



# Strengthening the European GHG emission objective in 2020 – What impacts for France? with Imaclim-R France

*Work in progress*

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Low Carbon Scenario: Engaging civil society in the EU roadmap process  
October 25th 2011, Bruxelles, Belgium

Low Carbon Societies Network



<http://www.lowcarbon-societies.eu/>

# The question

- What would be the impact in France of a more ambitious European / National target
  - -25% in 2020 or
  - -30% in 2020
  - Compared to the existing -20% in 2020?

# Imaclim-R France

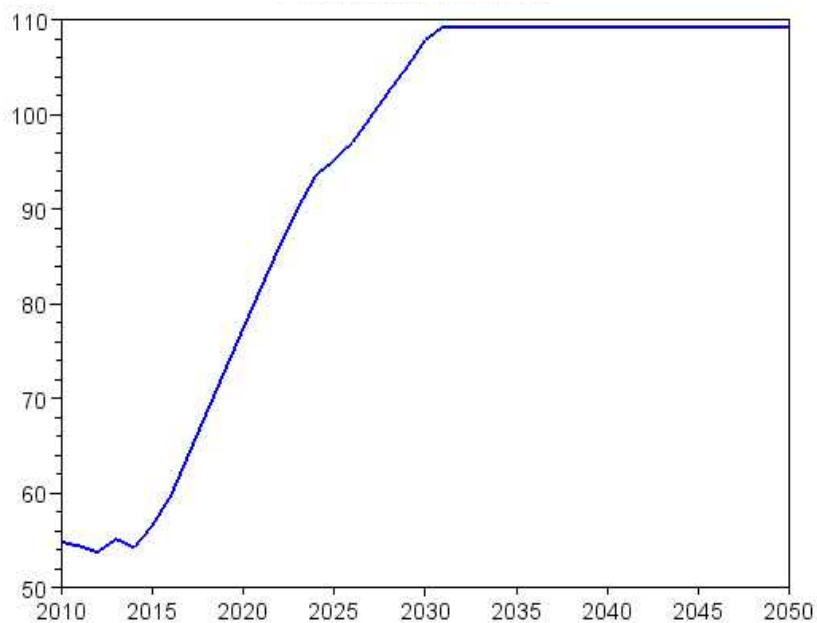
- Imaclim-R
  - Hybrid model : Consistency between the evolution of technological systems and macroeconomic constraints
    - Sectoral modules (power sector, residential...)
    - Representation of behaviors specific in each sector ; imperfect foresight
    - Inertia in the evolution of technological systems (non-flexible characteristics of equipment vintages available at each period)
  - Simulation  $\neq$  optimization
- Imaclim-R France:
  - 15 sectors,
  - open economy,
  - consistent representation of the world context (energy prices,

# Scenario Protocol

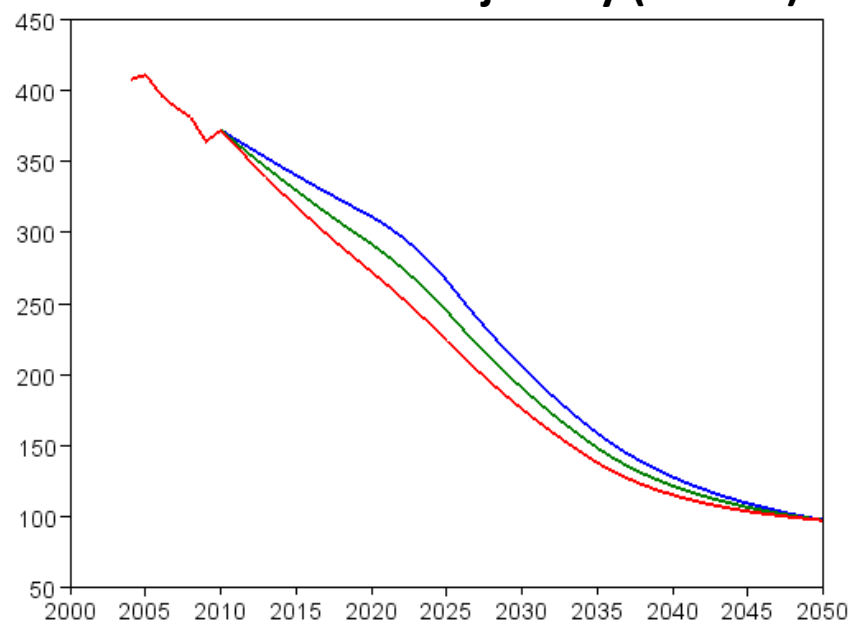
- EXOGENOUS CONTEXT
  - 3 emission trajectories (-20%, -25%, -30% in 2020)
  - world prices
- SCENARIOS WITH EMISSIONS REDUCTIONS
  - Carbon tax only
  - Carbon tax + Specific sectoral policies and measures
  - Carbon tax + Specific sectoral policies and measures + carbon tax recycling on lowering the labour cost

