26th World Gas Conference

TS WOC 3 1

ARE NEW GAS TRANSMISSION LINES STILL USEFUL ?

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WGCPARIS2015
WORLD GAS CONFERENCE

Needs for new gas transmission lines depend on geographical area

- In USA, development of shale gas is a key factor

- In emerging economies, natural gas is a key factor for developing economy and reducing pollution

- In Europe, demand is more uncertain

3 key factors

- 1 – european gas production is declining : new import routes are necessary

- 2 – market opening and european security of supply => need for new interconnections

- 3 –the impact of consumption ?

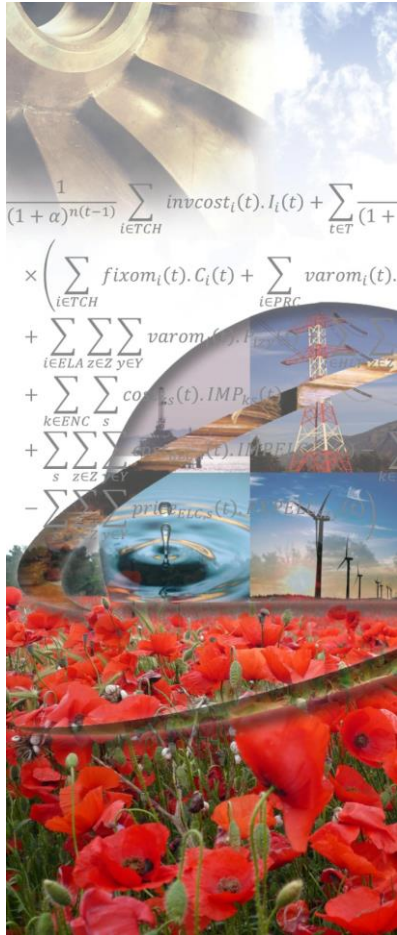We propose to examine the evolution of French gas consumption through a prospective study

(Re)thinking the future of natural gas allocation in France by 2050

- A study by :

  - Edi Assoumou
  - Nadia Maïzi
  - Gilles Guerassimoff

- Centre for Applied Mathematics, Mines ParisTech
- Industrial Chair Prospective modeling for sustainable development
- Partnership with GRTgaz

Centre for Applied Mathematics

- Industrial Chair ParisTech Prospective Modeling for sustainable Development

- Key partner of GRTgaz for prospective

  - Prospective Modeling

  - Optimization, Decision

  - Energy, Economy, Climate

  - Advanced Master specialized in Energy Systems Optimization

 - Phd speciality : Control, Optimization and Prospective

Analysis methodology

- The TIMES-FR energy system model

- Using the TIMES approach developed under the IEA-ETSAP implementing agreement
  - 18 participating countries
  - Large users community
  - Bi-annual workshop

- A time horizon of 2050 with 5 years steps

- Multi energy with 12 sub-period time slices
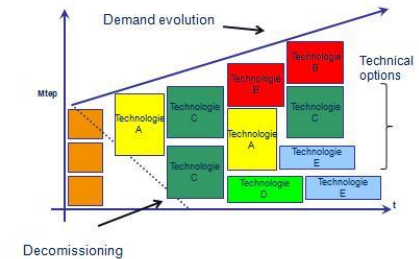 - Winter, Spring, Summer, Automn
  - Day, Night, Peak

Modeling principle

- Bottom-up and technology oriented
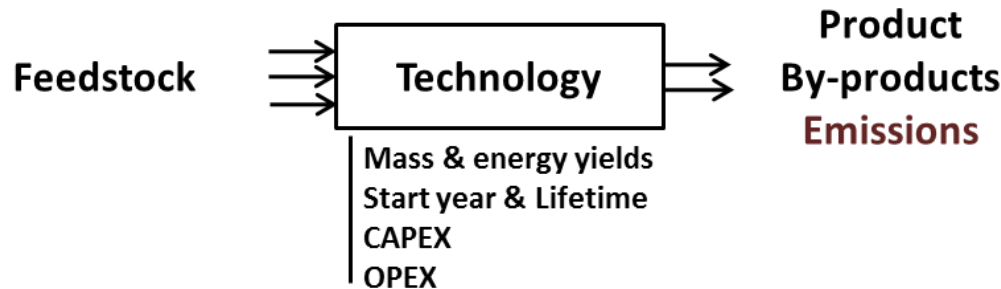
- Optimisation= Mininimal total cost under constraints

