



Sustainability, Globalization and the Energy sector

A European perspective

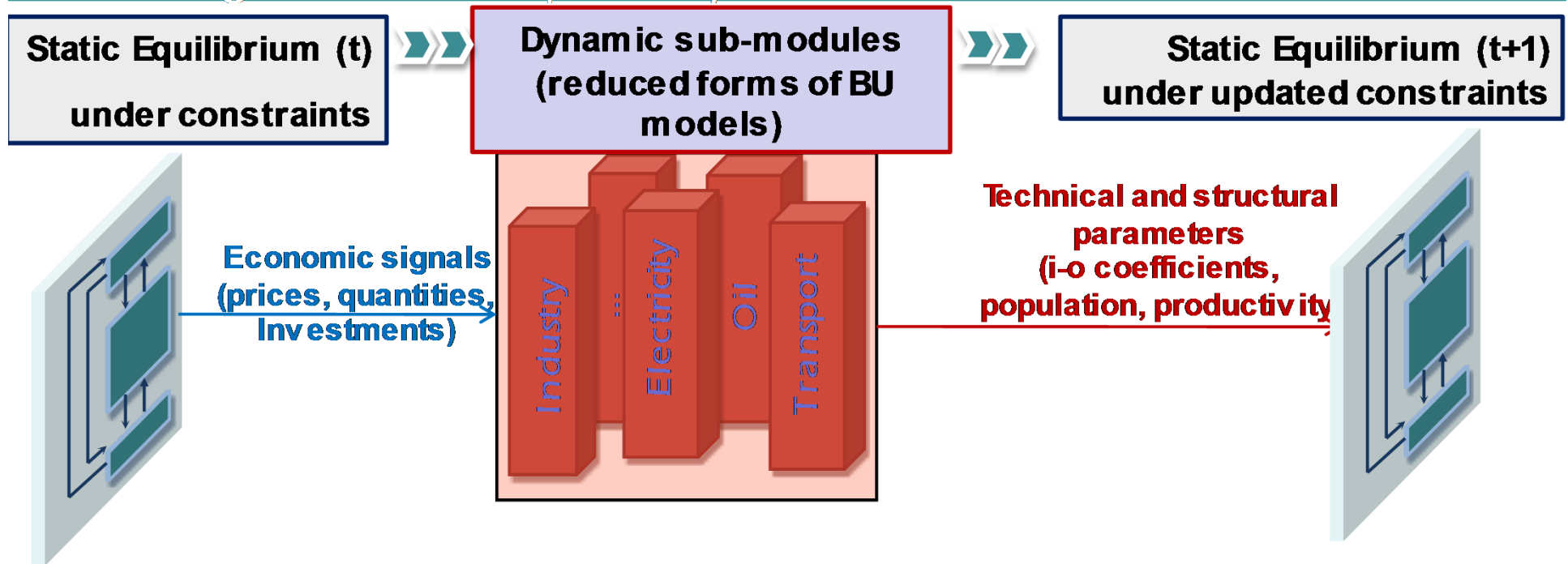
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Economic globalization and global energy issues: challenges for Europe

- Two global challenges for sustainability
 - Resource depletion (esp. oil)/Oil dependency of Europe (40% of energy primary and expected to grow, 2,8% EU GDP)
 - Climate change : articulation btw objectives (2°C) and policies (EU 3*20, Copenhagen pledges)
- Economic Globalization: a decisive driver in the transition towards sustainable development patterns
 - Energy markets are internationally integrated: the challenge of diversified sources of supply for Europe
 - Carbon emissions and trade interactions among regions : embedded emissions and quotas allocations
- Methodology: a numerical assessment of the macroeconomic interplay between
 - Technical change
 - Growth drivers (demography, labor productivity, savings)
 - Globalization patterns (international goods and capital markets)
 - Environmental effects (resource depletion and carbon emissions)

IMACLIM, an energy-economy framework to investigate transition pathways towards sustainable future



