

Energy transitions and EU governance of the energy mix: states, markets and geopolitics

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Introduction

Key Questions

- What is understood by ‘energy transitions’?
What are the different concepts related to ‘energy transitions’?
- What kind of energy transitions is the EU aiming for?
How has the EU energy mix evolved in recent years?
- How might energy transitions occur? What are the governance models?

Introduction

Structure

1. Probing the meaning of ‘energy transitions’
2. EU energy transition pathways
Reviewing the EU energy mix
3. Three governance models for energy transitions
EU energy policy: pathways and drivers

1. Probing the meaning of 'energy transitions'

What is understood by 'energy transitions'?
What are the different concepts related to 'energy transitions'?

- Problem of vague concepts in energy arenas.
- A definition of the 'transition' term:
'the process of movement from a quasi-stable condition through an interval of rapid change to re-stabilisation' Raskin al. (2002: 1).
- Ambiguity: transition as process or product?



Two key understandings of energy transition(s) in the European context

Type 1. 'The energy transition to a sustainable energy supply'

100% renewables (RES)

decarbonisation scenarios e.g. zero carbon

a product oriented frame

Type 2. 'Multiple energy transitions'

RES, nuclear, gas, CCS, + ...

'low carbon economy'

a process oriented frame

NB common element: importance of energy efficiency in all transition scenarios



Transition pathways and modes

‘transition pathways’ - the issue of how we get from A to B.

Three ways of reformulating this question:

1. What are the drivers which promote structural change? What are the obstacles which preserve the status quo?
2. Are transitions market-led, state-led or EU driven?
3. Do transitions occur on the basis of complementarity, inclusion and coordination *of energy sources*, or on the basis of rivalry, eviction and disorder?

2. EU energy transition pathways

What kind of energy transition(s)
is the EU aiming for?

- ‘The EU is going through a transition aiming towards a low-carbon energy system, with concrete targets for 2020.’ European Commission (2013: 3)

'The objectives of the EU energy policy (...) are to ensure safe, secure, sustainable and affordable energy contributing to European competitiveness. The EU objective is also to progressively decarbonise the EU economy, especially post-2030. The Energy Roadmap 2050 illustrates some pathways as to how this objective can be achieved in the energy sector. Among fossil fuels, **gas nevertheless remains the first option** due to its lower emissions, sunk costs for transmission and distribution, its continued use in certain industrial sectors (such as in the production of fertilisers and chemicals), and, in particular, its flexibility in balancing intermittent renewables generation.'

European Commission (2013: 11)

'Electricity will play a central role in the low carbon economy. The analysis shows that it can almost totally eliminate CO₂ emissions by 2050, and offers the prospect of partially replacing fossil fuels in transport and heating.'

European Commission
(2011: 6)

'Electricity could also provide around 65% of the energy demand of passenger cars and light duty vehicles. (...) EU energy systems are in the early phase of a major transition in electricity.'

European Commission (2013: 6)



Commentary

EU trajectory is characterised by type 2 transitions

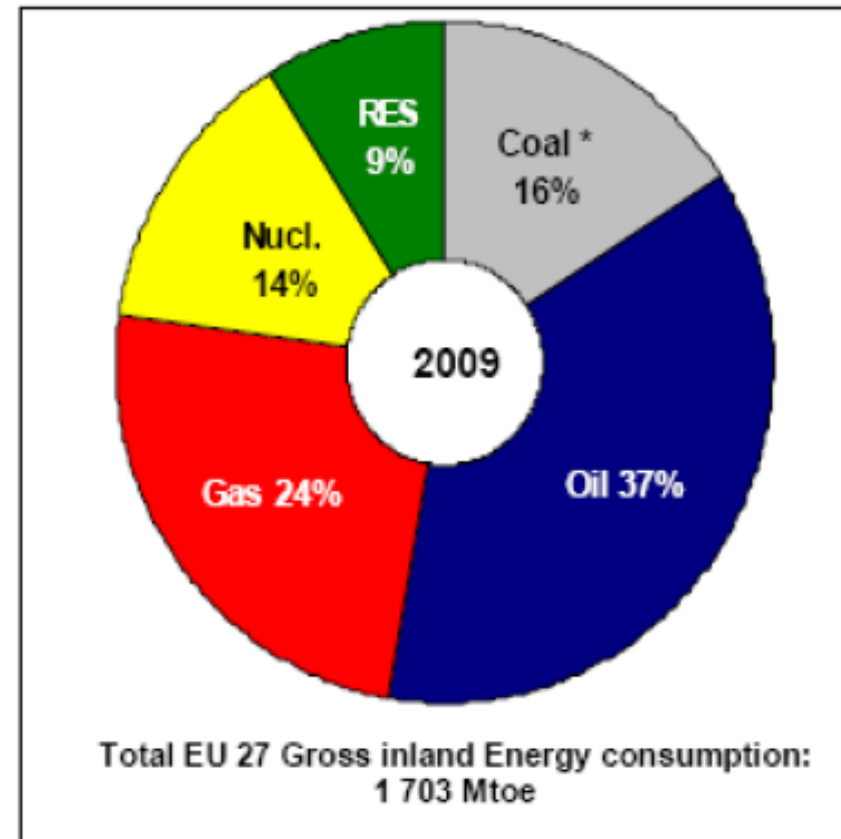
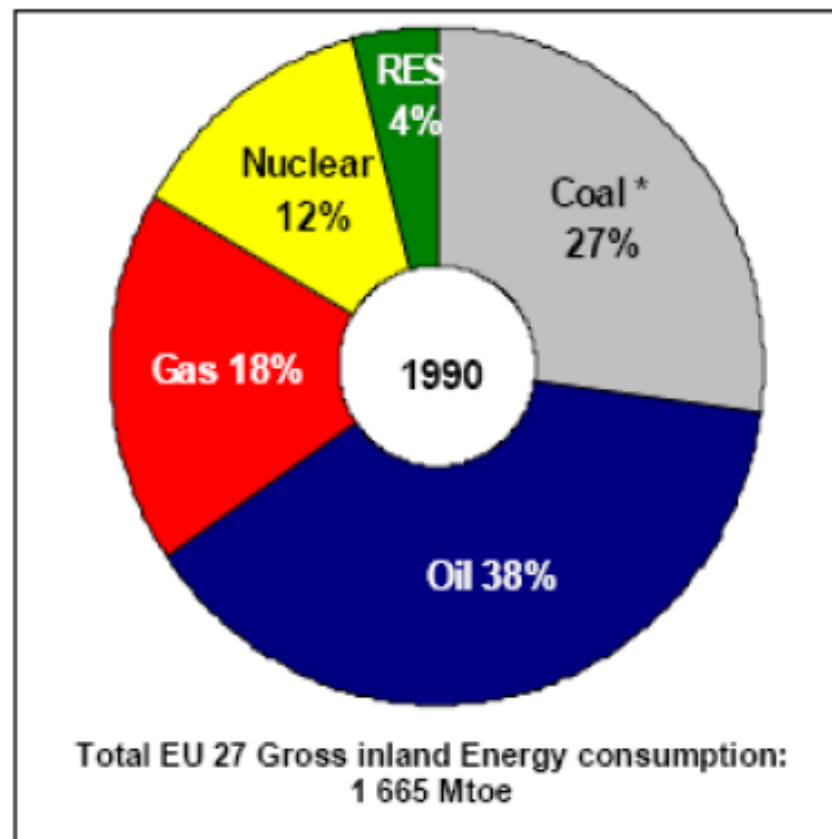
- ‘Low carbon economy’
- Multiple energy sources, including gas
- Process rather than product

