GLOBAL OIL & GAS SUPPLY EXPECTATIONS

THE SCENE – THE ISSUES

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The announcement of the imminent depletion of oil reserves : a recurrent theme

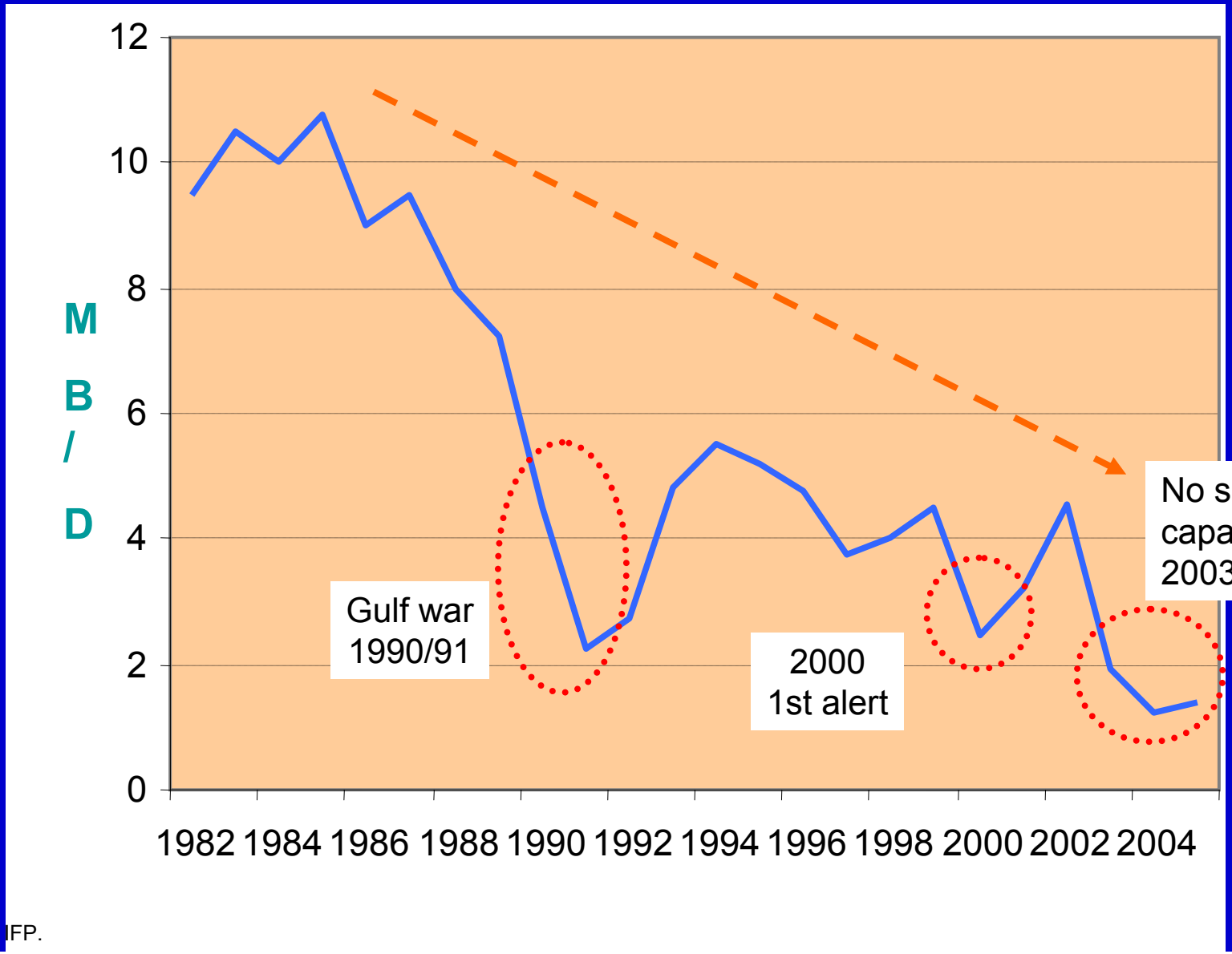
« La Technique moderne » 1919

« Nearly 4.2 billion barrels of oil had been produced in the United-States since 1859...

… No more than 7 billion additional barrels could be produced. »

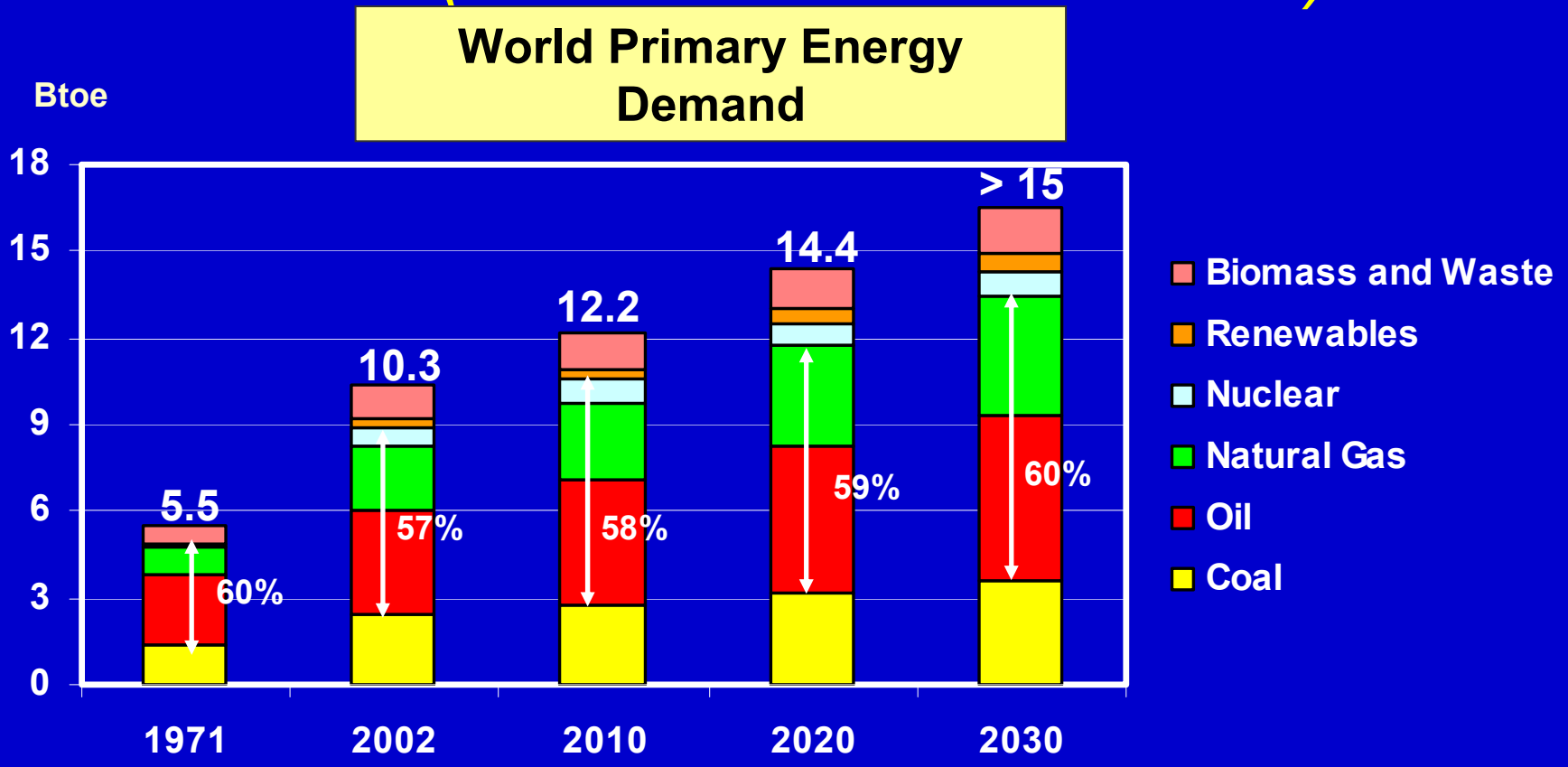
NB : 185 Billions bl were produced in the US to 2005

An on going decrease of OPEC spare capacity



Source : AIE - IFP.

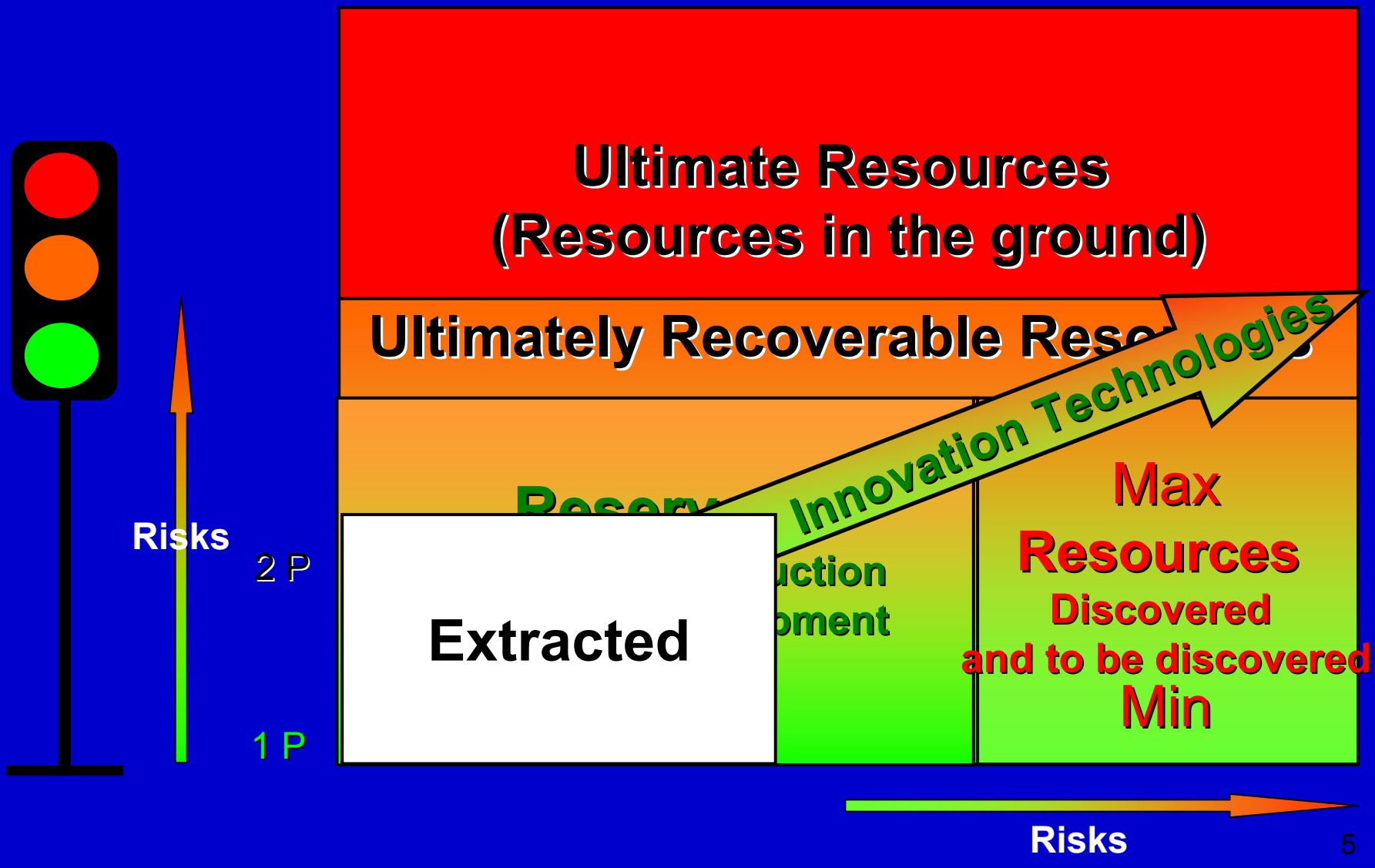
1970 - 2030 Evolution of World Energy Balance (incl. Biomass and Waste)