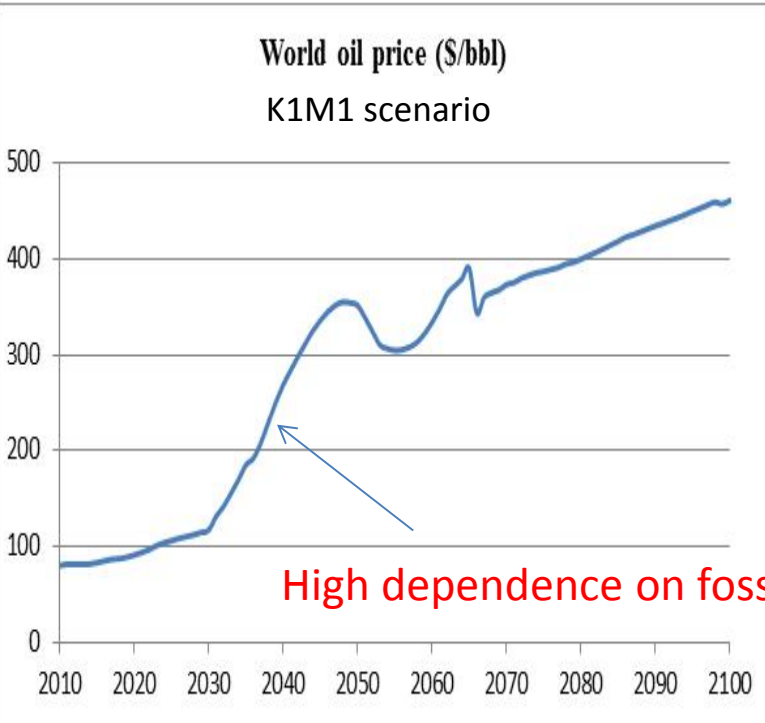
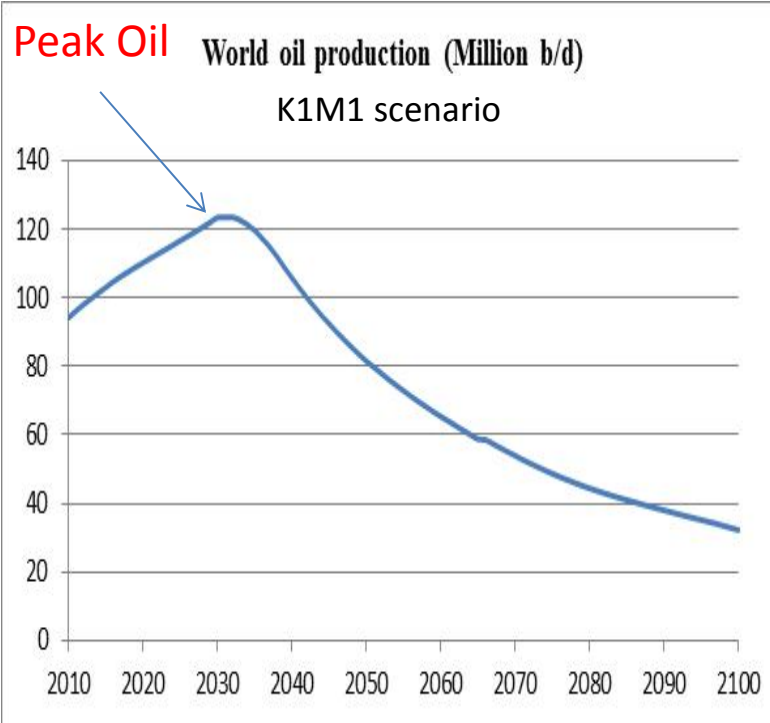
- ❑ Explicit *material* content of macroeconomic trajectories (incl. energy)
 - BU/TD : expert-based information
 - Structural change between Technologies, Consumption styles and Localisation
- ❑ Endogenous deviations wrt Exogenous Natural growth (demography + productivity)
 - Unemployment, Idle capacities, Investments under imperfect foresight
- Endogenous oil markets (resource, market power, geological inertia)
- Exogenous carbon trajectories, endogenous carbon prices
- International trade: Armington specifications, Exogenous capital flows

Different assumptions on globalization

	Preference for local goods (M0)	Preference for international diversity of goods (M1)
Correction of capital imbalances (K0)	Scenario K0M0	Scenario K0M1
Persistence of capital imbalances (K1)	Scenario K1M0	Scenario K1M1

- What impact on long term oil market trajectories?
- What economic impact for Europe?