$$\sum_{\substack{y \in years \\ regions}} Disc(y) \times (INVCOST(y) + FIXCOST(y) + VARCOST(y) + TAXSUB(y) + COSTDECOM(y) +$$

$$ELASTCOST(y) - LATEREVENUES(y)) - SALVAGE = OBJ(y)$$

Modeling principle

- Overview of the Reference Energy System
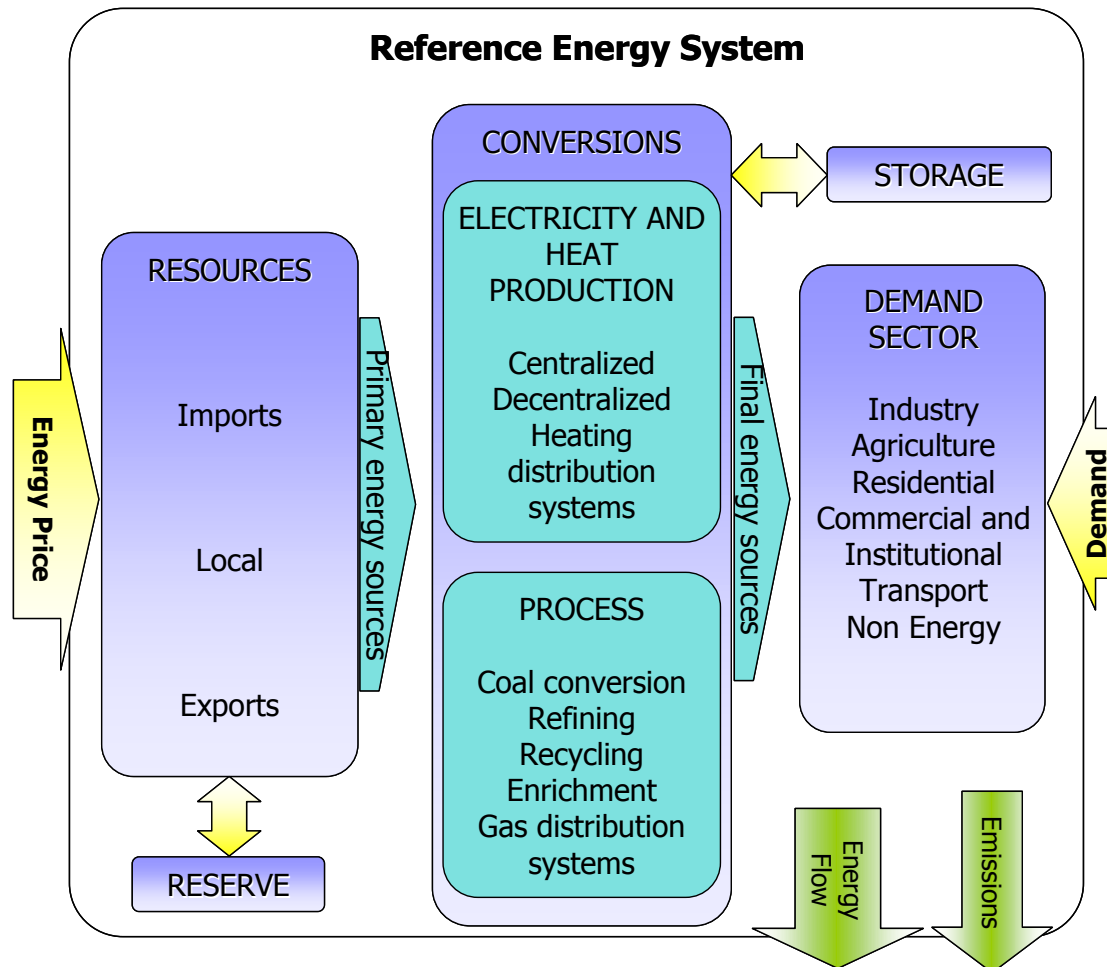
Scenarios: 3 main dimensions investigated

- Environmental policy: Tax30, F2,F3,F4(30€/ton CO_2, decrease greenhouse gases by 2,3 or 4)

