

This presentation has been made
in the frame of a project entitled

„Development of enhanced engineering
methods with the aim at utilization of
subterranean energy resources”

 **PULSE**
earth energy engineering
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Priorities in Research and Development of IOR/EOR and RCC Methods (Module 1)

István J. Lakatos

Applied Research Institute of Applied Earth Sciences
University of Miskolc



Legacy of Projects

Nearly 60 years of successful activities aimed at „*supporting the Hungarian oil and gas industry with fundamental and applied research in IOR/EOR and RCC technologies*”

Deed of Foundation of the Institute by the Hungarian Academy of Sciences, 1957

Objectives

Primary aim of *Module 1* is development of brand new technologies to increase recovery efficiency in oil and gas fields meeting both *global and domestic preconditions*. Main focuses of activities are the following:

- Novelties in technologies addressing the whole reservoir space and
- Advanced methods in reservoir conformance control addressing the near wellbore region

Philosophy

Brand new R&D activities of the Institute must cover the whole spectrum of innovation

Innovation



Adaptation



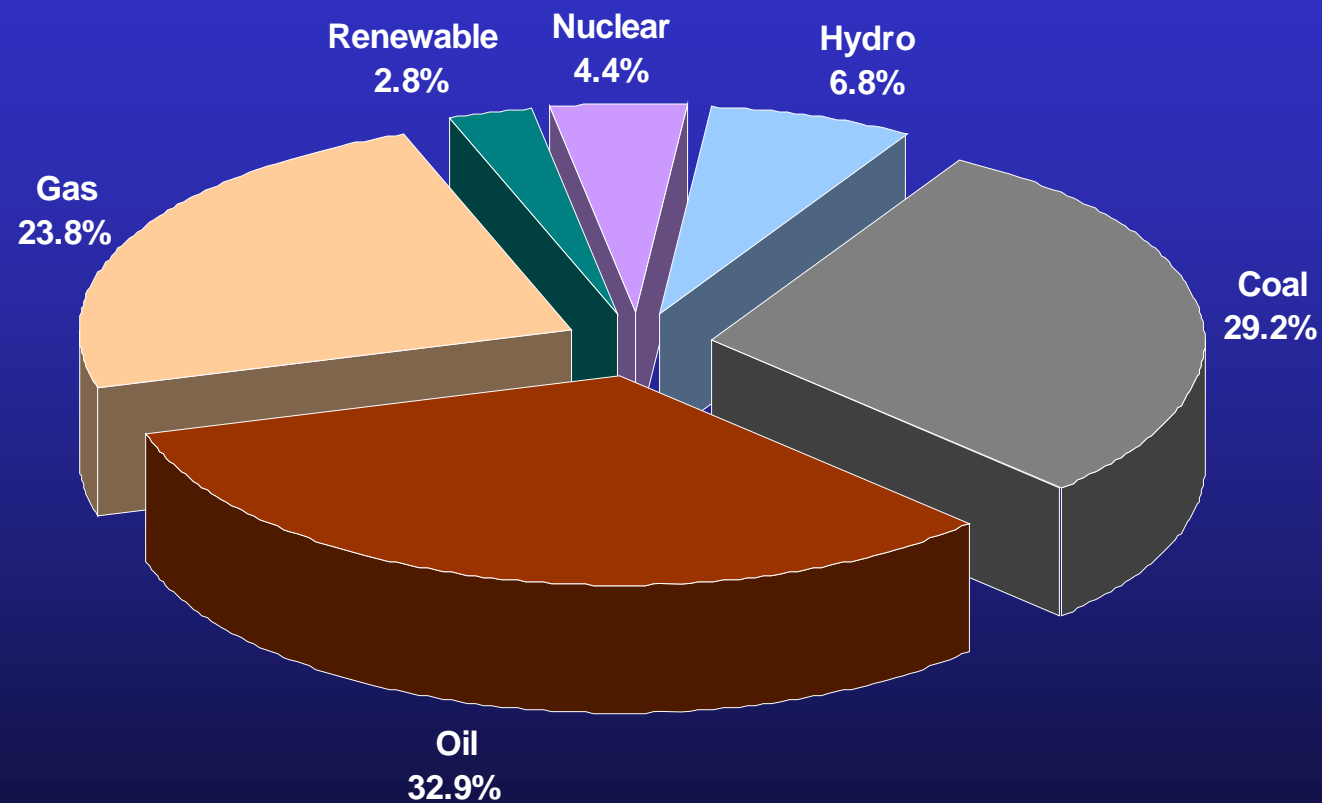
Strategy

Realistic *R&D&I activities* must comply with the hectic changes of the petroleum industry at present (and probably the near future) taking simultaneously the worldwide and regional preconditions into account including:

- Available resources and reserves
- Production environment
- Technological limitations
- R&D&I options
- Supply/Demand
- OPEX/CAPEX
- Human force
- Price
- Profitability
- Socioeconomic aspects
- Environmental regulations
- etc.

Total Primary Energy Supply (Global, 2016)

