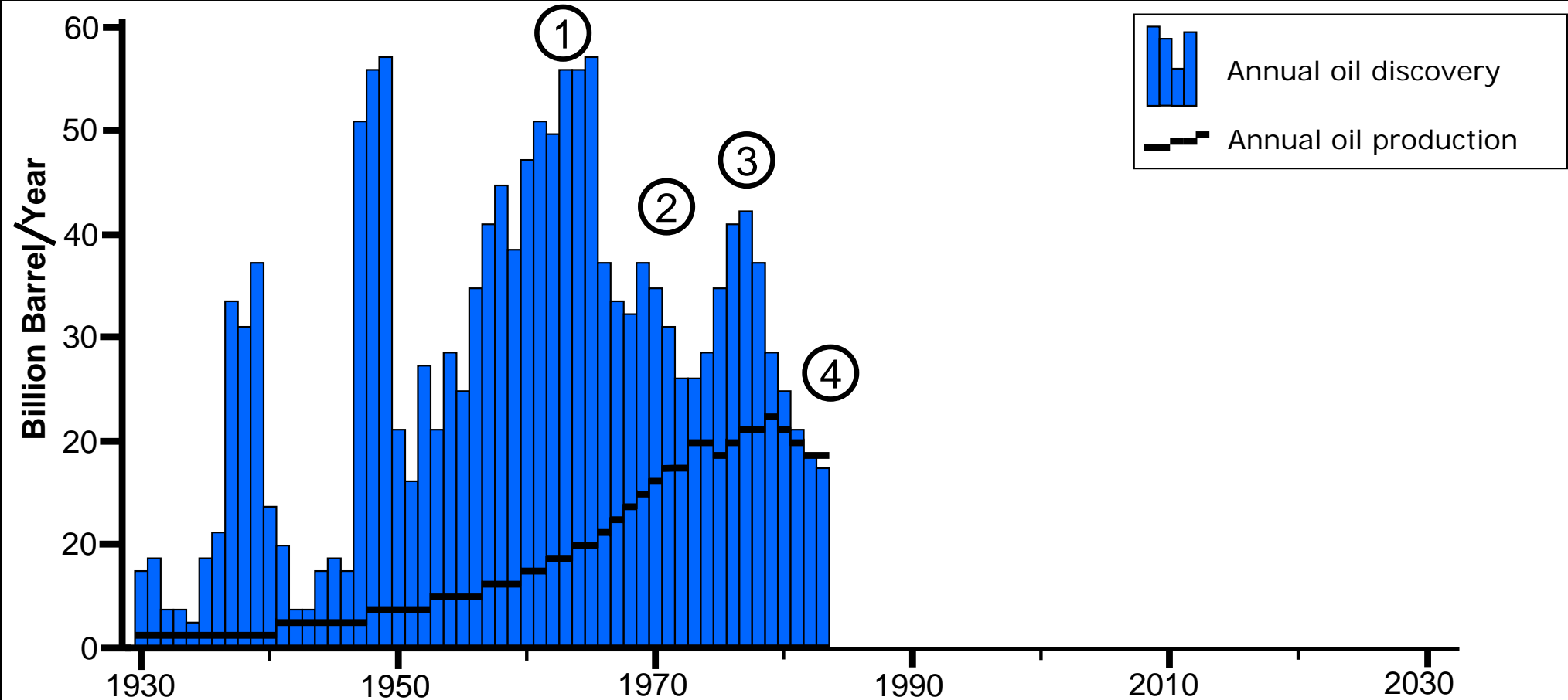


③ Western oil companies, having lost their fields in the Middle East, and encouraged by such rise in oil prices started extensive exploration in other parts of the world.

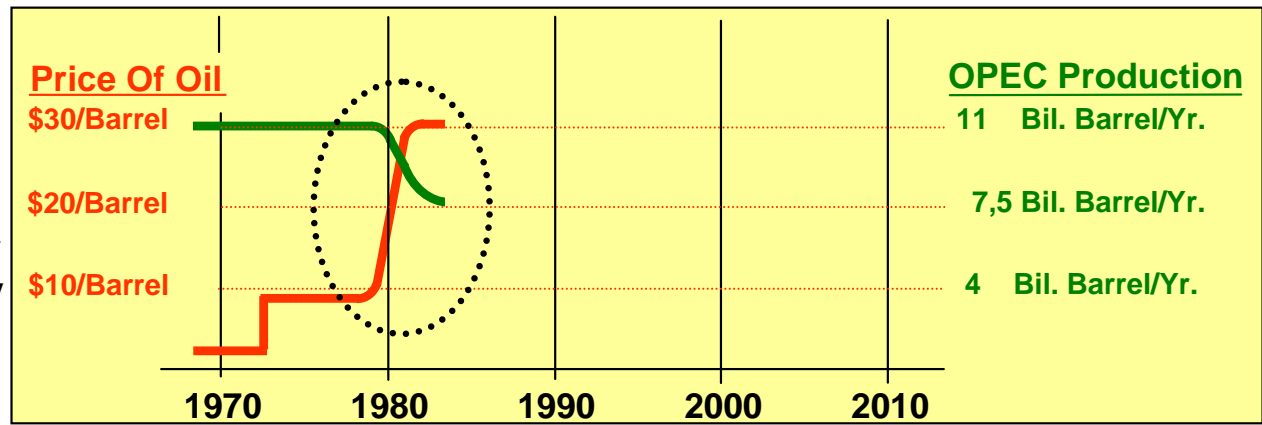


This was the period when oil fields in Alaska North Sea, Gulf of Mexico, Nigeria, North Africa and Siberia were discovered.

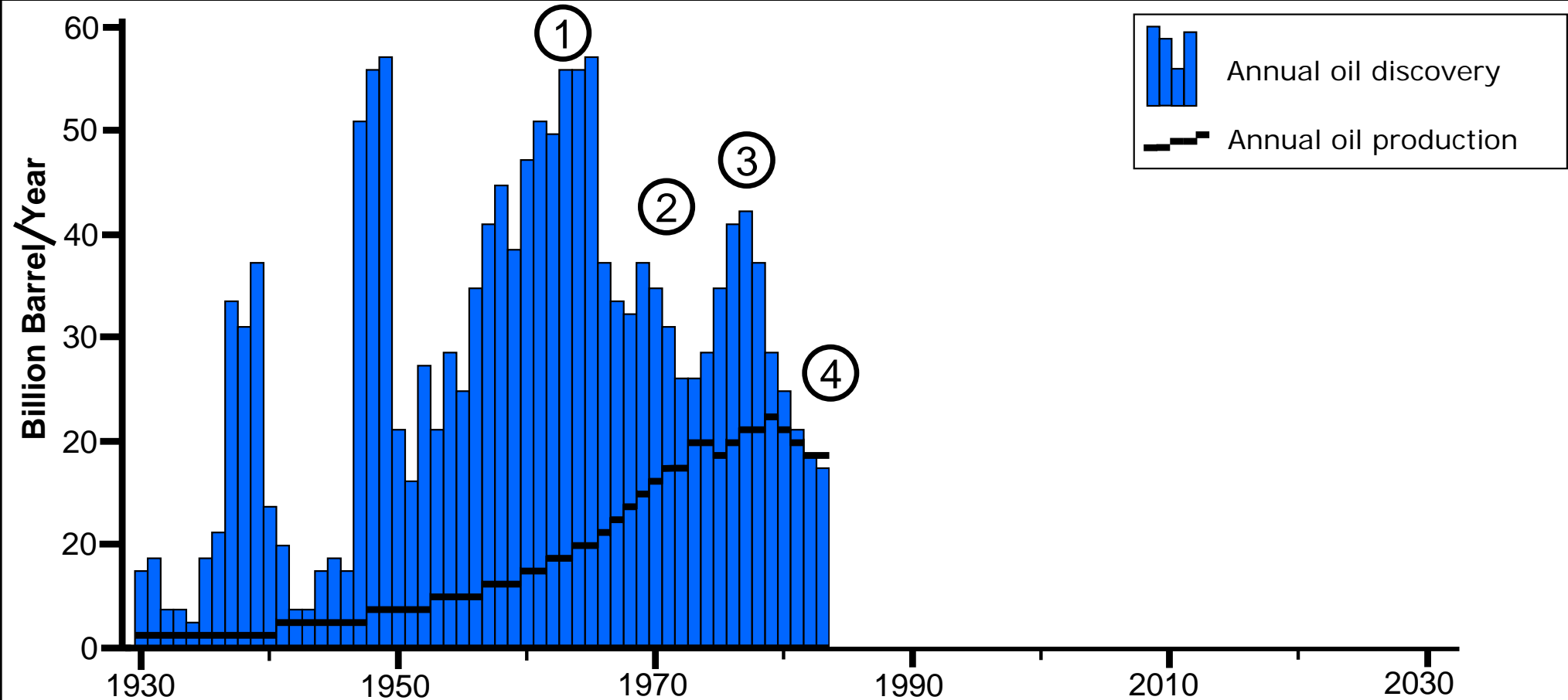
What Is Going On In The Global Oil Sector...?!



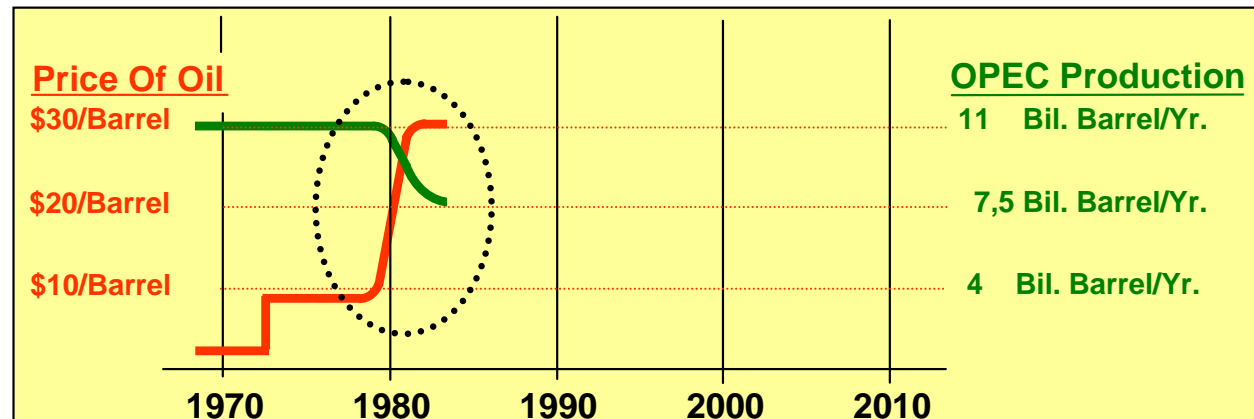
④ As a reaction to these developments, during 1979-82, OPEC suddenly dropped its production from **30 billion Barrel/Day** to **20 billion Barrel/Day** and raised its price 300% from **\$9 to \$30 a barrel**.



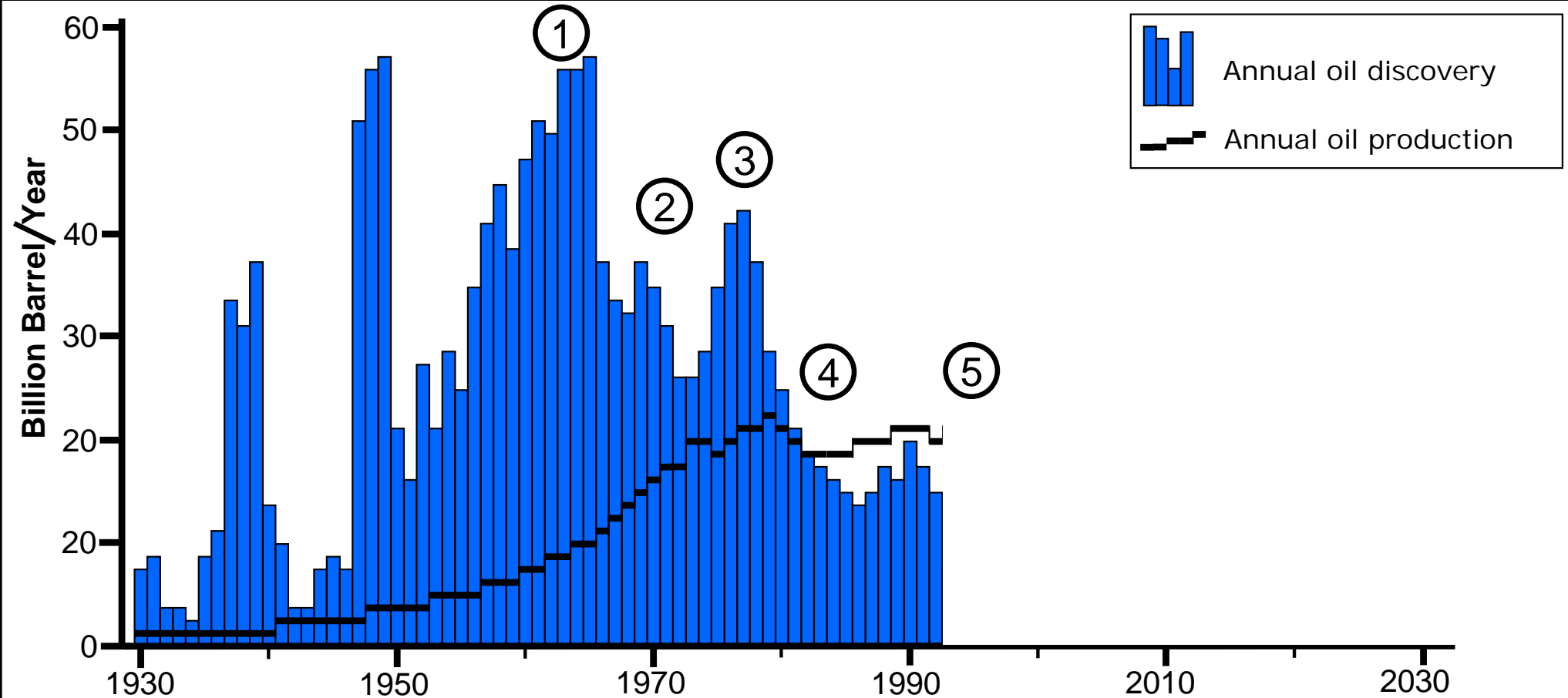
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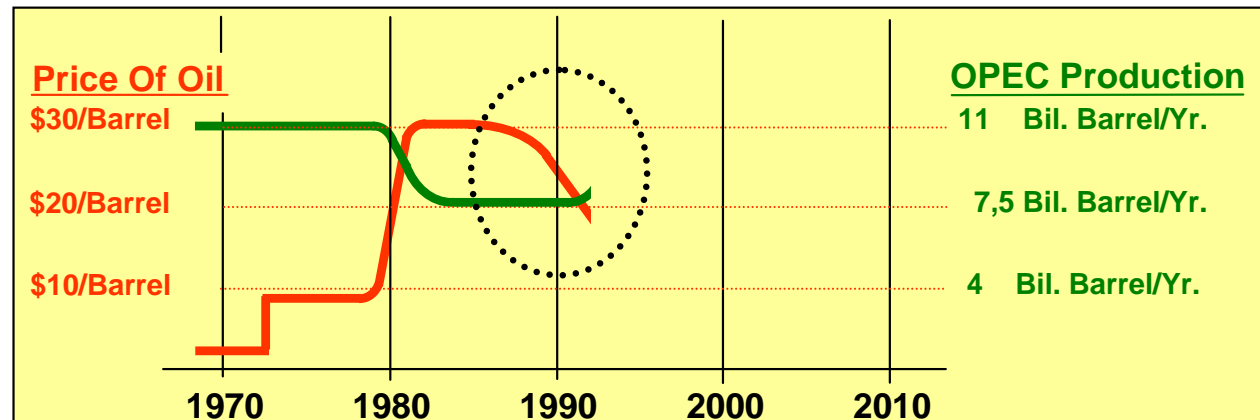
④ This OPEC action caused significant drops in global oil consumption. World economies took serious measures to increase their energy use efficiencies. Also some alternatives to oil (coal, natural gas, nuclear, wind, solar) started to be used more widely.



What Is Going On In The Global Oil Sector...?!