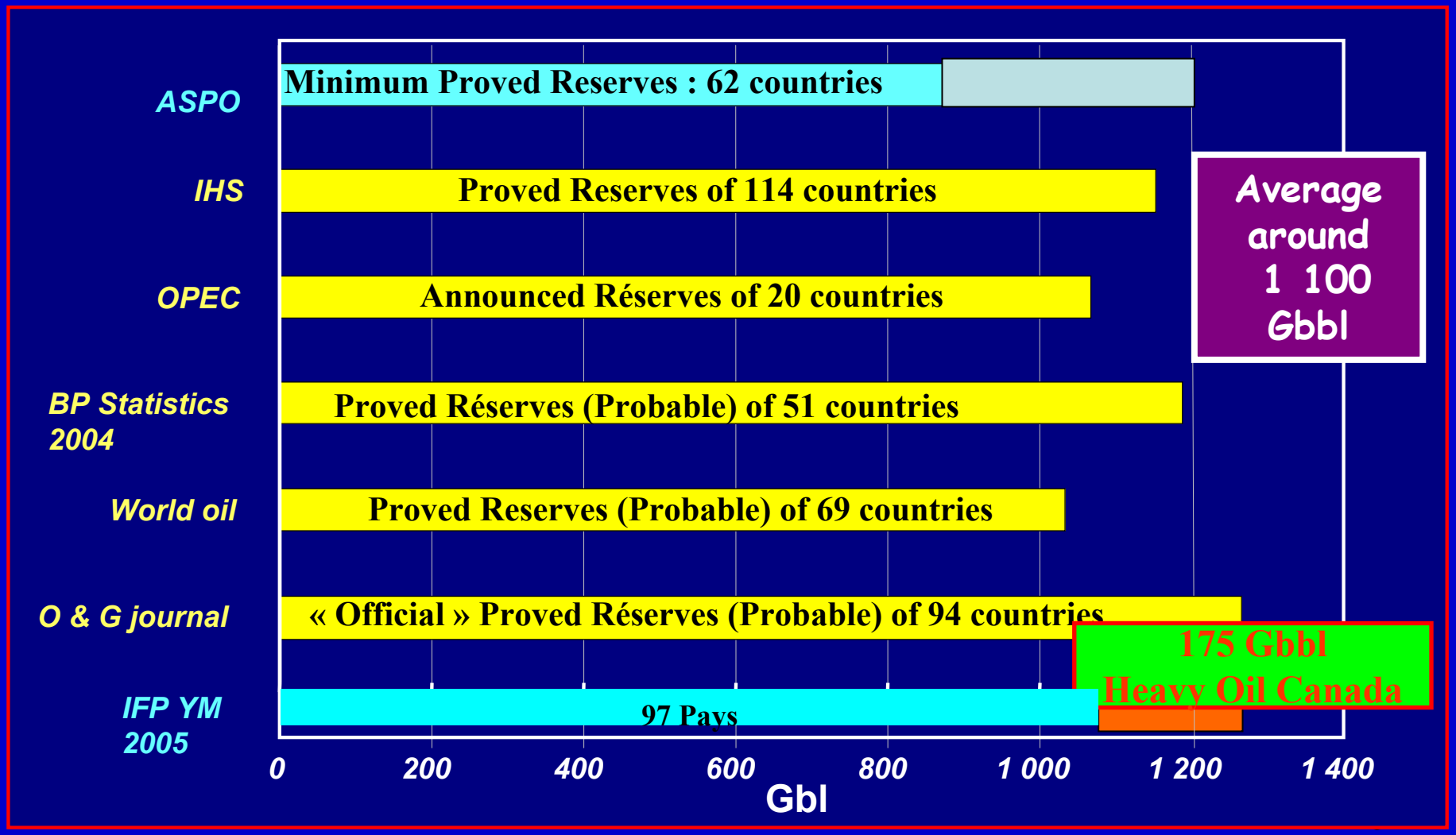
Reference scenario: + 60% for 2000 – 2030 period

Source: IEA WEO 2004

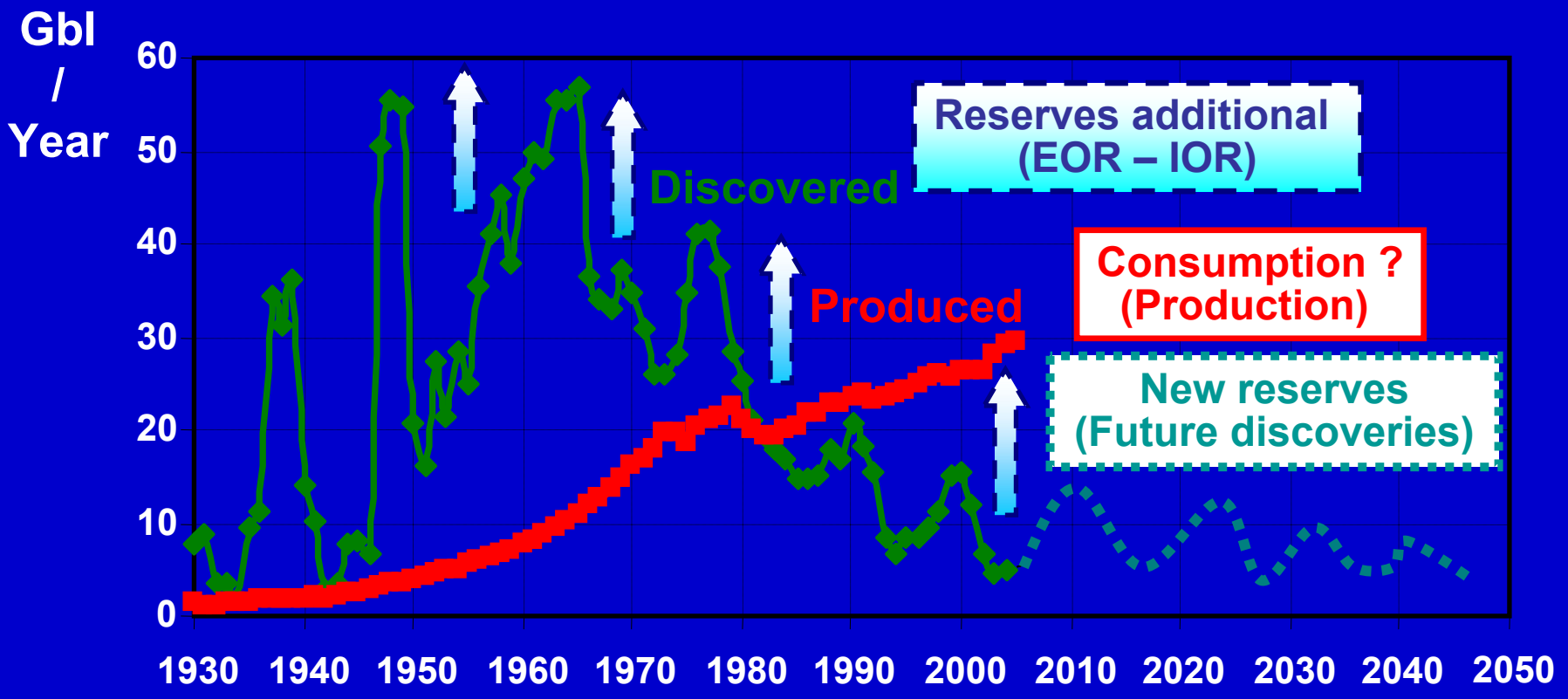
..... RESOURCES AND RESERVES



.... What could be the Reserves of Liquid HC ?