Strong elements of ‘path dependence’

- Reaffirmation of existing policy choices
- Continuity rather than change?

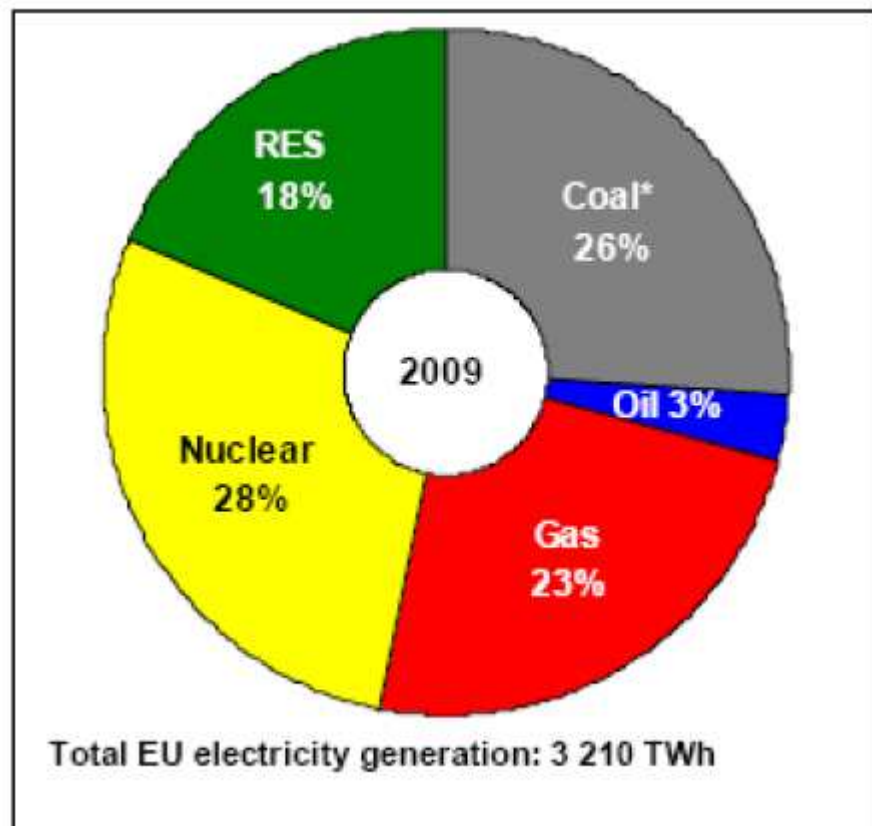
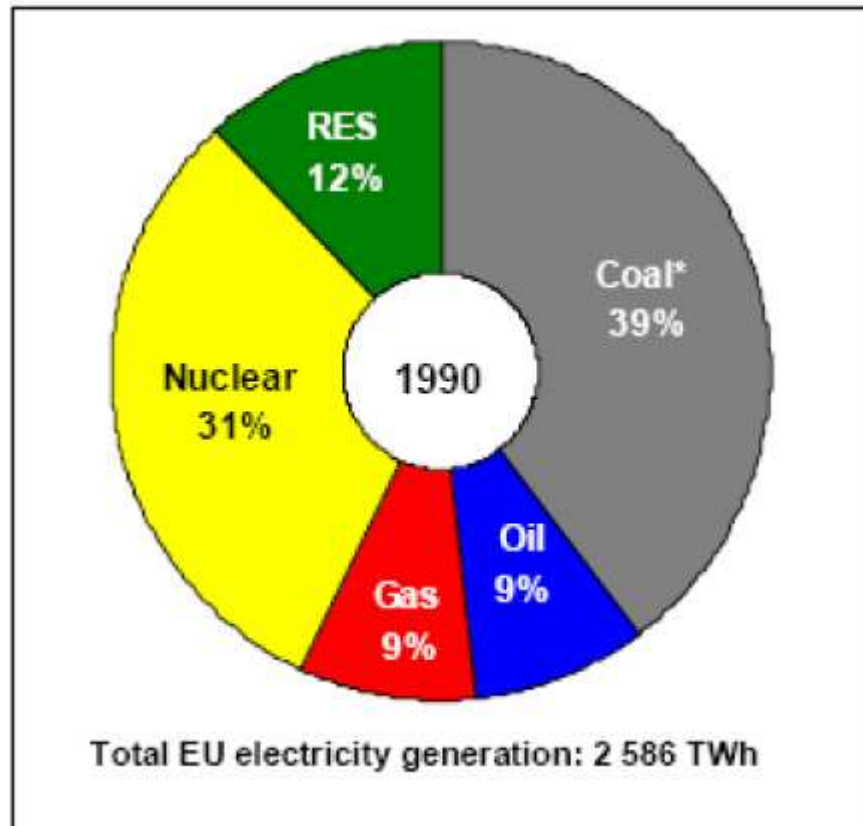
Reviewing the EU energy mix