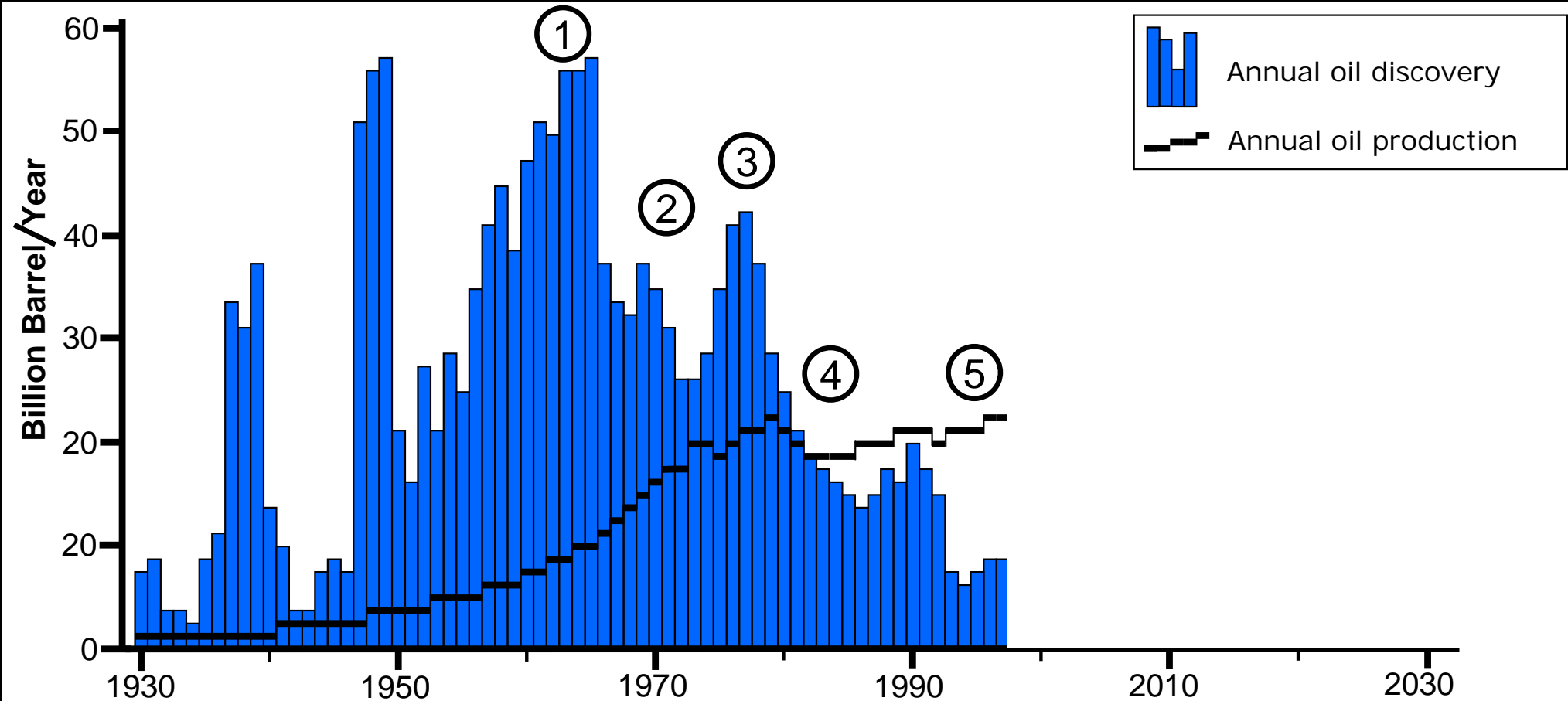


⑤ At the same time, increasing non-OPEC production in late 1980s and mid 1990s (from North Sea, Gulf of Mexico, Siberia, Nigeria, Alaska, Kazakhstan), resulted in more oil supply than needed (the "oil glut").



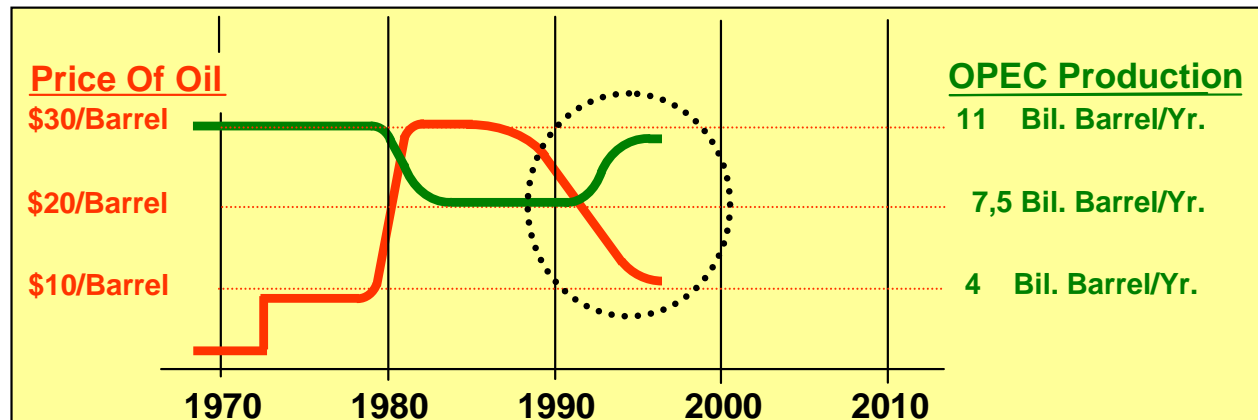
This caused oil prices to fall below \$20 a barrel.

What Is Going On In The Global Oil Sector...?!



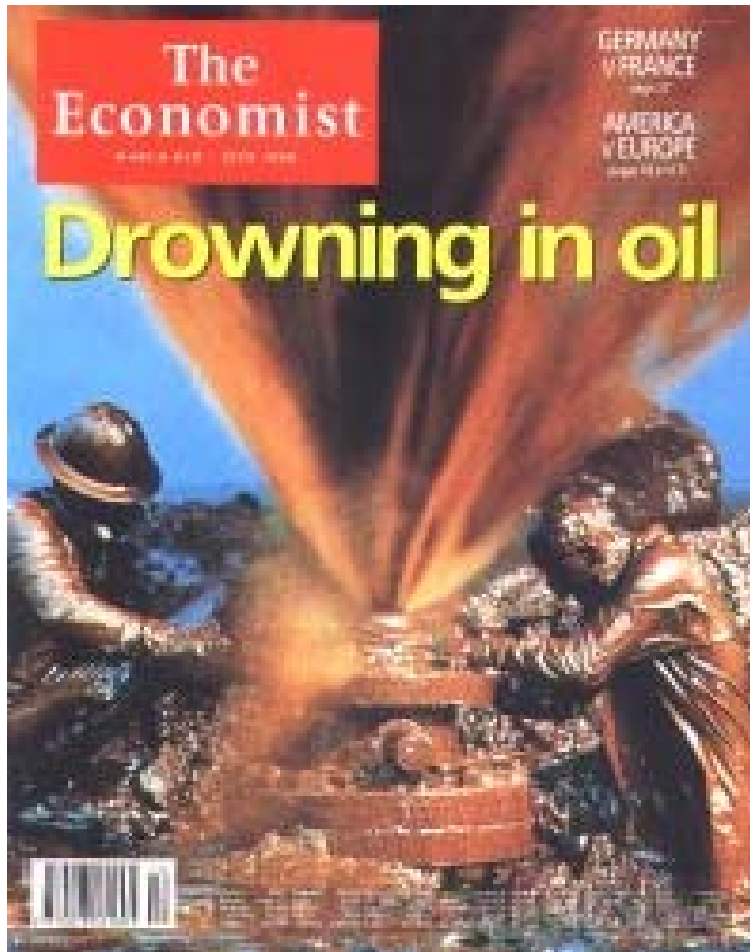
⑤ With such falls in their national revenues, the OPEC countries started to secretly produce over their self imposed production quotas.

This caused oil prices to fall to \$10 range...



Seemingly endless supply of cheap oil during late 1990s caused the world press to cry out teasingly that we were

“drowning in oil”



The Economist's cover
March 6, 1999

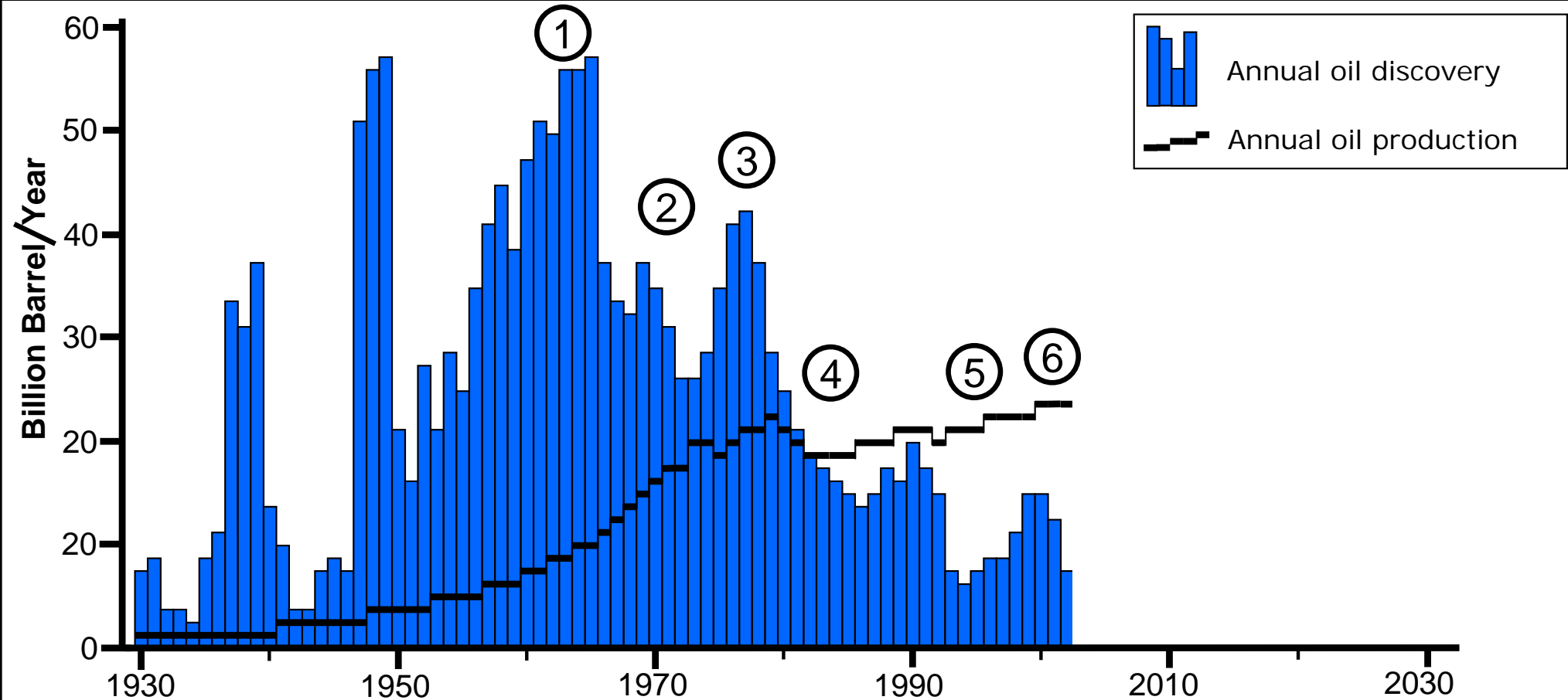
It was ignored that part of this rising oil consumption was caused by ditching the efforts to develop alternatives to oil and the general efficiency in the use of energy...

Yes, the statistics of this period show that the western economies have generated more goods & services per unit of energy consumed. But what is ignored is the fact that some of the energy intensive activities such as steel, ship building, auto manufacturing, etc., were moved from the developed countries to developing ones. Thus, at global scale, consumption of oil did have a net rise during this period...

In my opinion this is not much different than Californians exporting their coal burning power plants to Nevada and Arizona, and claiming to have clean air...

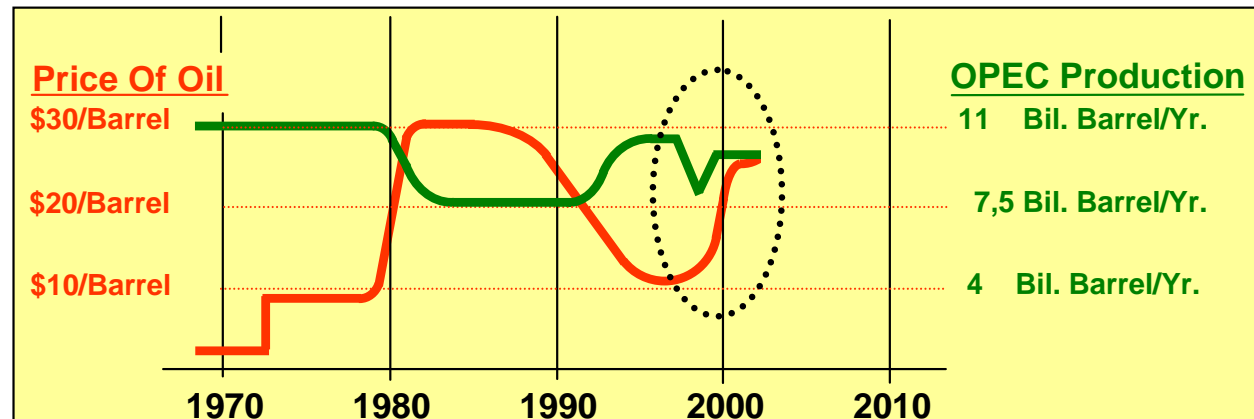
Thus, the claim that rising oil prices have less affect on western economies because they have become more energy efficient is not entirely true. It will only take a little longer for them to feel the affects of higher oil prices as long as they continue to import those goods that are energy intensive to manufacture...

What Is Going On In The Global Oil Sector...?!



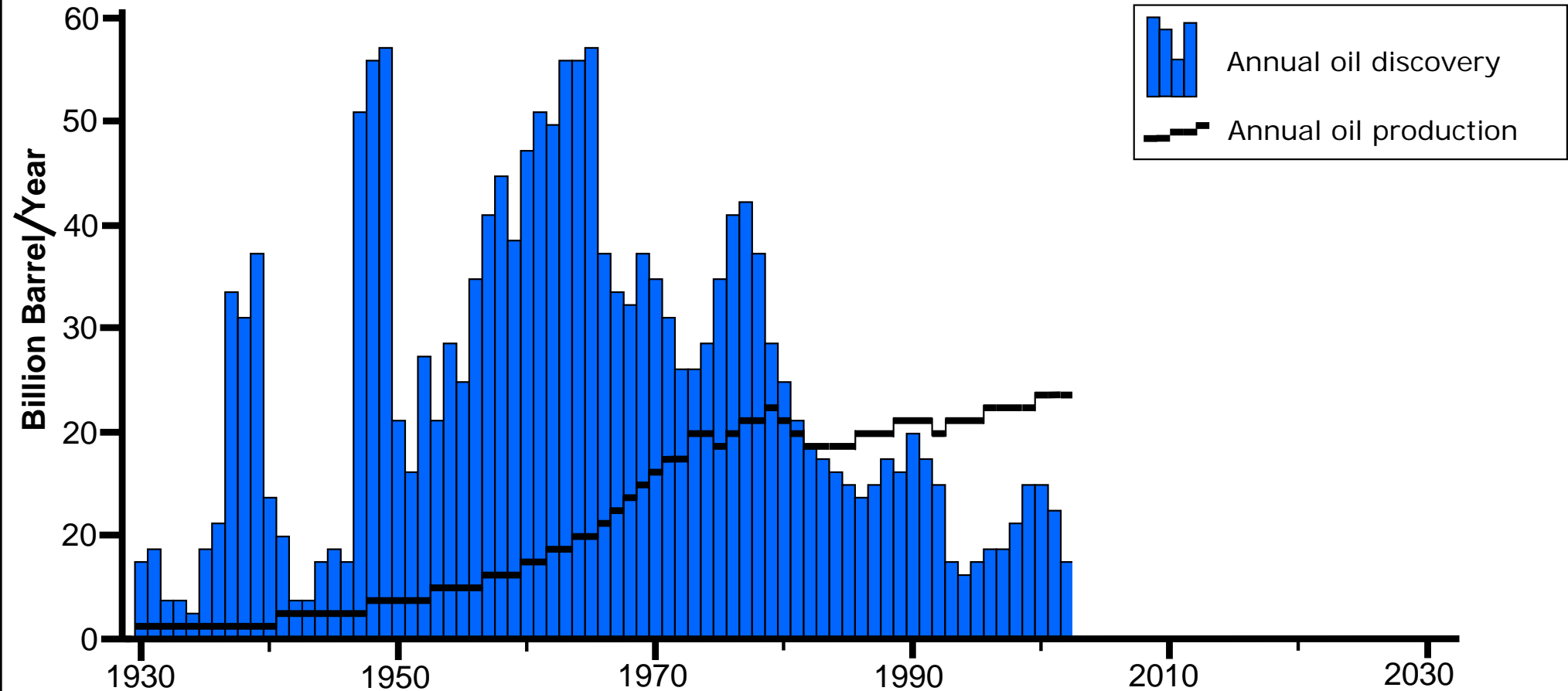
⑥ Unable to resist such US pressure, OPEC members led by Saudis cut their oil production. Prices climbed back to \$20 range.