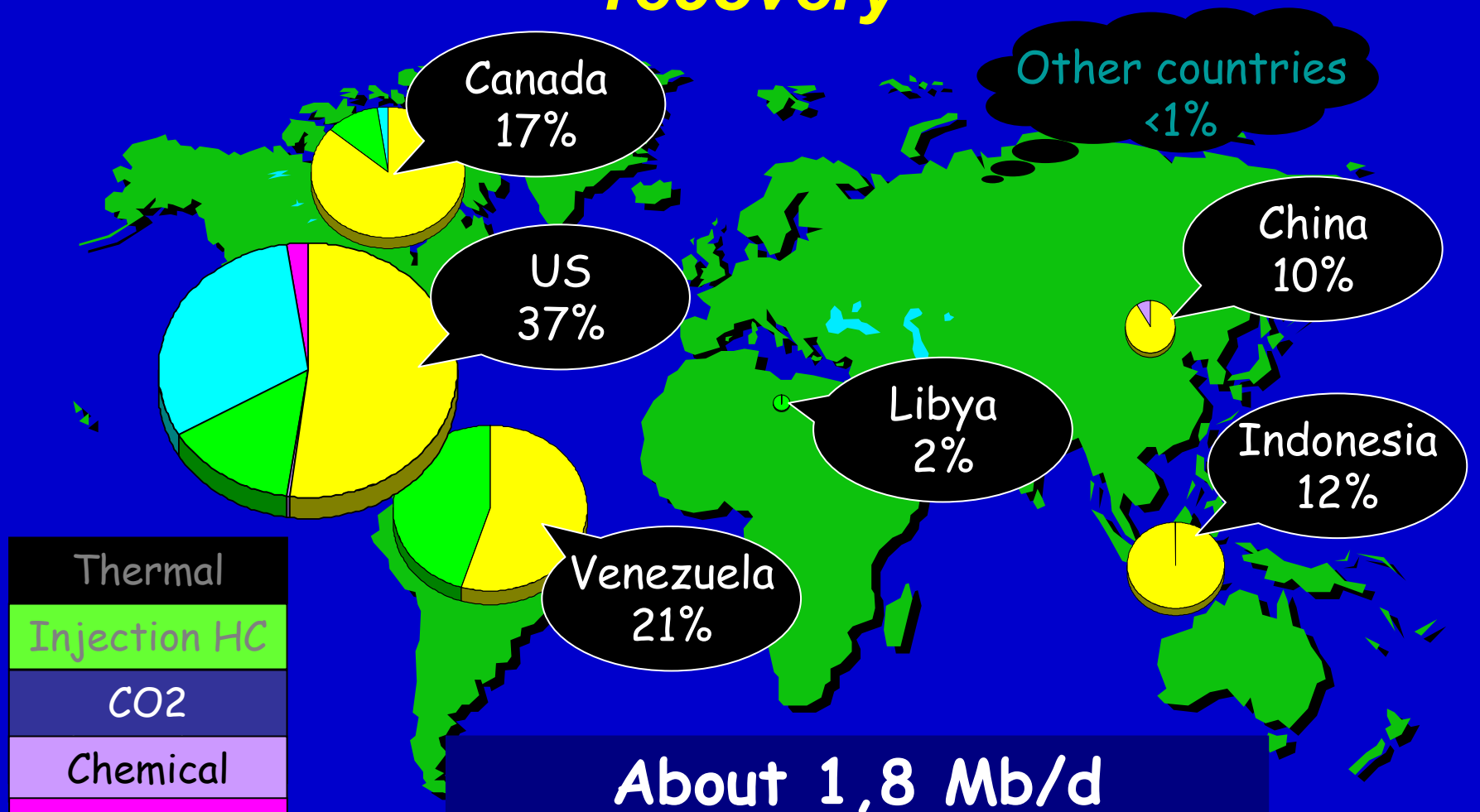


THE GROWING GAP
(Production / Reserves)



From the 80's, annual production is more important than reserves discovered, therefore worldwide oil production will decline one day.

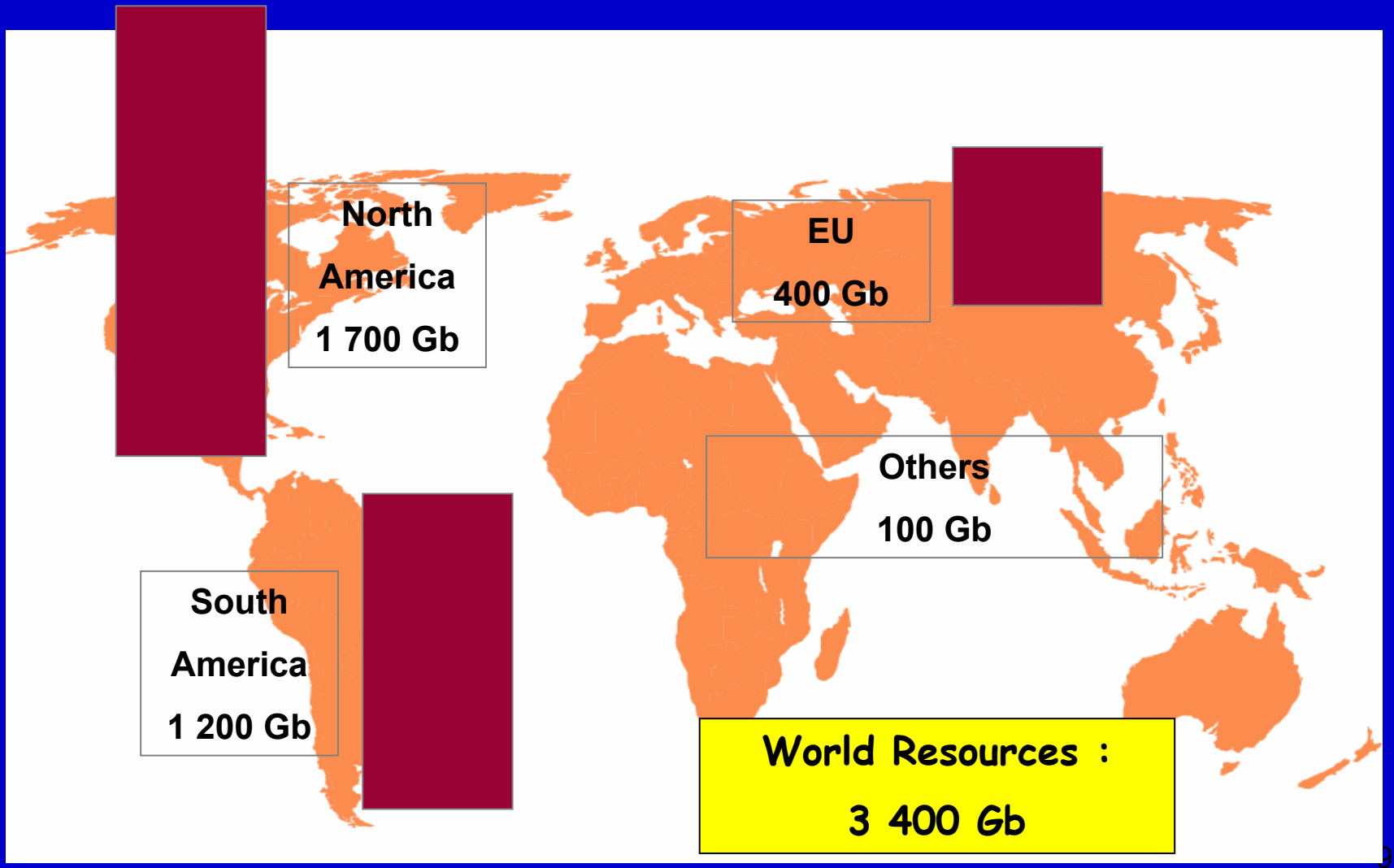
2004 : Share of Production for tertiary recovery



About 1,8 Mb/d

(2% of world production)

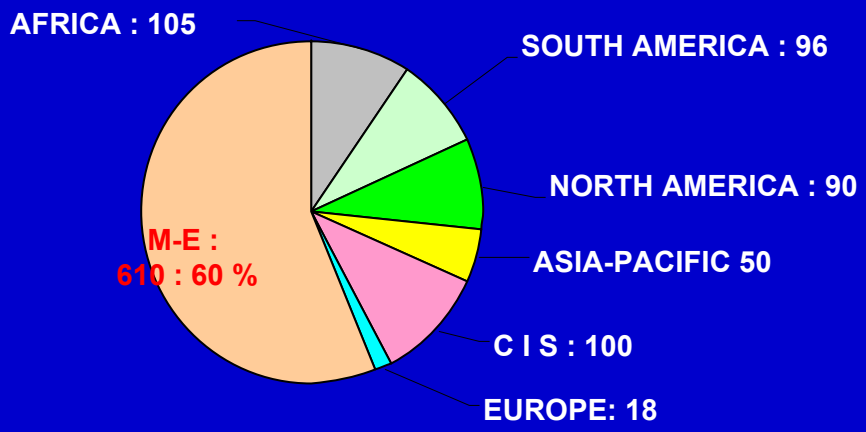
Non Conventional Resources : extra heavy oil/tar sands



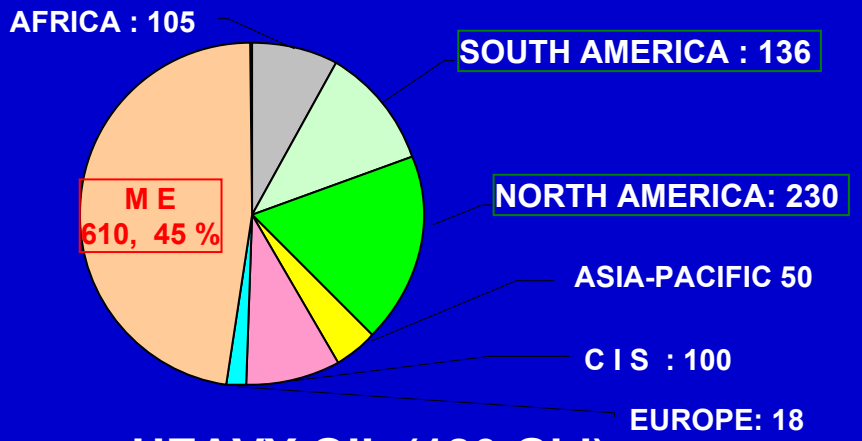
Source: IFP

..... Where are Reserves?

