



Sustainable Energy transitions and the economic globalization

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Economic globalization and global scale issues

Increasing Economic globalization has:

- Spurred tensions on the oil market
- Enhanced the climate change urgency

- ✓ How to make compatible economic globalization and sustainable development pathways?

- ✓ What role will oil market dynamics play?

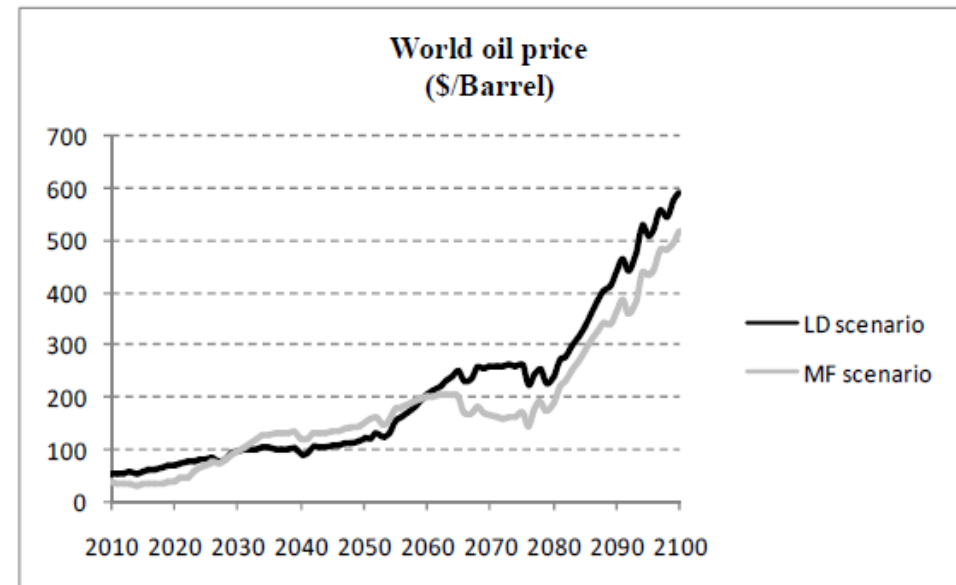
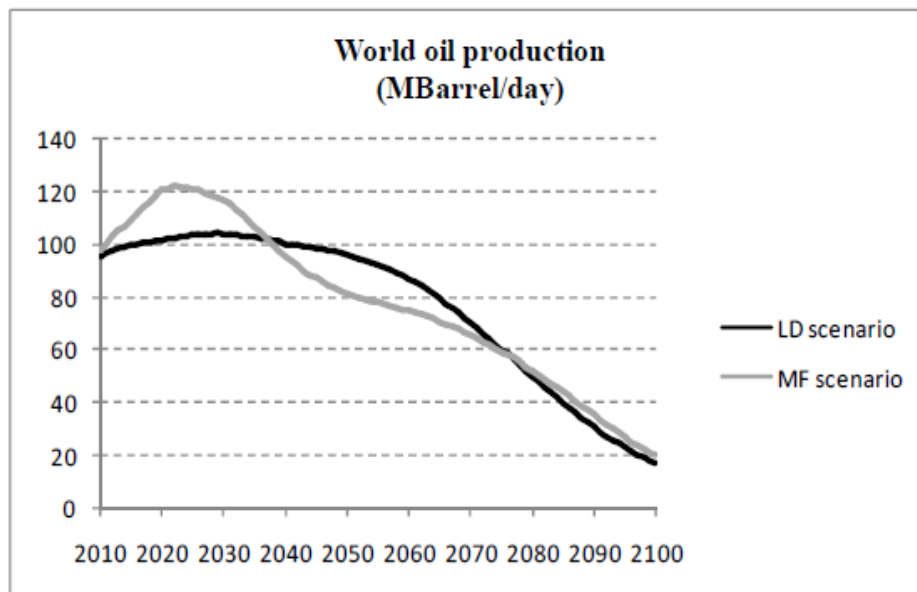
IMACLIM: an energy-economy framework to investigate transition pathways

- A central objective: representing structural change between **T**echnologies, **C**onsumption styles and **L**ocalisation of activities
- An **hybrid** model:
 - Sets a dialogue between engineers and economists
 - Ensures the consistency of both analyses (physical and monetary flows, IO tables and energy balances)
- Addresses **second best** mechanisms:
 - Unemployment, excess of capacities, imperfect foresights
- A **recursive** model:
 - Provides a snapshot of the economy at each point of time

Short terms Investments in oil capacities drive long term development pathways (Baseline scenario)...