EU gross inland energy consumption by fuel in 1990 and 2009



Eurostat May 2011 - * Coal and other solid fuels - RES: Renewable Energy Sources

Electricity Generation in the EU by type of fuel in 1990 and 2009



Eurostat May 2011 - * Coal and other solid fuels - RES: Renewable Energy Sources

EU ambitions and targets

Some milestones:

In 2007-8, the EU 'energy and climate package' set the aspiration for 2020 of a :

- 1.20% GHG emissions cut
- 2.20% of energy consumption from RES (legally binding)
- 3.20% improvement in energy efficiency.

The Lisbon Treaty (entered into force in 1.12.2009) gave a new basis for EU energy policy making.

In 2011, the European Commission set out two roadmaps for the energy transition:

- 'A roadmap for moving to a competitive low carbon economy in 2050',
- 'Energy Roadmap 2050'

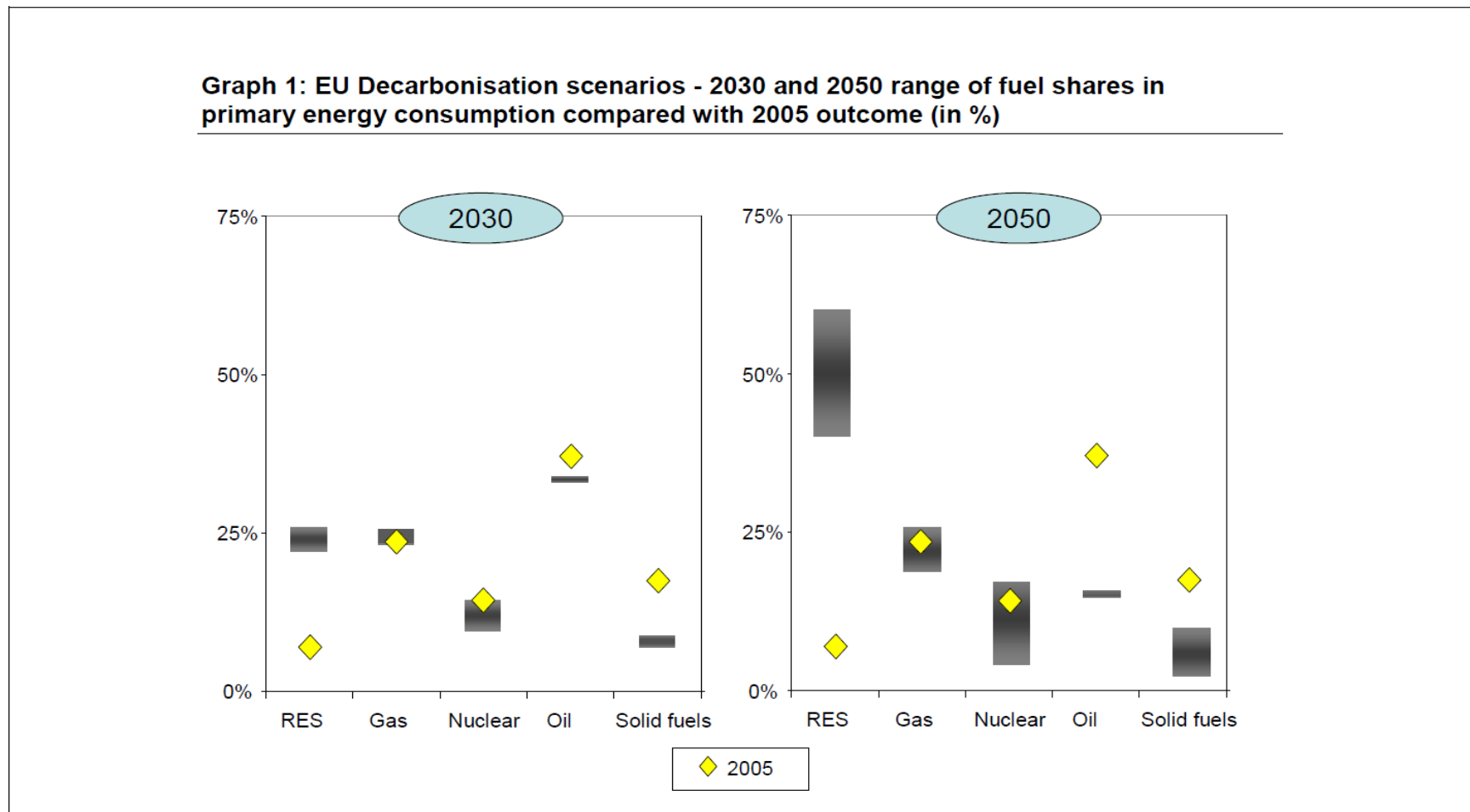
Transition scenarios

'Ten structural changes for energy system transformation'

- (1) Decarbonisation is possible – and can be less costly than current policies in the long-run
- (2) Higher capital expenditure and lower fuel costs
- (3) Electricity plays an increasing role
- (4) Electricity prices rise until 2030 and then decline
- (5) Household expenditure will increase
- (6) Energy savings throughout the system are crucial
- (7) Renewables rise substantially
- (8) Carbon capture and storage has to play a pivotal role in system transformation
- (9) Nuclear energy provides an important contribution
- (10) Decentralisation and centralised systems increasingly interact

Source: European Commission (2011: 5-8) 'Energy Roadmap 2050'

Transition scenarios



Source: European Commission (2011: 5) 'Energy Roadmap 2050'