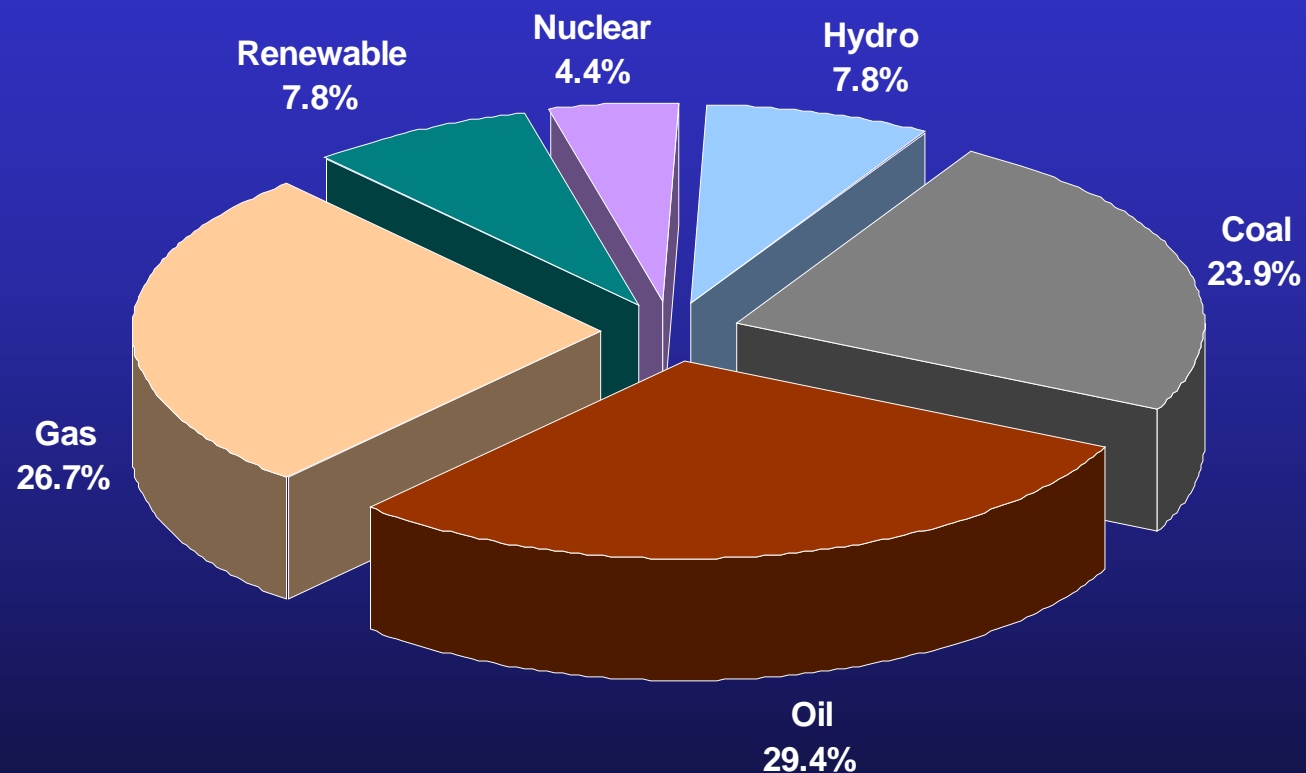
Total TPES 13.147 Gtoe



Oil + Gas : 7.466 Gtoe; 56.4%
Fossils : 11.305 Gtoe; 85.9%

Total Primary Energy Supply (Global, 2035)

Total TPES: 17.8 Gtoe (+34.8%)



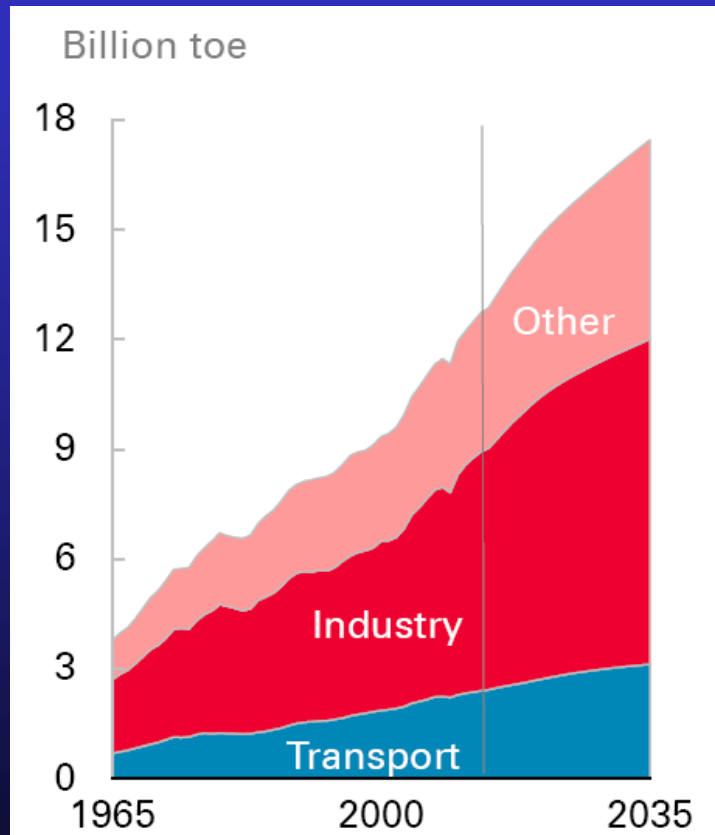
Oil + Gas : 10.1 Gtoe; 56.7%

Fossils : 14.4 Gtoe; 80.9%

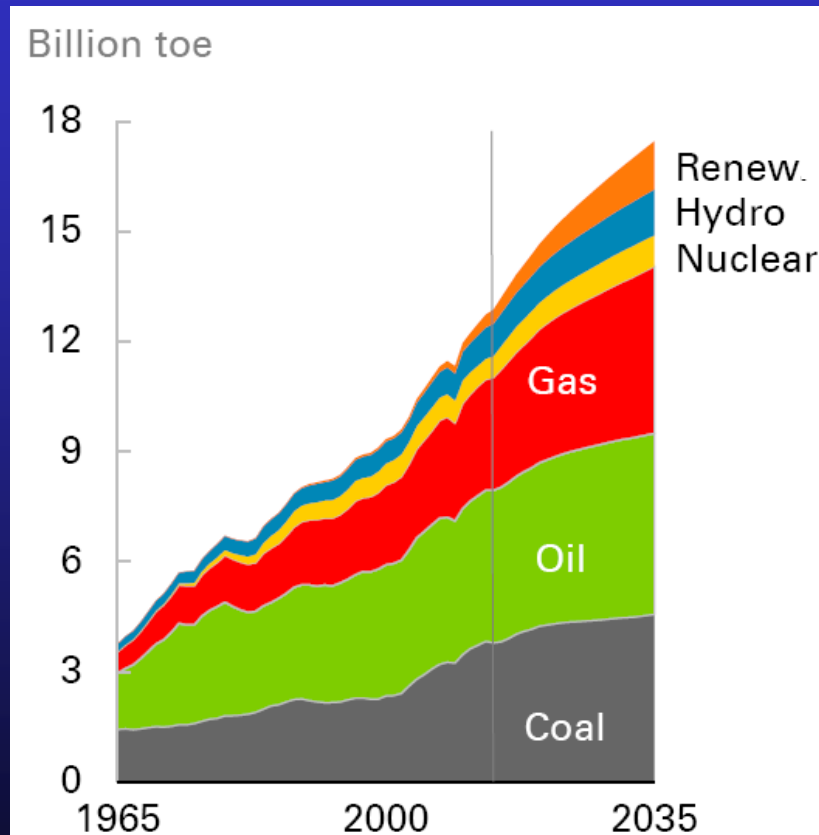
Growth of Energy Industry between 1965 and 2035