# Exogenous Context

## Oil Price (\$/bbl)



## French Emission trajectory (MtCO<sub>2</sub>)

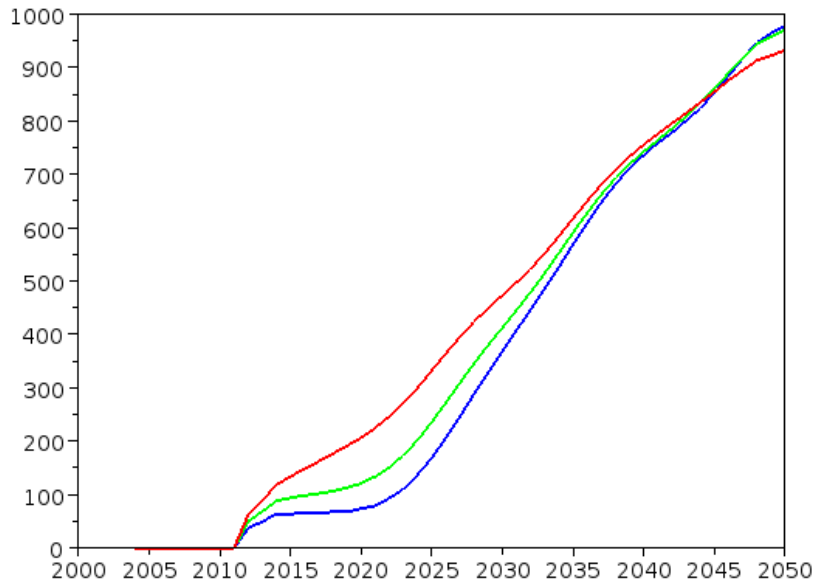


Moderate increase in oil price

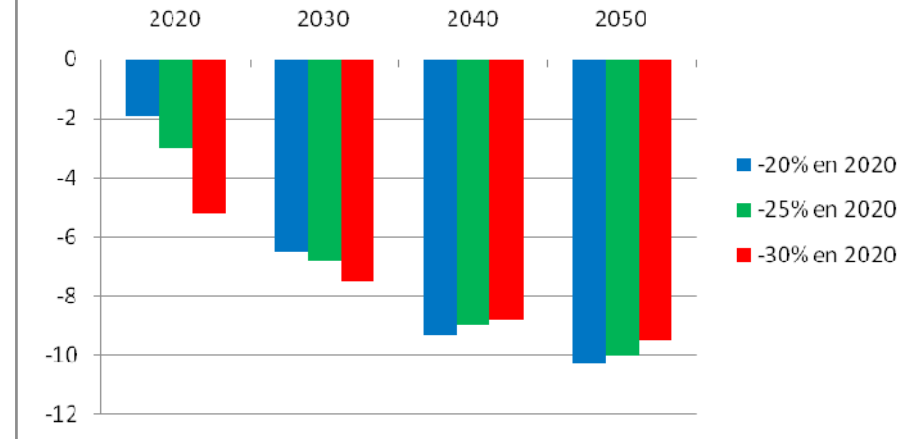
Different carbon budgets : 10% (resp. 5%) inferior for the « -30% » (resp. « -25% ») trajectory compared to the « -20% » trajectory

# Carbon tax only

Carbon tax only (€/tCO<sub>2</sub>)