Long term oil markets (no climate policy, K1M1)



High dependence on fossil fuels

Resource constraints and long term socio-economic trajectories

		2010-2100	2010-2030	2030-2040	2040-2050	2050-2100
Europe	IMACLIM growth rate	1,66%	2,46%	1,34%	1,61%	1,42%
	Natural growth rate	1,63%	2,05%	1,89%	1,65%	1,41%

On average it is not a big deal

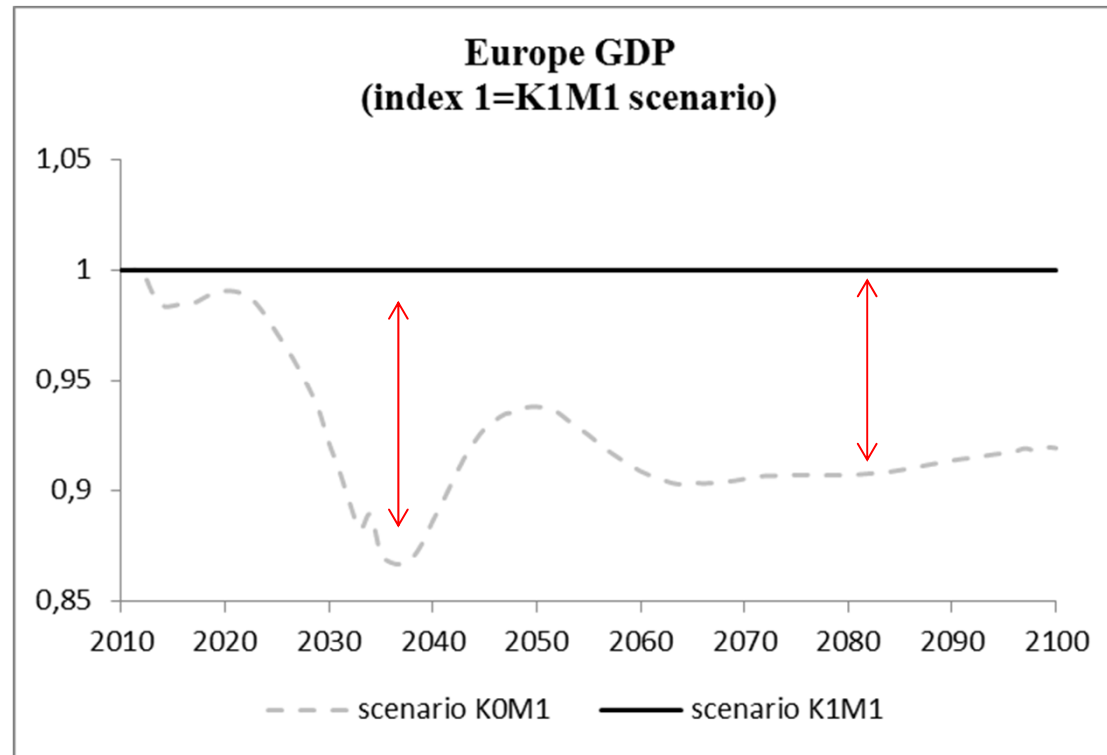
Deep economic crisis
Following peak oil

Long term regime
adaptation of the
economy

Different assumptions on globalization

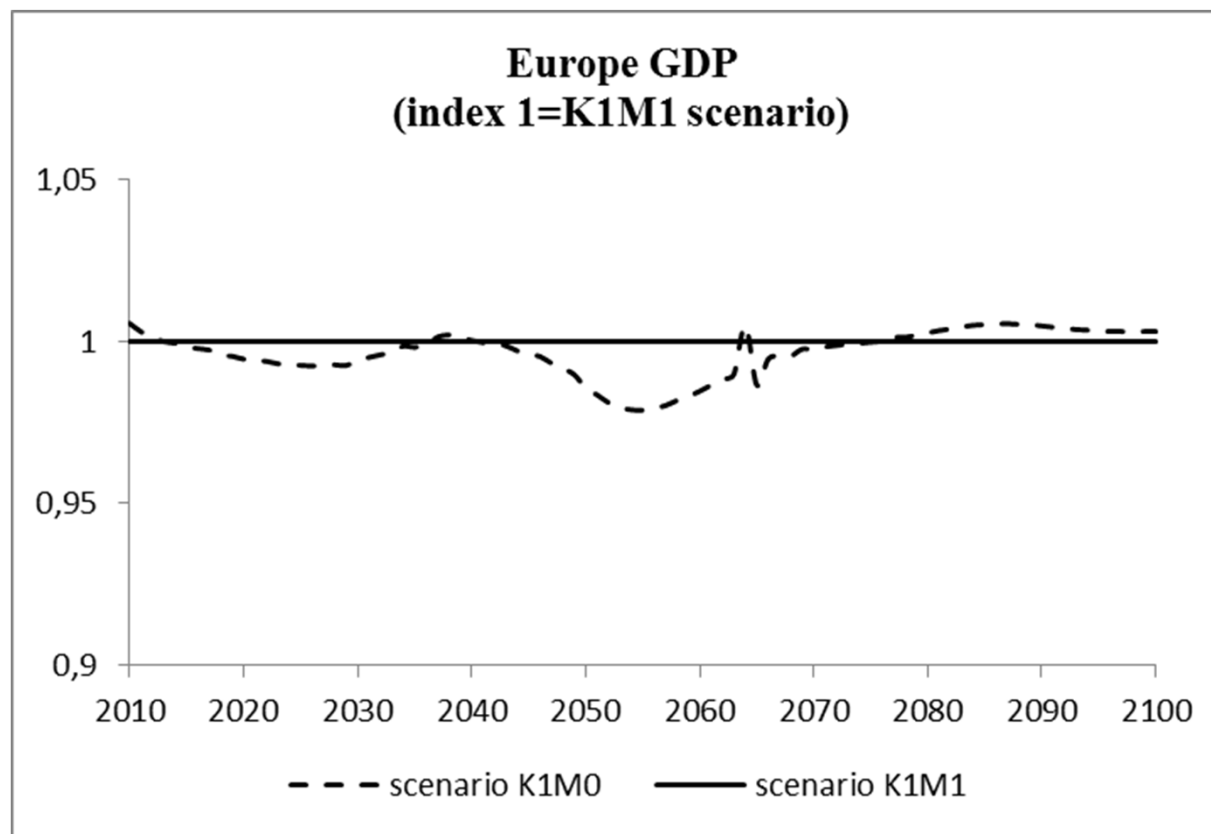
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Capital availability, technical change and macroeconomic trajectories under resource constraints