Driving force of growth: industrial and other use

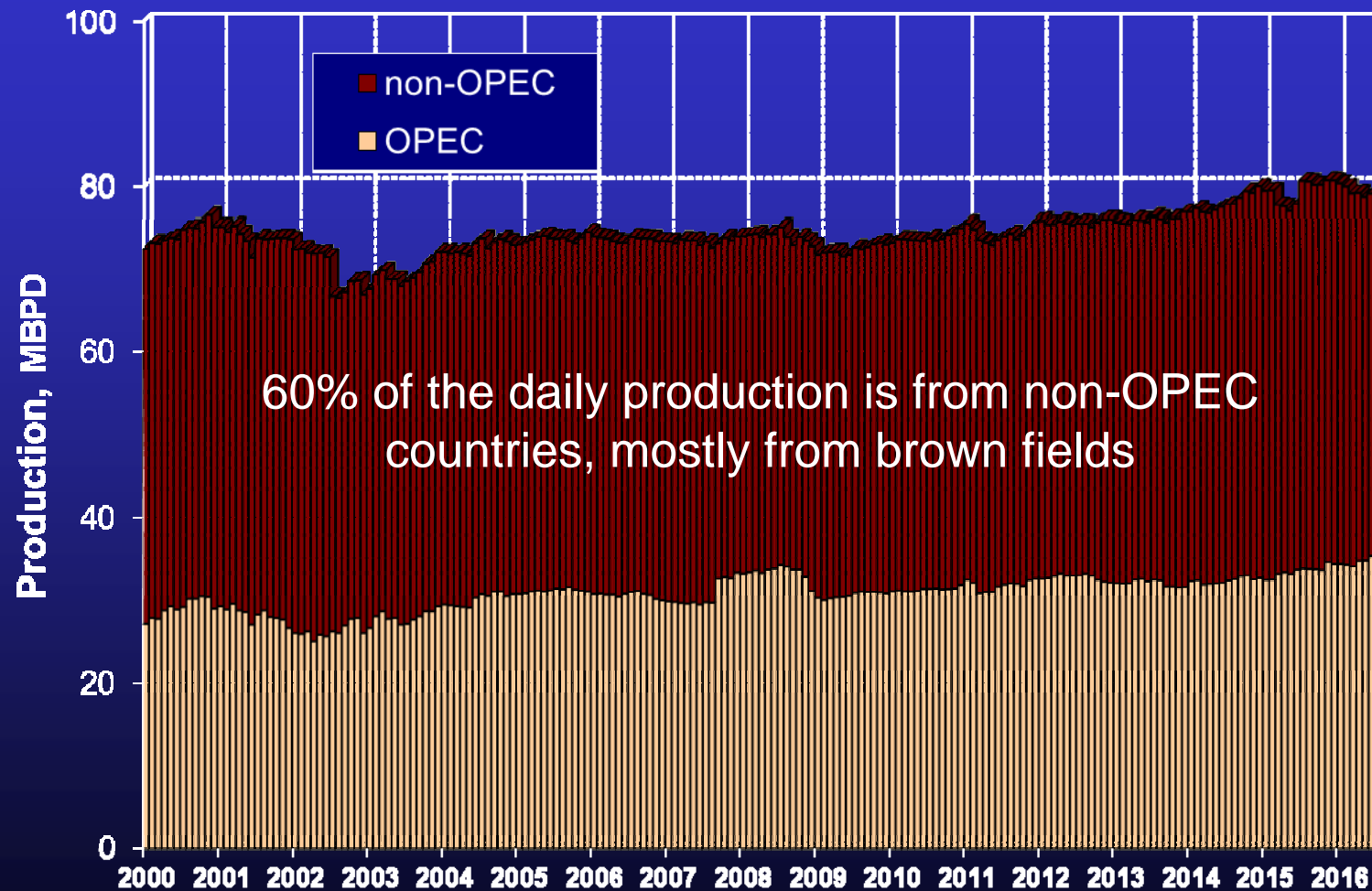
Consumption by sector



Consumption by fuel

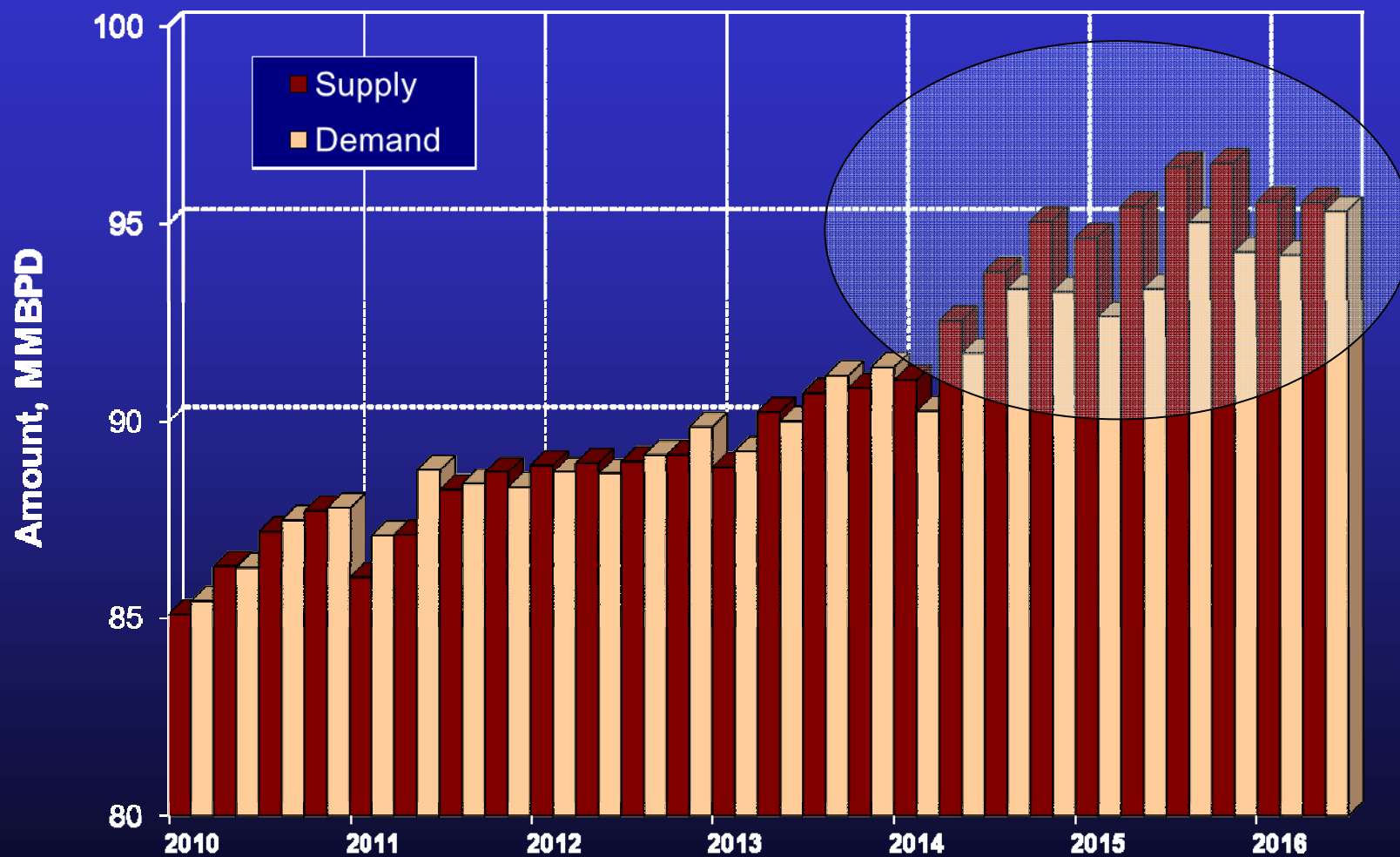