GDP losses / reference scenario

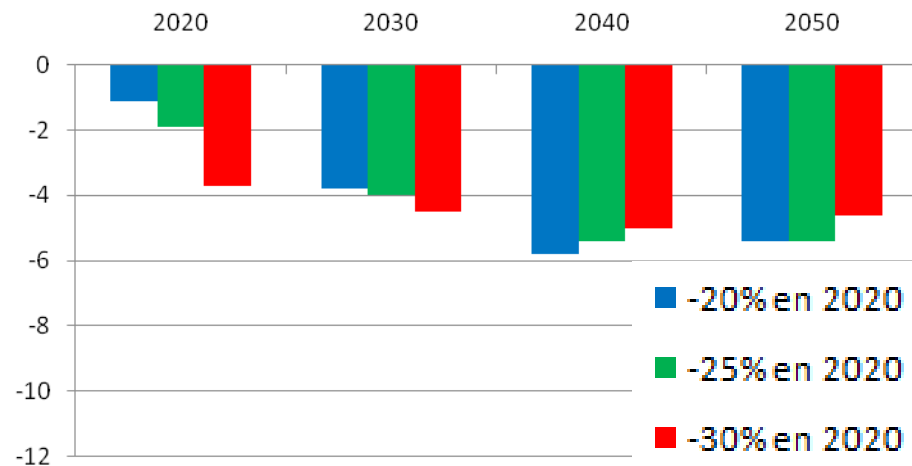
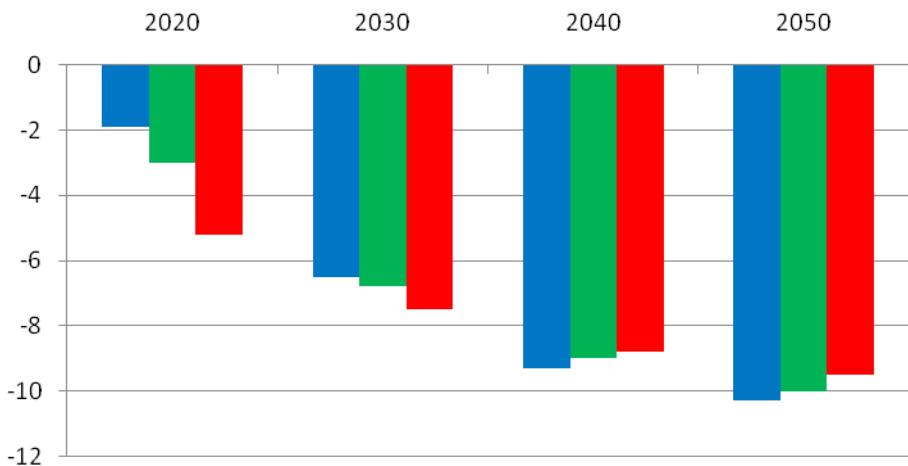
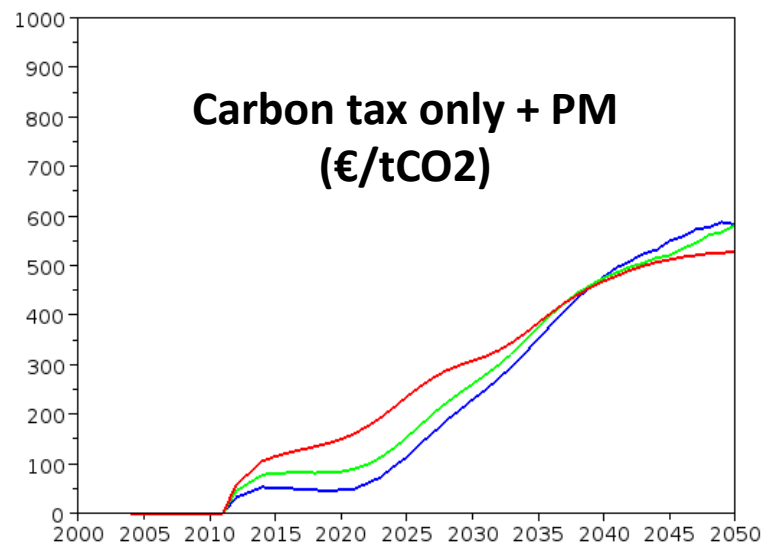
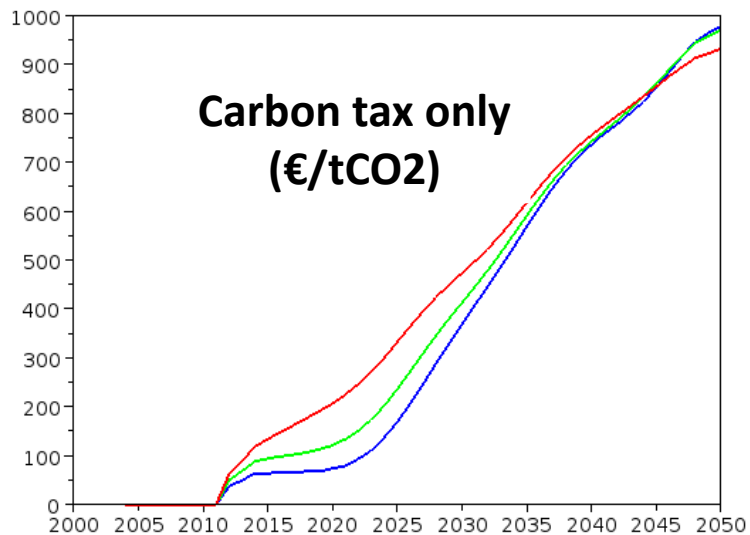