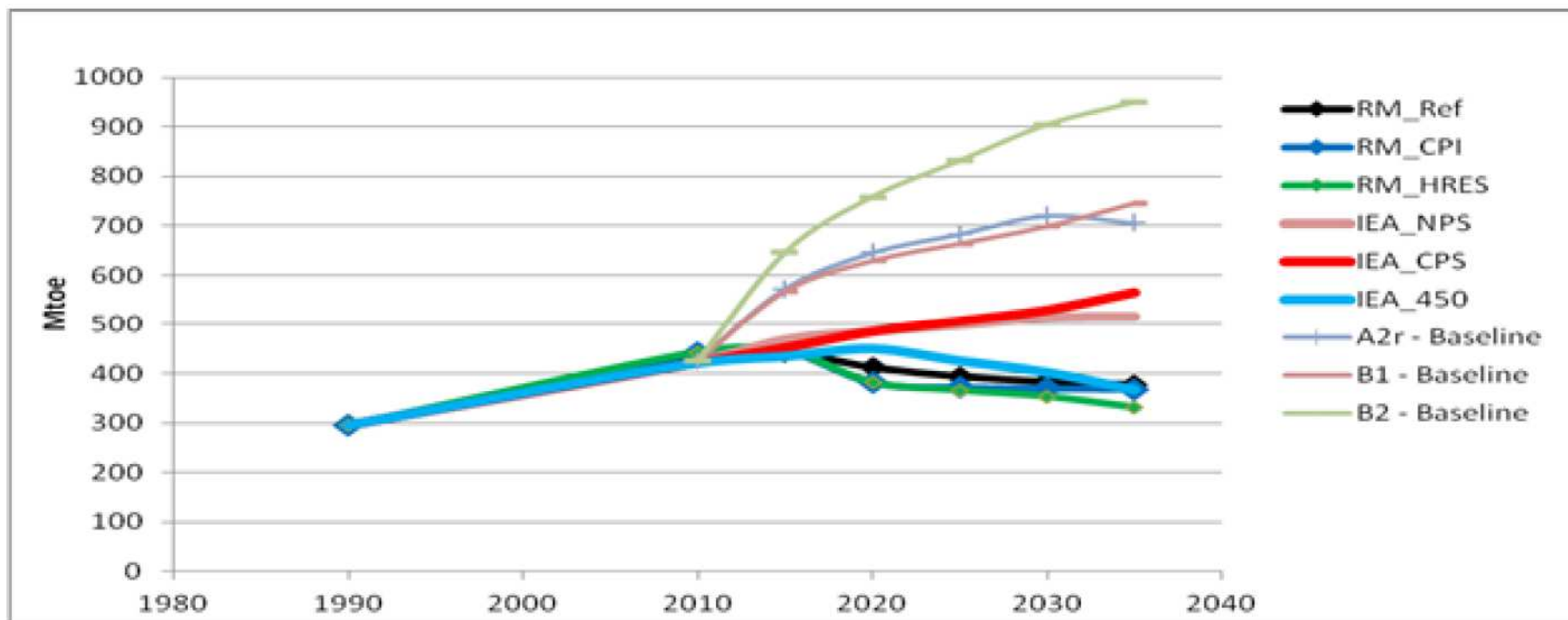
Transition scenarios - the persistence of gas?

Table 5: Fuel shares in primary energy consumption

	2005	Reference/CPI		Decarbonisation scenarios	
		2030	2050	2030	2050
RES	6,8%	18,4%-19,3%	19,9% - 23,3%	21,9% - 25,6%	40,8% - 59,6%
Nuclear	14,1%	12,1% - 14,3%	13,5% - 16,7%	8,4% - 13,2%	2,6% - 17,5%
Gas	24,4%	22,2% - 22,7%	20,4% - 21,9%	23,4% - 25,2%	18,6% - 25,9%
Oil	37,1%	32,8% - 34,1%	31,8% - 32,0%	33,4% - 34,4%	14,1% - 15,5%
Solid fuels	17,5%	12,0% - 12,4%	9,4% - 11,4%	7,2% - 9,1%	2,1% - 10,2%

