



Phasing out the nuclear energy in France? *A heuristic exercise around an unlikely perspective*

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**Side-Event Combating nuclear with or
without nuclear
Warsaw COP19 - 12 november 2013**

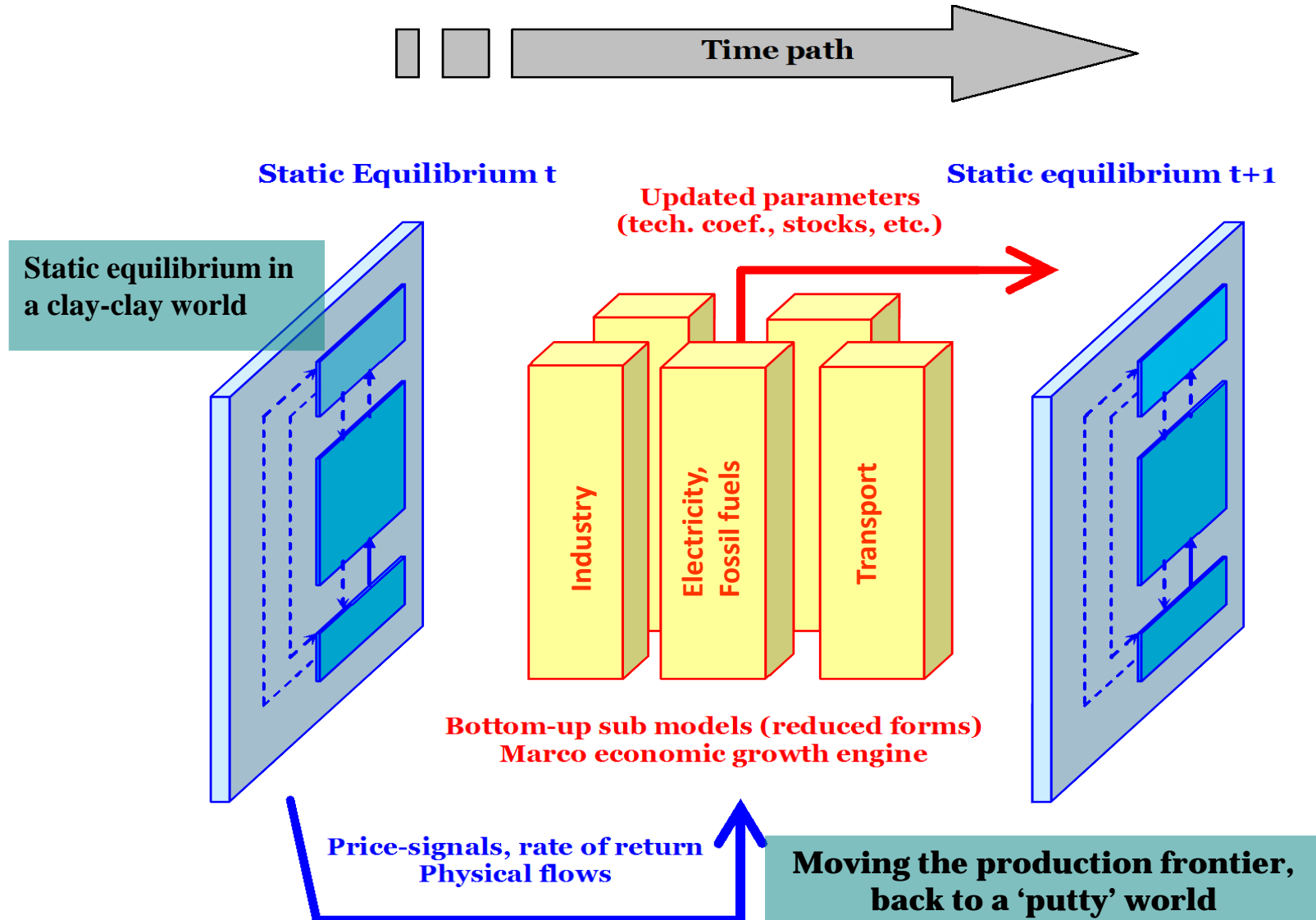