LD scenario: Limited investment in oil capacities

MF scenario: High investment in oil capacities



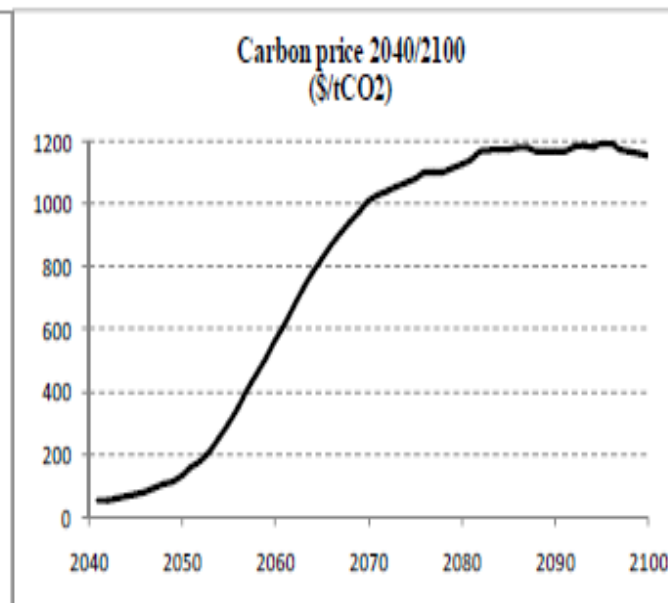
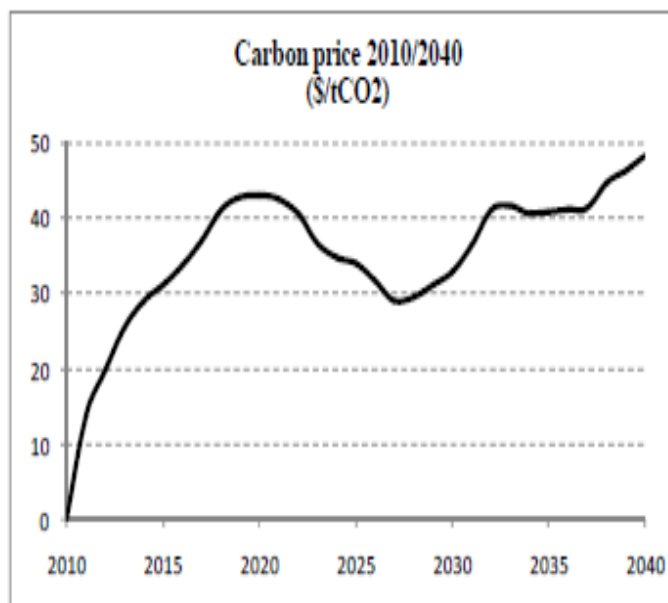
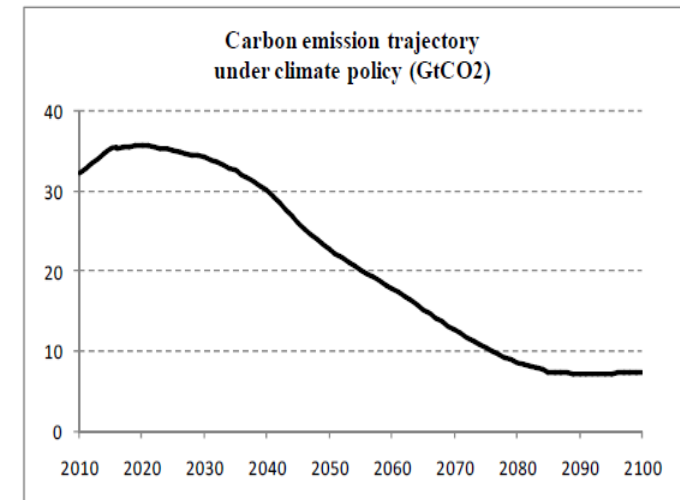
...and risks of carbon lock-in (Europe)

	2010-2100	2010-2020	2020-2040	2040-2075	2075-2100
LD scenario	1.74%	2.49%	2.62%	1.31%	1.34%
MF scenario	1.76%	2.54%	2.48%	1.43%	1.33%
natural growth	1.61%	2.36%	2.17%	1.19%	1.45%