European Commission (2011) 'Energy Roadmap 2050: Impact Assessment Part 1',

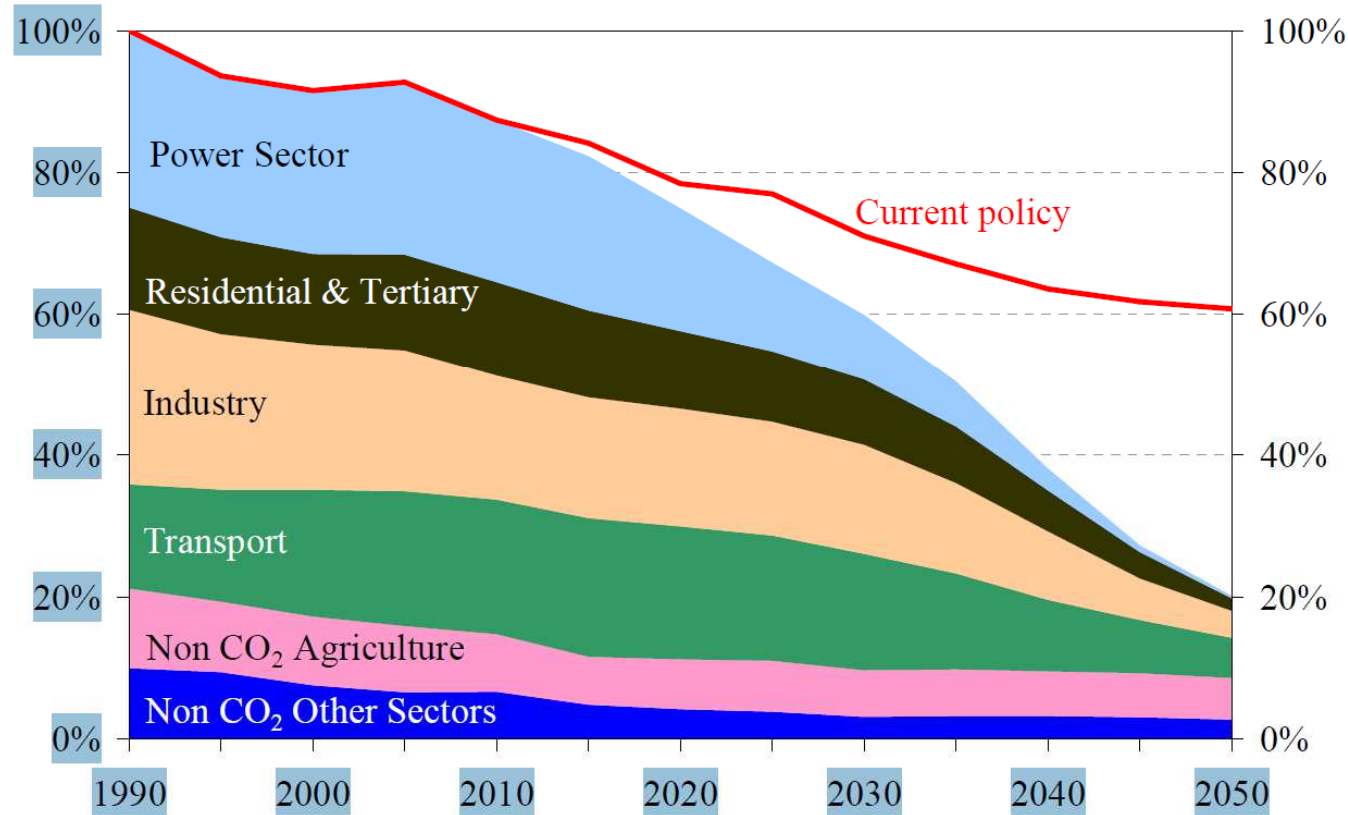
Figure 1: EU Natural Gas Consumption Scenarios to 2035 [Mtoe]*



*RM = Roadmap 2050; IEA = World Energy Outlook 2011; A2r, B1 and B2 = IIASA.

Uncertainties over energy sourcing: complementarity or eviction?

Figure 1: EU GHG emissions towards an 80% domestic reduction (100% =1990)



Source: European Commission (2011: 5)

‘A roadmap for moving to a competitive low carbon economy in 2050’

3. Three governance models for energy transitions

How might energy transitions occur?

What are the governance models?

- A) State driven policies (intervention)
- B) Market oriented policies (liberalisation)
- C) Geopolitically driven policy making (foreign policy)

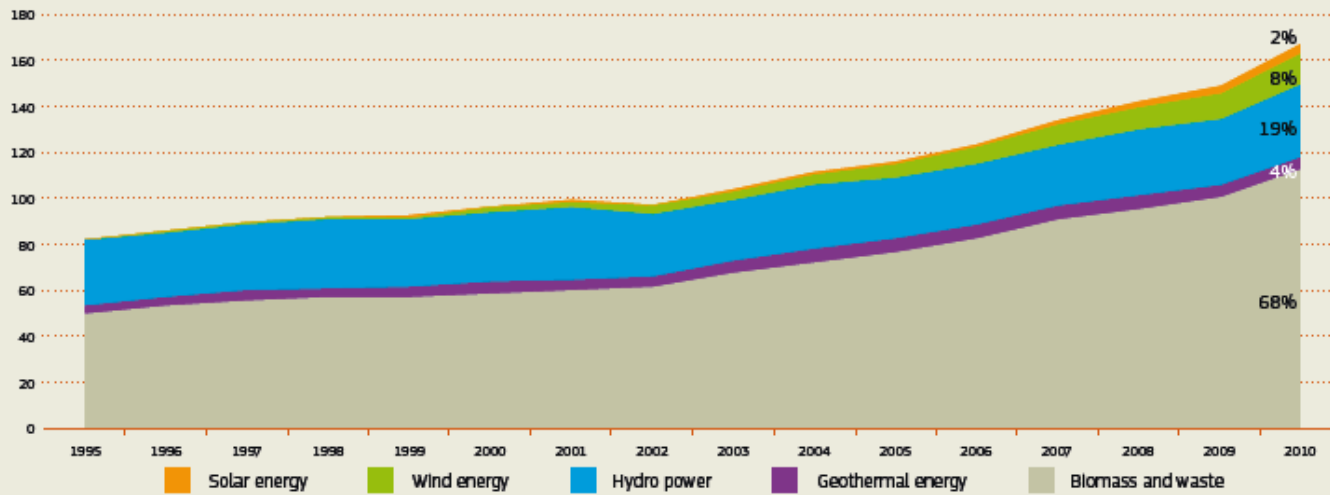
3A) State driven policies

domestic policies which are target based and deterministic because they involve the setting of prices or quantities:

feed-in tariffs set prices,
quota schemes set quantities
(such the UK Renewables Obligation).

