



# KdG South Campus May 04, 2017

## EU Energy & Climate Policy

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**Based on inter alia:**

Europe's electricity regime: restoration or thorough transition. *Int. J. of Sustainable Energy Planning and Management* 5 (2015) 57-68

Self-governance in global climate policy: An essay (2015), 52p.

Sustainability aspects of transitions to low-carbon electricity supplies. IAEA Technical Meeting, Amsterdam, June 21, 2016



# Overview

- 1. Energy: substrate of civilization**
- 2. EU energy policy**
- 3. EU climate policy**
- 4. Sustainable, low-carbon energy transitions**
- 5. How to Act?**

**Review of main findings**



# Energy: substrate of civilization



## Civilization

⌘ Paradigms  
[social construct  
policy, politics]

**ENERGY USES**

**=**

**TECHNOLOGY**

**×**

**ENERGY  
SOURCES**

## Substrate

From  
dense sources + poor technology  
to  
weak sources + strong technology

Lock-in  
⌘ existing infrastructure  
⌘ incumbent interests

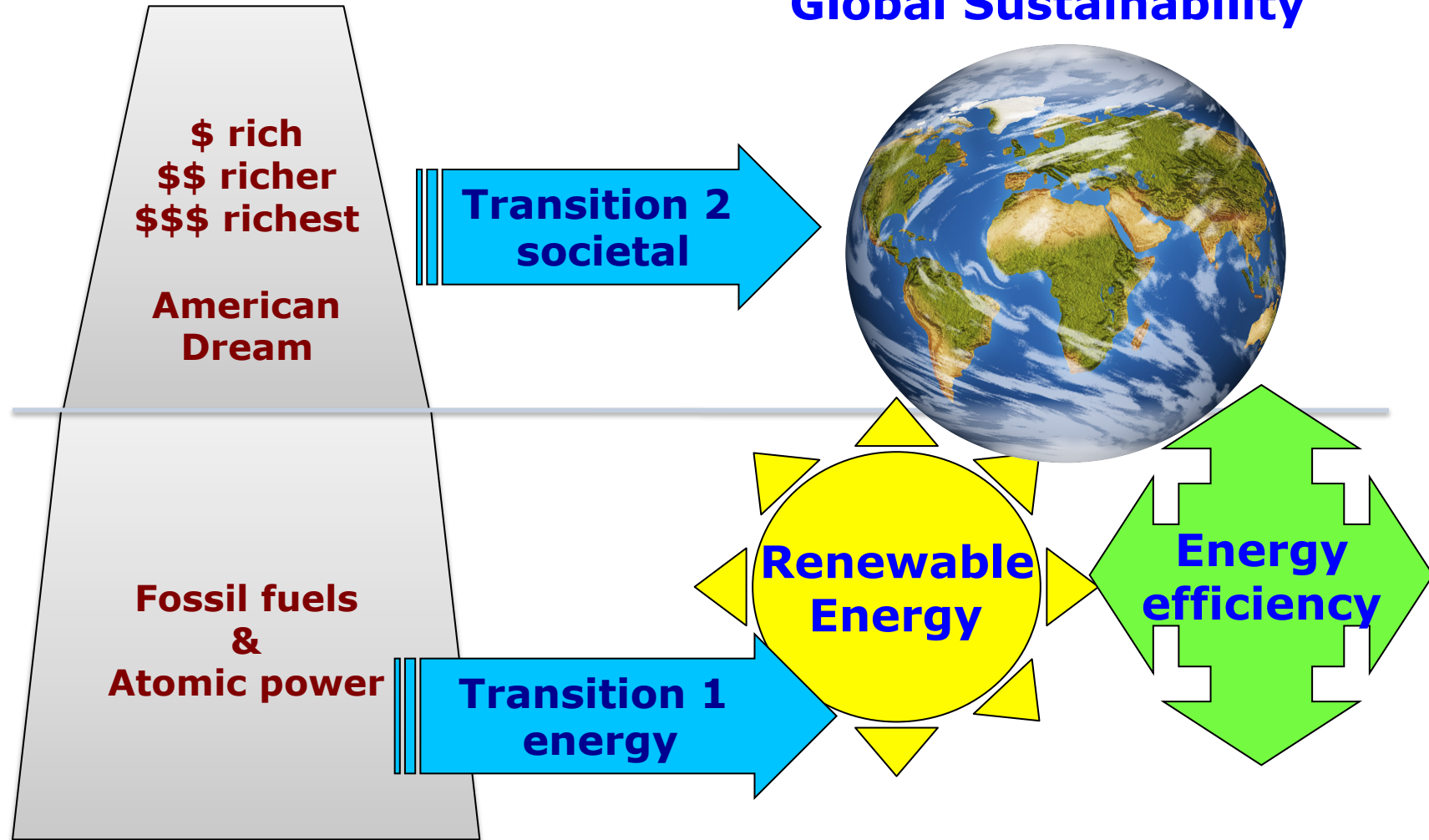
# Energy ⌘ Civilization: **Present** → **Future**