Oil Production of OPEC and non-OPEC Countries

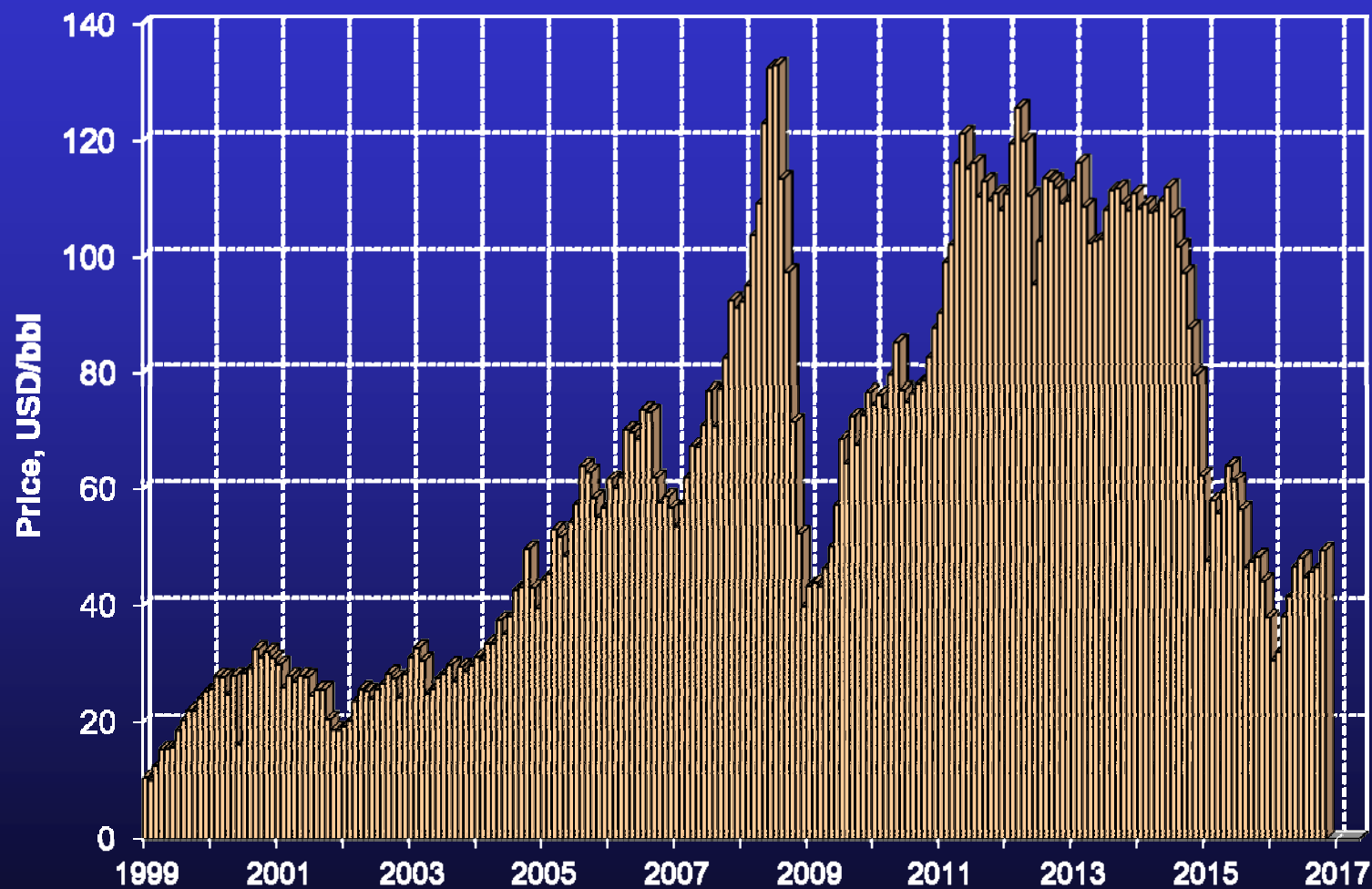


Oil Supply and Demand Recently

Market problem: overproduction (mainly)