This created the access Saudi production capacity that we are so thankful for these days.



This also allowed western oil producers to rigorously explore and produce all they could...

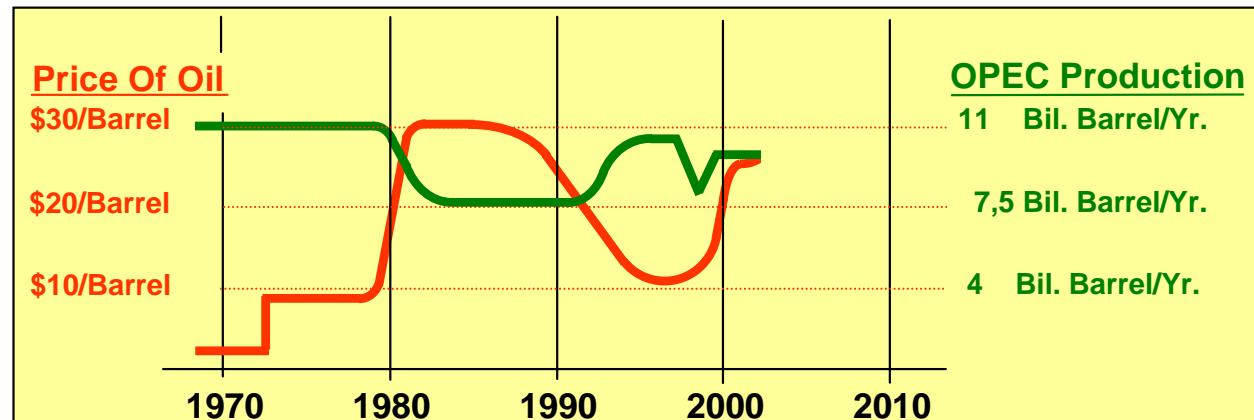
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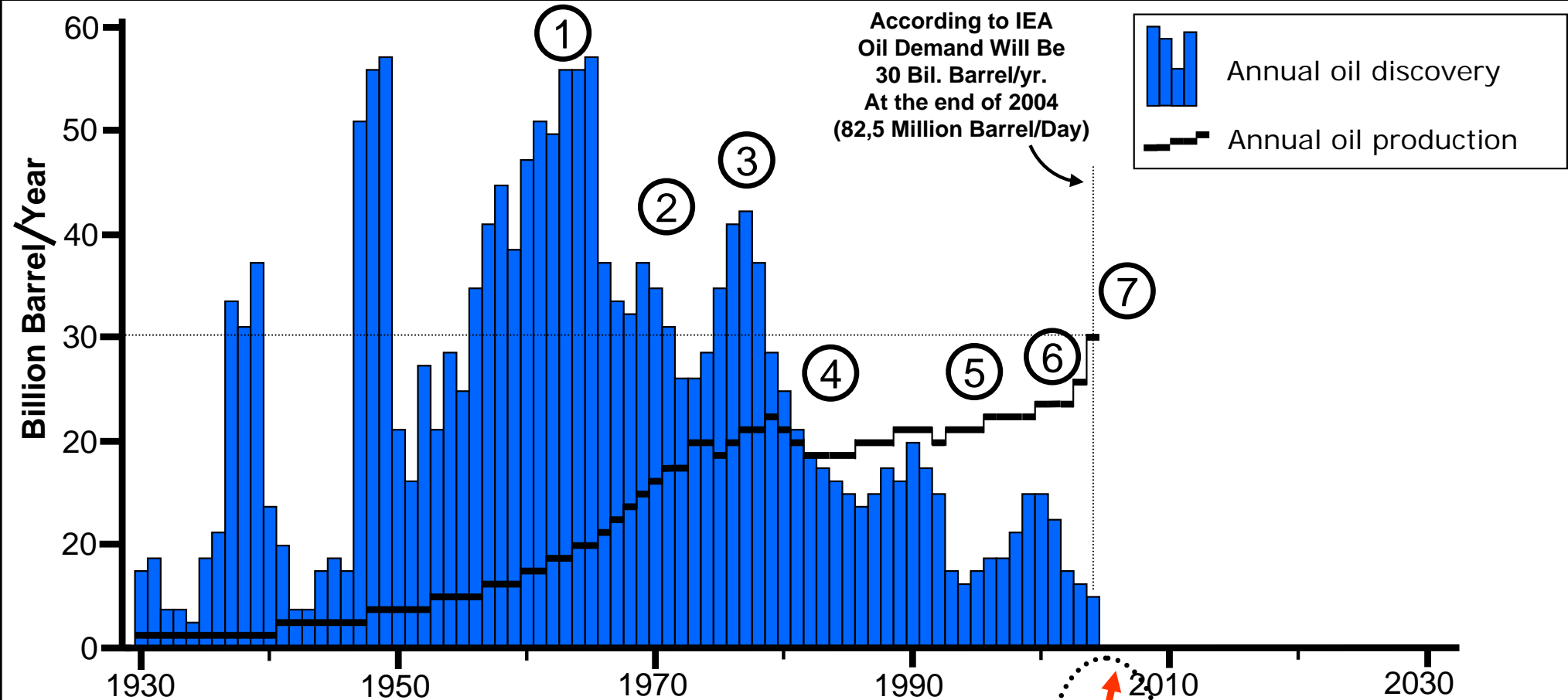
If we were to summarize:

Until late 2002, Government policies were the main factor affecting the oil prices.

While demand for oil was met without much problem, the \$22-\$28 price range was satisfactory to both producers and consumers.



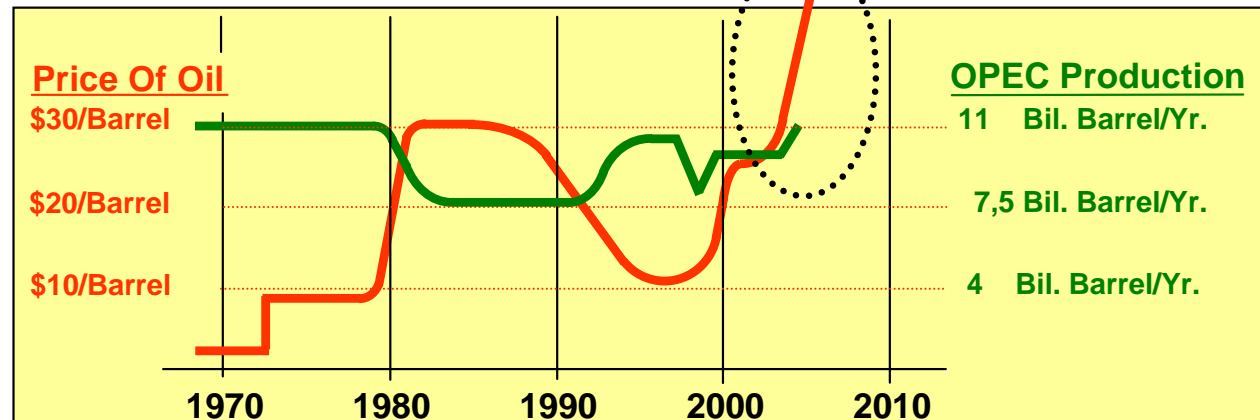
What Is Going On In The Global Oil Sector...?!



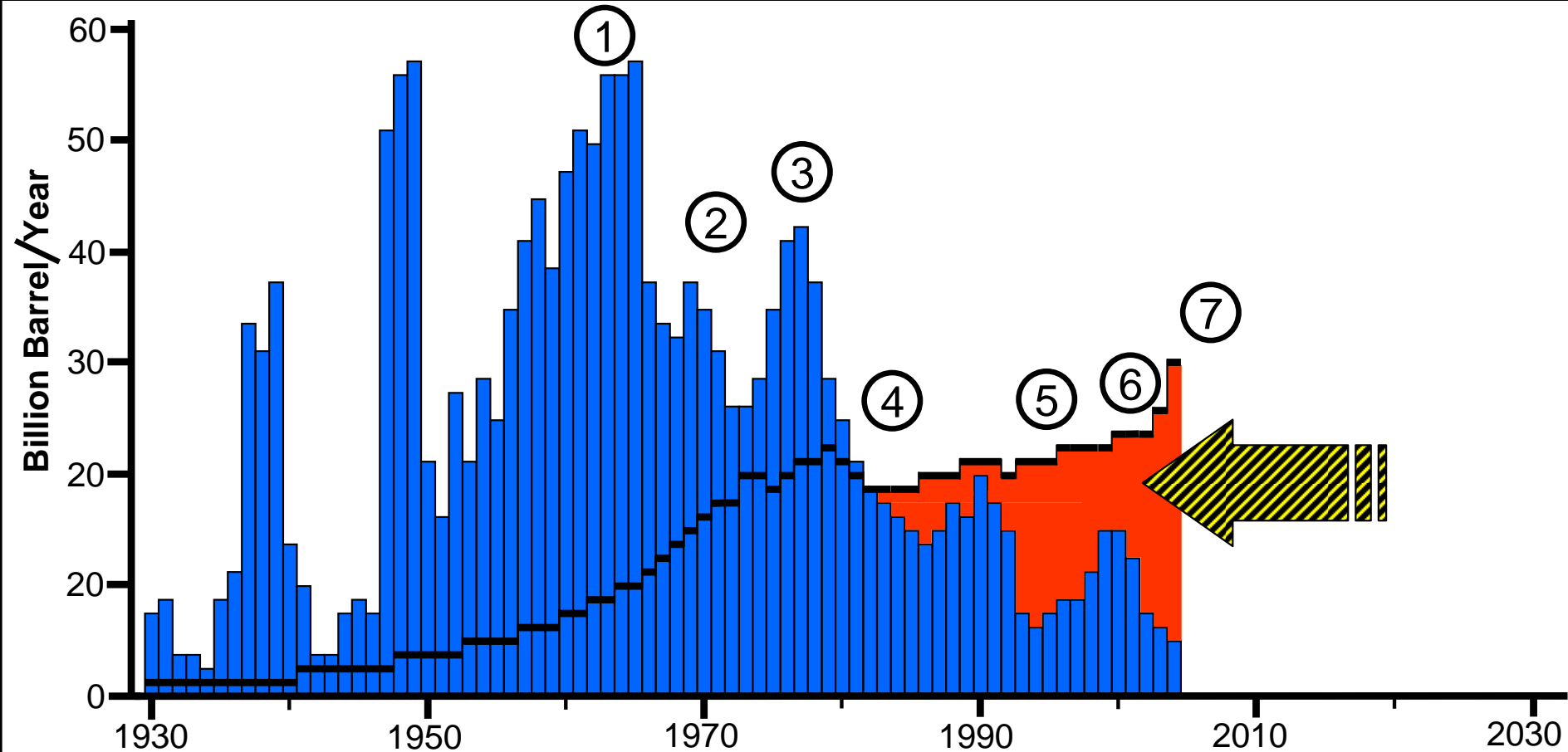
⑦ Led mainly by China and USA, demand for oil, started to rise very rapidly by late 2003...

And prices reached peaks over \$55 in 3rd quarter of 2004.

But market analysts continue to insist that oil prices are going up mainly because of terrorism and Iraq war...



What Is Going On In The Global Oil Sector...?!

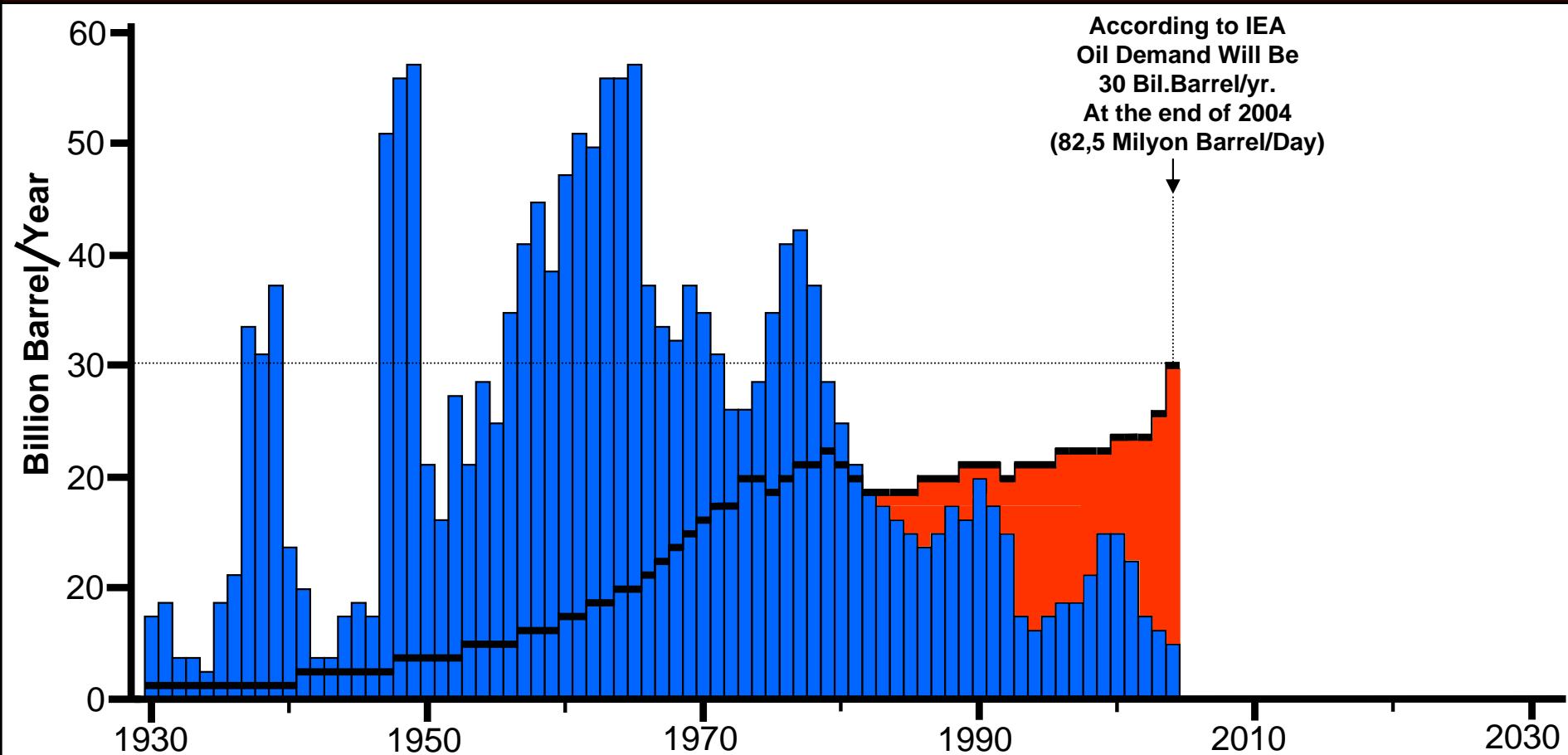


But some of use are starting to realize that there are other and more fundamental reasons behind these price peaks...

For one, in spite of the increasing exploration budgets, the amount of oil discovered each year since 1980 is much less than the oil consumed in that year...!