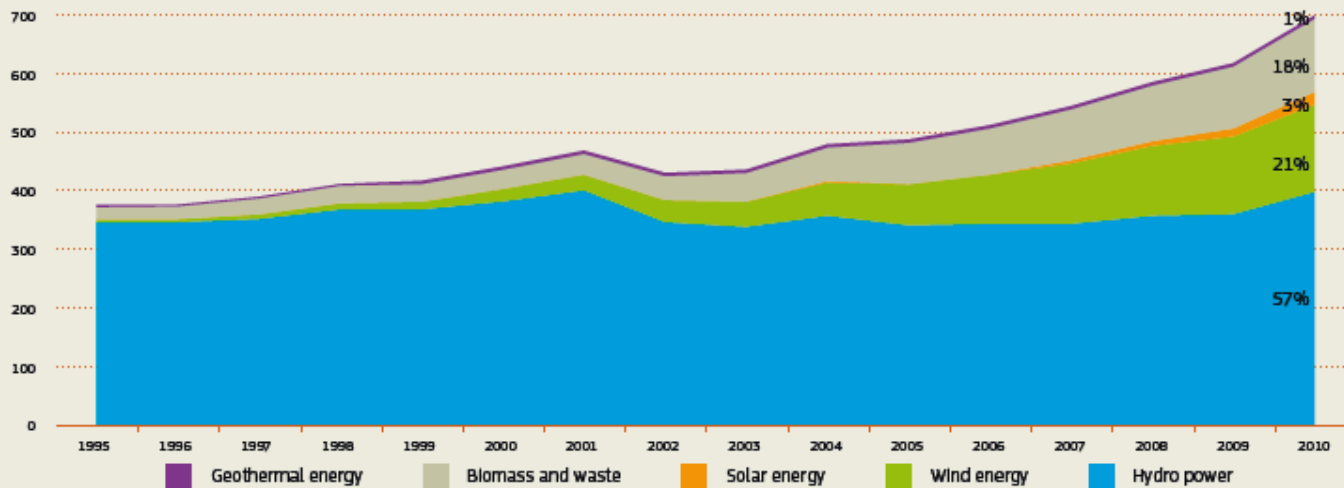
Case study: RES – wind power and photovoltaic

FIGURE 15 - EU-27 RENEWABLE ENERGY PRODUCTION (in Mtoe) (1995-2010)



Source: Eurostat

FIGURE 17 - EU-27 GROSS ELECTRICITY GENERATION BY FUEL (in TWh) (1995-2010)



Source: Eurostat

3B. Market oriented policies

EU liberalisation of electricity and gas markets –

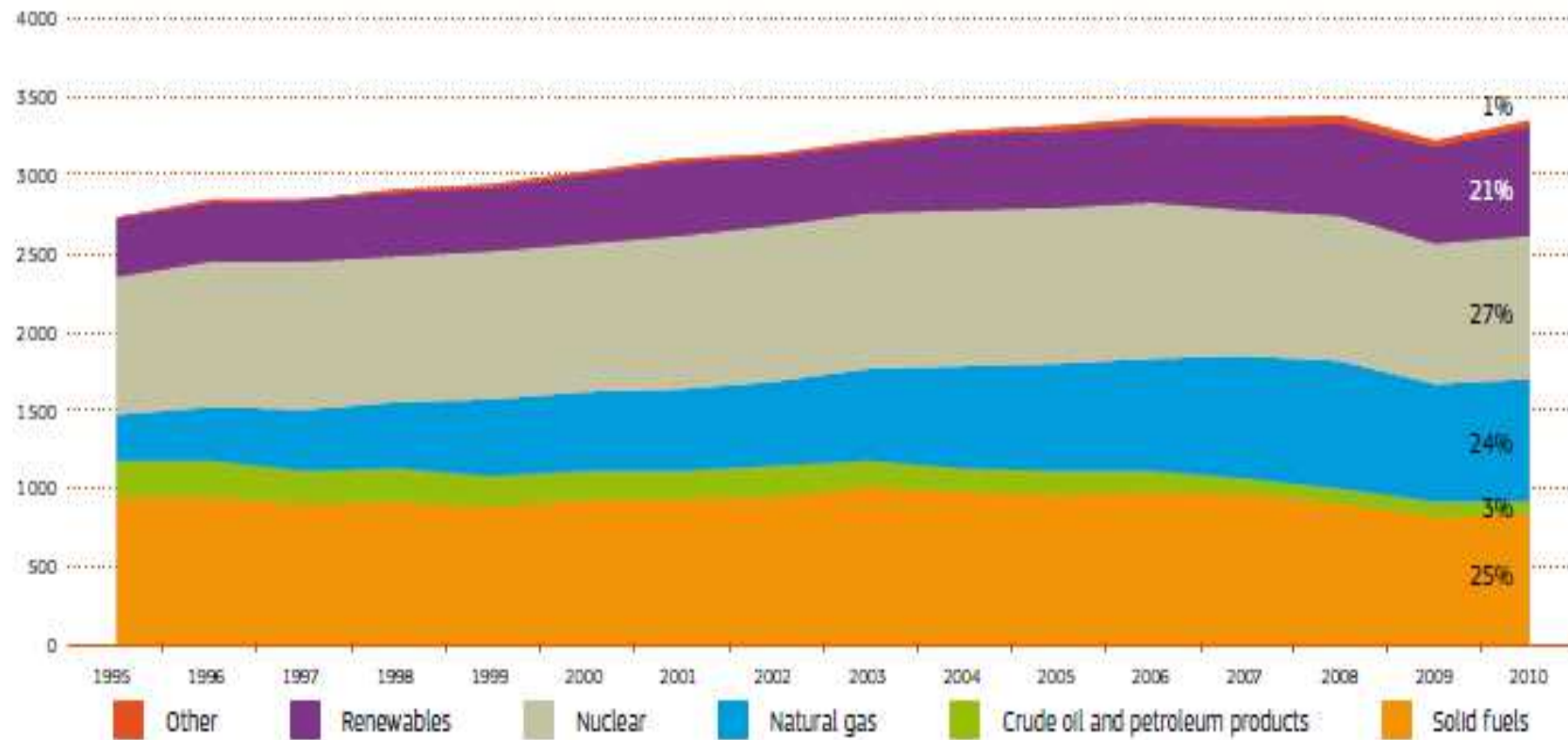
- open-ended and non-deterministic process
- e.g. no targets for change for energy sources or conversion technologies
- guided by market principles, notably undistorted competition.

Three 'packages' of EU energy market liberalisation:

1. 1990s - end legal monopolies in the electricity and gas sectors;
2. 2004: unbundling vertically integrated activities of utilities; introducing competition in wholesale generation market and retail supply, etc.
3. 2009: enforced unbundling (unconstitutional?); enhanced consumer rights; energy solidarity in emergencies.