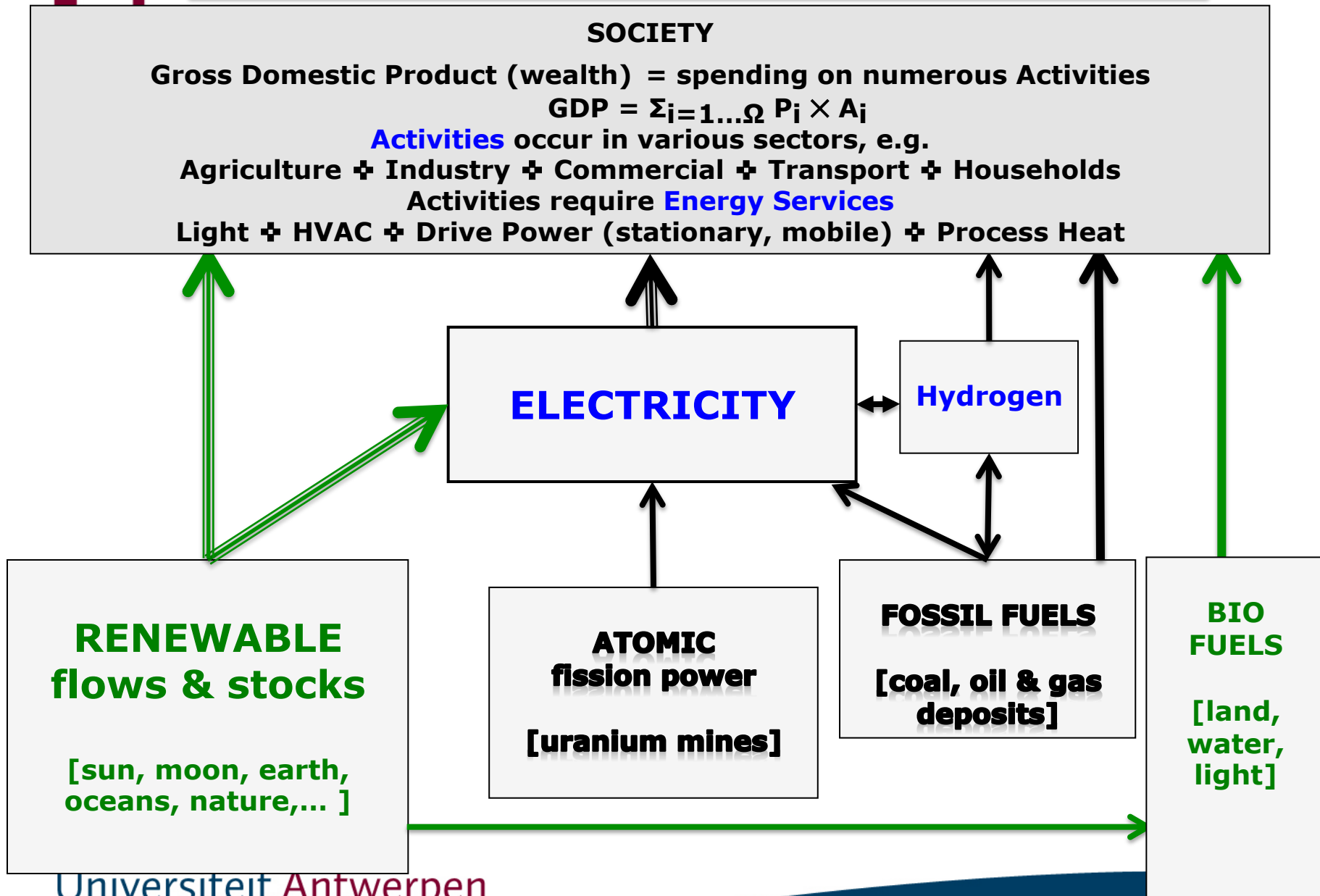
**Present**

**Future**

**Global Sustainability**



# Energy for Activities & Services in Human Societies





**1. People**  
  
≈  
**7 billion (2012)**

**2. Welfare**  
  
≈  
**72-85 trillion \$US /year (2012)**

**3. Fossil fuels**  
**≈ 11 billion toe /year (2013)**  
**coal, oil, gas**

**Gaseous litter**  
**≈ 36 billion tons CO<sub>2</sub> (2014)**

**4. Nuclear fuel**  
**≈ 2% of final energy use**

**Eternal waste problem**  
**Accidents**  
**Atomic weaponry**



# Post 1945 global [energy] developments

## 1. Fossil fuels

- Continuous growth in using coal, oil, natural gas
- In 1960s oil substituted for coal as energy 'kingmaker'

## 2. 'Atoms for Peace' (1953) launched civil atomic power

- Promise of overall clean energy transition
- Stranded by risks, accidents, high costs, unsolved dangers
- Technological progress limited or speculative

## 3. Science & Technology

- Exponential growth in reach & diversity
- Motor for renewable energy & efficiency solutions

## 4. Climate Change

- From unknown to decisive constraint on energy use
- Requires urgent transition to low-carbon energy systems

## 5. Sustainable Development (1987; Rio Summit 1992)

- Natural complement of sustainable energy
- Radical reversal (≠ old wine in new bags)



## EU energy role constrained by many factors

### **Coal** European Coal and Steel Community

- Dwindling competitiveness of European mines

### **Atomic Power** EURATOM

- USA control 1950-60s; IAEA (Int. Atomic Energy Agency)

### **Oil & Gas** Limited European sources; import dependent

- Geopolitics: role of Major Companies & Exporting Countries

### **Electricity** Not a source, but instantaneous flows created & used

- National systems, often state owned (France, Sweden, ...)
- Europe wide integrated grids: *technically* - more links needed; *economically* - Internal Energy Market Directive 1996-2003-2009, but more harmonization, regulatory capability, ... needed

### EU role squeezed by

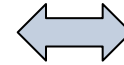
- . MS unwillingness to transfer authority on energy matters
- . Private business interests (oil&gas majors, electric corporates, ...)
- . Geopolitics by USA, OPEC, IAEA, Russia, ...