- Nuclear power development

- Fossil fuel price assumptions

|	Price scenarios $2005	Oil $/boe	Gas $/MBTU	Coal $/ton
2030	Lowfossils	82.6	10	60.9
	High fossils	101	11.8	96.9
	High oil-lowGas	101	9.3	96.9
2050	Lowfossils	82.6	10.6	46.8
	High fossils	114.9	13.7	101
	High oil-lowGas	114.9	11.9	101

2050 = decrease by 25% to 50 % vs 2010
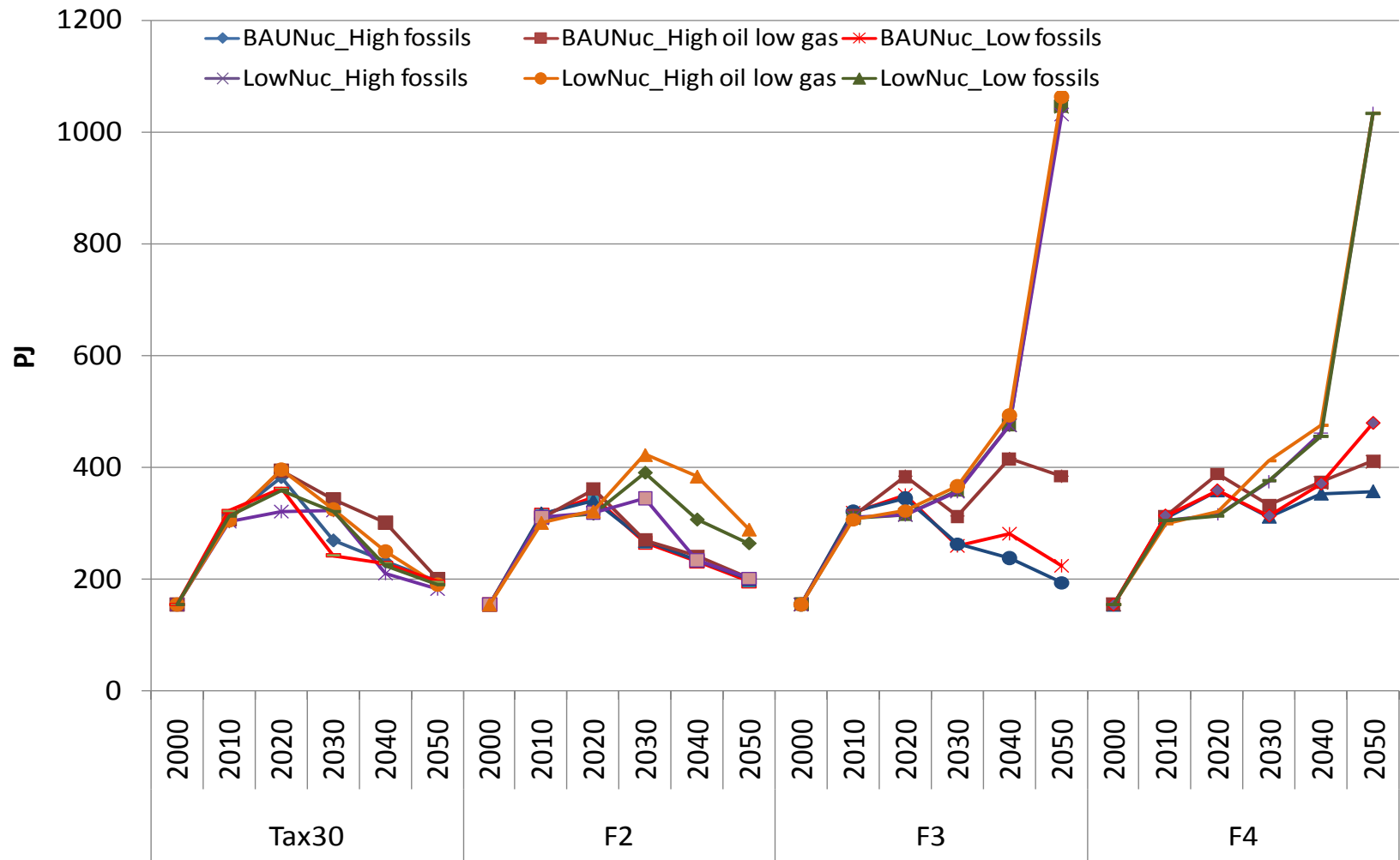
- Developments in **traditional markets**
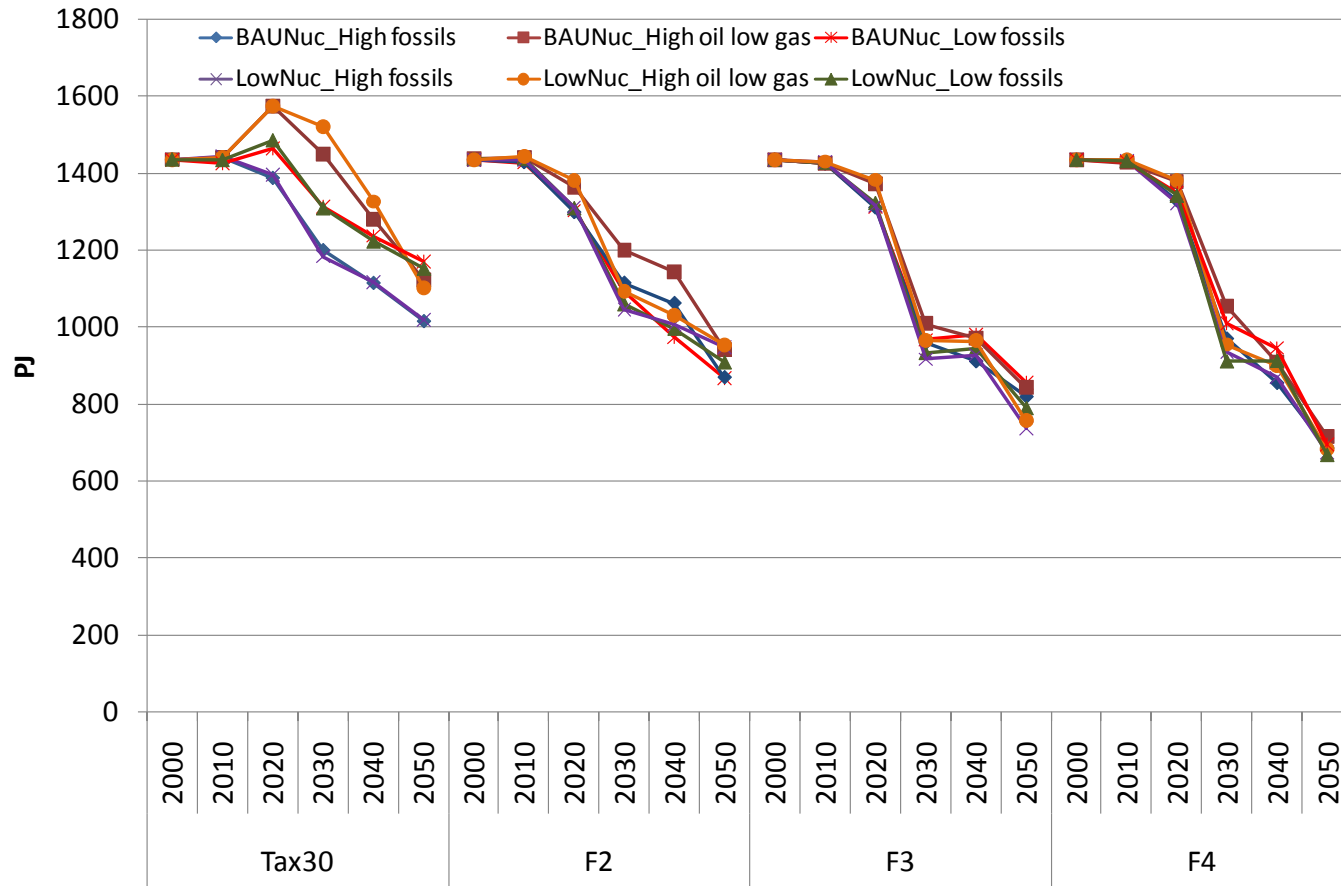
Natural gas consumption in the building and industry sectors