- Less energy efficient capacities installed in the short term
- Less cumulative learning by doing in the long term

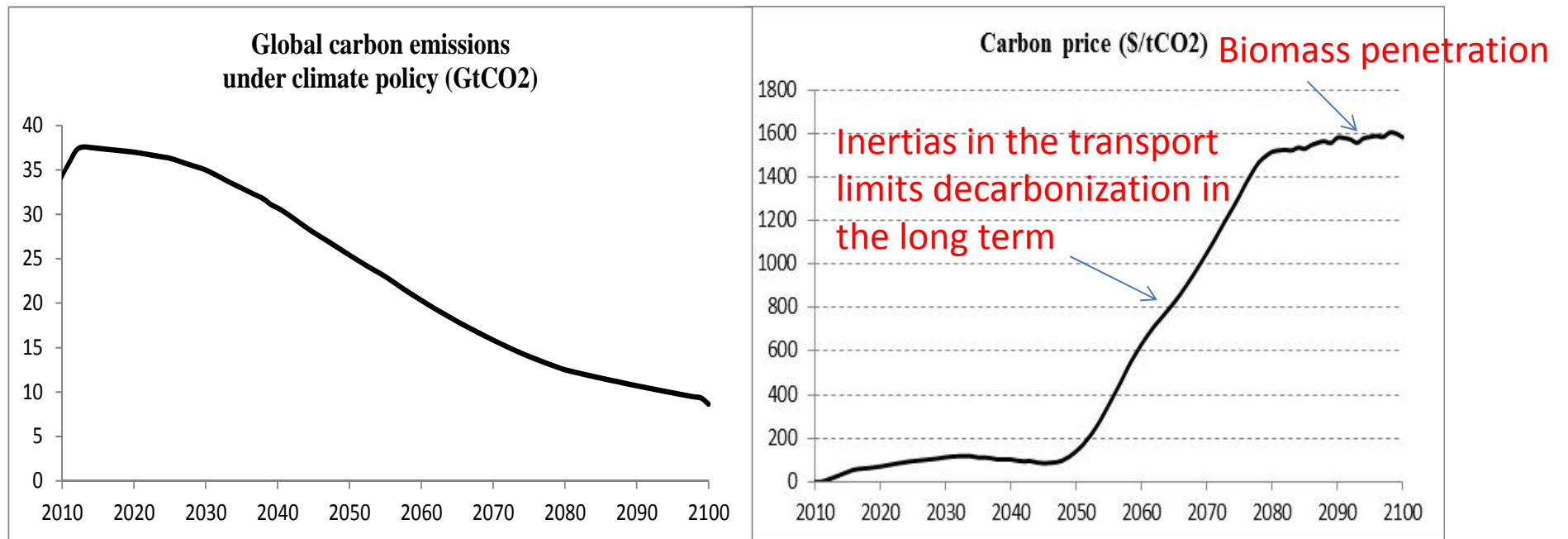
Preference for goods, wage adjustment and macroeconomic trajectories under resource constraints