The aim of a heuristic exercise

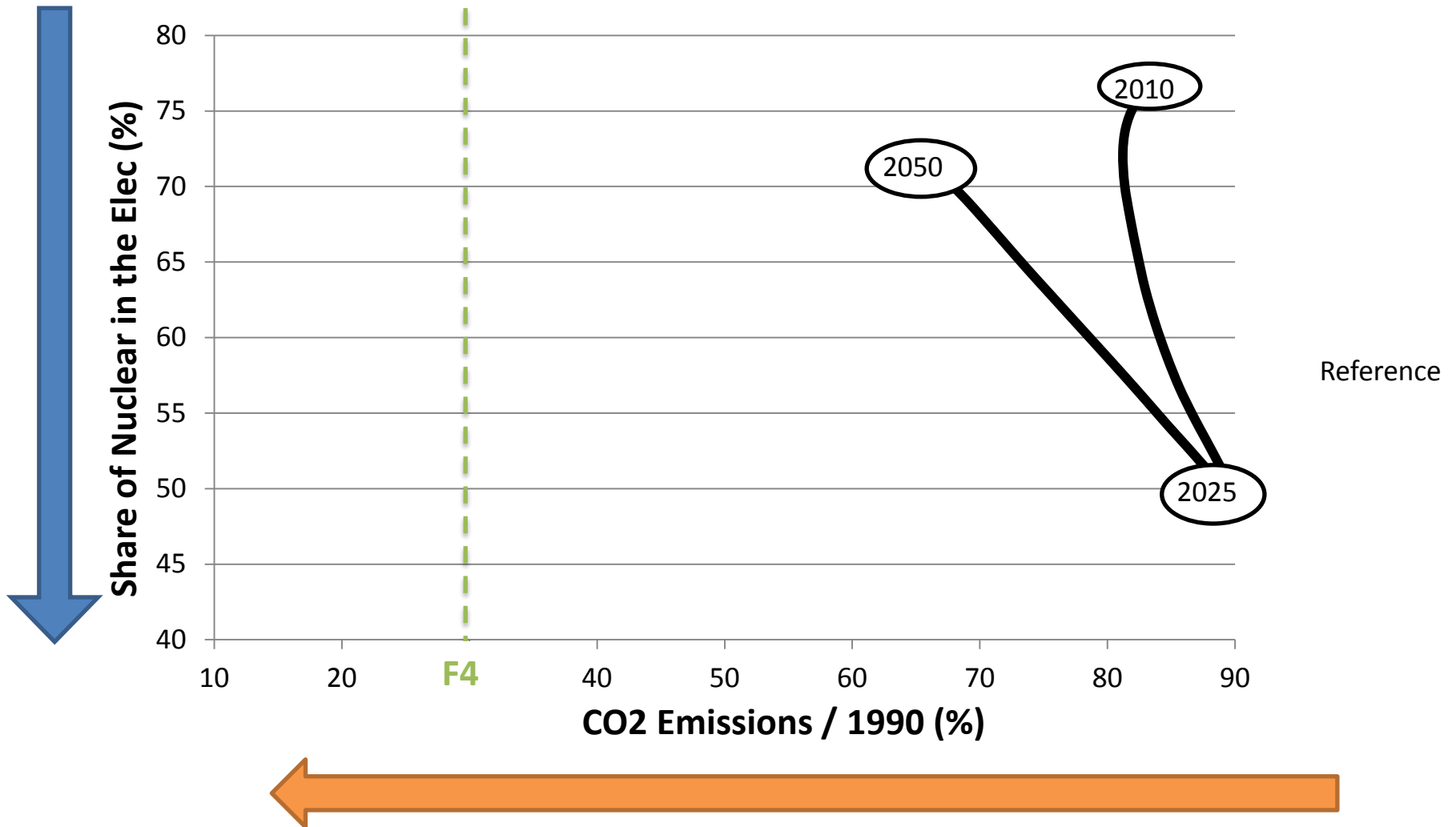
- **To put some rationale in strong divisive lines in France and beyond**
- **To make explicit the systemic effects between energy and non energy policies**
- **To derive more general lessons about what “energy transition means”**