- ✓ 3 trajectories hardly comparables because with different carbon budgets
- ✓ High and increasing losses
- ✓ Early action : Short term loss and moderate gain in the long run

# Sectoral policies and measures

- Residential:
  - Eco-Free Loan for retrofitting
  - Tax credit on efficient equipments
  - Ambitious thermal regulation for new dwellings
  - Retrofit obligation for existing dwellings
- Transports
  - Bonus - Malus for new vehicles
  - Infrastructure policies (urban forms, multimodality of infrastructures)
  - Improved logistic for transports of goods
- Power sector  
Support policies to renewables, decommissioning of coal plants
- Modes de vie
  - Decrease in the material content of consumption styles

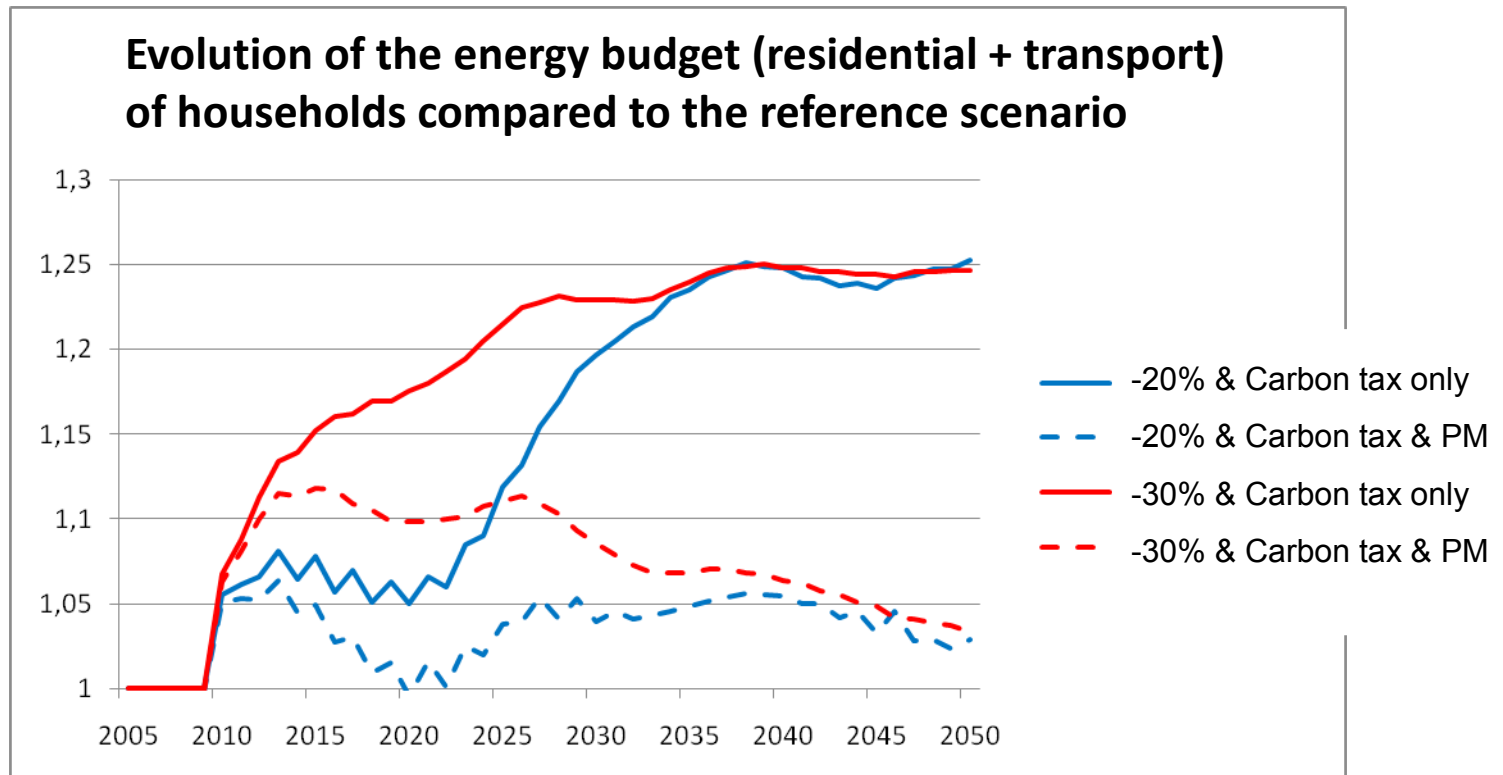
# Impact of P&M on the tax and on GDP losses