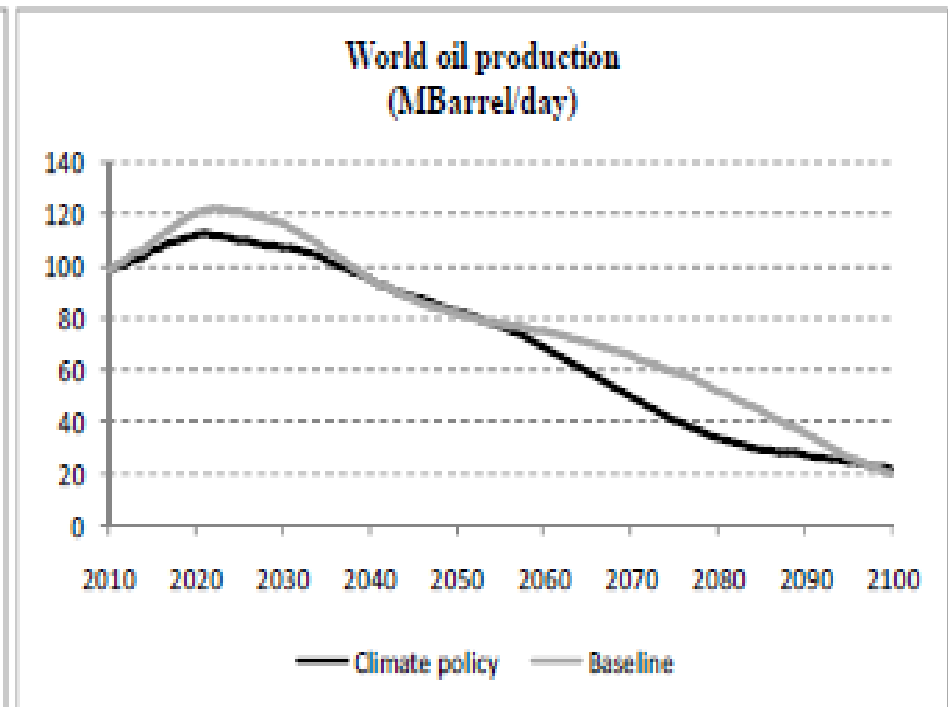
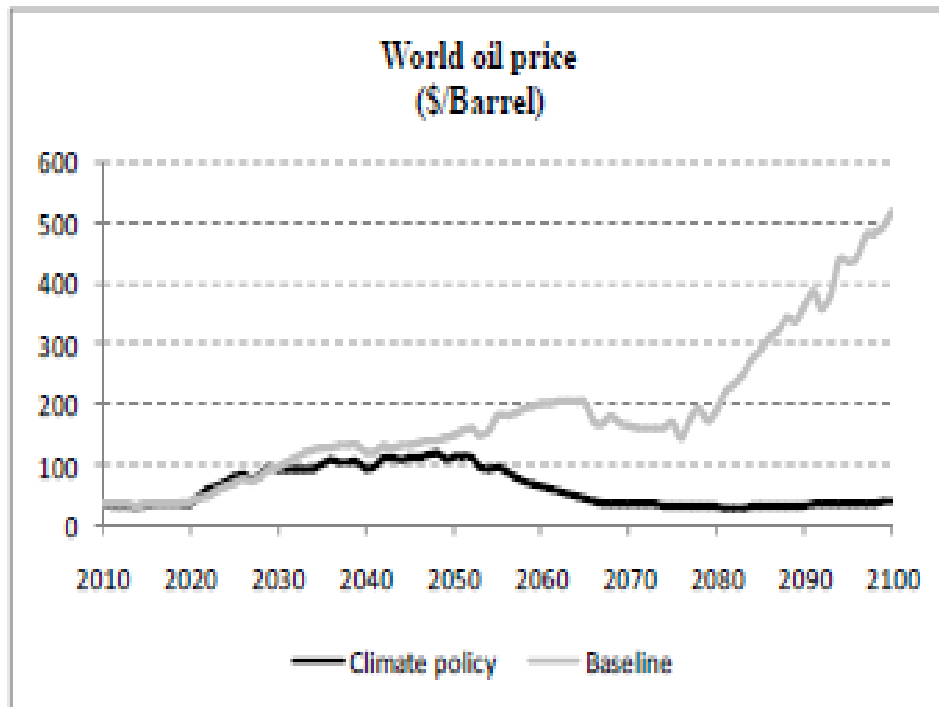
- Close average growth rates in both scenarios, difference in the time profile
- Both scenarios lead to the unsustainable long-term development patterns: “Natural” growth rate (Solow steady rate of growth) < Efficient growth (second best world)

Climate policies: a hedge against a costly transition?