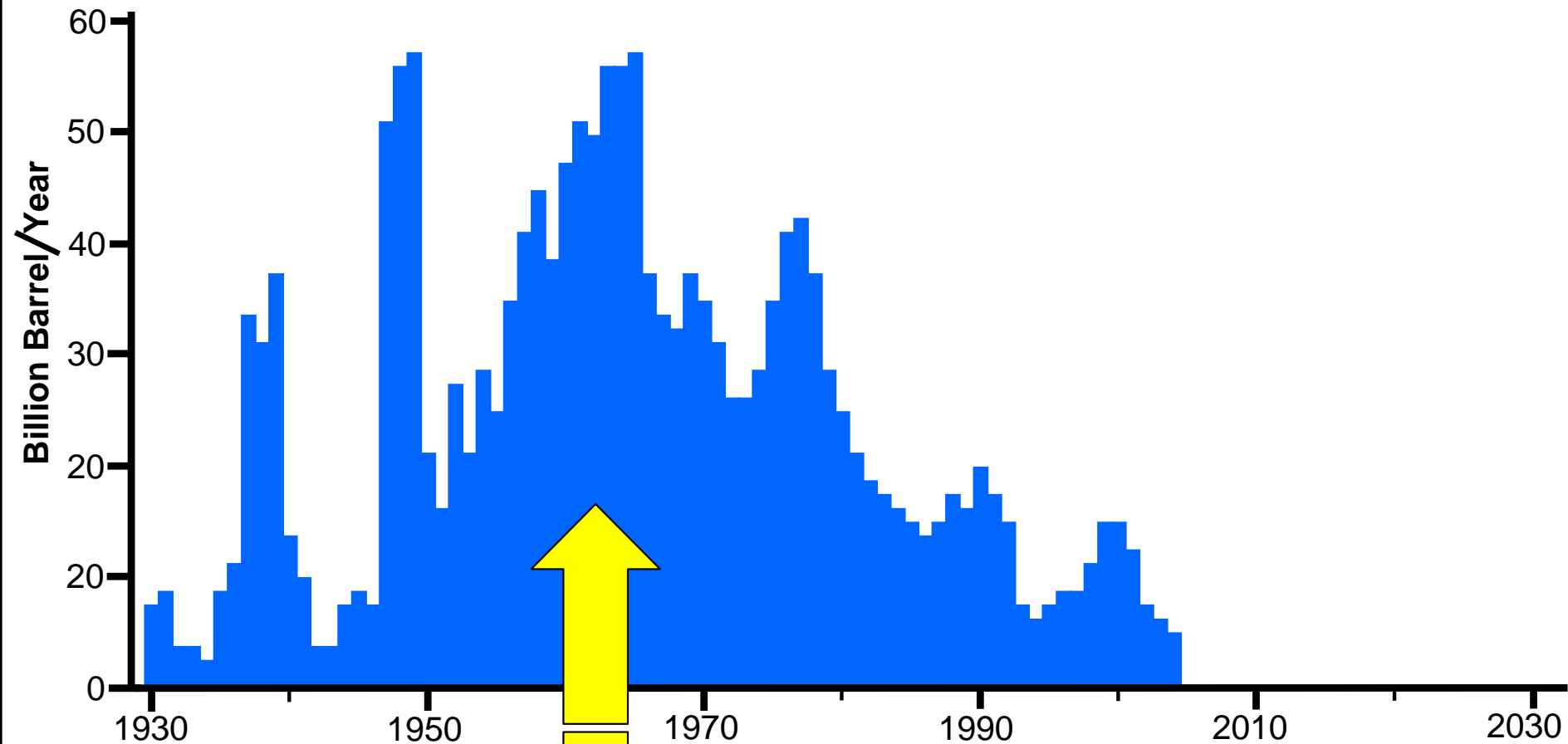
And, even though oil production capacity utilization has passed 90%, demand for oil in 2004 has just barely been met...!

What Is Going On In The Global Oil Sector...?!



Now let us look at
what is awaiting us from now on...

What Is Going On In The Global Oil Sector...?!

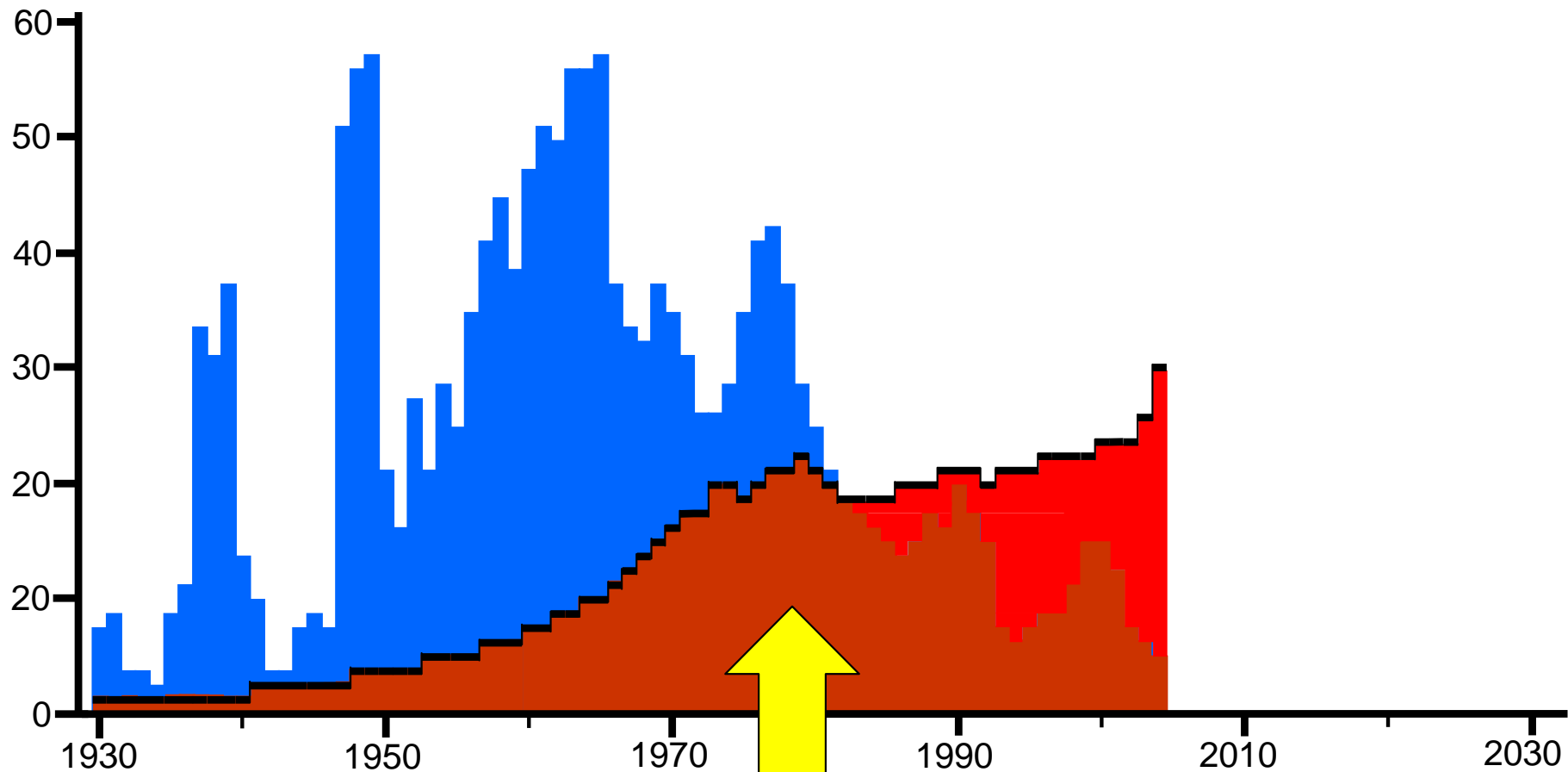


According to ASPO, over all total of discovered oil is 1800 billion barrels.

Unacceptable and artificial oil reserve increases in OPEC members mentioned in PART-1 have been accounted for in the calculation of this number.

Some others think that 2000 or 2200 billion barrels is a more correct number. We will come back to that.

What Is Going On In The Global Oil Sector...?!



According to ASPO, over all total of discovered oil is 1800 billion barrels.

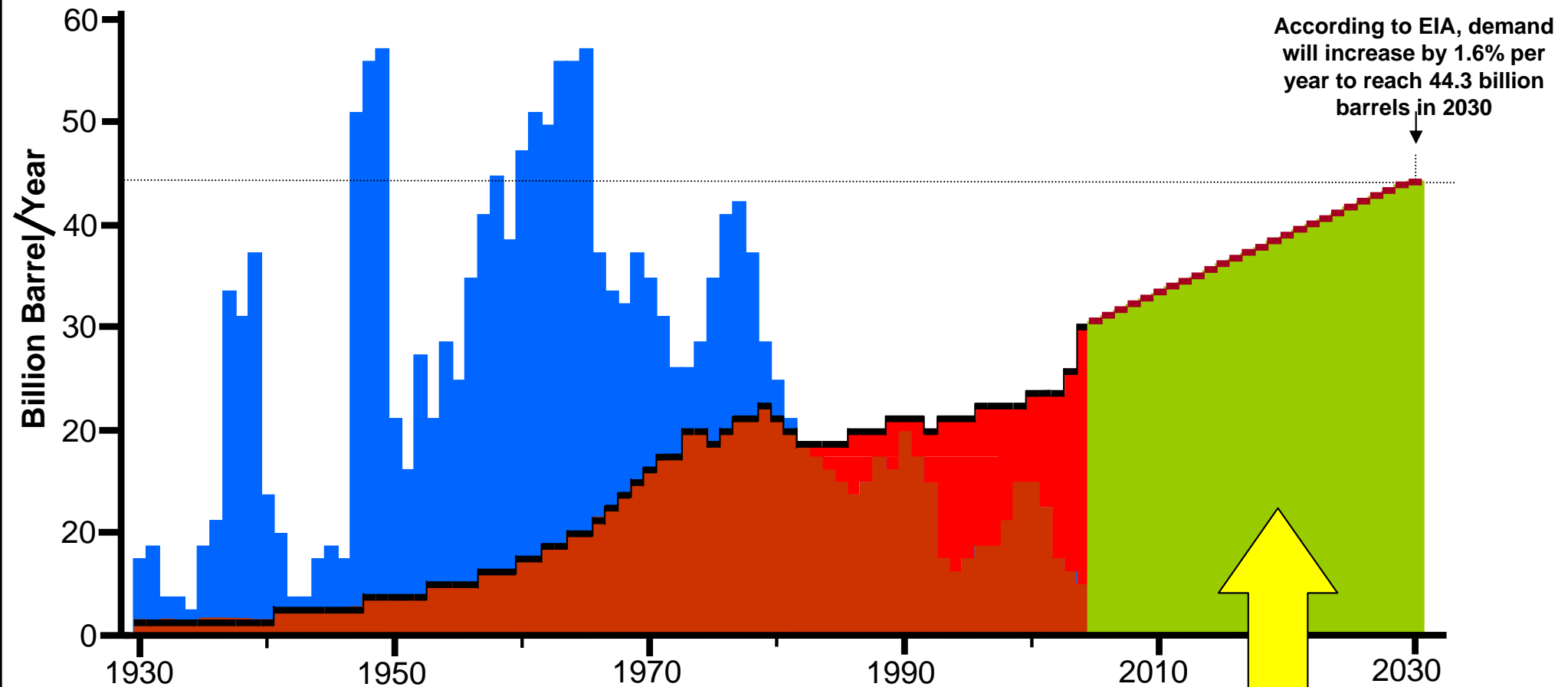
Total oil produced to date is 900 billion barrels.

Even though it is not possible to determine exactly, this figure is accepted by all concerned. This means that half of all oil discovered has been produced, and thus, the remaining producible global oil reserve today is about 900 billion barrels.

What Is Going On In The Global Oil Sector...?!

R.Oğuz Çapan

oguz.capan@solar-ltd.com



According to ASPO, over all total of discovered oil is 1800 billion barrels.

Total oil produced to date is 900 billion barrels.

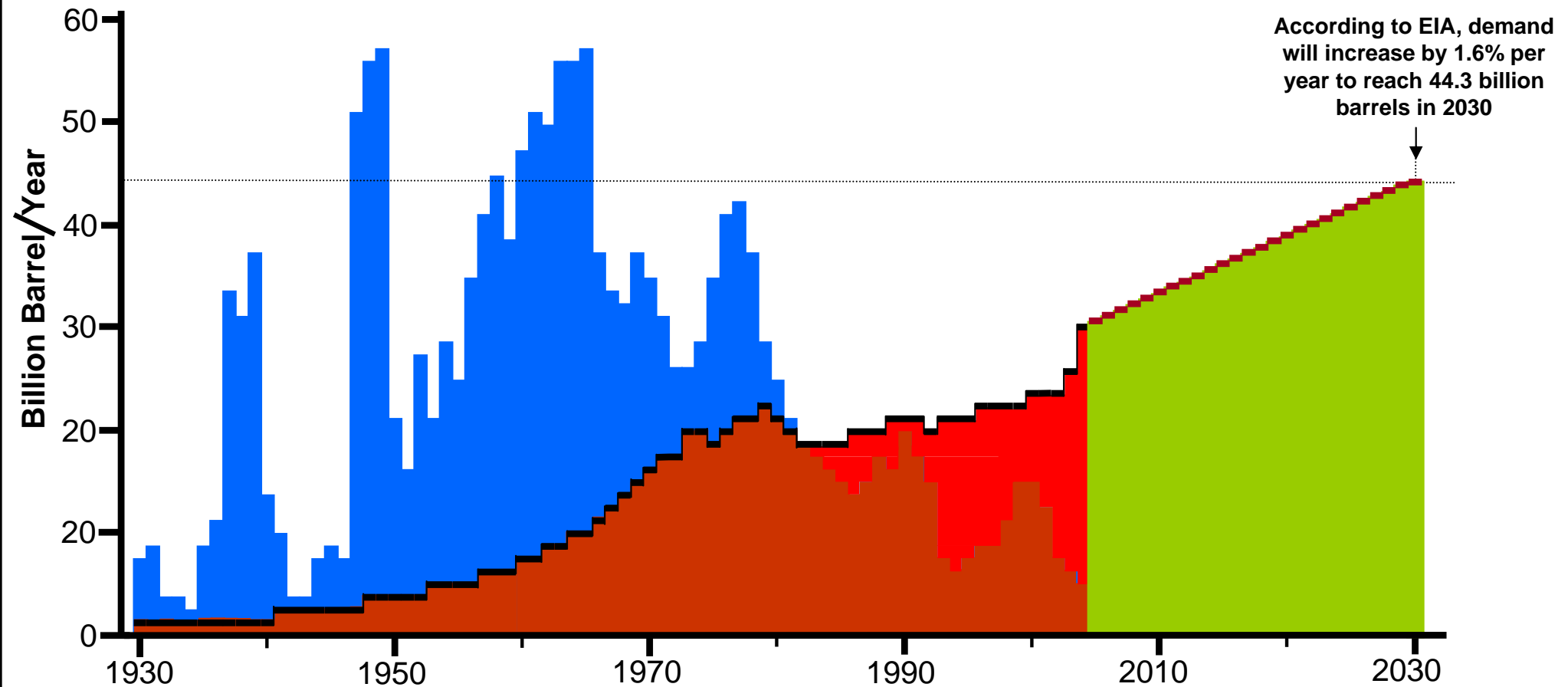
IEA estimates that total demand between 2005-2030 will be 920 billion barrels.

Remaining oil is equal to what EIA estimates we will need until 2030.
However, the fact is, the rate at which this existing remaining oil reserve can be produced will fall far short of meeting the demand...

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R.Oğuz Çapan

oguz.capan@solar-ltd.com



According to ASPO, over all total of discovered oil is 1800 billion barrels.