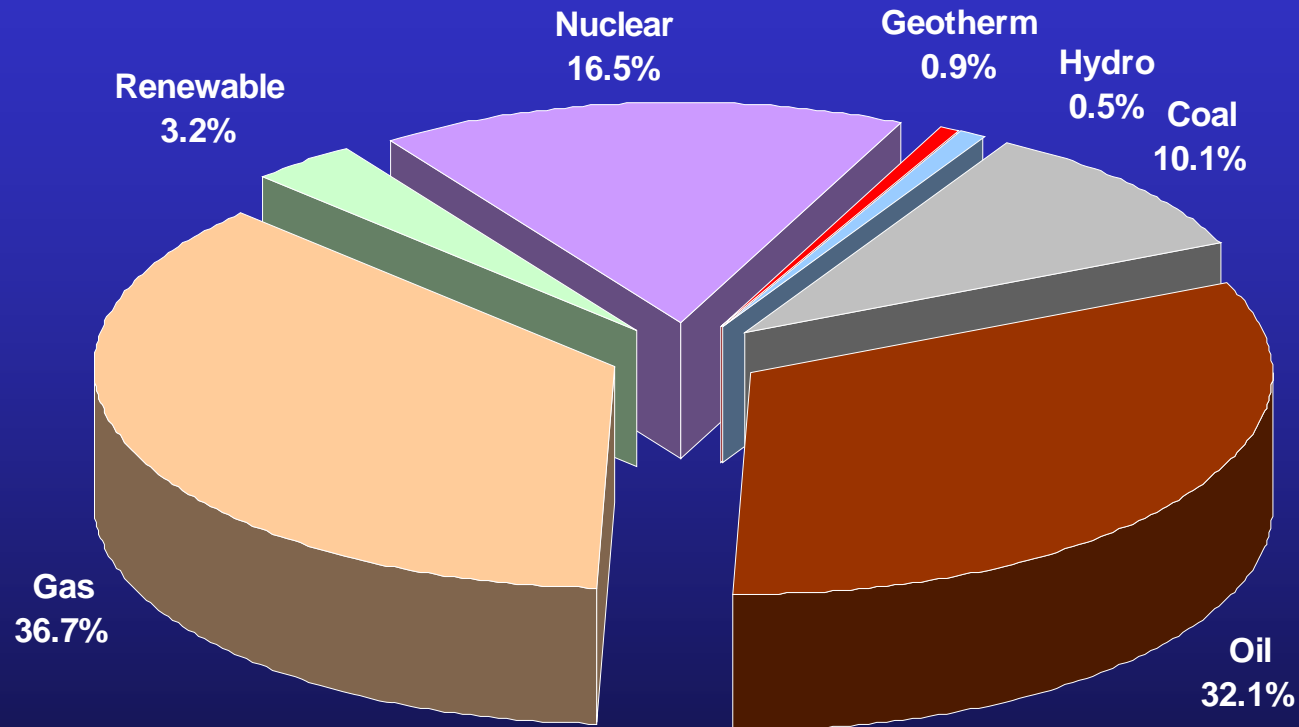


Price of Brent Oil in the Past Decades



Total Primary Energy Supply in Hungary, 2016

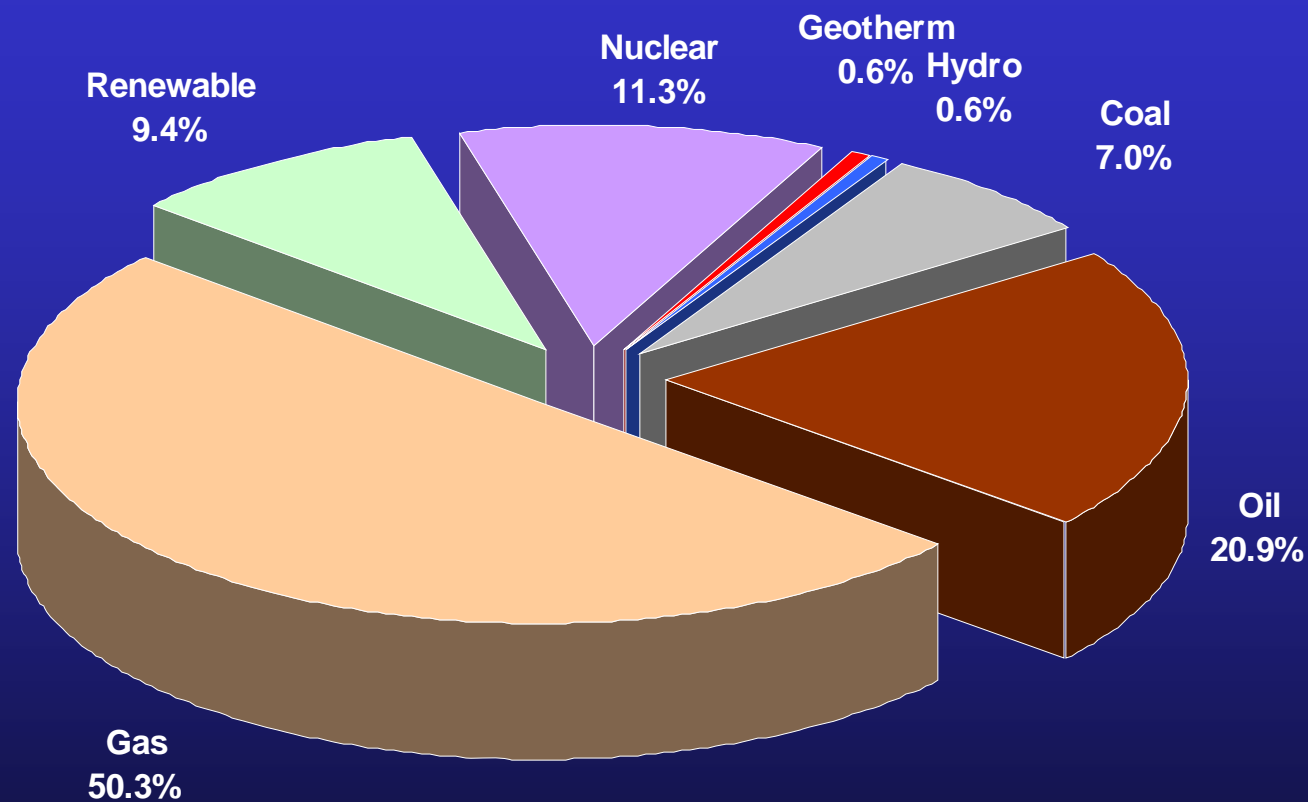
Total = 21.15 Mtoe



Target of Module 1 → Oil + gas : 68.8%, 14.55 Mtoe