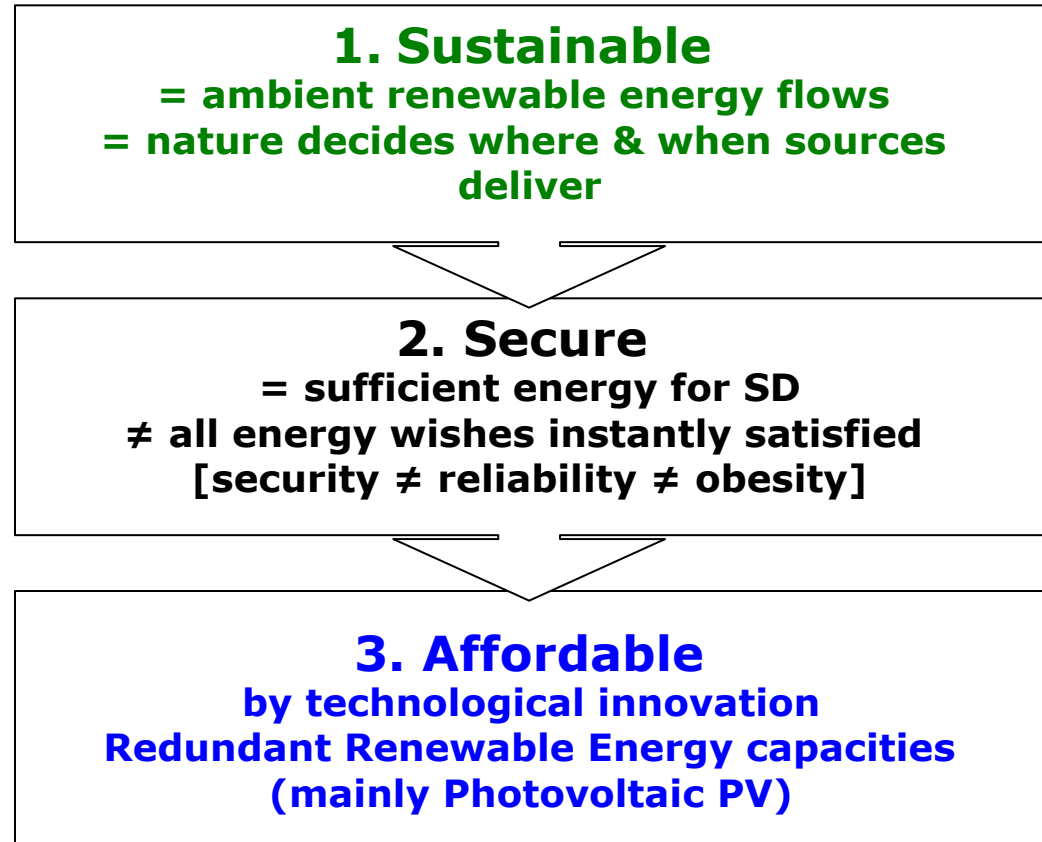
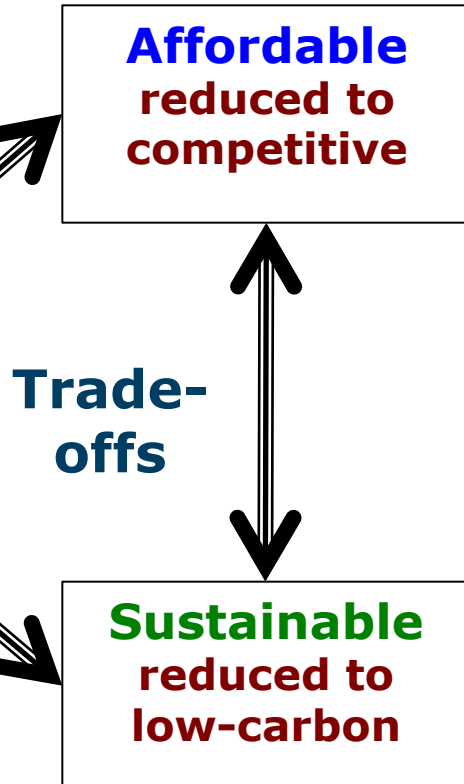


## Today's EU energy policy: wavering discourse

**Policy goals  
framed as  
TRILEMMA**



**Actual  
CASCADE**





## Global and EU climate policy

Climate and atmosphere protection = **global commons**

**UN Framework Convention on Climate Change (Rio, 1992)  
+ annual Conference of Parties (COP, since 1995)  
set the global context**

**EU: a willing world leader in climate policy, however:**

- **internally divided (e.g. Germany ⇔ France on Atomic power)**
- **poor foresight**
- **stronger world nations rule:  
USA at COP3 (Kyoto, 1997),  
USA + BRICS at COP15 (Copenhagen, 2009)**
- **corporate sector fences the stage (COP21; EU climate policy)**
- **EU's climate policy flagship – the Emissions Trading Scheme (ETS) – is a leaking boat**



## **Nipping distributed RE growth by large energy companies ☞ EU Commission**

- **Magritte Group (March 19, 2014) recommends:**
  - **Preference for 'mature renewables in the regular market'**
  - **Priority to the utilization of existing competitive power capacity rather than subsidizing new constructions**
  - **Restore the ETS as climate and energy policy flagship**
- **EU (April 9, 2014) New Energy State Aid Guidelines**
  - **Refrain the German Energiewende**
  - **Payments for UK coal power capacity**
  - **Subsidize planned atomic plant at UK Hinkley Point (£92,5/MWh during 35 years)**
  - **Since then, EU lost pace and leadership in Renewable Energy deployment**
- **Nuclear discourse molds fake reality**
  - **No real sustainability assessment of atomic power**
  - **Hides incompatibility of nuclear with wind & solar power**