- Large wage adjustments required to export after peak oil in a context of preference for local goods
- Lower dependency on transport and long term oil markets

Climate change and Climate policies

- Exogenous carbon emission trajectory
- World level carbon price
- European Objectives: -80% CO₂ emissions in 2050



Socio economic effect of climate policies and different time horizons

	2010-2100	2010-2030	2030-2050	2050-2070	2070-2100
No climate policy	1,6%	2,4%	1,3%	1,6%	1,4%
450ppm CO2	1,51%	2,1%	1,8%	1,3%	1,0%
natural growth	1.63%	2,1%	1,7%	1,5%	1,3%

No Transition cost in the short term Long term socio-economic tensions

- Complementary measures required to decarbonize the transport sector

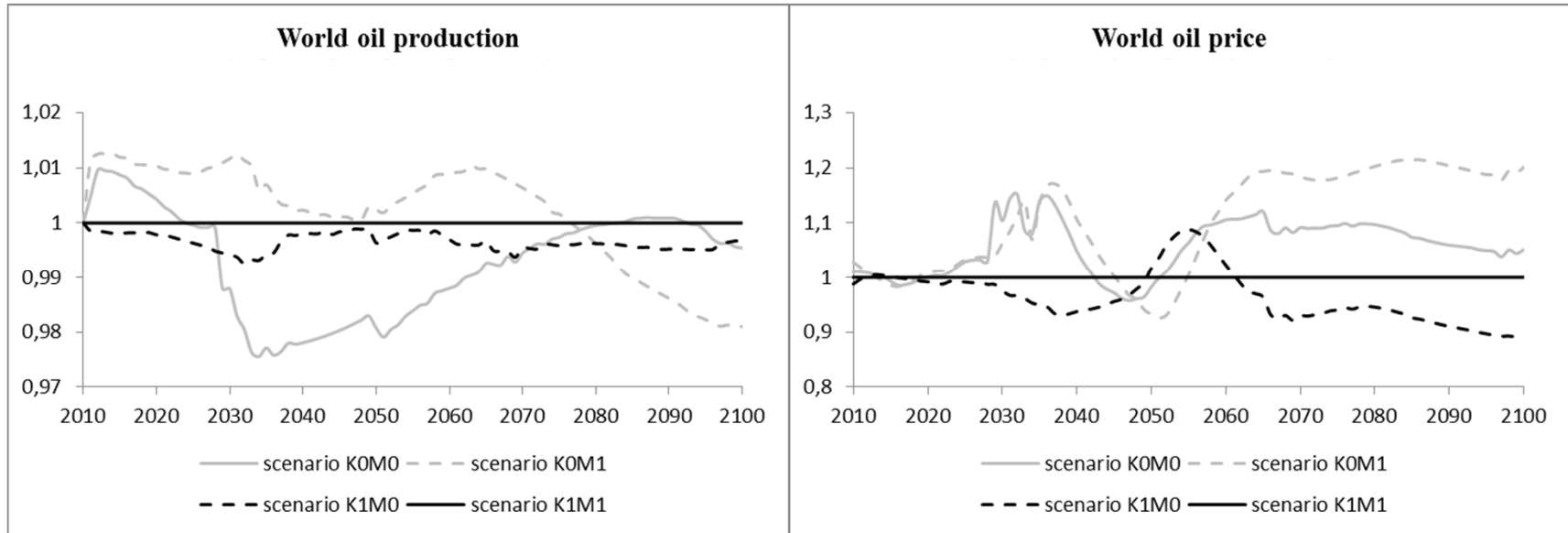
Key messages

- A first attempt with the Imaclim model to assess the impact of globalization on long term development under resource constraint and climate change
- Specific mechanisms highlighted
 - Interaction btw technical change and fluidity in the capital market
 - Competitiveness and preference for local goods
 - Transport is a crucial sector for the transition to low oil and carbon society
- Key challenges : articulating globalization patterns and early reorientation of the investments toward low carbon infrastructures (transport, building) in an adverse context
 - This requires an upgrading of climate finance
- Further modelling improvements:
 - GDP as a debatable indicator of sustainable development
 - Drivers of capital flows (monetary policies, debt...)

Thank you for your attention!

<http://www.imaclim.centre-cired.fr/>

Contrasted impacts of Globalization alternatives on oil markets



Index 1= K1M1 scenario