Total fossil fuels : 78.9%

Total Primary Energy Supply in Hungary, 2030

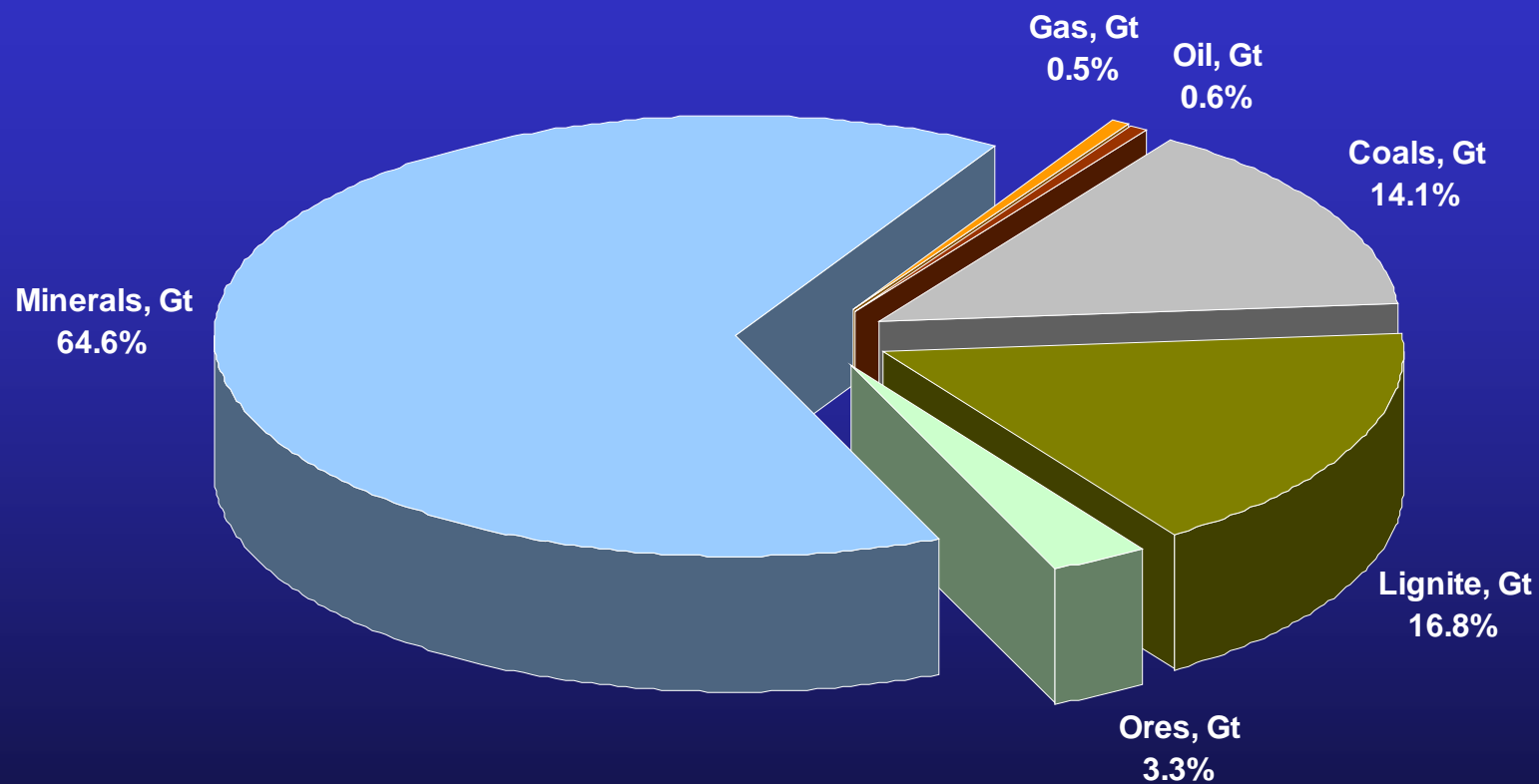
Total = 31.51 Mtoe



Target of Module 1 → **Oil + gas : 71.2%, 22.37 Mtoe**
Total fossil fuels : 77.1%