A recursive and modular architecture:

static equilibria + dynamic relations informed by engineering based information



Risk vs Risk; Nuke vs Global Warming



Encilowcarb project scenarios (EUFP7) : optimistic views on consensual P&M (policies and measures)

Energy efficiency regulations

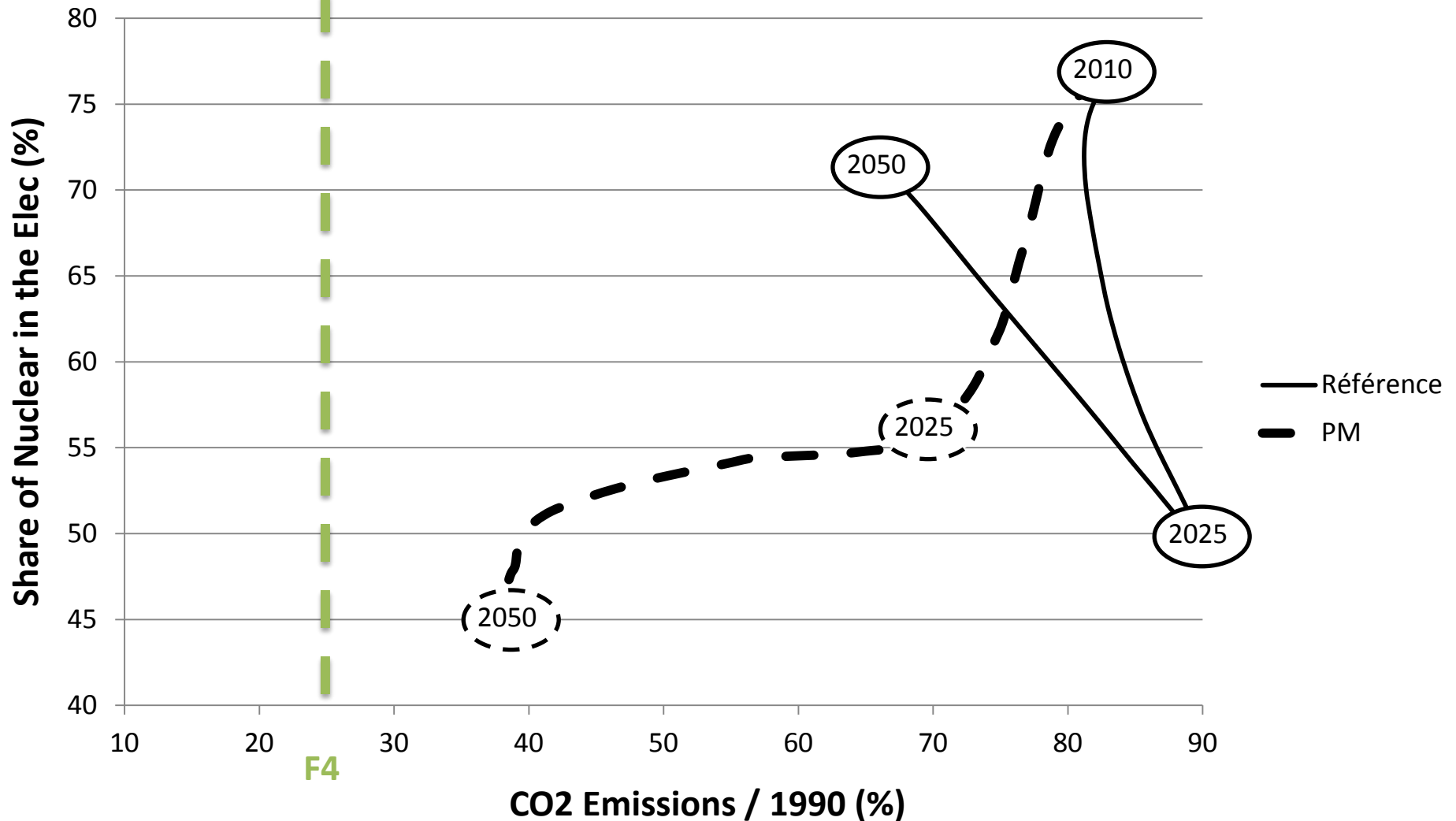
Financial incentives for upgraded air conditioning