- Kyoto type architecture
- Exogenous carbon emission trajectory
- World level carbon price
- Quotas allocation: Contraction and convergence



Ensure energy security (MF scenario)

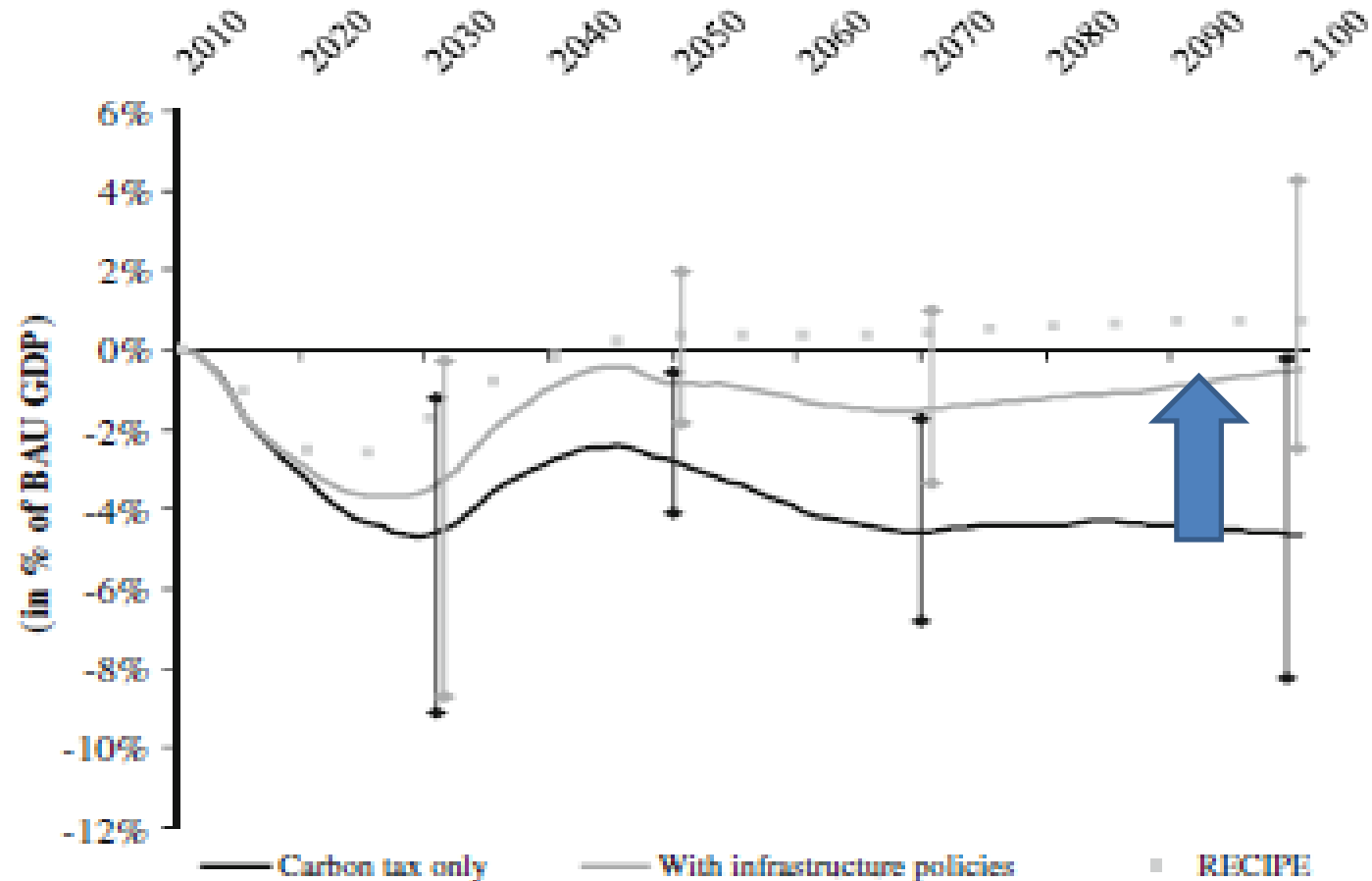


Partially limit transition costs (Europe)