- Losses divided by 2 on the long run because of P&M implementation
- Gains in the middle and long run of an early action
- Implementation of P&M as soon as possible to lower short run impact of a -30% target

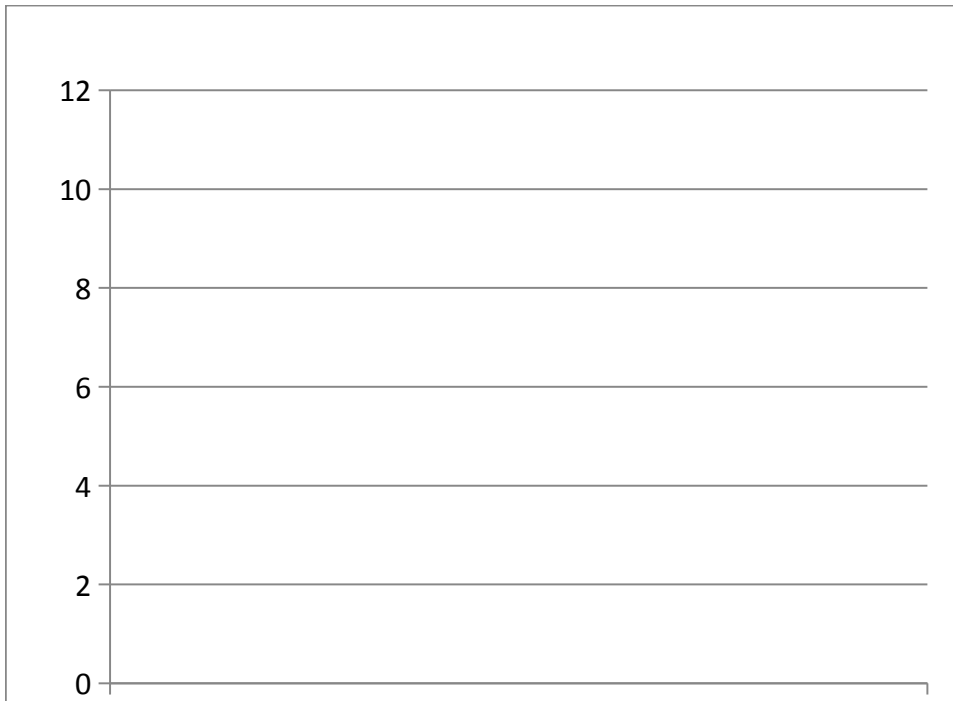


# P&M absorb part of the increase in the energy price due to the carbon tax whatever the trajectory



# Sectoral burden sharing of the decarbonization

Sectoral emissions (MtCO<sub>2</sub>) –  
scenario -25% - Tax + PM



	2020	2030	2050
Agriculture	-16,9%	-41,1%	-89,8%
Power	-47,5%	-54,3%	-98,0%
Transports	-23,6%	-45,3%	-60,5%
Residential	-30,8%	-67,7%	-71,2%
industries-services	-23,5%	-54,3%	-91,6%
Total	-25%	-53%	-76%