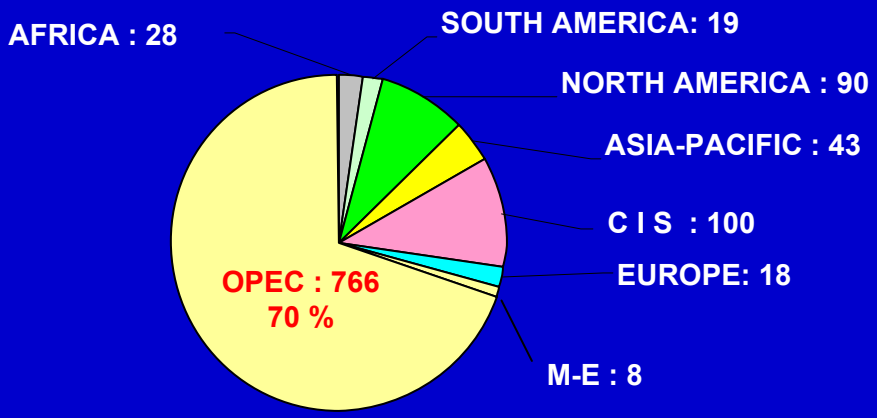
CONVENTIONAL OIL
1 070 Gbl, (By World Regions)



+ HEAVY OIL (180 Gbl)
1 250 Gbl, (By World Regions)



CONVENTIONAL OIL
1 070 Gbl, (By World Regions/OPEC)



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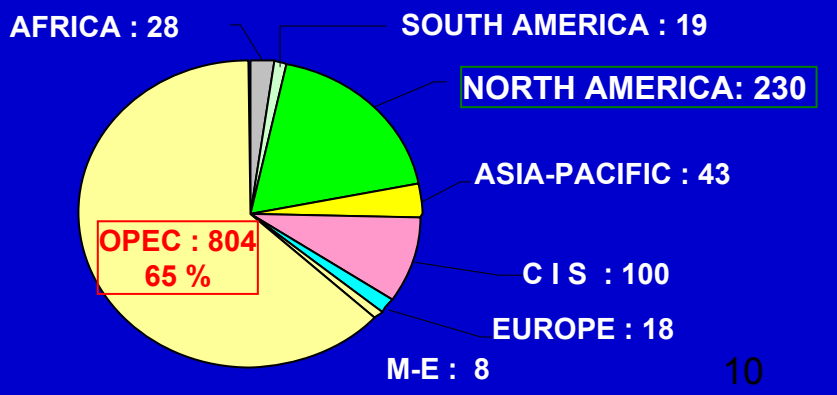
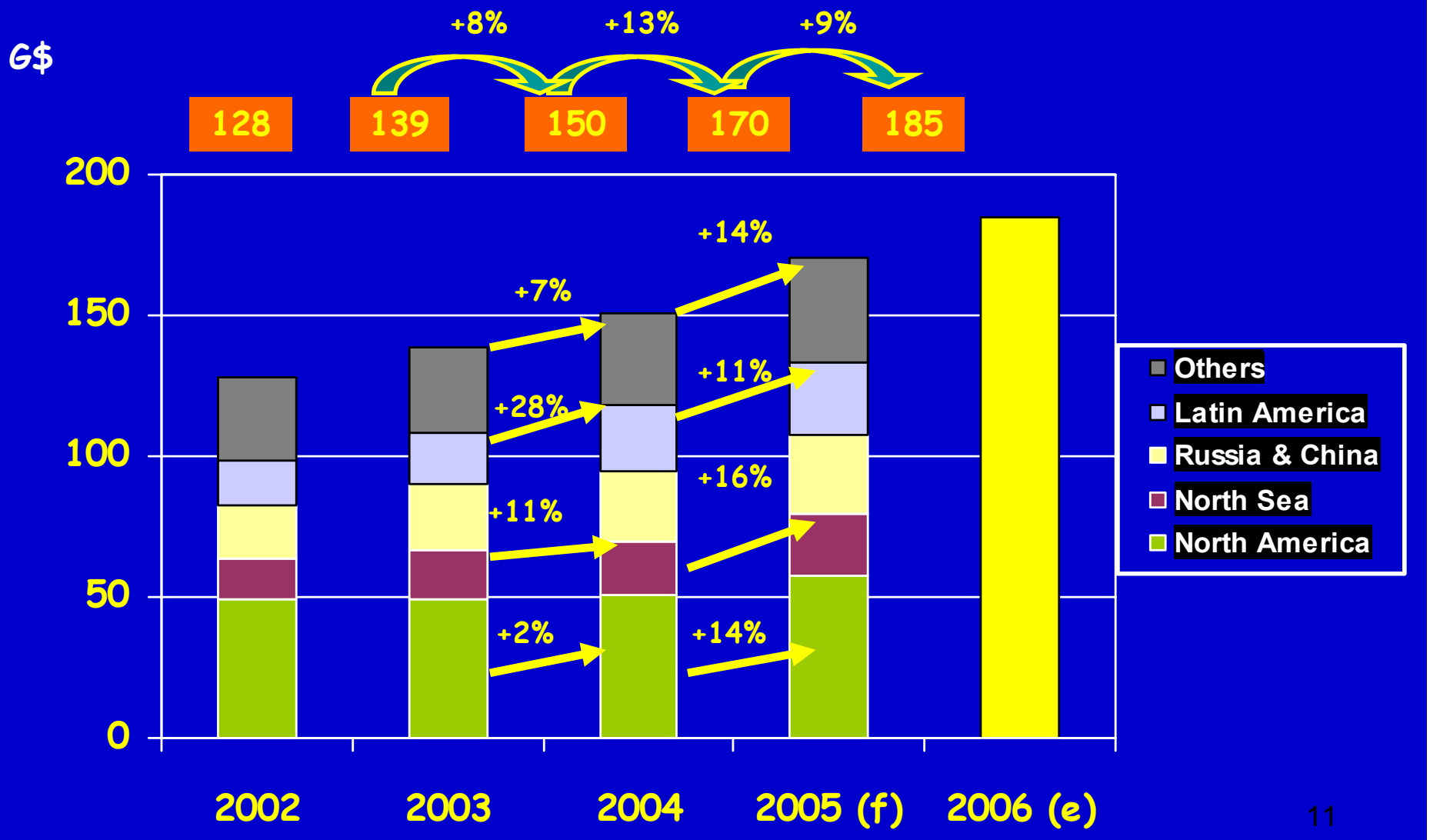


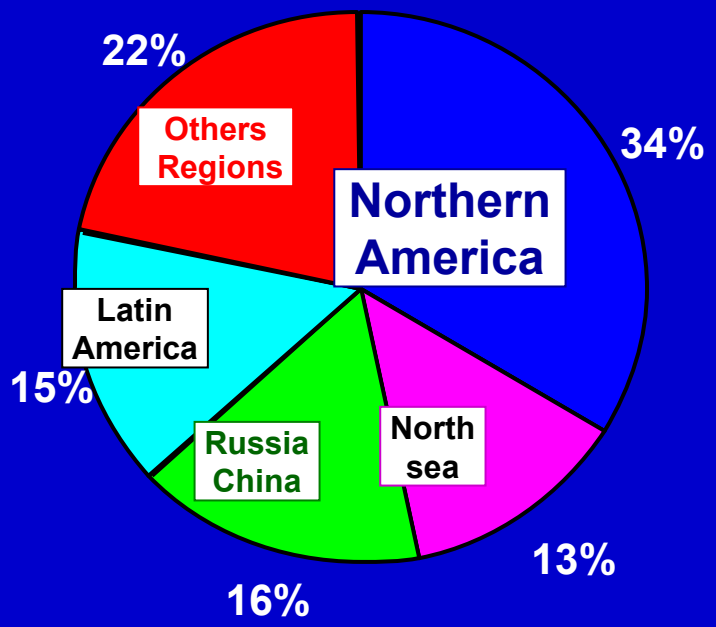
Investments in E/P (including Russia and China)



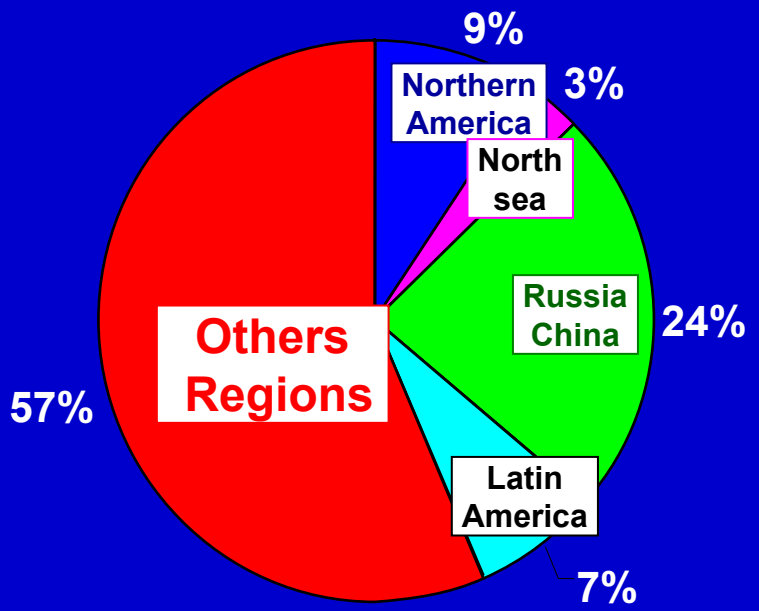
Source : IFP (e) : estimate (f) : forecast

INVESTMENTS IN EP / MAIN PETROLEUM REGIONS

Investments are mainly in Northern America



But reserves and resources are mainly in Others Regions (Middle East & Africa)