	2010-2100	2010-2020	2020-2040	2040-2075	2075-2100
Baseline	1.76%	2.54%	2.48%	1.43%	1.33%
Climate policy	1.73%	2.43%	2.52%	1.29%	1.43%
natural growth	1.61%	2.36%	2.17%	1.19%	1.45%

- Moderate macroeconomic costs on average
- Negative effects in the short and long term reflecting OBSTACLES to the decarbonization
- Sustainable pathways in the VERY long term horizon

Going beyond a carbon price: global climate policies and local action on transportation infrastructures



Source: RECIPE project

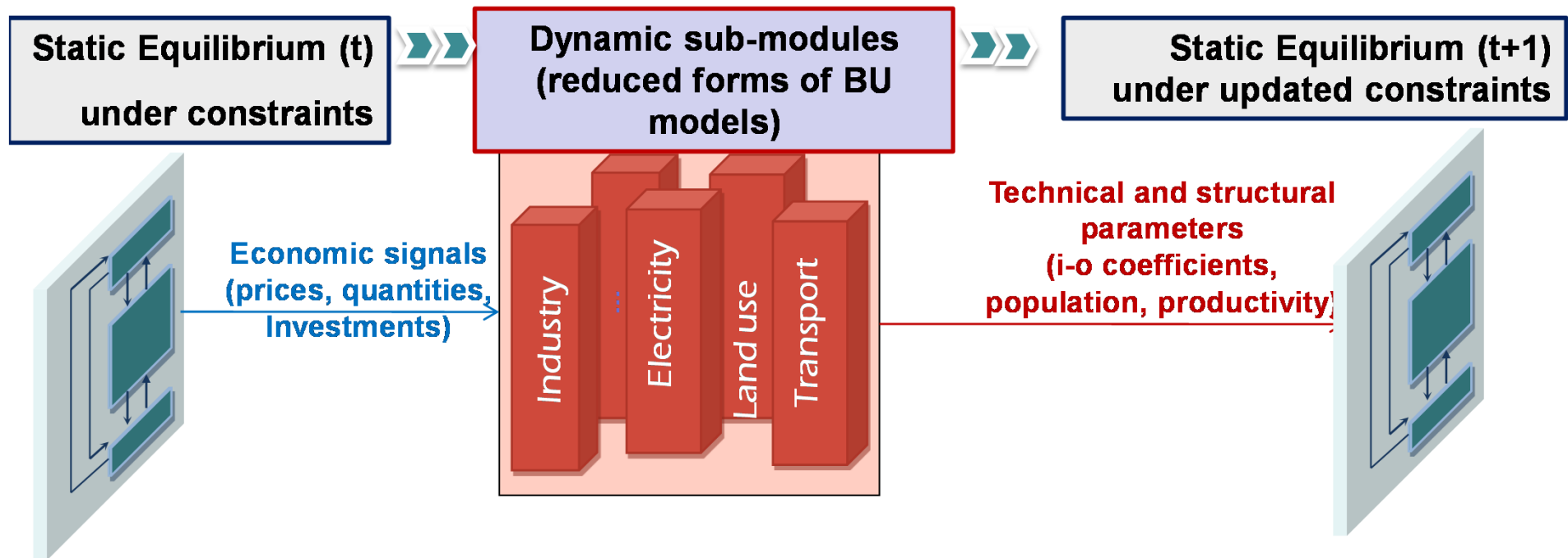
Key messages

- ✓ An innovative framework to inform on the determinants and the challenges of the energy transition in a **second best world**
- ✓ Oil market dynamics are a **key driver** of long-term development pathways :
 - ✓ Risk of oil intensive development pathways
- ✓ Climate policies **accelerate** the decarbonization of economies and enhance energy security for oil importers
- ✓ Need to **articulate** global climate policies and local action to “lubricate” the bifurcation towards sustainable future :
 - ✓ Towards a paradigm shift of climate policies (Cancun 2012)

Thank for your attention!

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

IMACLIM, a recursive and modular architecture



- ❑ Explicit content of contrasted views of globalisation and sustainability
 - *Hybrid matrixes in values, energy and « physical » content*
 - Secure the consistency of the engineering based and economic analyses
 - Explicit accounting of inertias on equipment stocks
 - Technical asymptotes, basic needs

- ❑ Investigating the transition towards sustainable future
 - *Solowian growth engine in the long run but transitory disequilibrium*
 - Unemployment, excess capacities
 - Investments under imperfect foresight (informed by sectoral models)