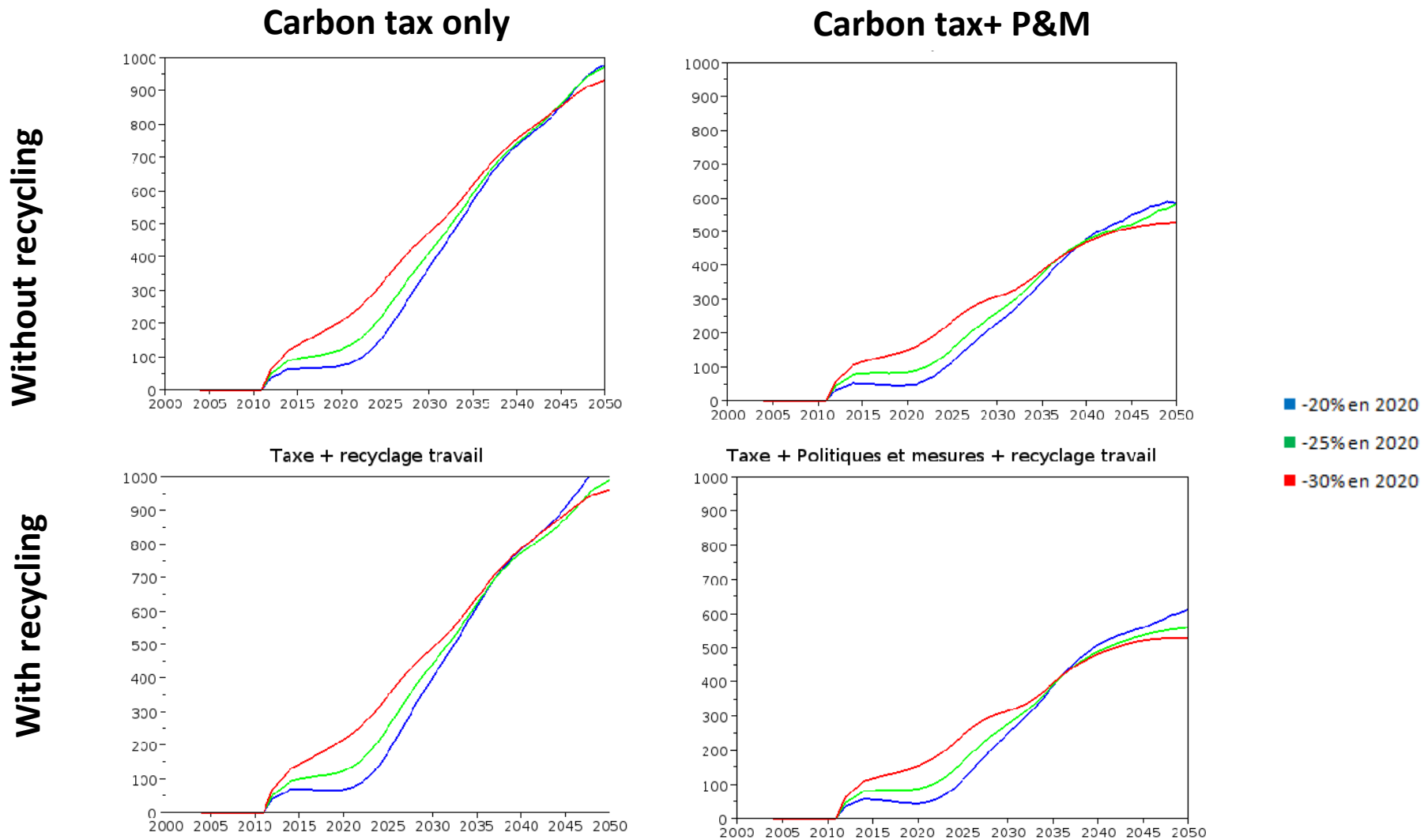
**Sectoral emission reductions in  
2020, 2030 and 2050 (/2005)**