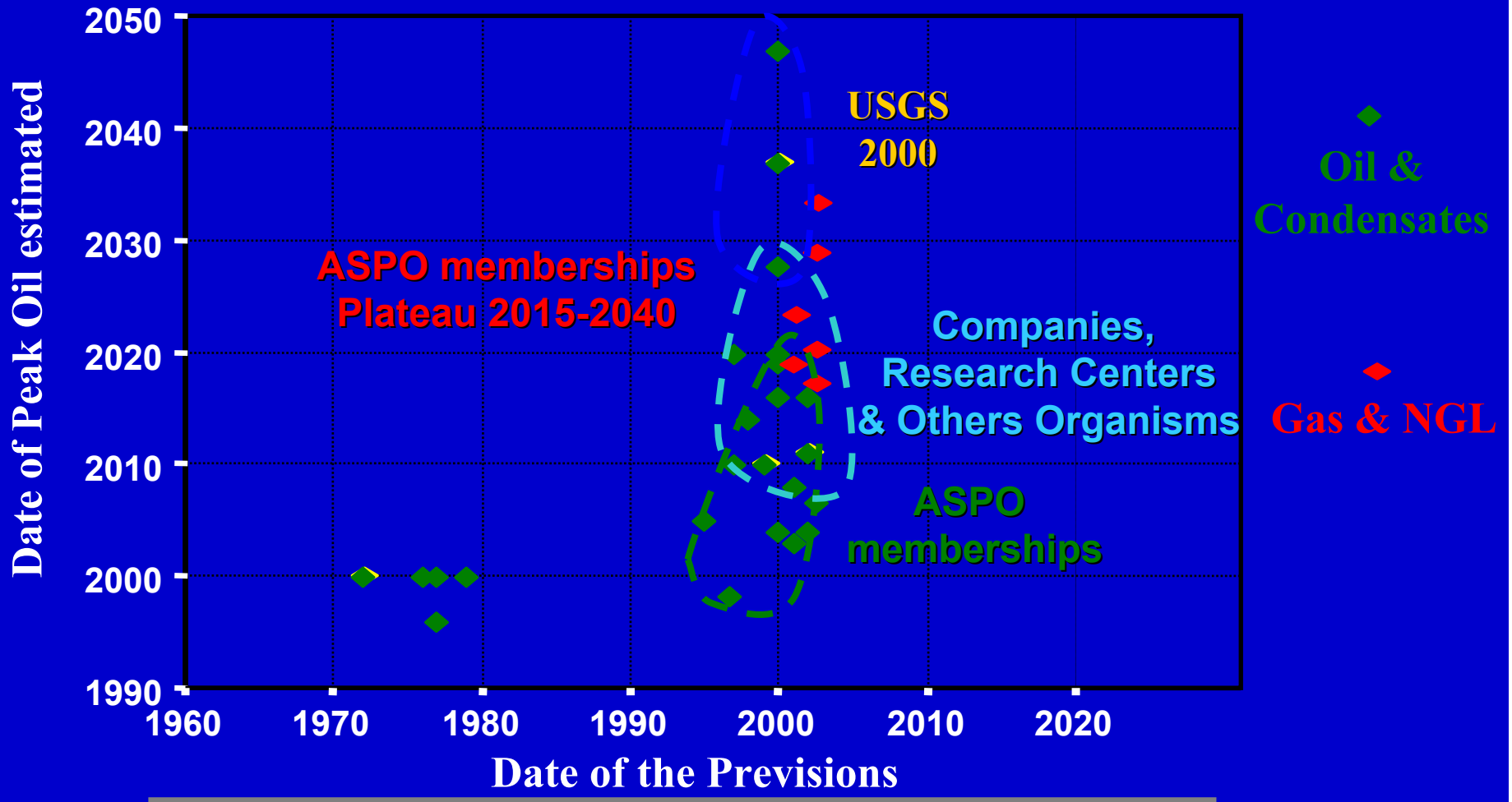


Source : IFP

E/P Investments and oil prices ?

- **Difficult access to the most attractive prospects**
- **Strengthening of fiscal regime**
- **Bottle-necks in the supply and service industry**
- **Lack of human resources**

DATE OF THE PEAK OIL PUBLISHED / DATE OF THE PREVISIONS



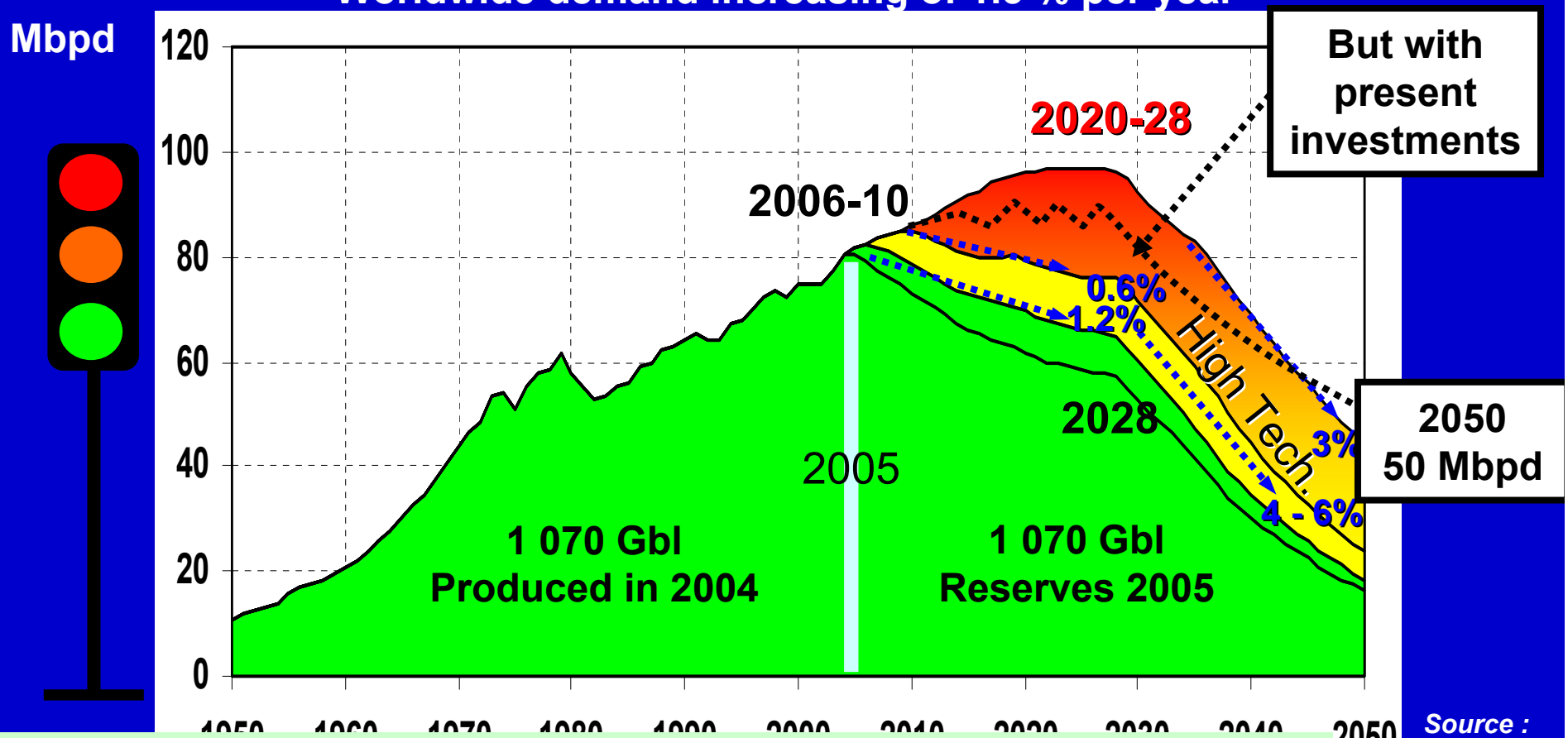
Numerous predictions in the last decade.
Peak of production of liquids between 2006-2030.
Who is right ?

Sources :
60 publications

.... PROBABLE SCENARIO OF PRODUCTION

1 745 Gbl = 1 070 producing and developing + 120 Gbl discovered + 555 Gbl High Tech.

Worldwide demand increasing of 1.5 % per year



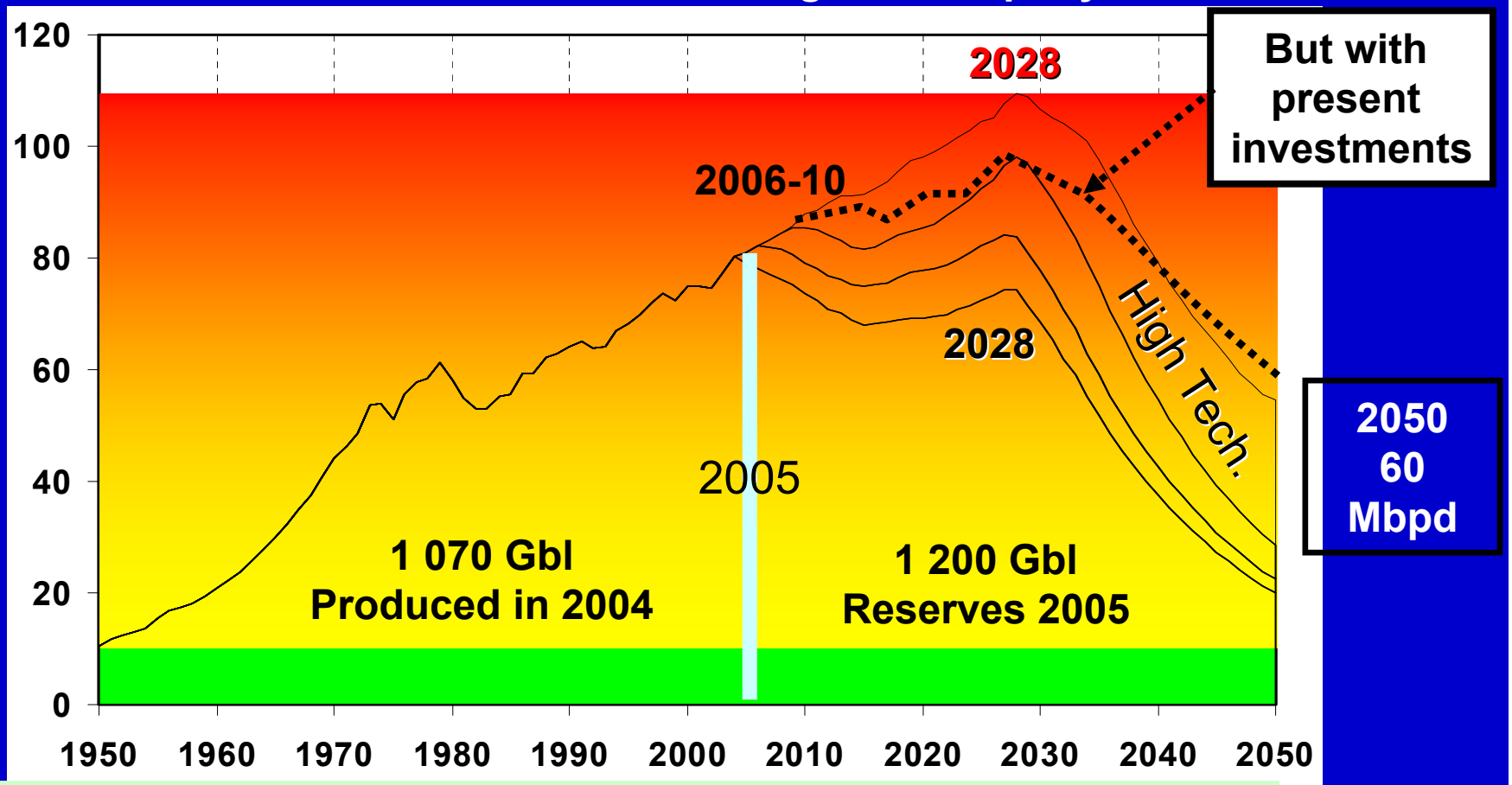
Source : IFP

- Over 2006 production limited technically and economically.
- 2010 Peak of production (90 Mbpd),
- Only High Technology can allow to find reserves, to maintain the production from 2010 to 2028 and to slow the decline

.... POSSIBLE SCENARIO OF PRODUCTION

1 975 Gbl = 1 200 producing and developing + 120 Gbl discovered + 655 Gbl High Tech.