Eco-taxes on trucks and on kerosene

P&M 'Encilowcarb'

Baseline

P&M: missed F4, reduced nuclear as a co-product



P&M: Missed F4 and a real transition problem

Time Period	2010-2015	2010-2020	2020-2030	2030-2040	2040-2050	2010-2050
Ref	0.77%	0.83%	1.09%	1.47%	0.85%	1.06%
P&M	0.73%	0.9%	1.32%	1.46%	0.9%	1.15%

GDP annual growth rate

	2015	2020	2030	2040	2050
PM	-2	26	183	254	307

Employment variation in thousands of 'full time' jobs

- The macroeconomic impact of adjustment costs
- Time-lag expenditures <-> benefits
- More significant costs at a disaggregated level

'Greengrowth' under F4 constraint?

A need of overlapped measures

Carbon Tax

Encilowcarb P&M

Reference

'Greengrowth' under F4 constraint?

A need of overlapped measures

Social negotiations

Carbon Tax



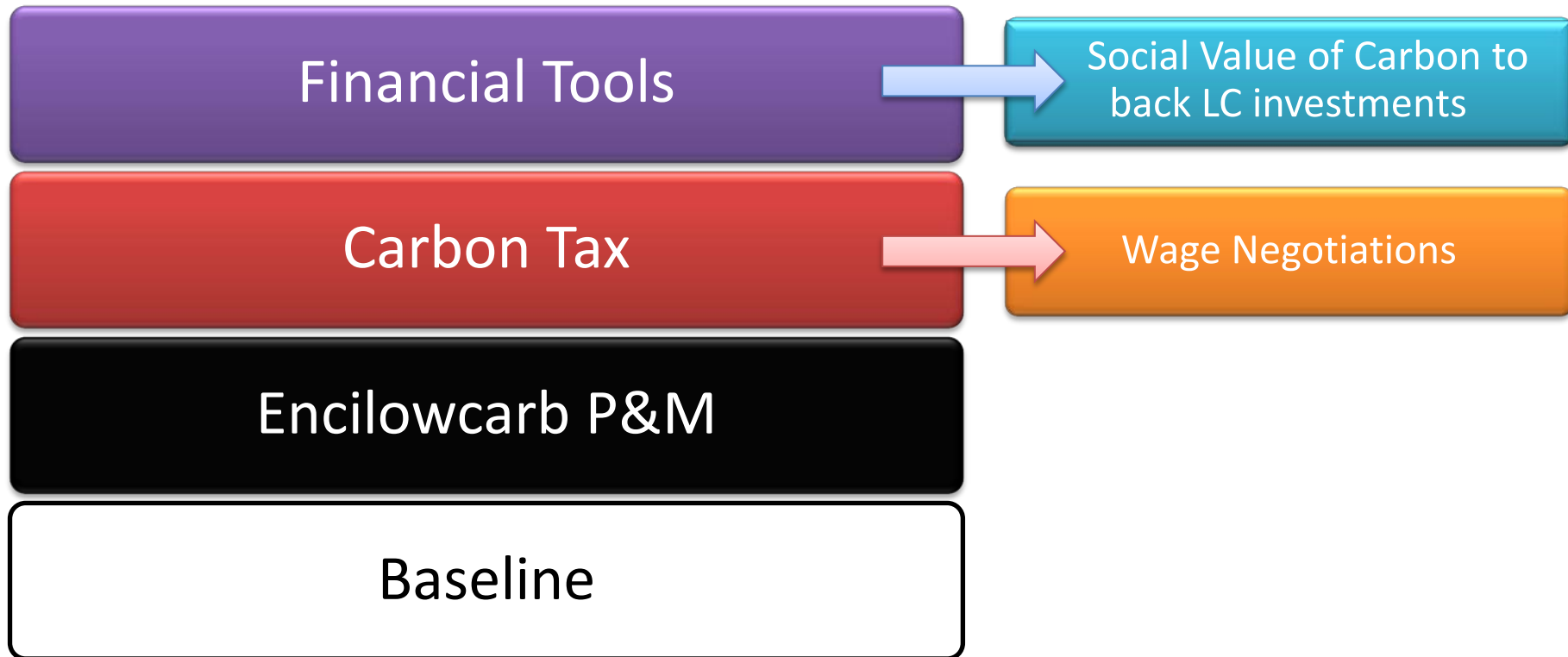
Wage negotiations

Encilowcarb P&M

Baseline

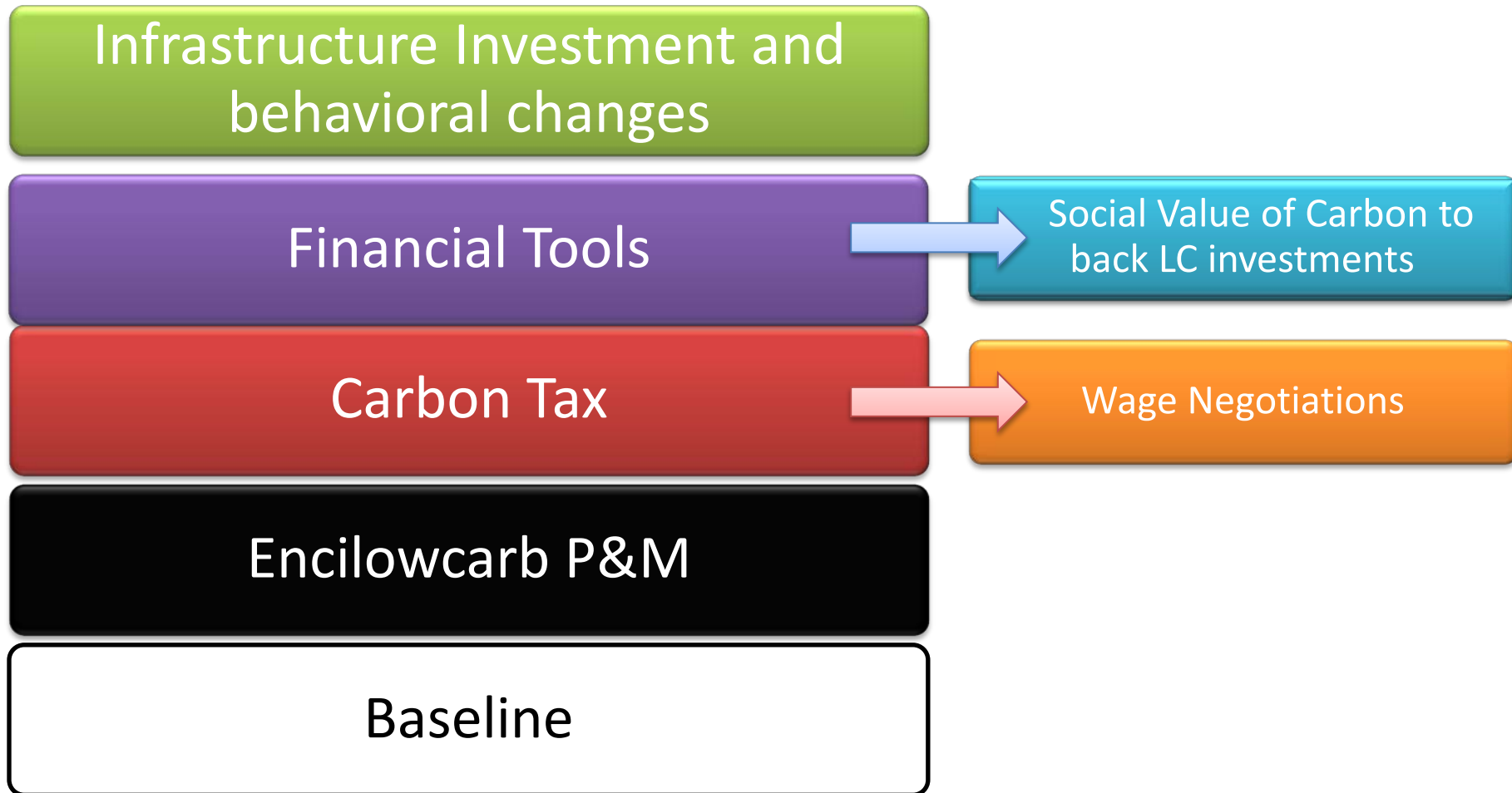
'Greengrowth' under F4 constraint?