2050 = opportunities, up to full compensation of traditional markets

- in the **transport sector : gas as a clean low cost**
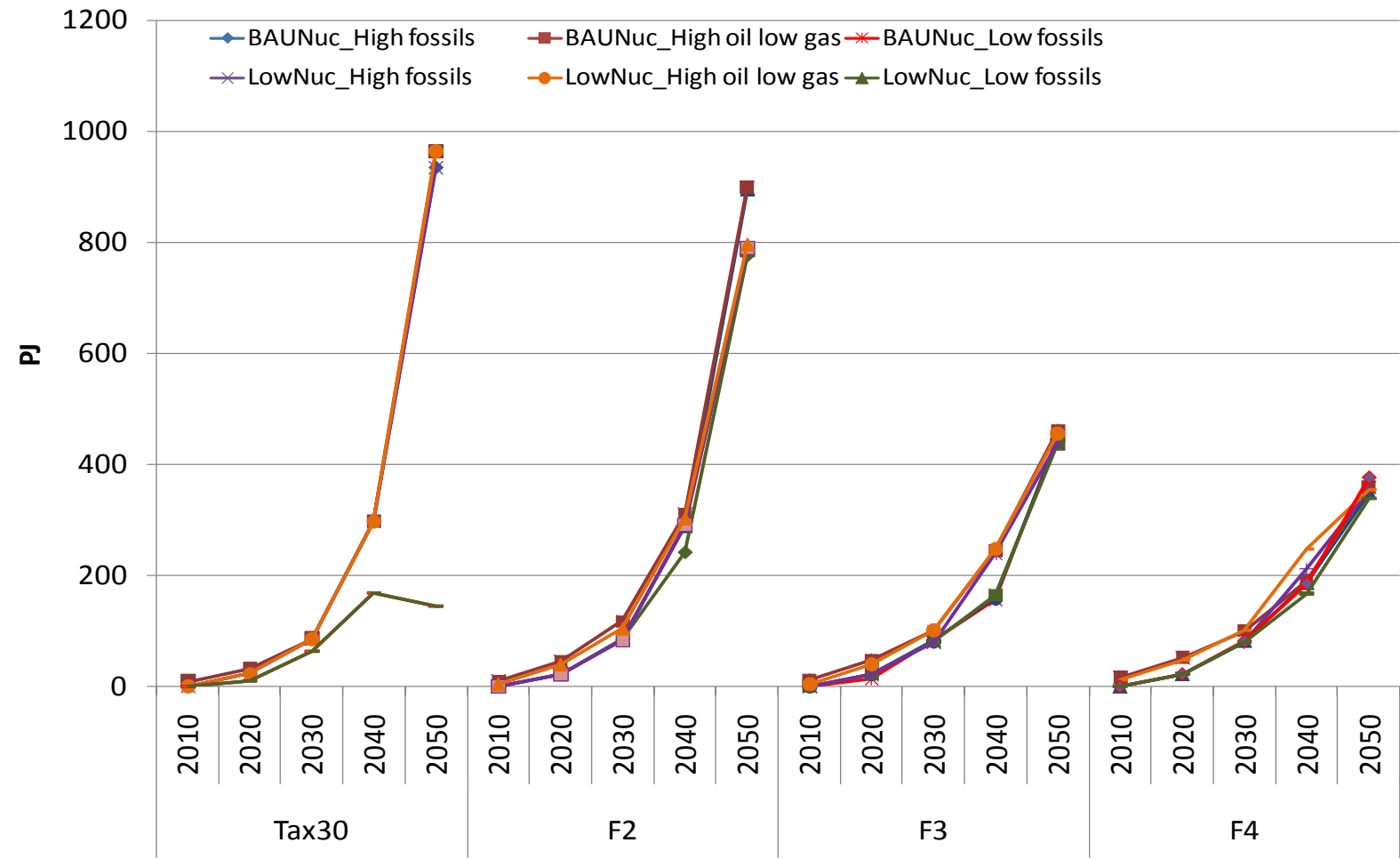
- Opportunities in the **electricity sector**