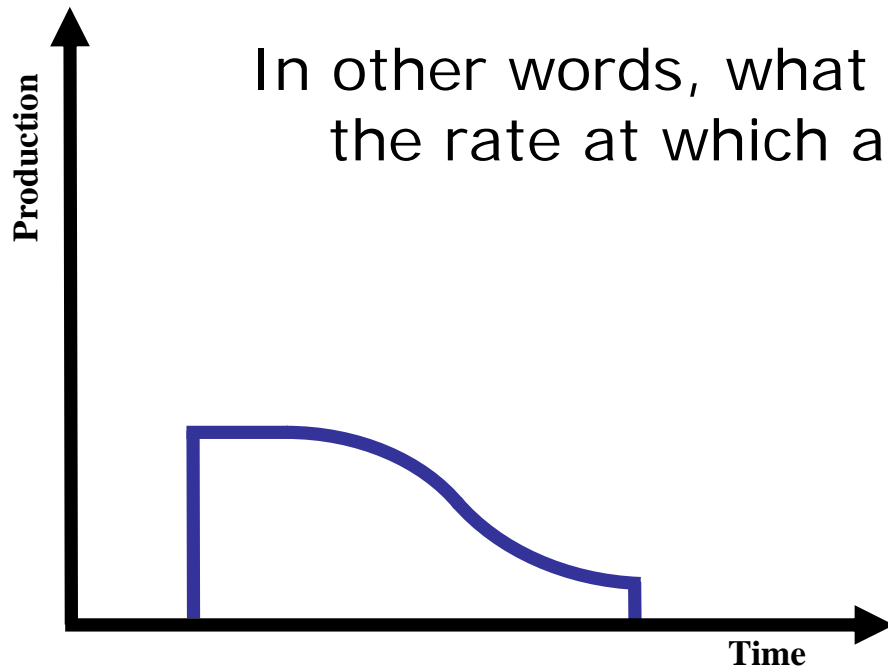
Total oil produced to date is 900 billion barrels.

IEA estimates that total demand between 2005-2030 will be 920 billion barrels.

In other words, while we are not "running out of oil" as some claim, but the production rate will not meet the demand. And the affect of this on the global economy will not be much different than running out of oil...

Let us expand on this very critical point...

In other words, what are the main factors that limit the rate at which an oil field can be produced?

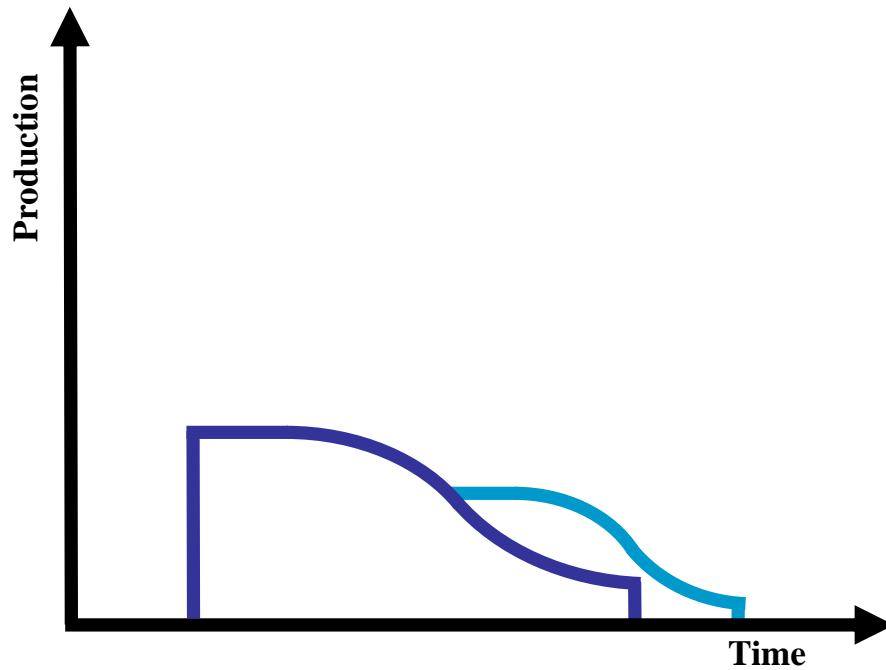


A typical production profile of a normal oil well

Production from a typical oil well reaches a maximum level soon after it is drilled. After maintaining at that level for a while, production rate declines in an increasing manner.

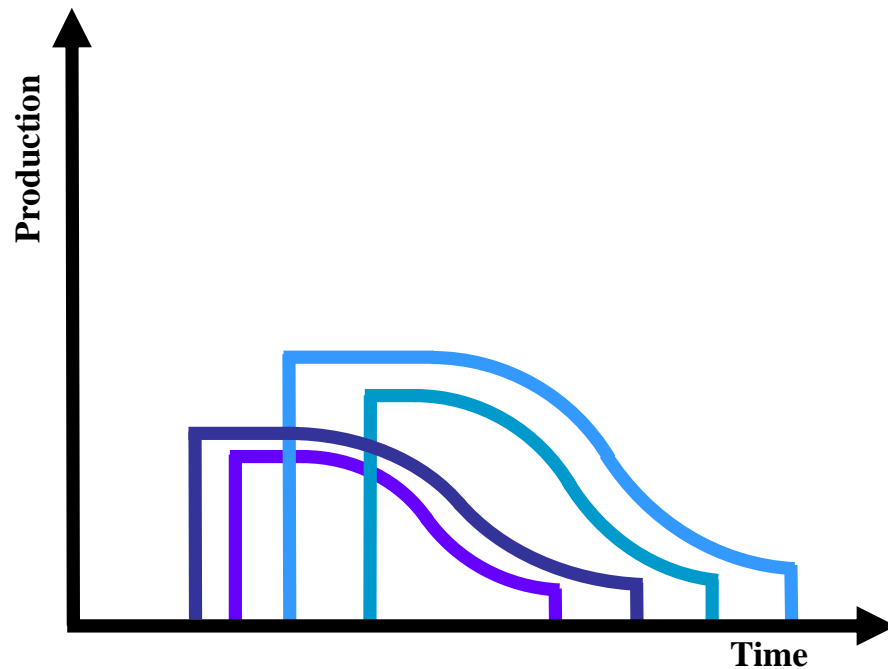
The reason for this decline is the negative affects the withdrawal of fluids (oil, gas and water) creates on the dynamics of the reservoir formation the oil is produced from.

In other words, when production rate decline starts, there is more oil remaining in the reservoir than the cumulative amount produced to that date, but it can no longer be withdrawn at the same rate.



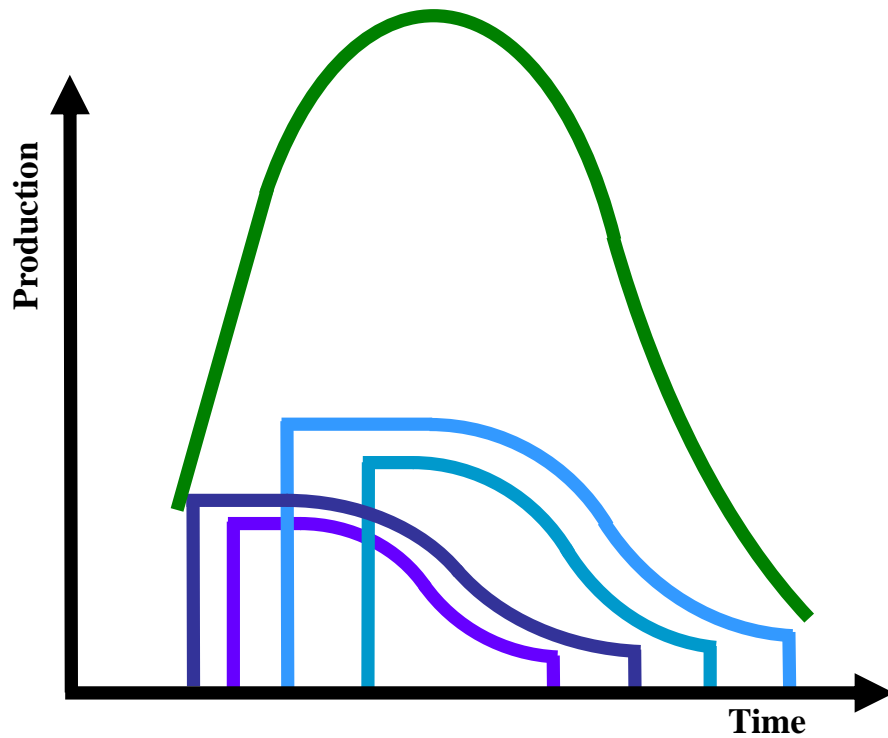
A typical production profile of a normal oil well (2)

Application of new technologies will arrest the decline rate for a while, but, a similar decline of production curve will soon resume.



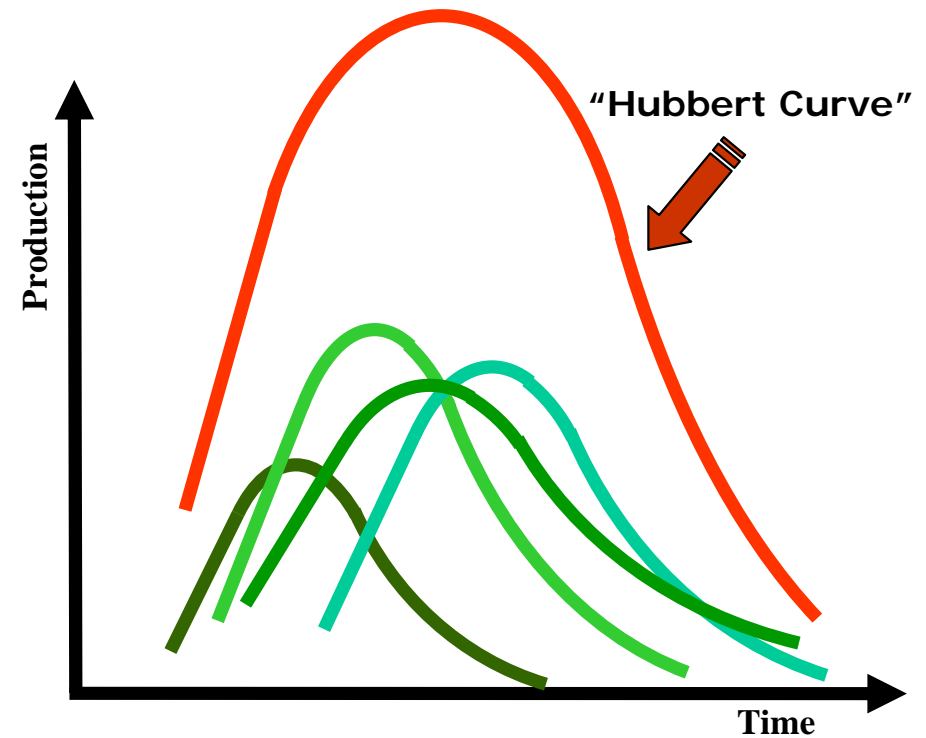
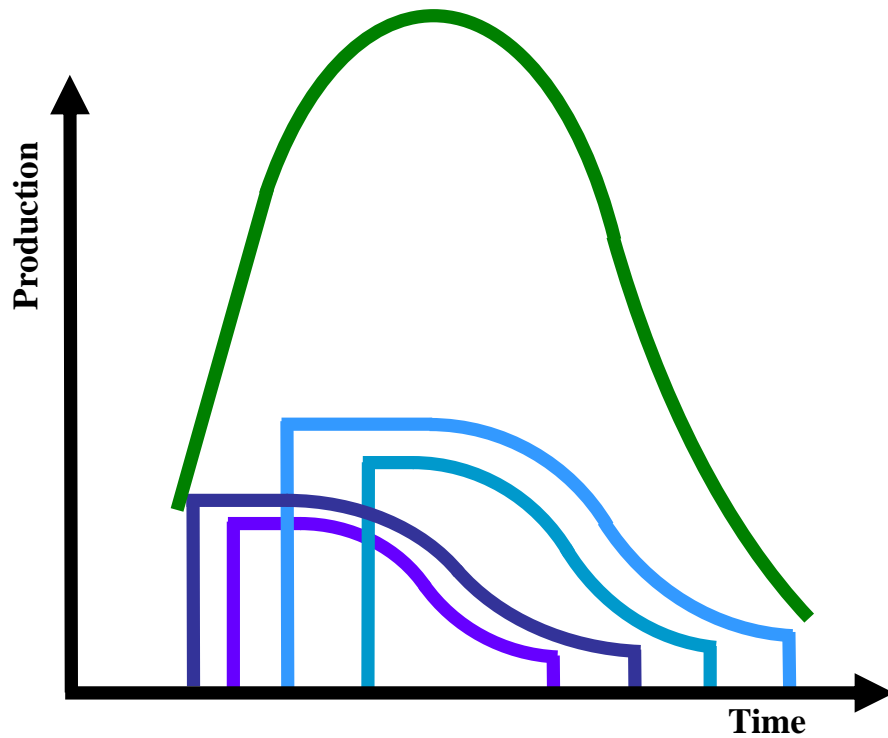
A typical production profile of an oil field

An oil field consists of a number of oil wells drilled at different times and each having a different production capacity...



A typical production profile of an oil field (2)

Therefore, the production profile of an oil field is the sum of the production profiles of all the wells contained in that oil field, and has the general shape of a **"bell curve"**.



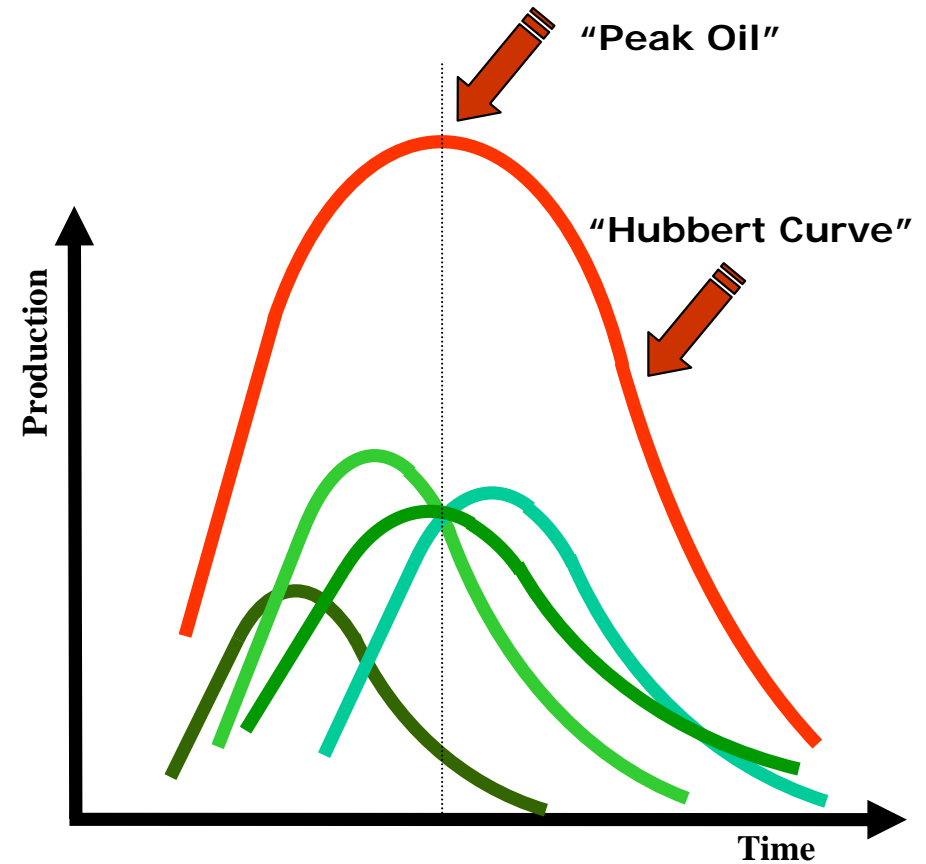
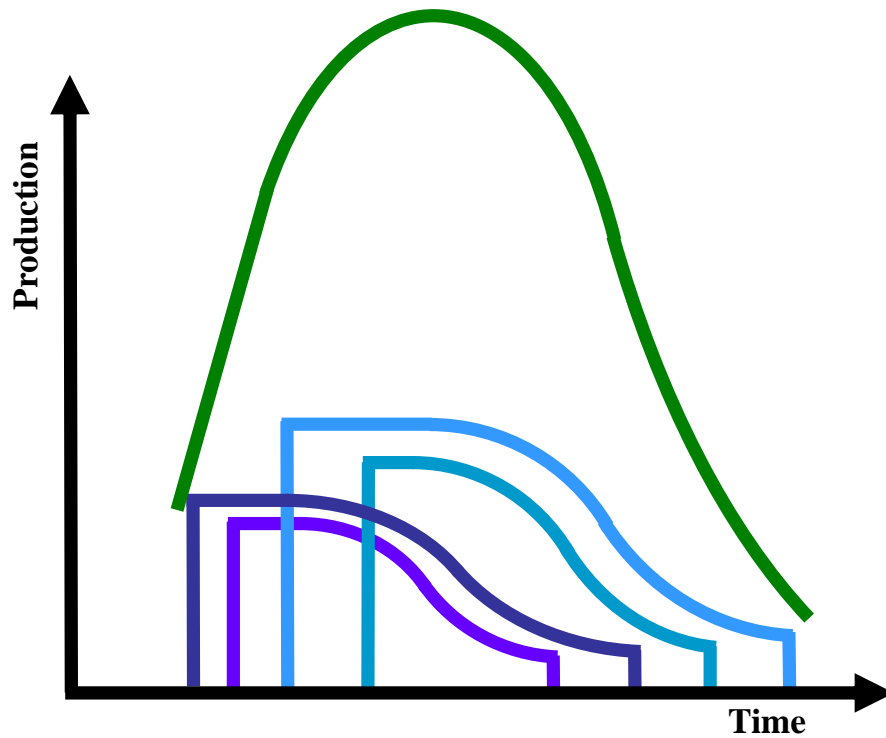
Global oil production profile

Just as the production profile of an oil field is the sum of all the production profiles of all the wells it contains, the global oil production profile is the sum of all the oil fields in the world, each coming on stream at a different date and having different production potential.