Natural Resources in Hungary, 2015

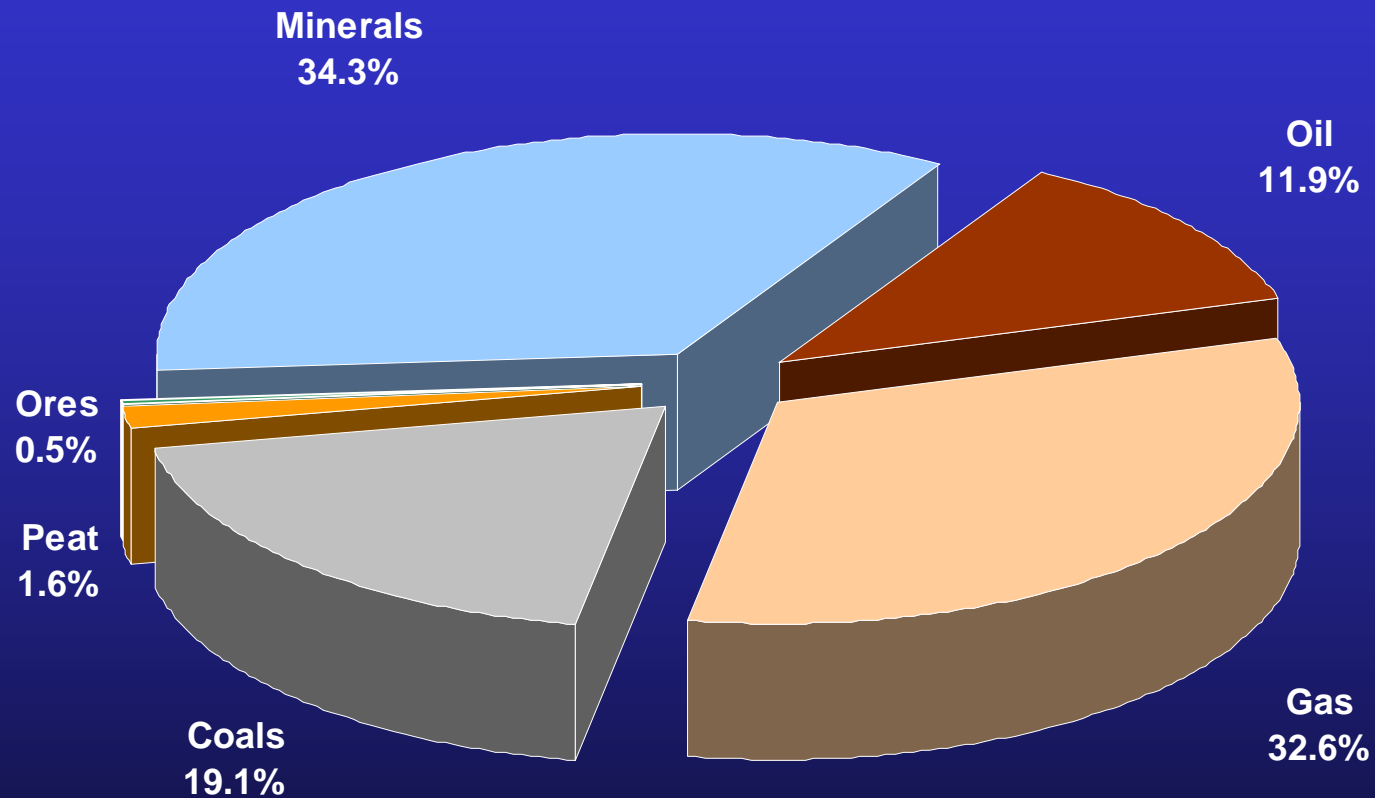
Total resource: 34.099 Gt



Oil + Gas : 0.403 Gt
Fossils : 10.933 Gt

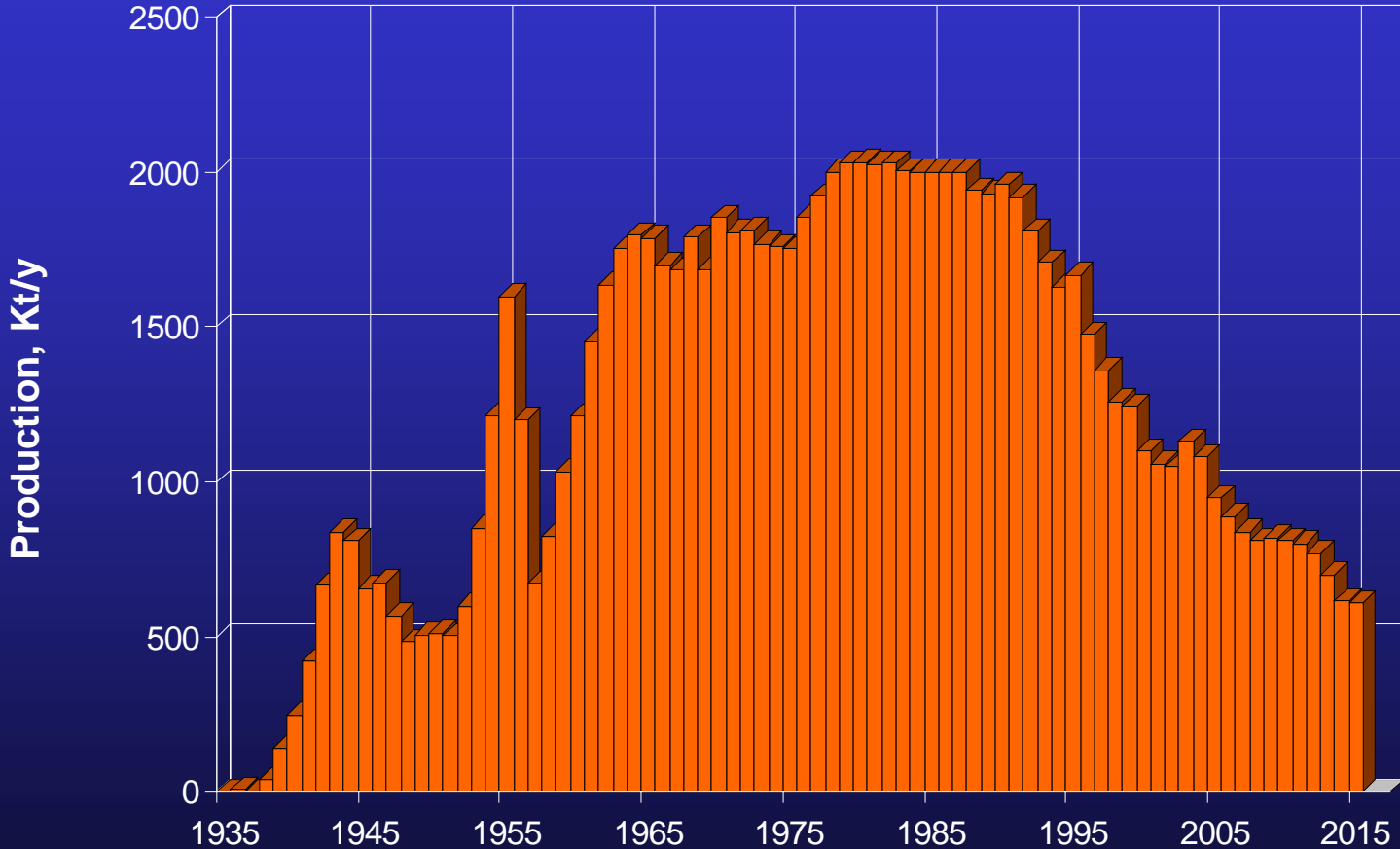
Nominal Economic Values of Resources in 2007