Worldwide demand increasing of 1.5 % per year



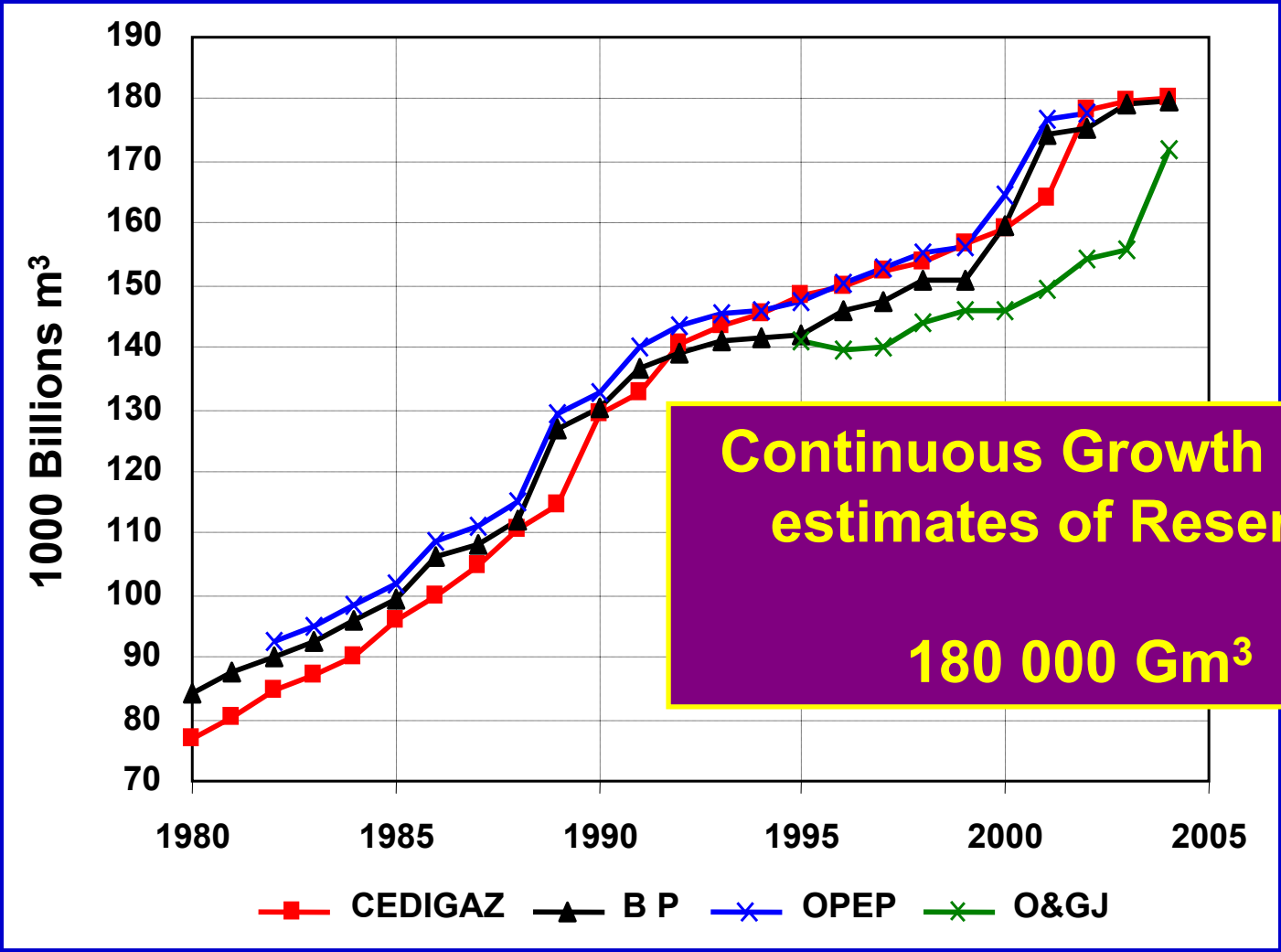
- Over 2006 production limited technically and economically.
- 2010 first peak of production (90 Mbpd), with a second one close to 2028 (100 Mbpd)
- Only high technology can allow to find reserves, to "satisfy" the demand 2010-28 and to slow the decline over 2028 corresponding to the "geological potentialities"

Source : IFP

NEW CHALLENGES FOR THE REFINING INDUSTRY

- Refining capacities not sufficient in consuming zones (N.America – Pacific Asia) following 30 years of low margin and a lack of investments
- Increasing transport needs with new quality standards for fuels
- Projects for new distillation or conversion capacities in particular in ….M-E
- .5 to 1 Billion US$ for a heavy conversion unit

.... WHAT COULD BE WORLD GAS RESERVES ?

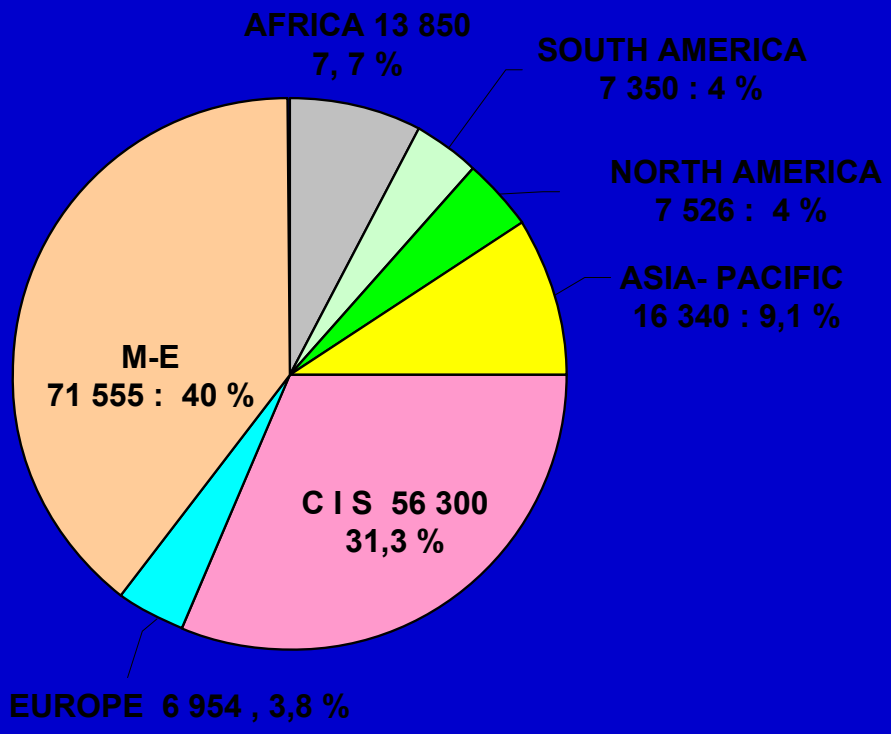


Continuous Growth of the estimates of Reserves

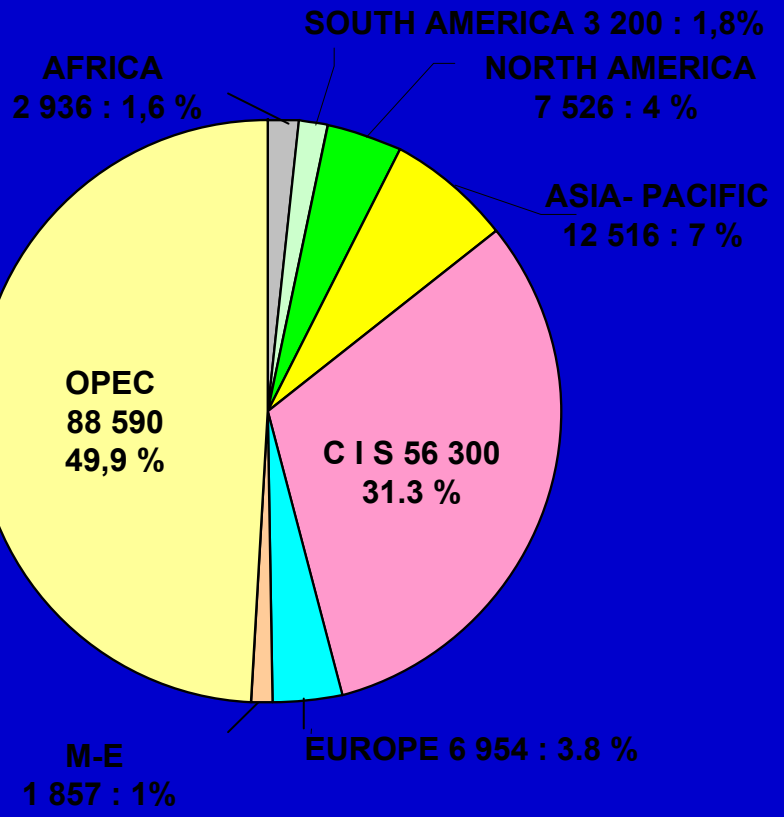
180 000 Gm^3

.... GAS RESERVES ? (in Gm^3)