**Important decarbonisation of the french economy except in the transport sector  
« Facteur 4 » in residential**

# Sectoral burden sharing

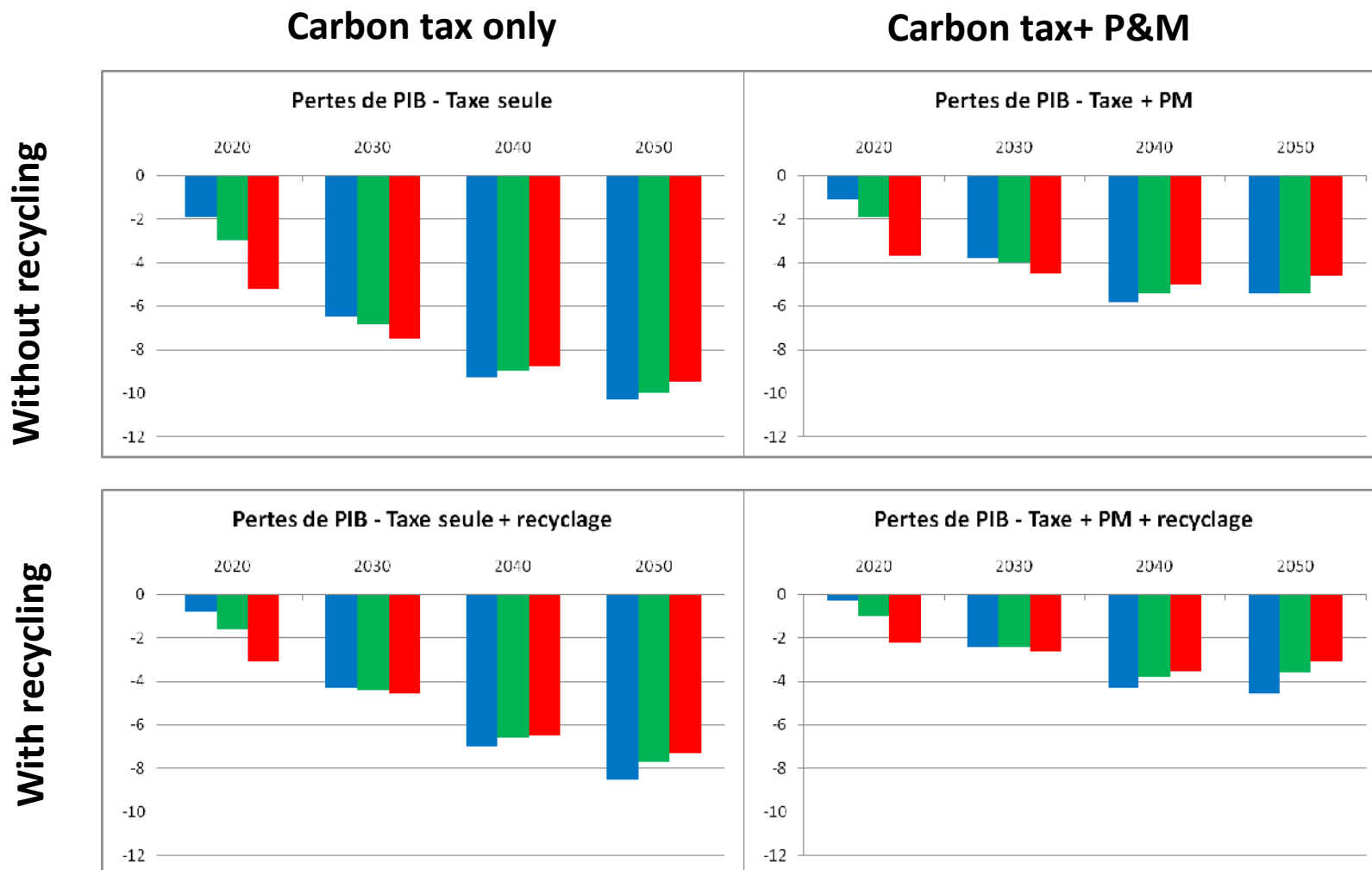
- Sectoral tax to comply with sectoral objectives?
- « Fine tuning » in the recycling to sectors consistent with the vulnerability of specific sector to the carbon tax

# Recycling carbon tax on lower labour cost



- Weak effect of the tax recycling on the tax level

# Recycling carbon tax on lower labour cost



- **With an early action, losses are really limited to the short run**
- **Significant benefits on the long run of an early action / delayed action**

# Conclusion

- Three determining assumptions
  - Equilibrium of the balance of capital in 2050
  - Budget of State balanced with transfers to households
  - Representation of the impact of climate policies on endogenous technological change and growth of productivity to be improved
- From a political point of view
  - Important to implement early PM to absorb short run losses of an early action
  - Tax recycling to lower labour cost absorb significant part of the cost of an early action.

Thank you!

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