Case study: electricity sector

FIGURE 9 - EU-27 GROSS ELECTRICITY GENERATION (in TWh) (1995-2010)



Source: Eurostat

3C) Geopolitically driven policy making

Energy geopolitics has largely taken the form of nation states pursuing economic objectives through energy sourcing policies,

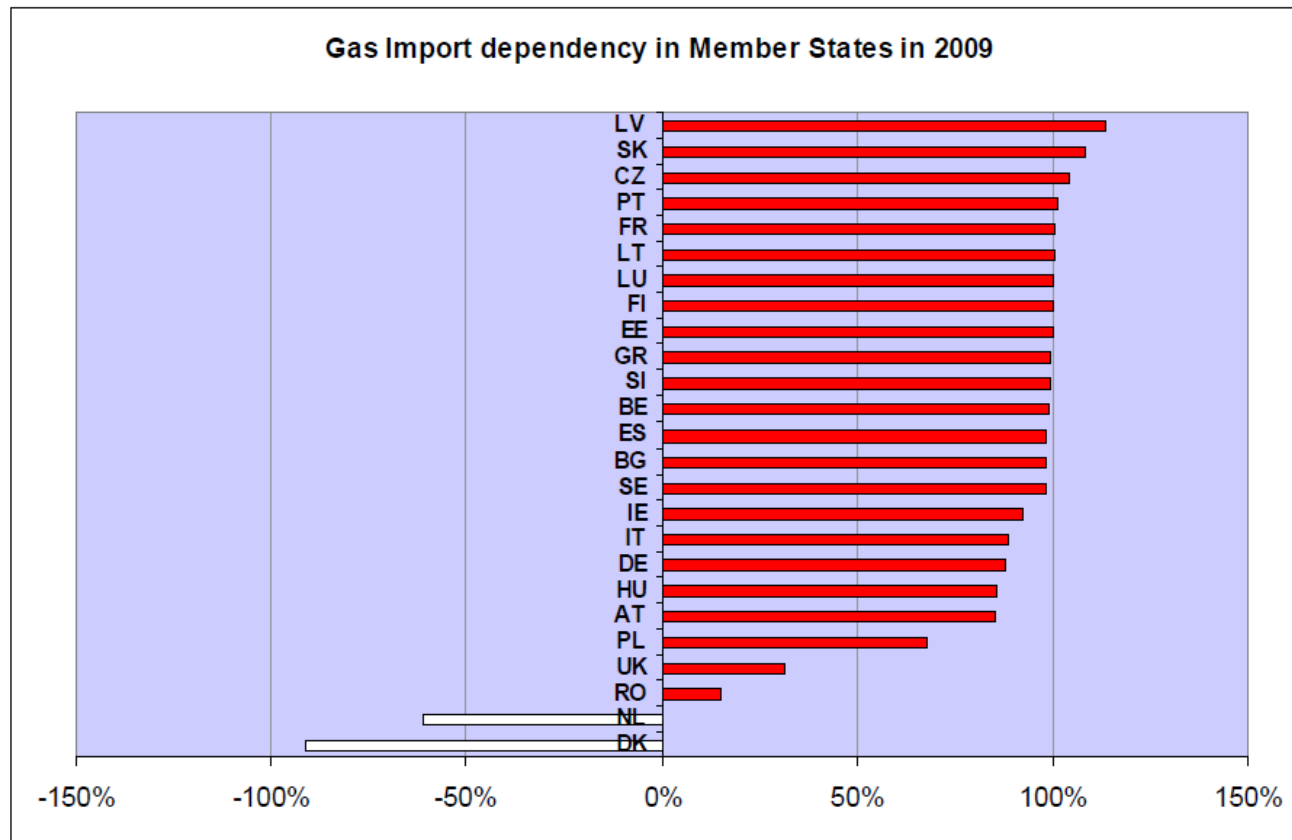
the key energy sources have been oil and gas;

example: bilateral contracts for supply of natural gas, such as those between Germany and Russia.

Energy security issues, related to sourcing dependencies, have led to greater European Community ambitions for 'solidarity' and formulation of common policies in relation to third party suppliers.

Case-study: gas

In 2009, Denmark and the Netherlands were the only gas exporting countries among the EU-27.



Values over 100% are possible due to changes in stocks. Source: Eurostat May 2011