BY WORLD REGIONS



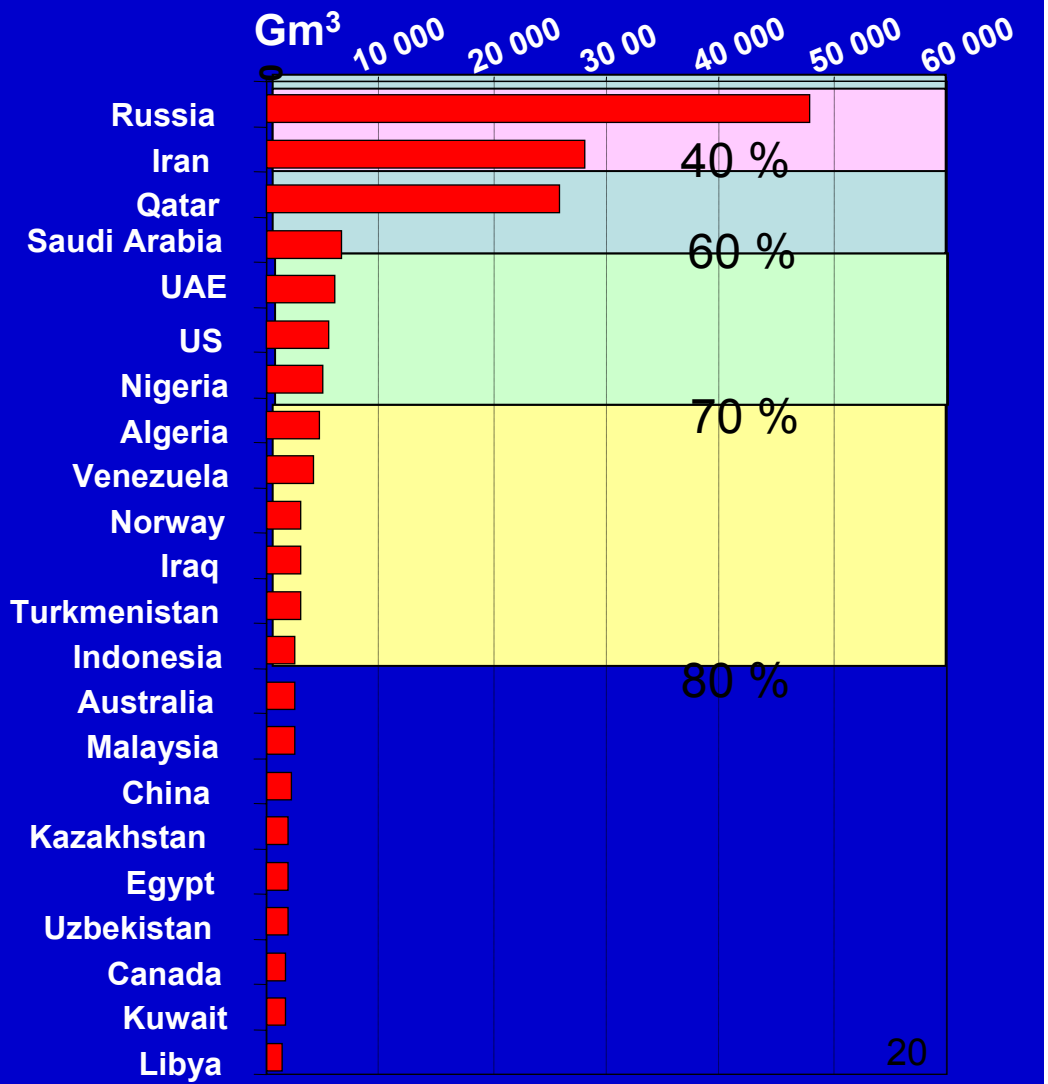
BY WORLD REGIONS / OPEP



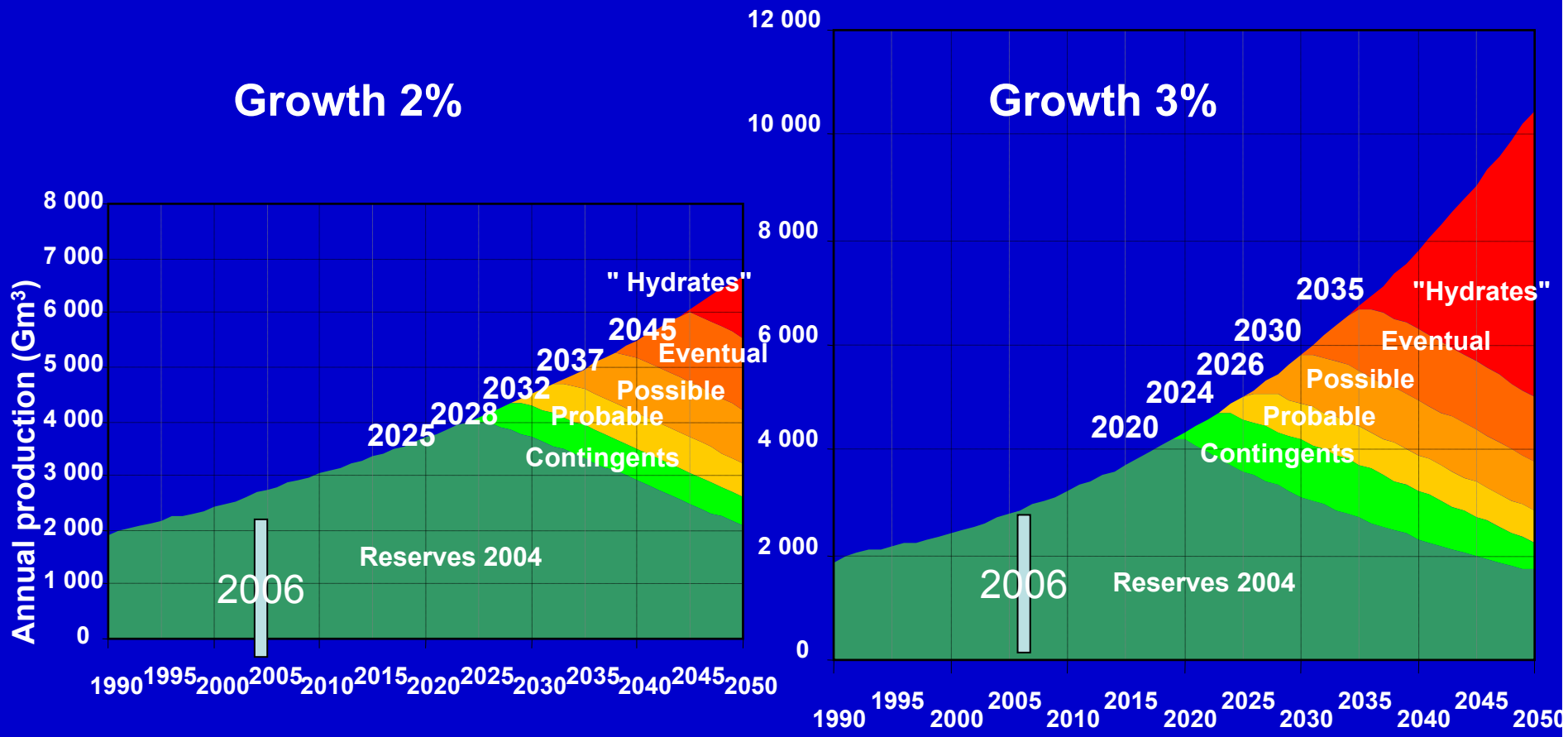
..... GAS RESERVES BY COUNTRY

3/4 in 9 Countries
(90 % in 22 countries)

Rang	PAYS	Réserves / Habitant
1	Qatar	36 833
2	Emirats Arabes Unis	1 439
3	**Brunei**	**858**
4	Norvège	687
5	Kowait	623
6	Turkmenistan	509
7	Iran	418
8	**Trinidad 8 Tobago**	**410**
9	**Oman**	**369**
10	Russie	333