Thus the global oil production capacity also has the shape of a **"bell curve"**.

This curve is called the **"Hubbert Curve"**.

What Is Going On In The Global Oil Sector...?!

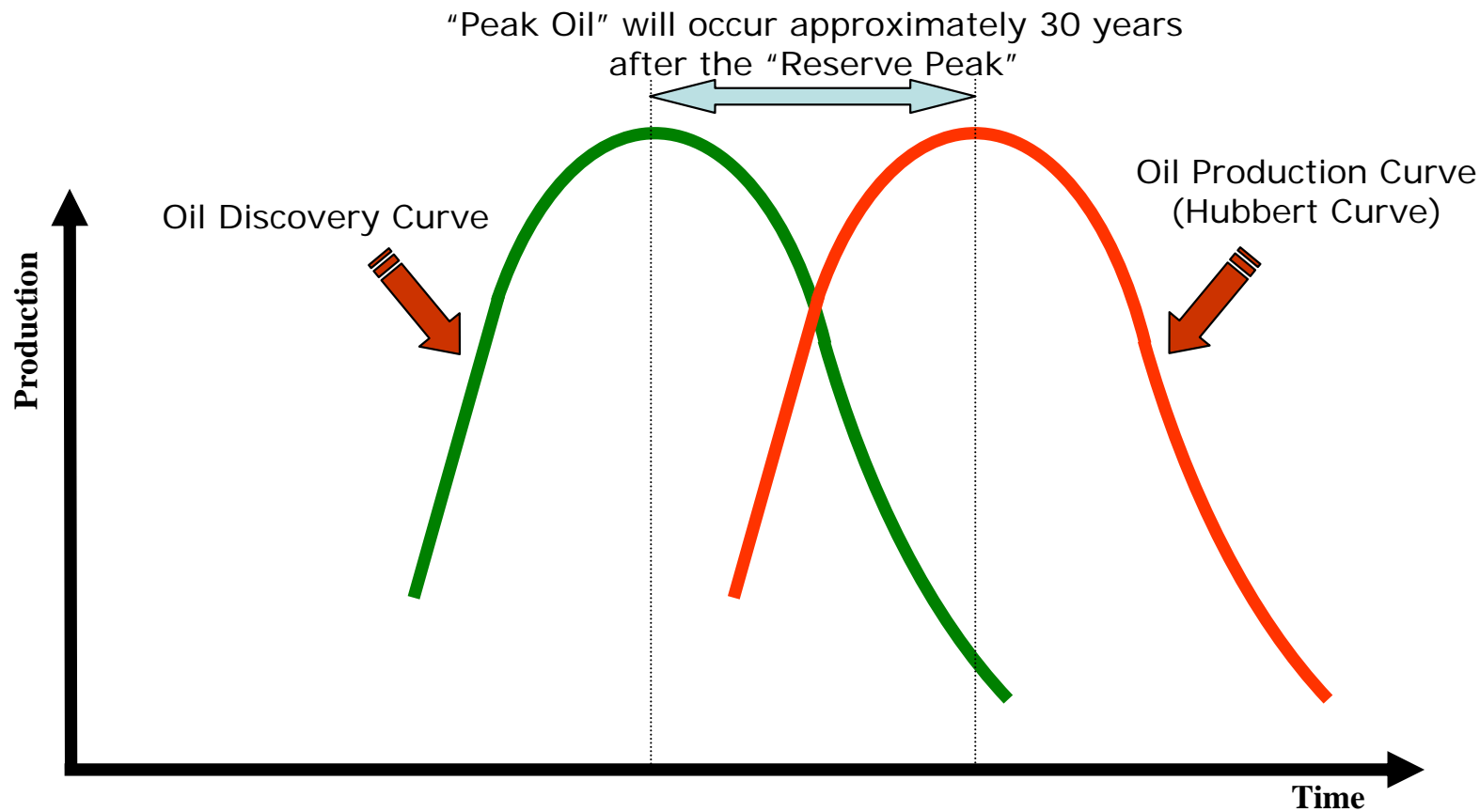


Global oil production profile (2)

In other words, it is wrong to assume (as some market analysts seem to do) that we have 900 billion barrels of remaining oil reserves, and since the average annual production rate is about 30 billion barrels, than we have enough oil to last for 30 more years.

No, maybe the remaining oil reserve will be produced for another 60 or 70 years, but since the production rate will fall sharply, the demand for oil will not be met...

What Is Going On In The Global Oil Sector...?!



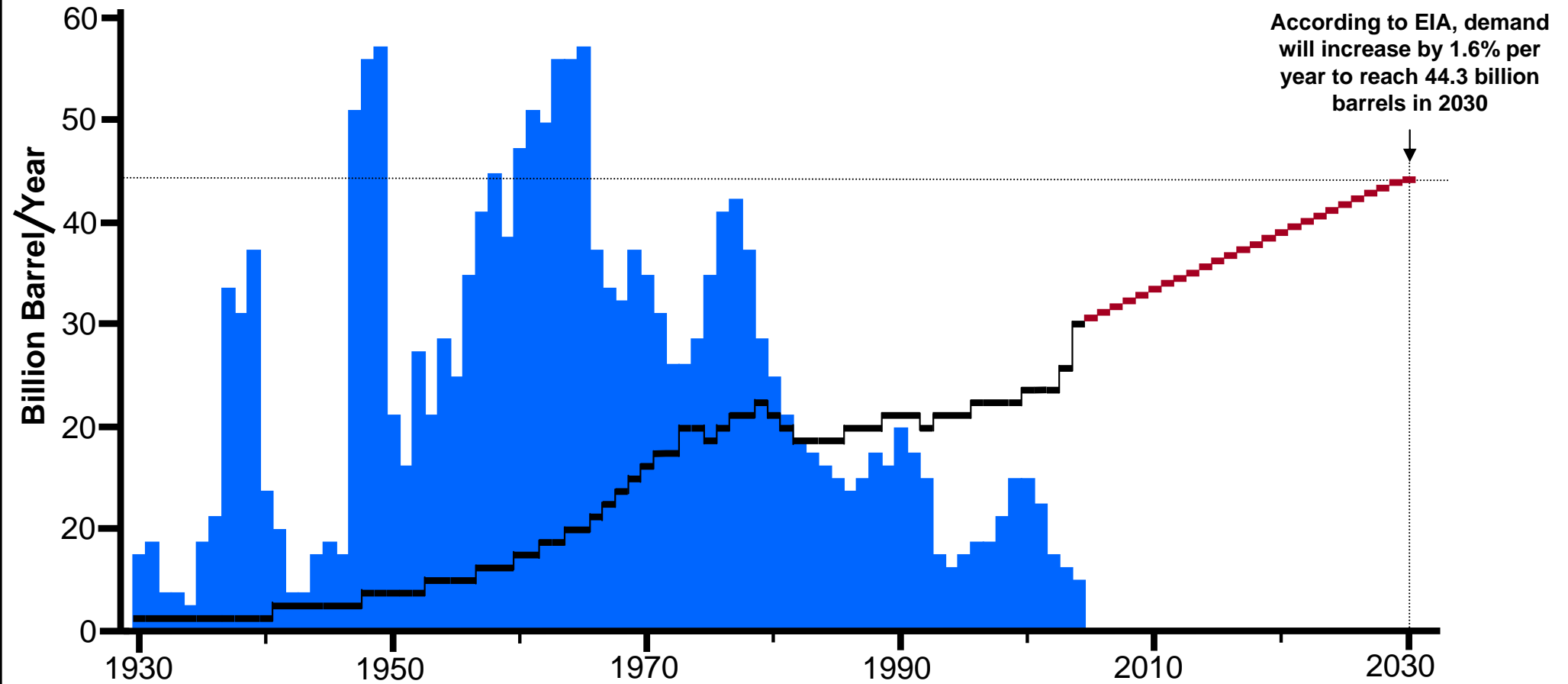
Global oil production profile (3)

Again according to Hubbert, "Oil Production Curve" will copy the "Oil Discovery Curve" some 30 years later. Thus, the "Peak Oil" point will occur approximately 30 years after the peak in discovery is reached.

What Is Going On In The Global Oil Sector...?!

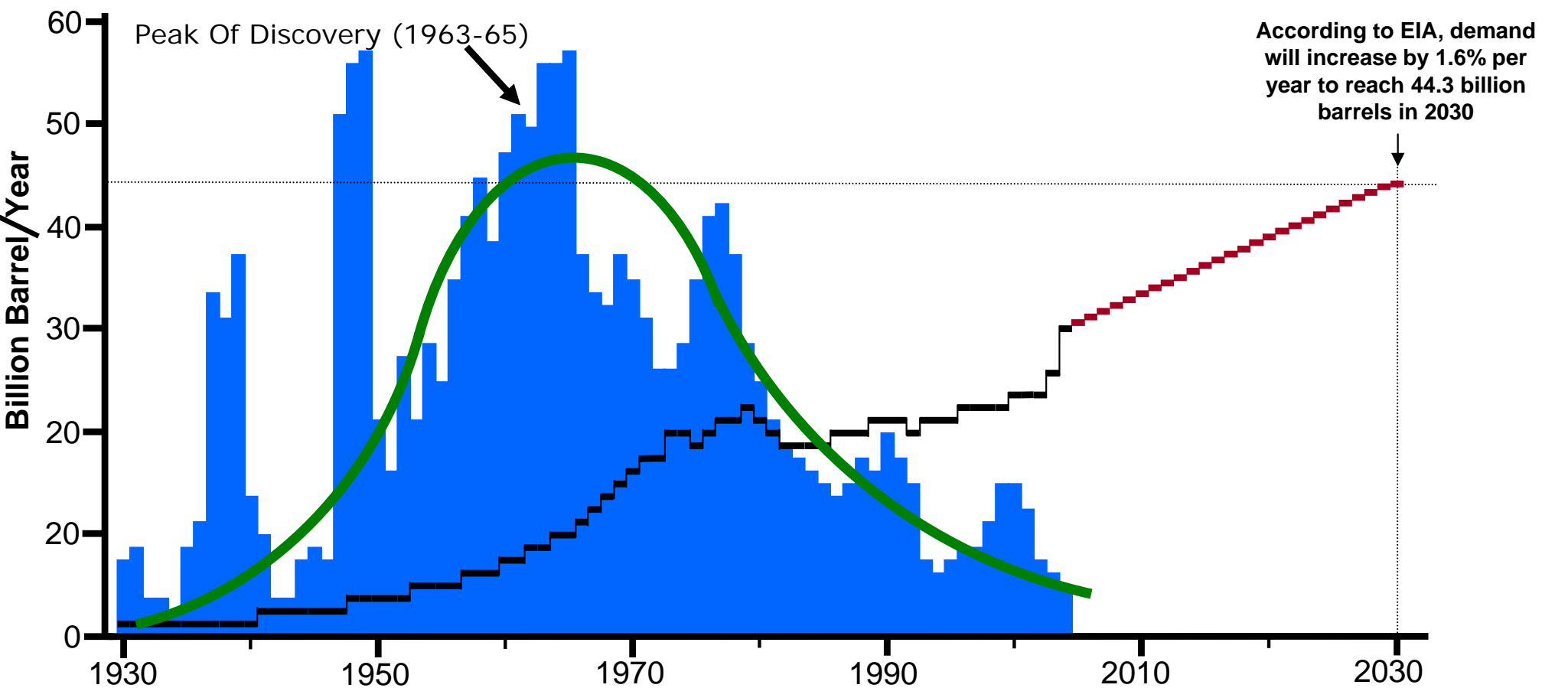
R.Oğuz Çapan

oguz.capan@solar-ltd.com



Now let us return to the actual global oil discovery/production curves and apply the Hubbert's principle...

What Is Going On In The Global Oil Sector...?!

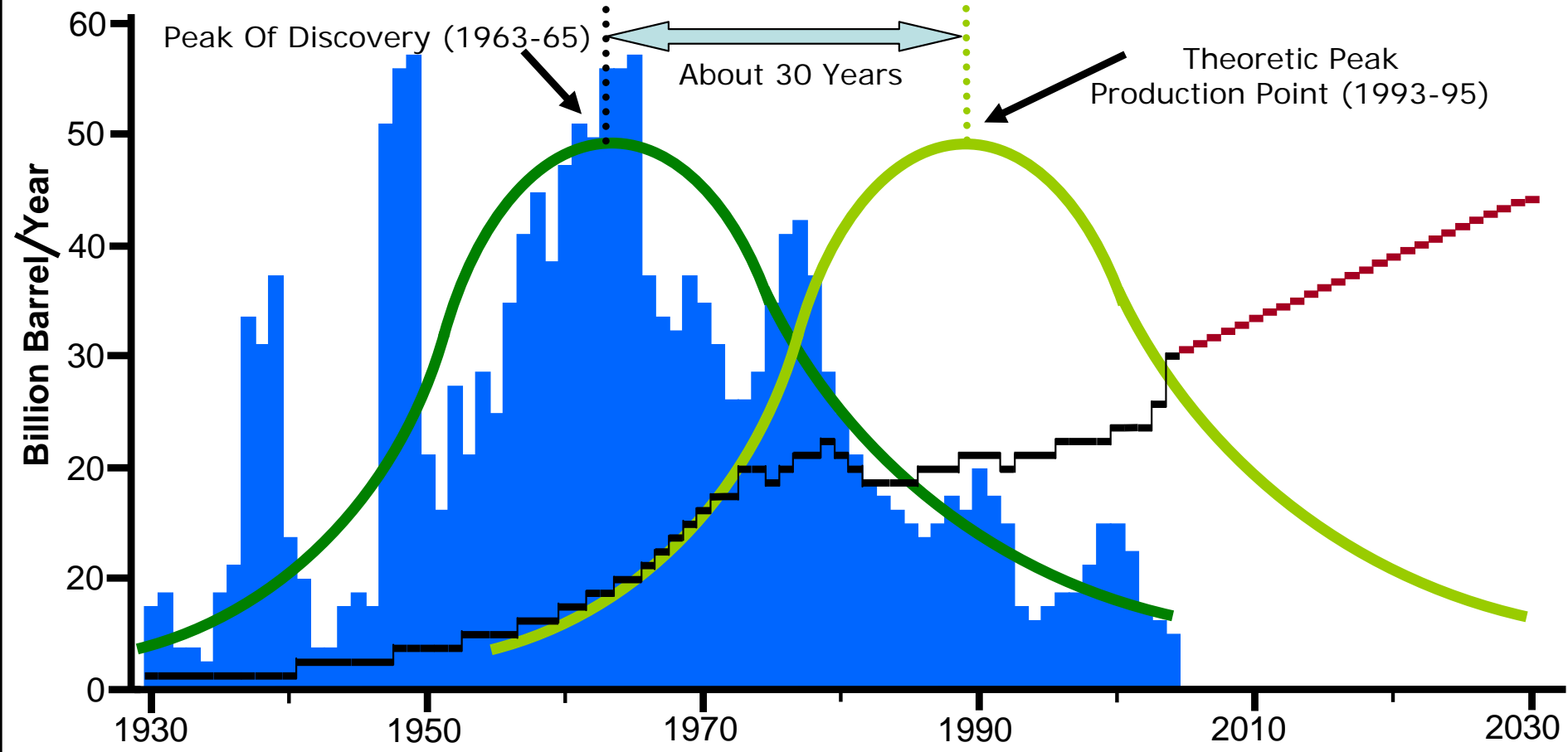


Peak Of Discovery (1963-65)