Results: from +30% to -20% depending on scenarios

- Highlighting a wide **range of prospects**
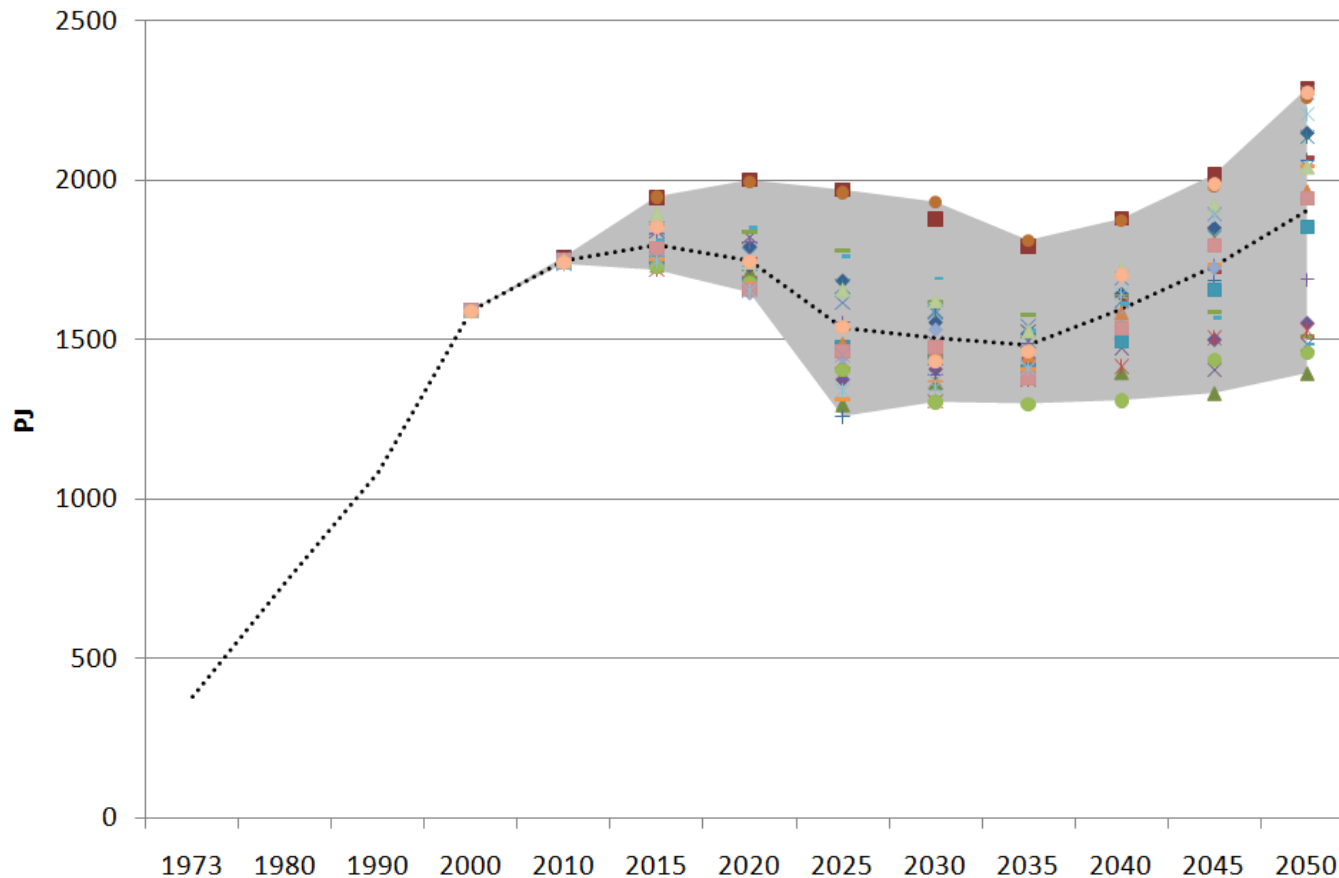
Total natural gas consumption

Several scenarios crossing environmental policy intensity, nuclear policy, fuel prices,

Key « take-away » results

- Growth or decrease by 2050?
  - A conditional future: between a 30% increase and a 20% decrease compared to 2010

- Key sector specific dynamics:
  - Decrease in traditional markets
  - Growing role of transport sector
  - Gas competition in the electricity sector

- Sensitivity to technical pathways
  - Nuclear policy
  - Renewable gas
  - Support for development in the transport sector

CONCLUSION

For european gas companies, energy demand is unknown,

Prospective studies show that, even if the trend now seems negative, the future also may lead to consumption increase.

If European policies and gas companies decisions lead to the positive scenarios, transmission lines will be useful like in other world areas.