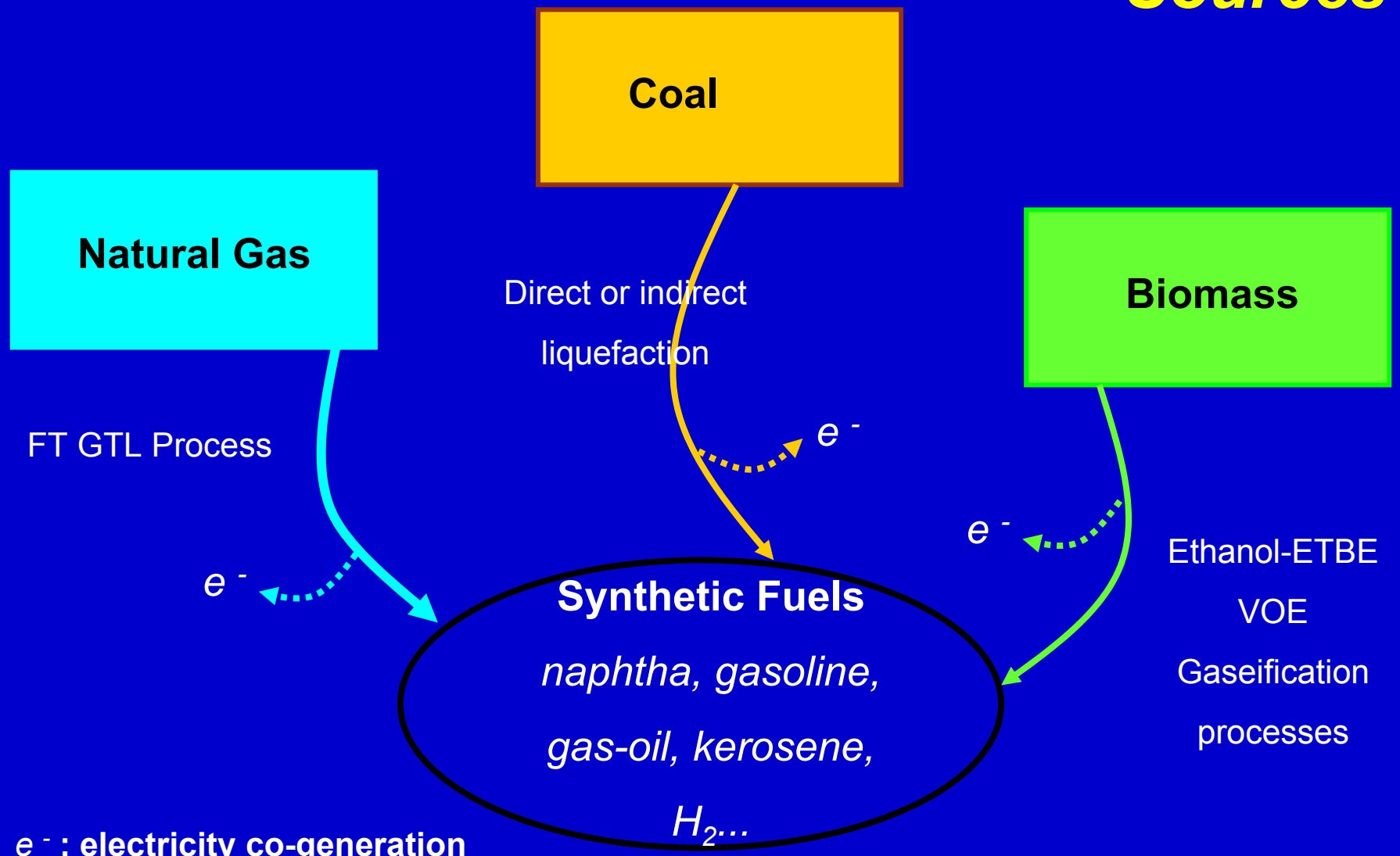


.... POSSIBLE SCENARIOS FOR GAS



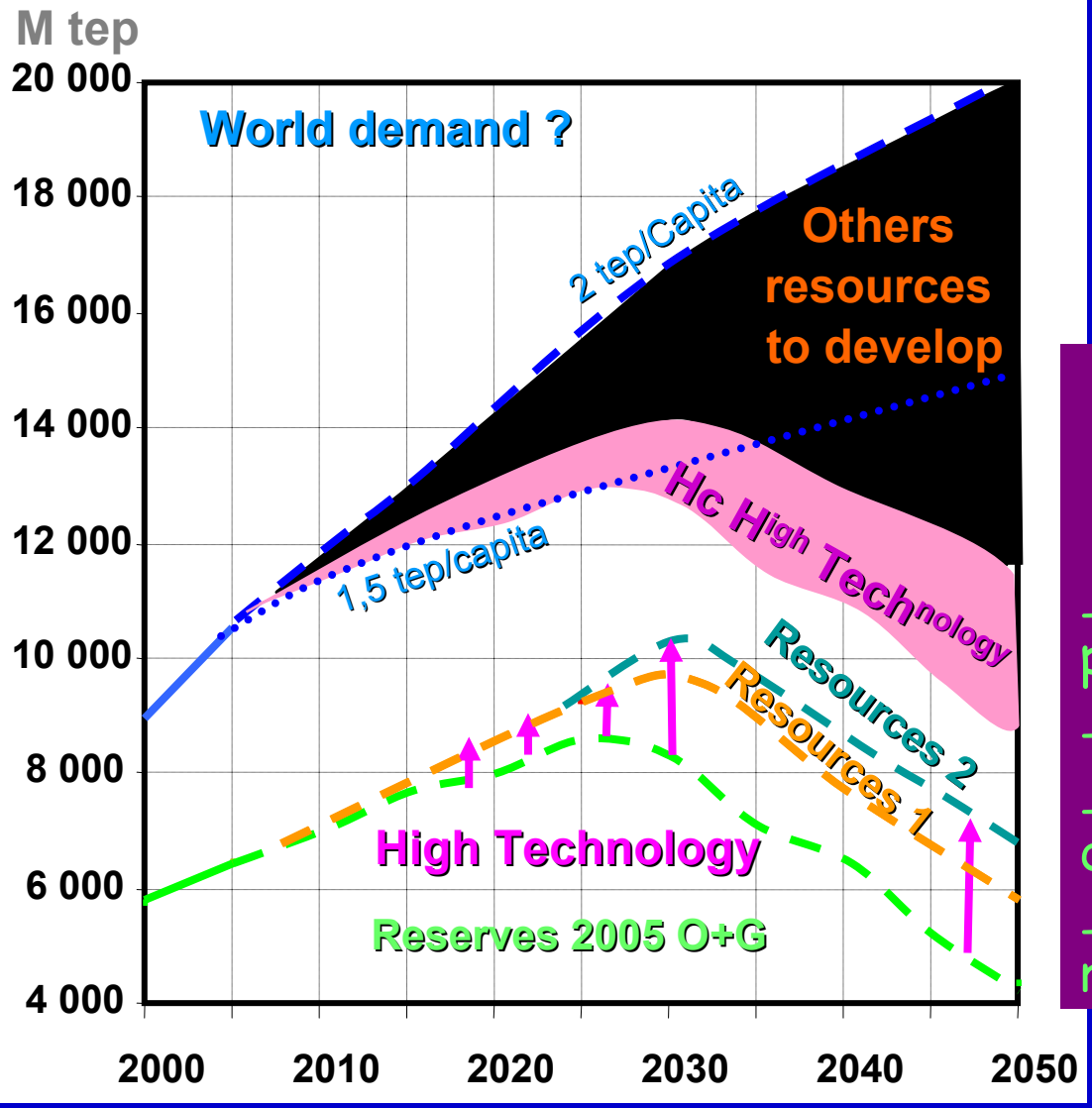
"Hydrates" = hydrates and their associated gas

Synthetic Fuels from other Energy Sources



e - : electricity co-generation

CONTRIBUTION TO THE FUTURE WORLD ENERGY DEMAND



2005: 6.5 billions inhabitants

2030: 8,5 billions inhabitants

2050: 10 billions inhabitants

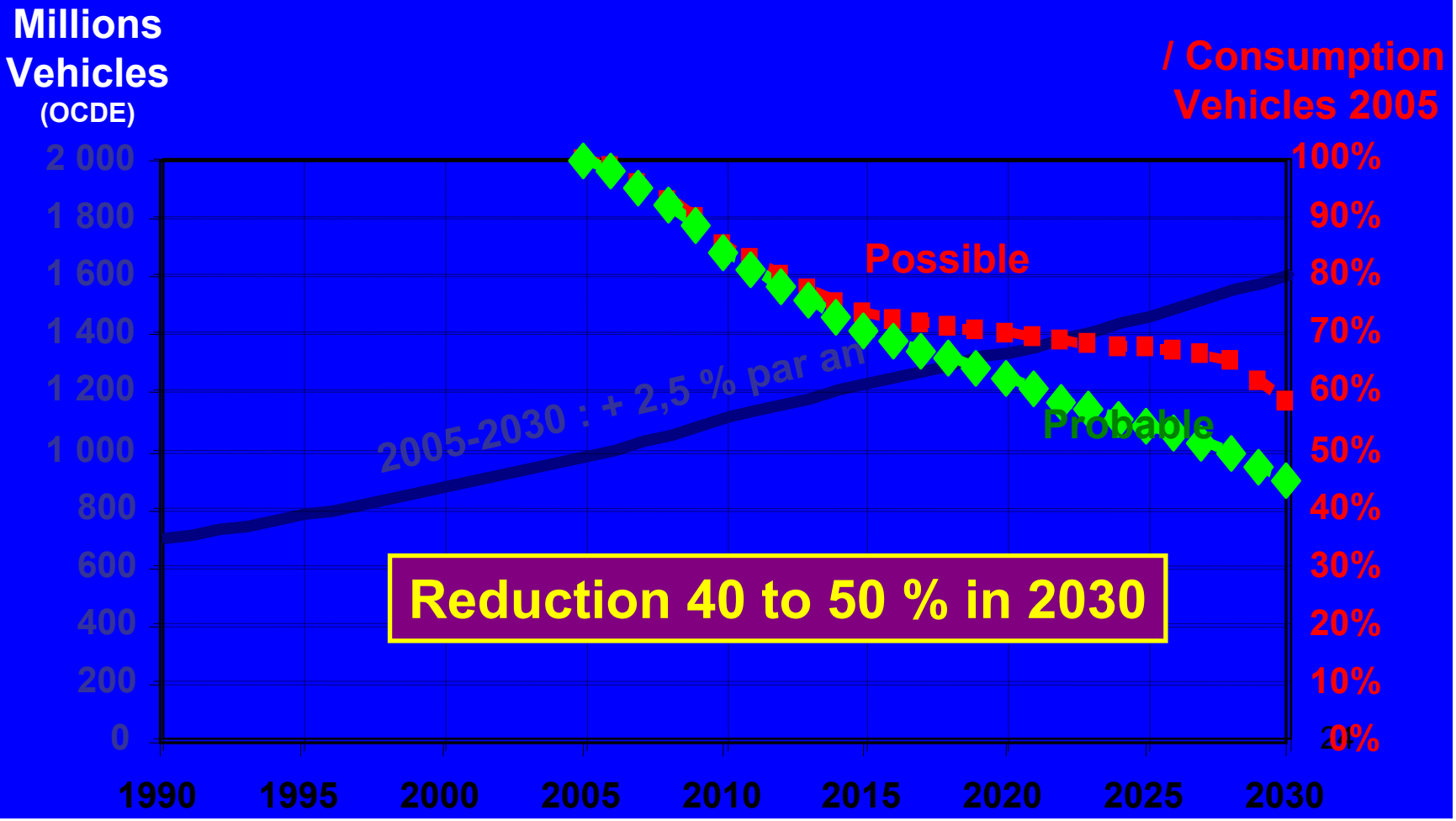
To ensure enough energy resources for everyone

For the unavailable energy transition, HC will have to be

- maintained to a high level of production
- used in an efficient way
- kept for sectors where it is difficult to replace them
- saved by consumption reduction

.... CONSEQUENCES
Consumption on road transport

Level of reduction of the average consumption of private vehicle / Consumption 2005



Some Conclusions
Some Questions

Certainties and Concerns

- HC are not inexhaustible : production peaks of Oil and Gas are anticipated
- World energy demand will continue to grow
- Economic and Environmental Constraints
- 21st century = a century of transition

Some Conclusions
Some Questions

Uncertainties

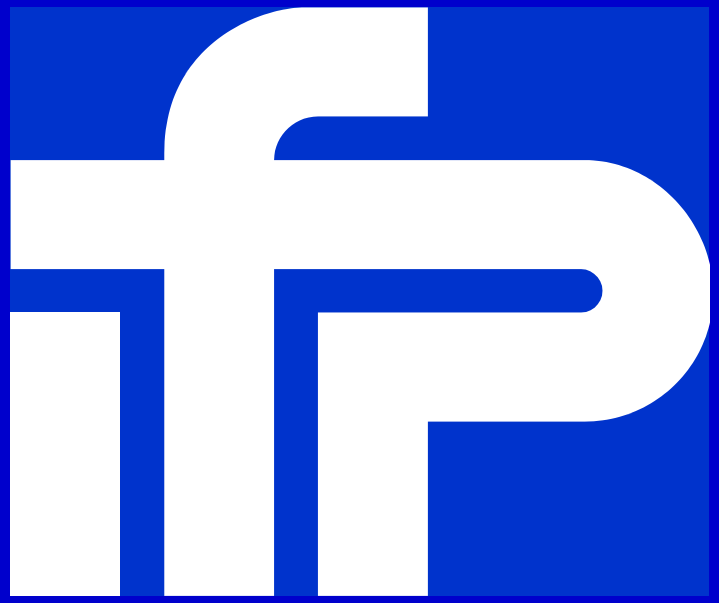
- To what extent, HC will be able to satisfy demand in particular for transport ?…(Energy demand?, Availability of HC ?, Environmental constraints? HC industry Investments?)
- What actions are to be taken to prepare an appropriate (smooth) transition?
- Involvement of socio-economic actors?

What could be the Technological (and Financial) Answers?

The future energy paradigm will need time. Proposed actions will aim to avoid (?)...or to delay the moment when supply will be no longer sufficient

- **A high level of production has to be maintained to satisfy the increasing demand, to delay production peaks (2028 for Oil? 2050 for Gas?) and to slow down the future production decline**
  - **Urgent investments in E/P...and refining**
  - **Production of « High Technology HC »**
- **HC have to be used in the most efficient way**
- **HC has to be kept for industrial sectors where it is difficult to replace them (ex: Transport, ...)**
- **It is urgent to develop and promote alternative fuels for Transport**

The new energy paradigm must be the result of a smooth evolution and not the result of a revolution.



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