According to EIA, demand will increase by 1.6% per year to reach 44.3 billion barrels in 2030

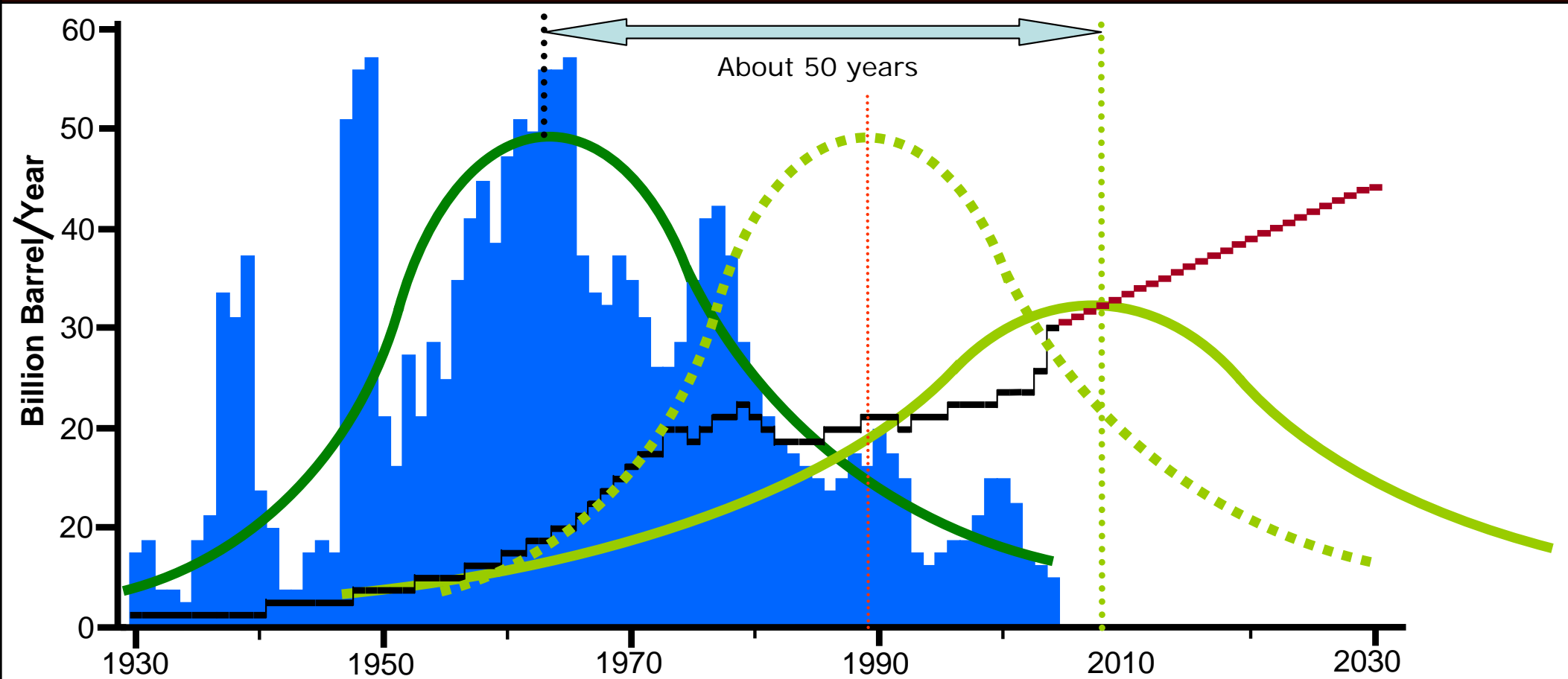
The global peak in oil discovery has occurred in 1963-65.

What Is Going On In The Global Oil Sector...?!



According to Hubbert's theory the peak in production capacity should have occurred around 1993-95. In fact we see that the early section of the production curve (1960-1974) does fit to the Hubbert Curve nicely.

What Is Going On In The Global Oil Sector...?!

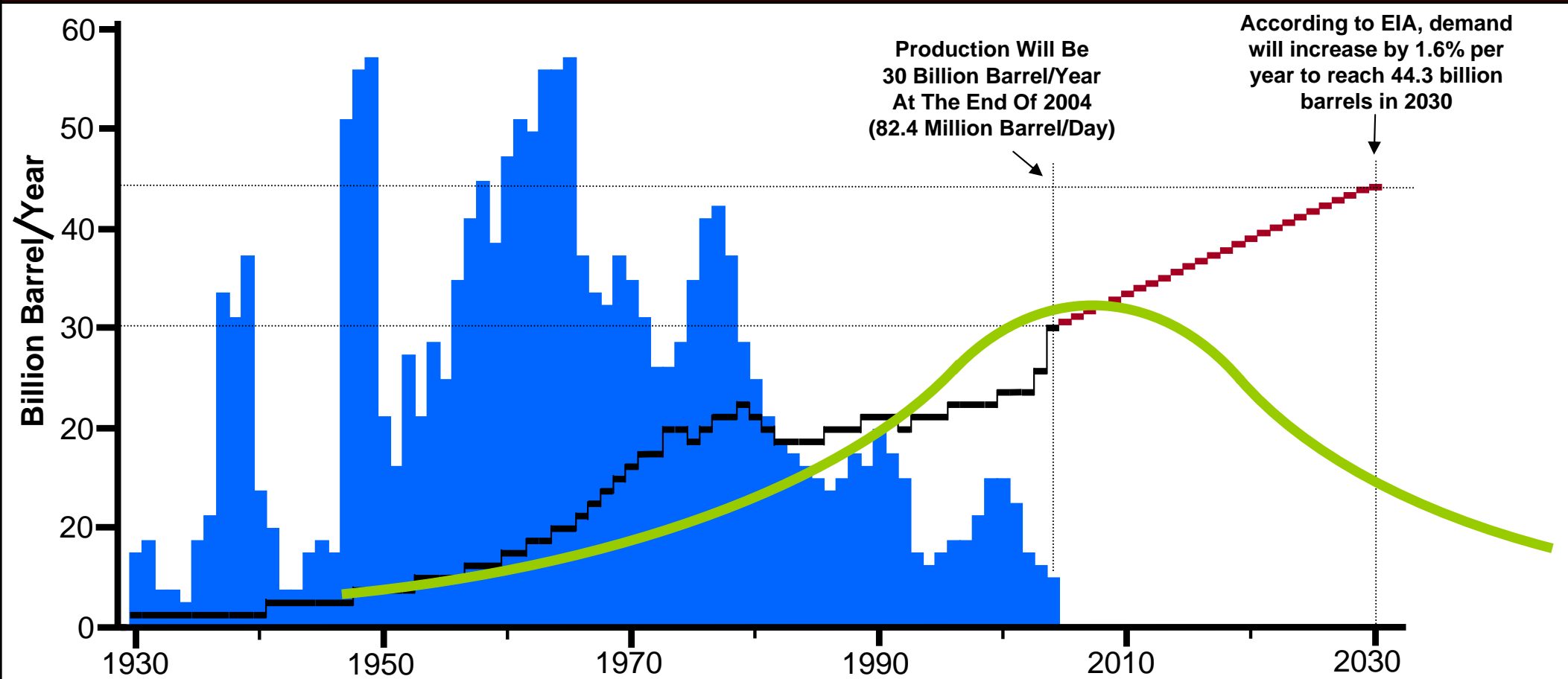


But, because of the OPEC crises of 1970s and 1980s that we mentioned earlier in this presentation, the oil production has been postponed and the Hubert Curve has been stretched out.

What Is Going On In The Global Oil Sector...?!

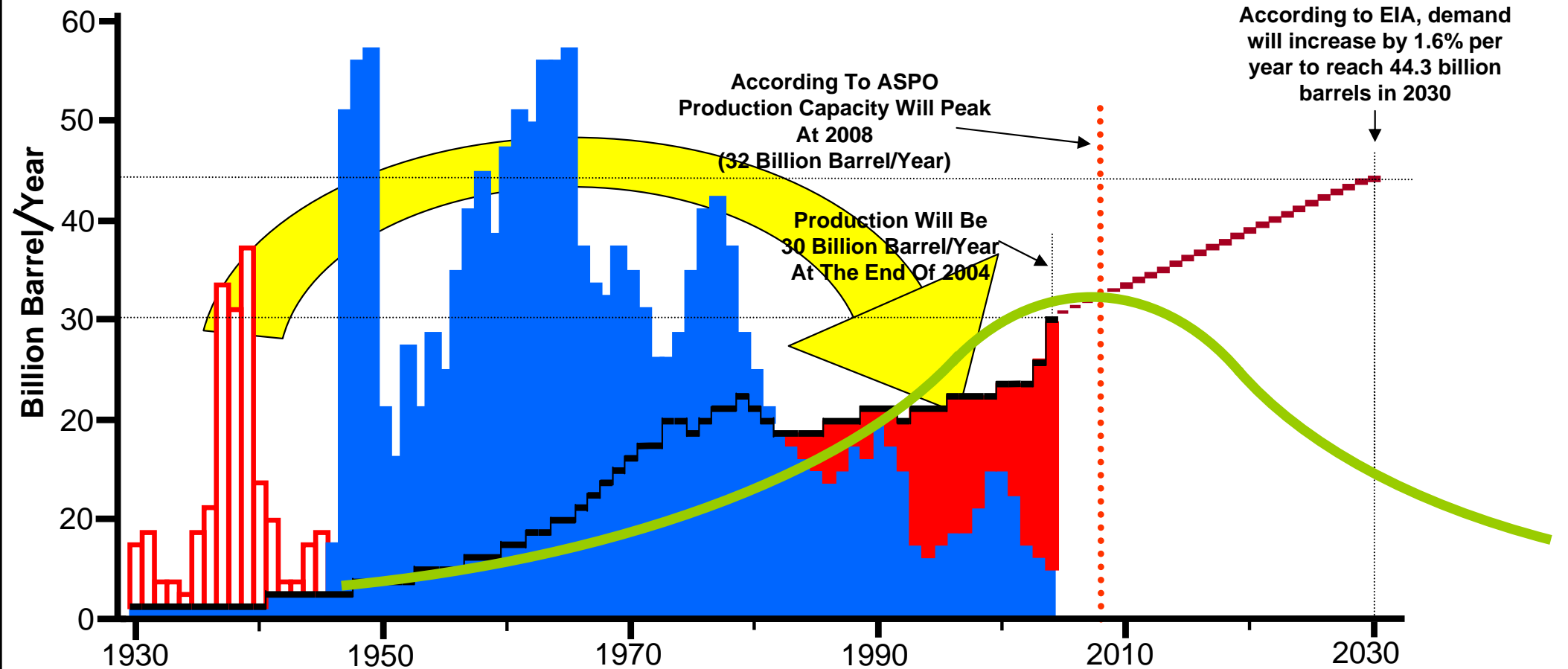
R.Oğuz Çapan

oguz.capan@solar-ltd.com



Now let us fit the remaining 900 million barrels of oil reserves into this stretched out Hubbert Curve...

What Is Going On In The Global Oil Sector...?!

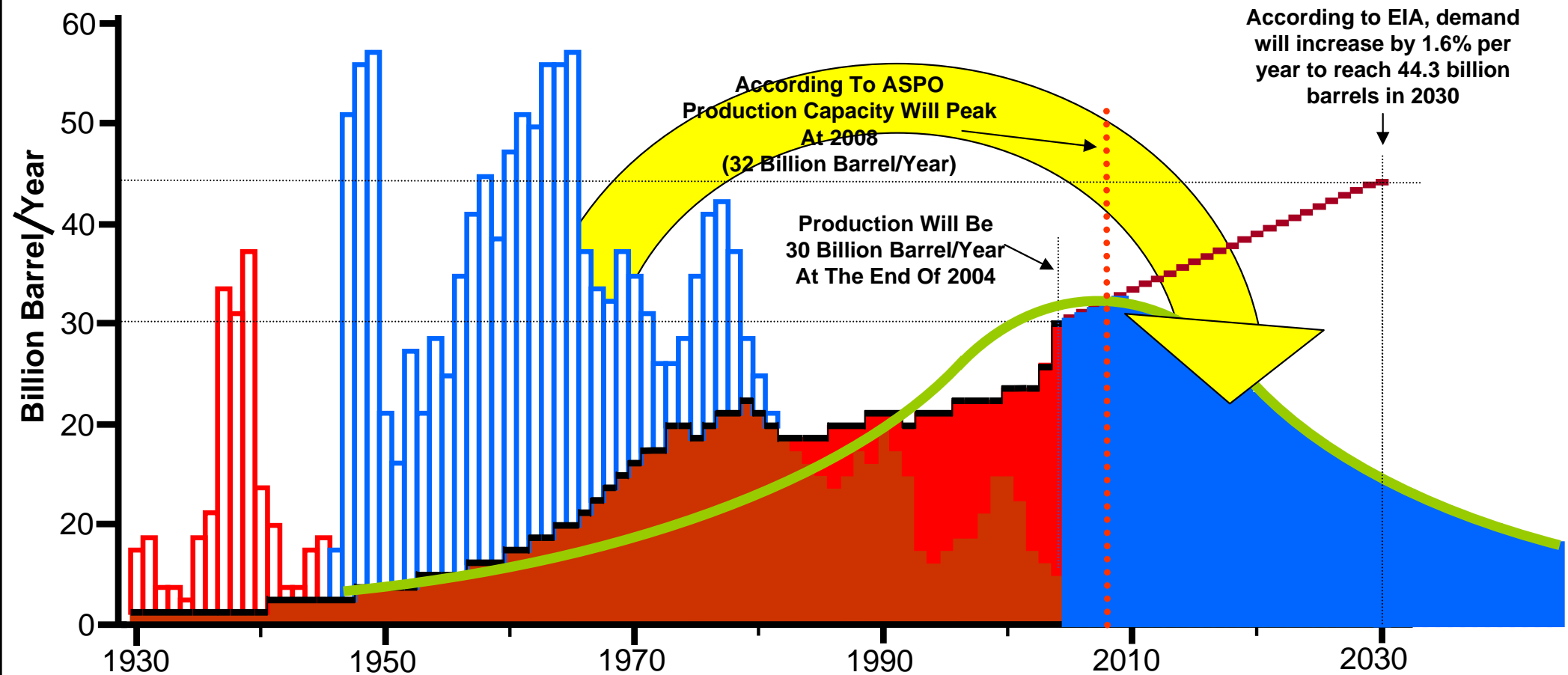


275 billion barrels of “**production-discovery deficit**” that has occurred since 1980 is equal to the “**production-discovery surplus**” of 1930-1945.