# Sustainable Energy Transition

## Thorough ⇔ Shortfall

**1. Phase-out fossil fuels & nuclear**  
**Grow local, public RE (Renewable Energy)**

**2. Technological innovation:**

- smart energy efficiency
- PV, wind, batteries

**3. FIT (Feed-in tariffs): support innovations by specific RE technology**

**4. Superior RE technologies:**  
harvest mediocre (variable, stochastic, intermittent) RE sources → cheap powergen capacities → redundancy → congestion on the grids → need for independent public regulators to regulate power traffic

**5. Emulation by all countries is possible:** essential for global solution & sustainable development

**1. Keep fossil fuels for longer;**  
**Low-carbon = priority for nuclear + large-scale RE**

**2. Questionable innovation:** PWR? CCS? biomass combustion? large-scale hydro and tidal?

**3. Subsidies for use of fossil fuels and for nuclear building and R&D**

**4. Old power supply model:** all capacities on command → theory of optimal composed systems + pricing at marginal cost ⇔ zero marginal cost renewables make theory outdated, request new perspective & theory

**5. Emulation by poor countries:** Unlikely, impossible, not desirable because of risks and dependency



## Clarify position of nuclear power in the sustainable low-carbon energy transition

1. Nuclear fission power (today's technology):  
**Crucial sustainability criteria are not met**
2. Is announced GEN IV more sustainable?  
**Virtually certain: NO**
3. Can announced nuclear fusion bring salvation?  
**Perhaps, but NOT before 2050 (year of decarbonization done)**

**If we circumvent Sustainable Development imperatives and Sustainability Assessment results & consider only low-carbon aspect, questions remain:**

1. Are flow renewable and nuclear power generation compatible? **NO**
2. Is smart grid development compatible with unflexible large-scale power stations? **NO**
3. Is nuclear power economically competitive? **NO**



# Nuclear support = Political Mystery

**ATOMIC**  
**FAILURES**  
Technical  
Economic  
Safety  
Environment  
Democratic  
Sustainability

**PERCEPTION**



**E = mc<sup>2</sup>**  
**cheap**  
**necessary**

**Propaganda pin**



## Energy Transitions: Terms of Reference

- ❑ Develop and deploy cost-effective energy efficiency
- ❑ Develop and deploy the sustainable renewable energy supplies (flows and stocks) ⇔ **energy 'Pantheon'**
- ❑ Preference for secure and free local natural flows, harvested by prosumers, and complemented by centralized renewable plants
- ❑ Apply '*polluter pays principle*': incumbent systems are liable, not challengers building the sustainable future goal systems
- ❑ New electricity economics: most capacities not on command but stochastic and redundant (need for public interest regulation!)
- ❑ Kickstart the transition, even stranding existing assets
  
- ❑ **Redirection of nuclear capability & assets**
  - ❑ Phased exit of nuclear power generation
  - ❑ IAEA: exclusive focus on security and safety (proliferation, waste management)
  - ❑ Refocus and restructure nuclear R&D (EU, Euratom)



## Blow up the climate gridlock

=

All countries continuously improve three indicators:

1. Increasing share of RE
2. Decreasing fuel intensity
3. Progressing tax reform

### Matches

- ☑ SE4All (UN)
- ☑ Polluter Pays
- ☑ Fairness

**Rejects**  
emissions trading  
with offsets

Energy from sun,  
wind, water, bio

The only sustainable  
low-carbon option,  
when for all people  
affordable

Prosperity  
with less  
fuels

Lean energy systems  
are affordable by all

Energy/carbon  
billing

Dosed price pressures,  
adjusted to diverse  
conditions  
New activities, practices  
New infrastructures