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'Greengrowth' under F4 constraint?

A need of overlapped measures



Low carbon growth with still 50% of nuclear

Period	2010-2015	2010-2020	2020-2030	2010-2050
Baselin	0.77%	0.83%	1.09%	1.06%
PM	0,73%	0,9%	1,32%	1,15%
Full Policy Package	0.87%	1.00%	1.46%	1.23%

Average GDP growth rate

- **F4 objective met with 'slightly' higher growth and employment**
- **Success conditional upon the political, social and technical capacity to enforce a diverse set of measures, including the Encilowcarb Energy Efficiency objectives**
- **Nuclear installed capacity passes from 65 GW in the reference case to 53 GW**

Adding on three ways of internalizing nuclear risks after Fukushima

- **N1:** security investments -> doubling the capital cost
- **N2:** shortening the extension of nuclear plants (50 years instead of 60 years)
- **N3:** phasing out nuclear around 2050
- All this under the same F4 constraint

Implications of the Nuclear phasing out in 2050?

	Emissions / 1990	GDP annual GR	Nuclear Capacity	Share of Nuke in Elec	CCS capacity	CCS as a share of Elec Capacity
Full Policy Package (FPP)	17%	1,23%	53 GW	49%	2 GW	1%
FPP + N1	18%	1,21%	38 GW	43%	10 GW	5%
FPP+ N2	18%	1,22%	39 GW	43%	16 GW	6%
FPP+ N3	25%	1,1%	2 GW	2%	37 GW	37%

Phasing out nuclear: real cost, no “de-growth” ... but

Time Period	2010-2015	2010-2020	2020-2030	2030-2040	2040-2050	2010-2050
Baseline	0.77%	0.83%	1.09%	1.47%	0.85%	1.06%
F4 : F.P.M	0.87%	1.00%	1.46%	1.50%	0.97%	1.23%
F4 + N3	0.83%	0.98%	1.43%	1.18%	0.83%	1.10%

GDP annual growth rate

- Phasing out nuke under F4 constraint entails a marginal real cost over the short term and a four years delay compared with F4
- Is this marginal cost acceptable is a matter of value judgment
- But the both the F4 objective and the phasing out seem achievable with a one year and a half gain in GDP around 2050

Misuses and gooduses of a numerical experiment

- **To form a judgment about the realism of the phasing out scenario ... look carefully at the list of preconditions**
 - Technological assumptions
 - Assumptions about the capacity of conducting deep institutional changes
 - Assumptions about the incorporation of energy policies into broader macroeconomic and social policies
- **General lessons for climate policies**
 - Macroeconomic policies matter
 - The link between energy policies and overall development policies matter
 - Caveat about the gap between consistent scenarios and the enforceable policies underlying these scenarios

For Complementary Information (in French) see:

Transitions énergétiques en France :
enseignements d'exercices de prospective -
*Contribution au débat national sur la transition
énergétique*

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<http://www.centre-cired.fr/IMG/pdf/CIREDPWP-201351.pdf>



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