What Is Going On In The Global Oil Sector...?! roguz.capan@solar-ltd.com

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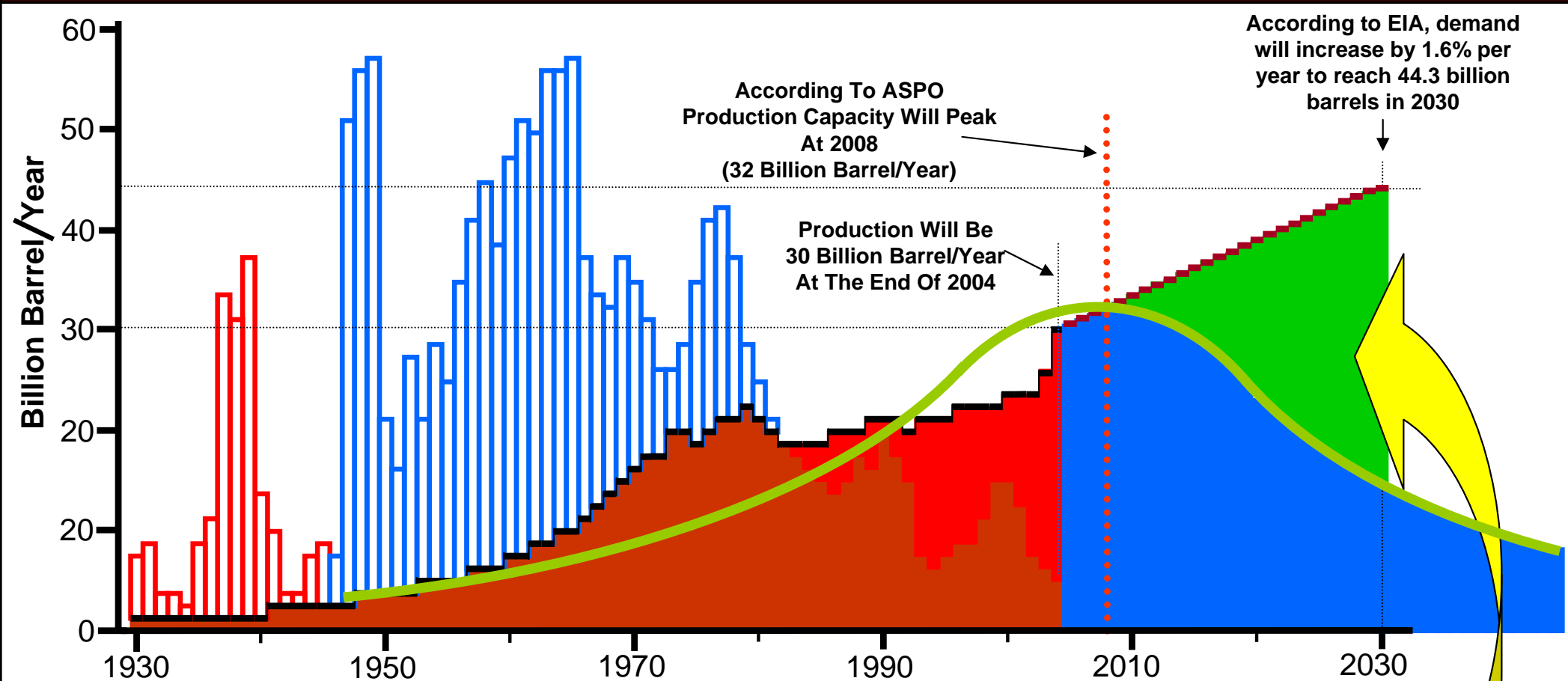
roguz.capan@solar-ltd.com



The “**production-discovery surplus**” that has occurred between 1946 and 1979 is approximately 900 billion barrels.

When we move this surplus under the future section of the Hubert Curve, we see that oil production will continue way past 2030...

What Is Going On In The Global Oil Sector...?!

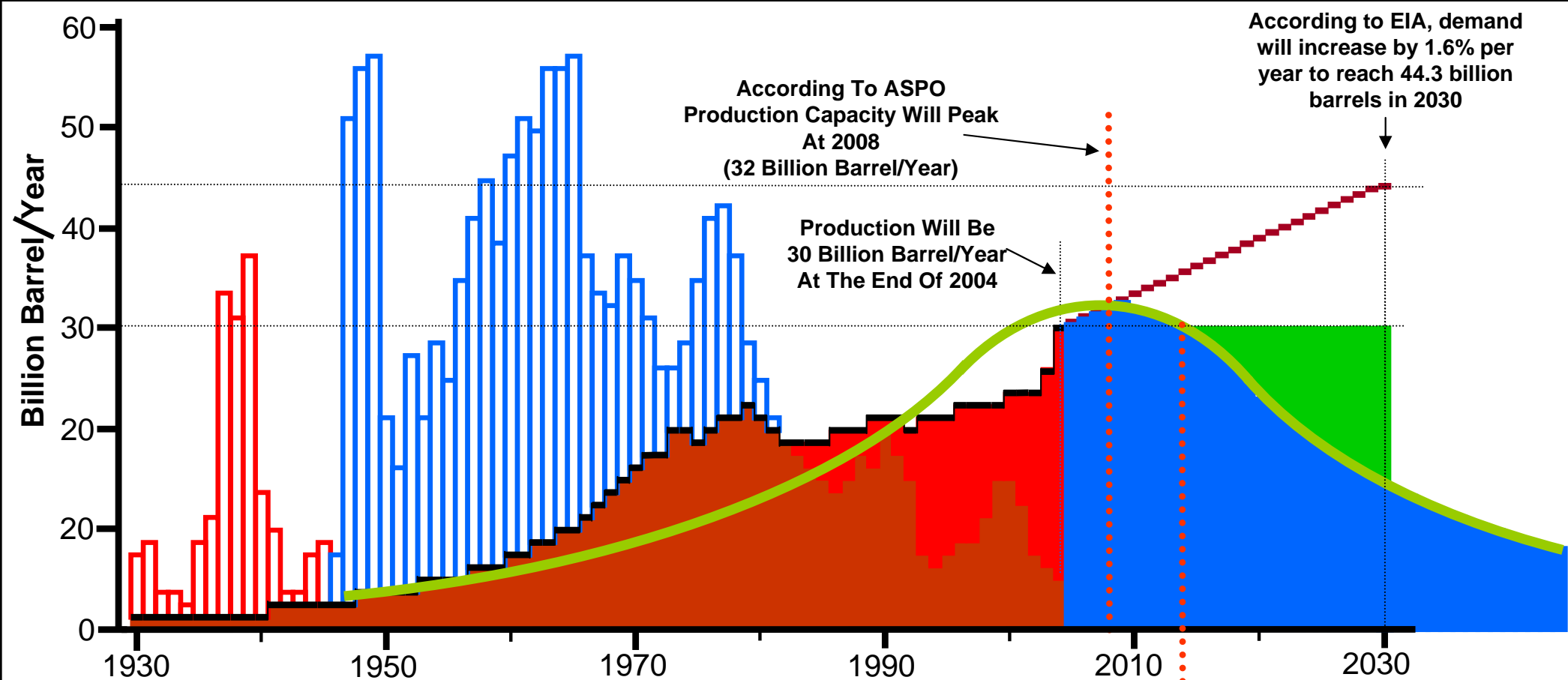


However, the most important point is whether the future production capacity under the Hubert Curve will be adequate to meet the estimated future demand for oil.

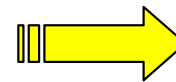
As seen here, while production will continue on, **there will be a significant negative gap between supply and demand after 2008**

(ASPO, Uppsala Univ. Of Sweden, London Oil Depletion Center)

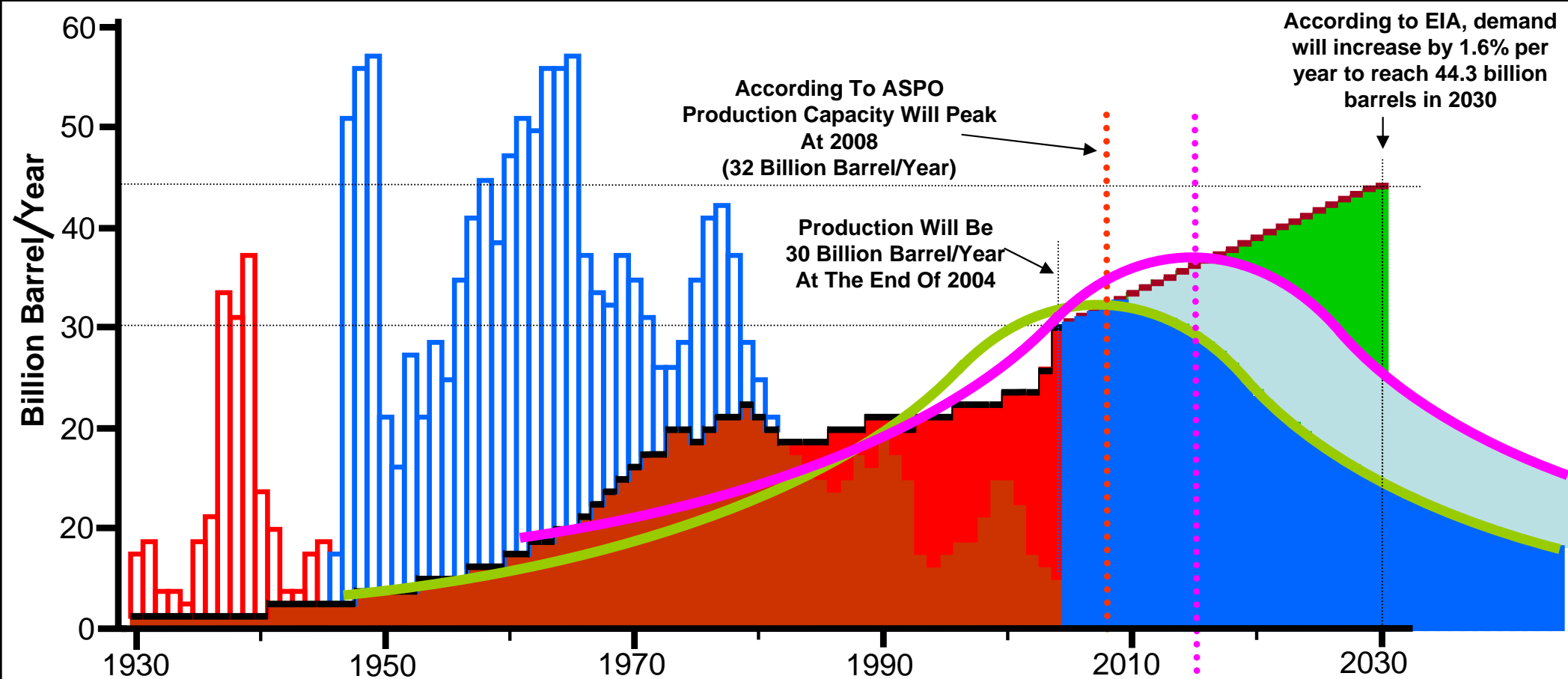
What Is Going On In The Global Oil Sector...?!



Even if we are able to keep the oil demand constant at today's levels, (which would mean a severe global economic recession), all we will be doing is postponing the beginning point of this supply/demand gap from 2008 to about 2012...

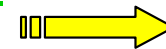


What Is Going On In The Global Oil Sector...?!

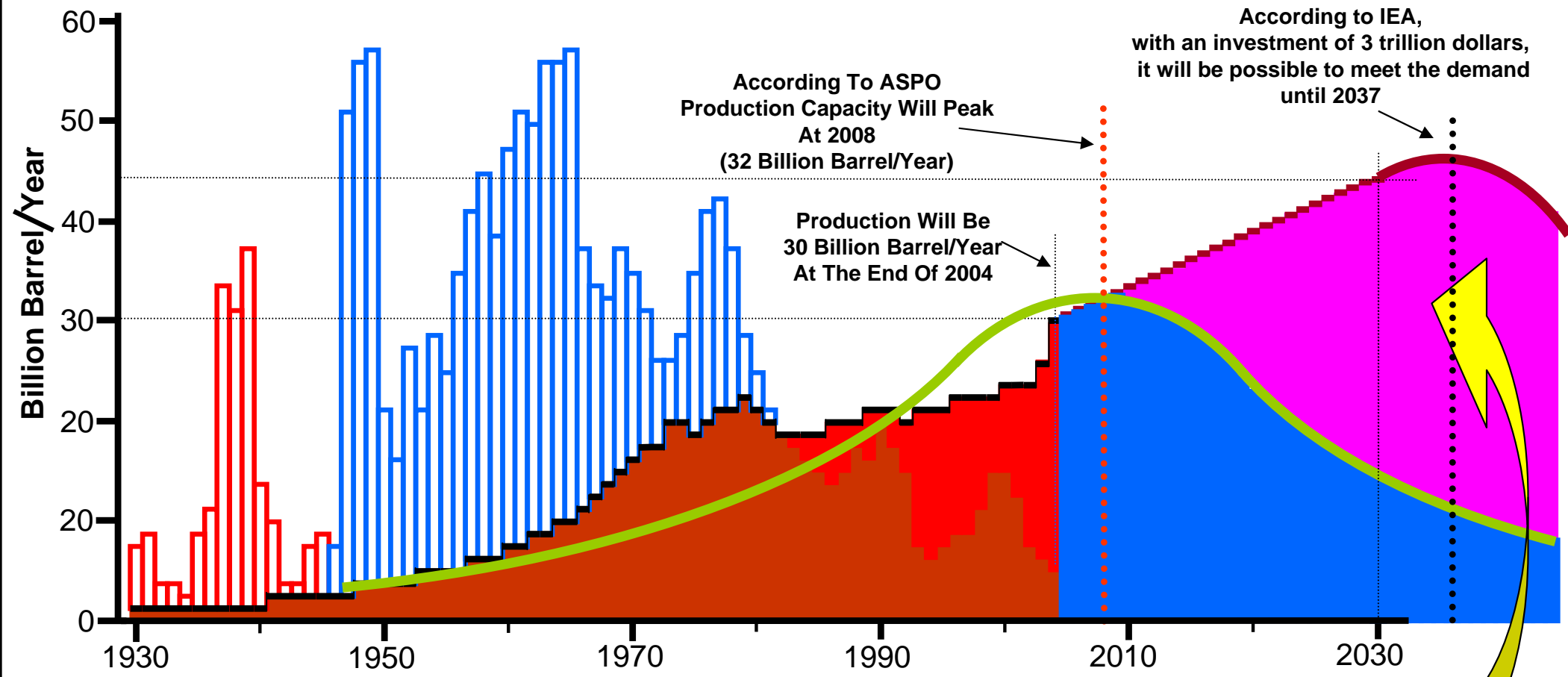


Even if we agree with those who argue that the remaining producible oil reserves are higher than the 900 billion barrels calculated by ASPO, (the common figure mentioned is 1200 billion barrels),

The beginning point of the supply-demand gap will be postponed until only 2015...!



What Is Going On In The Global Oil Sector...?!



IEA has chosen to stay out of all these "details" and just declared that all that is required to meet the global oil demand to year 2030 is a \$3 trillion investment...

If we were to summarize:

Even if we forget about the factors such as the global tanker and refinery capacity limitations mentioned in PART-1 of this presentation...

meeting the oil demand forecasted by IEA through 2030
will require the discovery and full development of
two Saudi Arabias very soon...!

Yes, you may think that I am making a “gross exaggeration”...
But I am the wrong person to be blamed:

“We need to find 50 million barrels a day additional production until 2010”

The person who said this in his speech at the 1999 fall meeting of
“London Institute of Petroleum” was...

the head of Halliburton at the time, and
the current Vice President of USA,

Mr. DICK CHENEY

(April 2004 issue of The Middle East)

And, according to the reports by EIA of USDOE...

“Total oil production of Persian Gulf area in 2001
(Saudi Arabia, Iran, Iraq, Arab Emirates, Kuwait, Qatar)
was 22.4 million barrels per day.”

Only half of what Mr. Dick Cheney says we need to discover...

The probability of the international oil explorers having missed reserves of this size is just ZERO...!

Let us now listen to Mr. Sadad Al-Husseini, who has started to speak more freely since he has retired:

SADAD AL-HUSSEINI , Former Head of Exploration, ARAMCO (the Arabian National Oil Co.):

They're not only overestimating the Middle East, but they overestimate non-OPEC, they overestimate Russia, they overestimate the whole global resource base. And I think this is a rather dangerous situation for the USA government policy to be based on.

(UK Channel-4 TV News Special Report: Oil Supplies – Aired on Oct. 26, 2004)

Let us for a moment be optimist as some “experts” are and assume that such giant reserves are hiding under the deep oceans and the polar ice caps, and let us also assume that we will find the investors to throw in the \$3 trillion as foreseen by the US EIA...

It is physically impossible to carry on and complete all this work in time to make a difference...

We just do not have the number of drilling rigs, off-shore platforms, pipeline laying barges, construction equipment AND personnel to do the amount of work within the next 10 years that it took several generations before us to accomplish...!

We will not go into it right now,
but the situation in Natural Gas Sector
is only slightly better...

"... (production) peak (for) gas might be a reality within 20 years after the peak oil, or around 2030. (...) With the enormous expansion that we now can see (in gas consumption) in Europe, (this gas peak) might be earlier."

JEAN LAHERRERE,
3rd. International Oil & Gas Depletion Workshop,
Berlin 24-25 May, 2004



Therefore, there is an urgent need
to develop alternatives to oil (and gas)...

Yes, this recommendation (actually a cry!) is coming
not only from the Greens and Environmentalists,
but this time from reputable oil professionals
(and Mr. Cheney)
and it must be heard...!

I THANK YOU
FOR YOUR TIME AND ATTENTION...

R. OĞUZ ÇAPAN
Oguz.capan@solar-ltd.com