Budget/tax reform

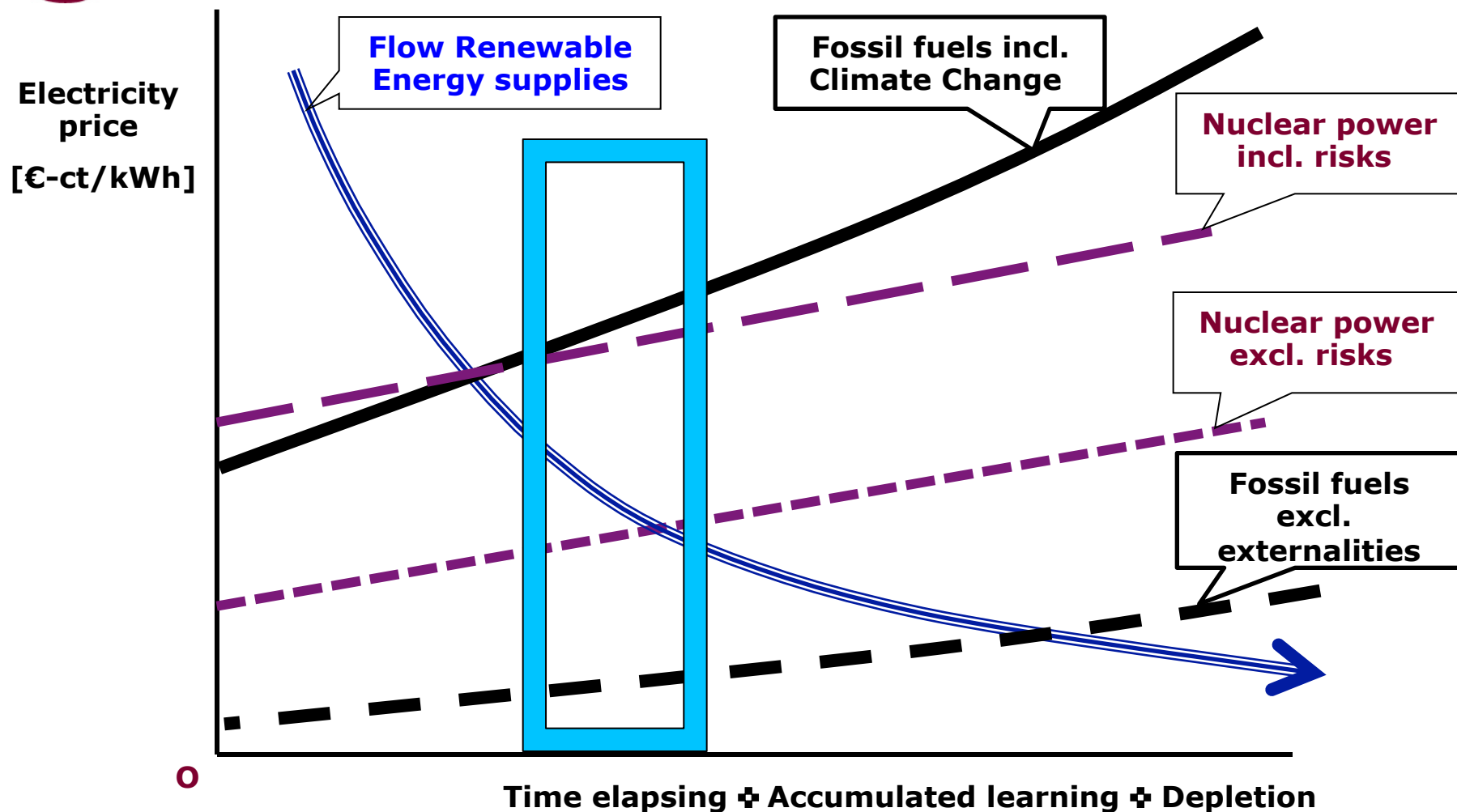
**Necessary thrust**





# Failing politics ⇔ decisive technological-economic reality

Electricity prices considering learning effects, externalities, risks





# Review of main findings (1)

## 1. Energy: substrate of civilization

- Energy transition spearheads sustainable development
- Two interlaced transitions: → renewables ⇄ → electricity
- Only two low-carbon energy sources: renewables/nuclear
- Energy use causes litter, risks, deterioration of climate, and many more challenges

## 2. EU energy policy

- Context set by five major post-1945 developments
- Constrained EU energy role
- Wavering 'trilemma' discourse ⇄ actual cascade

## 3. EU climate policy

- EU world leader? More talk than walk
- Since 2014: nipping distributed renewable energy growth



## Review of main findings (2)

### 4. Sustainable, low-carbon energy transitions

- **Thorough** ⇔ **Shortfall**
- **Nuclear power not sustainable & not compatible with wind and solar power deployment → mystery of nuclear support**

### 5. How to Act?

- **Terms of reference for urgent energy transition**
- **Blow up the climate gridlock**
- **Decisive technological-economic reality**