Total NEV: 8,932 HUF

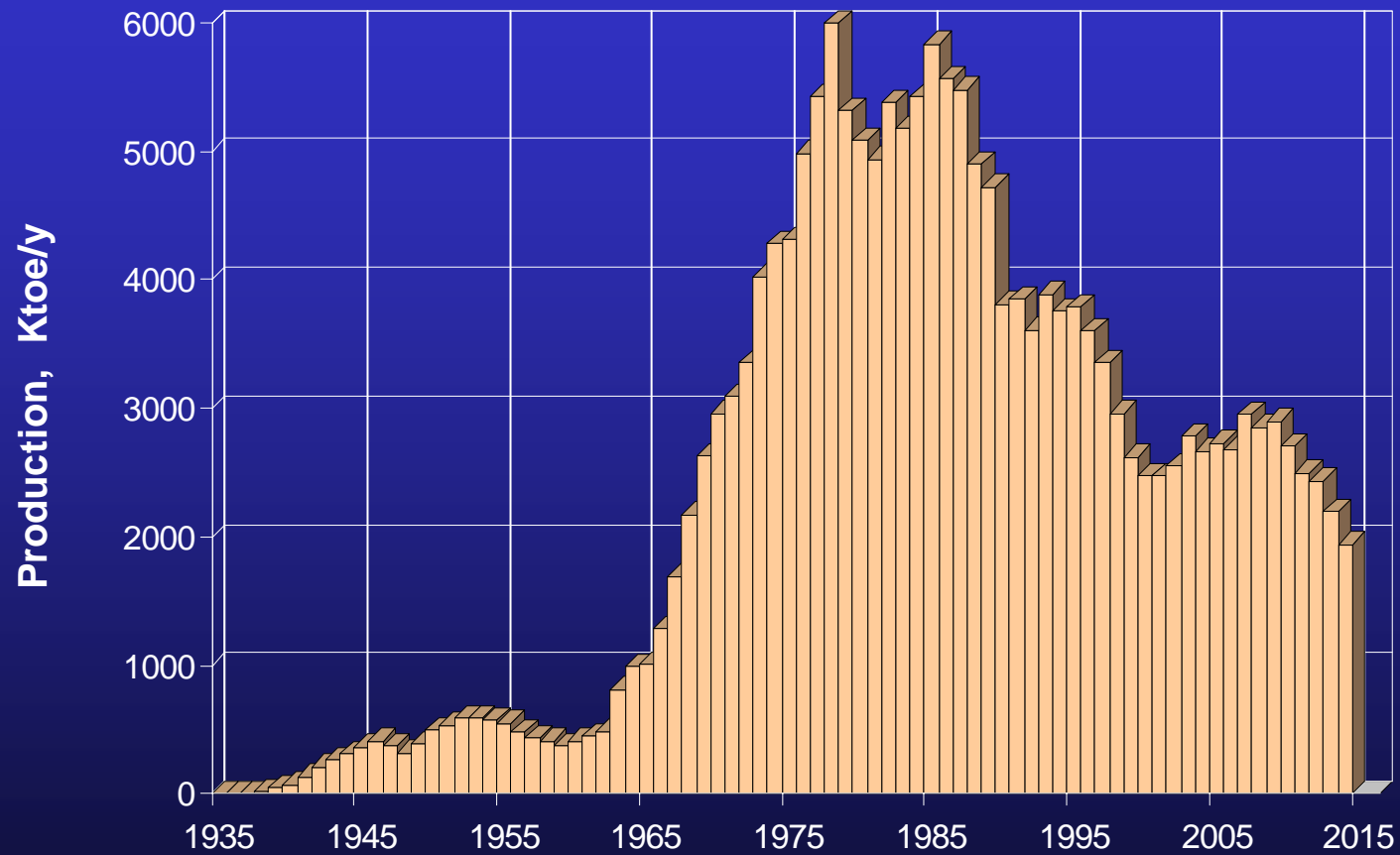


Target of Module 1  Oil + gas : 3,974 Billion HUF, 44.5%

Oil Production in Hungary

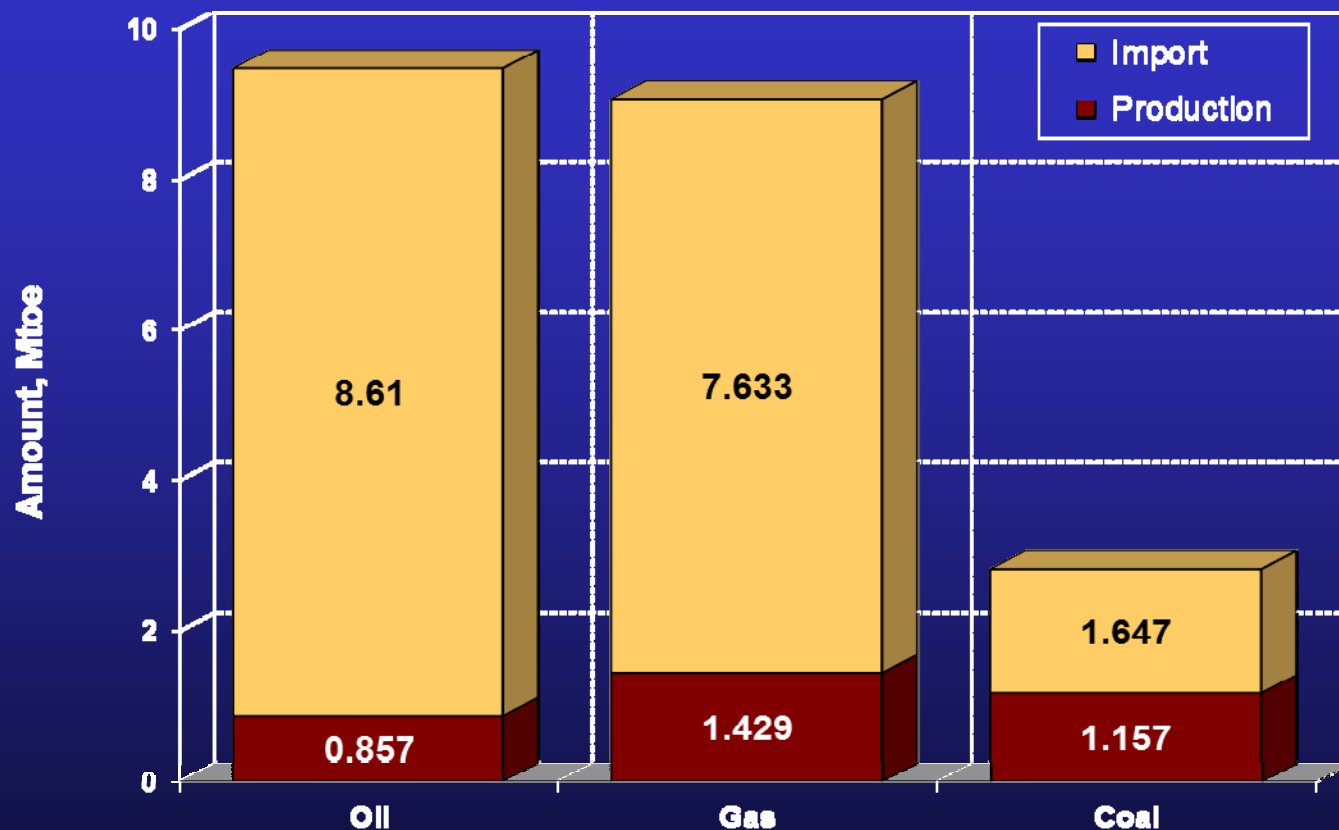


Gas Production in Hungary



Production and Import of Fossils in Hungary, 2015

Hungary is the most import-dependent country of the EU



Import dependency (fossils) : 62.3%
Import dependency of oil : 91.0%
Import dependency of gas : 84.2%

Factors Influencing of Innovations

Coinciding global and local preconditions:

- Demand of hydrocarbons will increase in the near future
- Innovative production technologies are needed in brown fields
- Novel methods must comply with low OPEX and CAPEX
- Global oil price should not be higher than 60-70 USD/bbl
- Technologies should be developed on multidisciplinary basis
- Production of unconventional oil and gas must be extended
- EOR is not appreciated by the operator due to the low oil price
- RCC (well stimulation) is in hands of international service companies
- Human force faces with rationalization
- Surface technology must remain simple and conventional
- Well trained human force must be available
- Materials and chemicals have to meet the incentives of REACH
- Advanced innovation activity will dwindle without governmental support
- Continuous life learning needs to keep pace with innovation
- Sensitivity of management towards the novelties is fundamental
- Environmental safety must span over the full lifetime of fields

Fundamental Goals of Module-1

- Development of environment friendly, low-cost technologies with the aim at increasing recovery factor in Hungarian oil and gas fields and improve well performance using multidisciplinary approaches;
- Fundamental goal is to stabilize the recovery rate or slow down the declining production in partially depleted brown fields;
- Enrich international cooperation, and active role in different scientific and engineering forums, and enforce the present reputation of the institute attained by both international and domestic organizations and individuals;
- Extend the weaponry of cooperation with R&D&I and industrial players forming a stable basis for fund-rising activity of the Institute.

THANK YOU FOR
YOUR ATTENTION!

SZÉCHENYI 2020



HUNGARIAN
GOVERNMENT

European Union
European Regional
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