Market Observatory for Energy

FIGURE 21 - IMPORTS OF NATURAL GAS IN THE EU

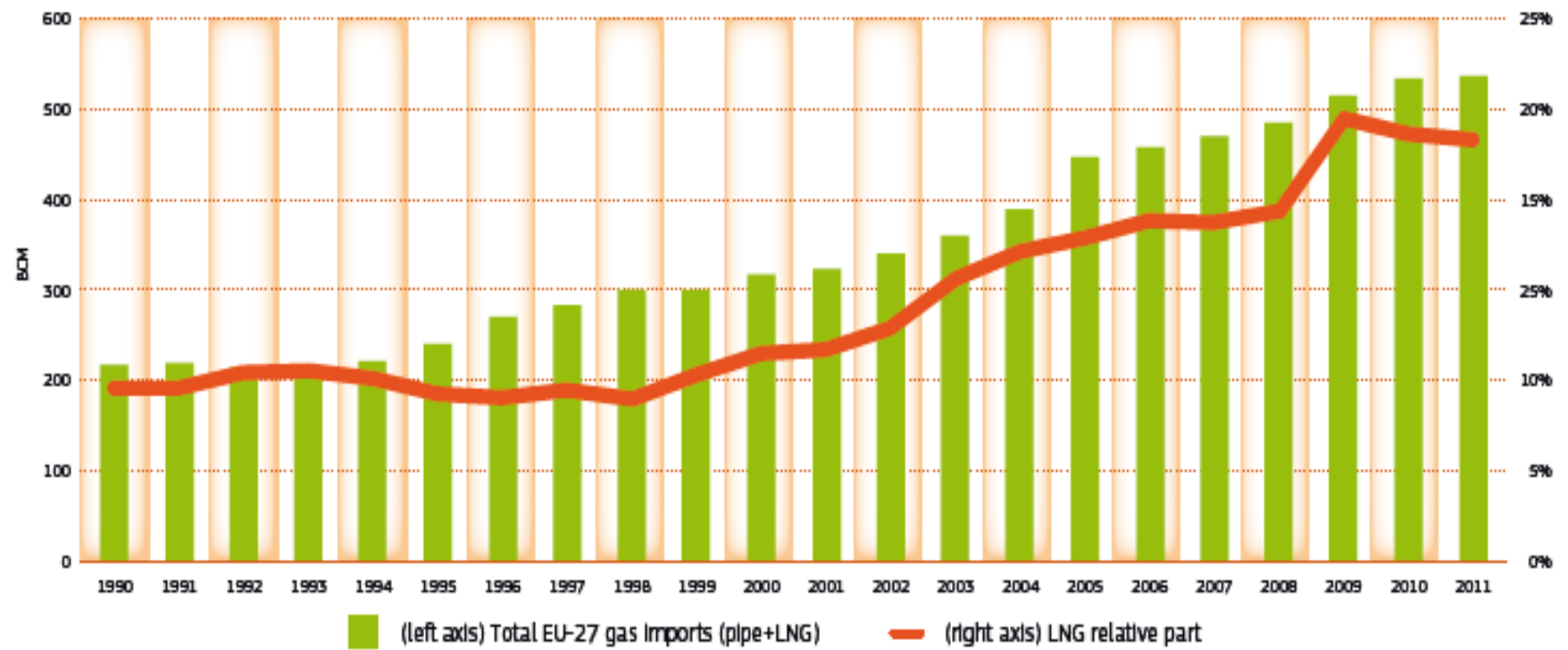
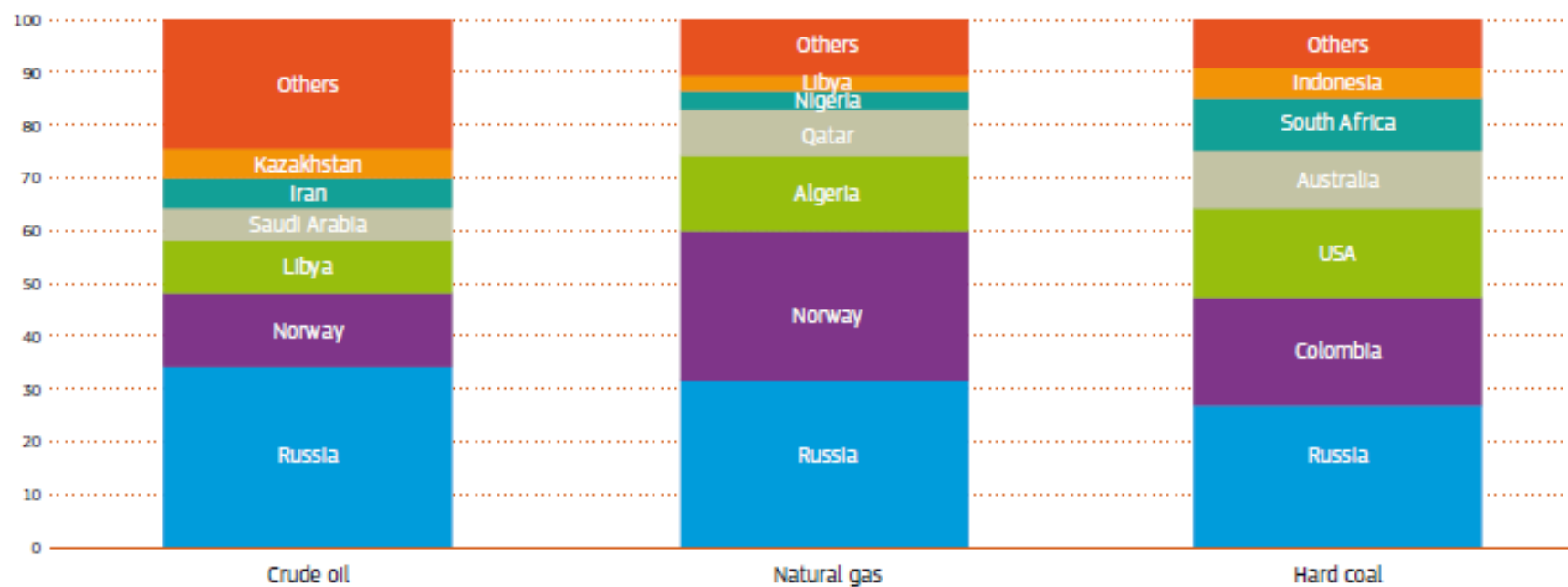


FIGURE 11 - EU-27 STRUCTURE OF IMPORTS OF FOSSIL FUELS (in %) (2010)



Source: Eurostat

3C) Geopolitically driven policy making

- Anxieties over the reliability of Russia as a partner, together with the Lisbon Treaty, have provided an opportunity for the EU to play a bigger role.
- On-going debates related to the intergovernmental v. supranational dimensions of EU energy geopolitics.

Milestones:

- Energy Charter Treaty – 1994
- European Neighbourhood Policy- 2004
- Energy Community Treaty – 2006
- European Commission (2013) ‘Roadmap EU-Russia Energy Cooperation until 2050’

Concluding observations 1

Transitions approach is not embedded within EU energy policy in any systematic way, even if found within climate and renewables energy policy announcements.

Rather energy security and, to a lesser extent, climate policy remain the main drivers.

The core problems of 'heroic' policy-making:

- ambitious sourcing targets mean high distance to targets;
- under-developed 'roadmaps';
- uncertain transition pathways.

Concluding observations 2

Tensions arising from the coexistence of the three modes of governance between:

- national and community levels of policy making;
- intergovernmental and supranational approaches;
- closed and deterministic v. open and nondeterministic governance modes.

A type 1 energy transition, based on a closed and deterministic set of policies, has an internal coherence to the extent that it is based on a pre-determined objective

But type 2 energy transitions, as enacted by current EU policy frameworks are – at best – more of a derived or secondary order consequence.

This makes their unfolding uncertain and unpredictable.

Thank you for your attention.

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