Security of sustainable energy supplies

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EASAC includes 29 National Science Academies from EU, NO, CH and UK (plus ALLEA and Academia Europaea)

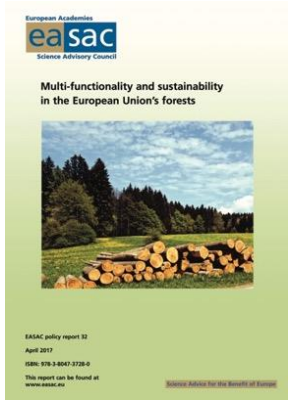
Mission - independent, science-based advice to EU policy makers (EC, EP, MS)

Programmes: Energy, Environment, Bioscience and Public Health

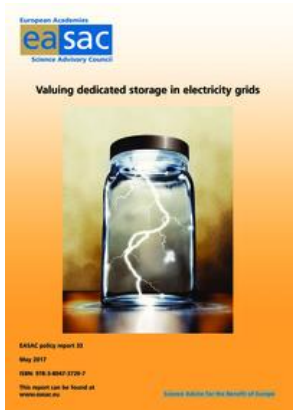
EASAC works inside and outside EU as affiliated network of IAP

IAP has academy networks in Europe, Africa, Asia, and the Americas

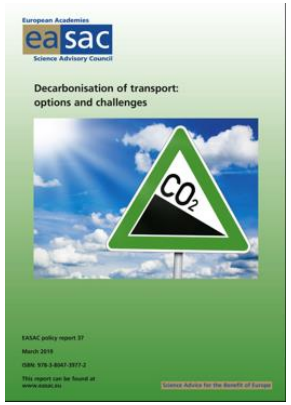
Recent EASAC energy reports



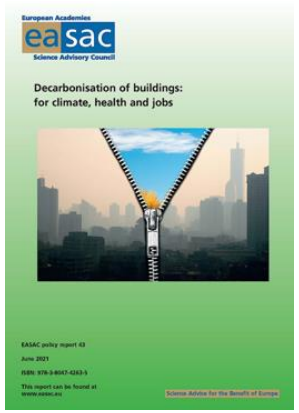
Forests



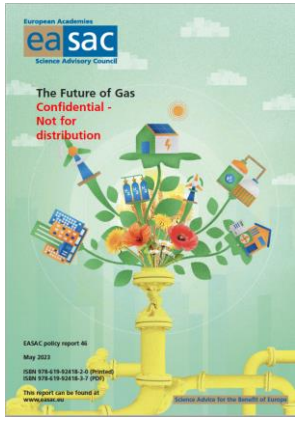
Storage



Transport



Buildings



Future of gas

Security of sustainable energy supplies

on-going

Energy security – EASAC is working on this !

"uninterrupted availability of energy supplies at affordable prices"

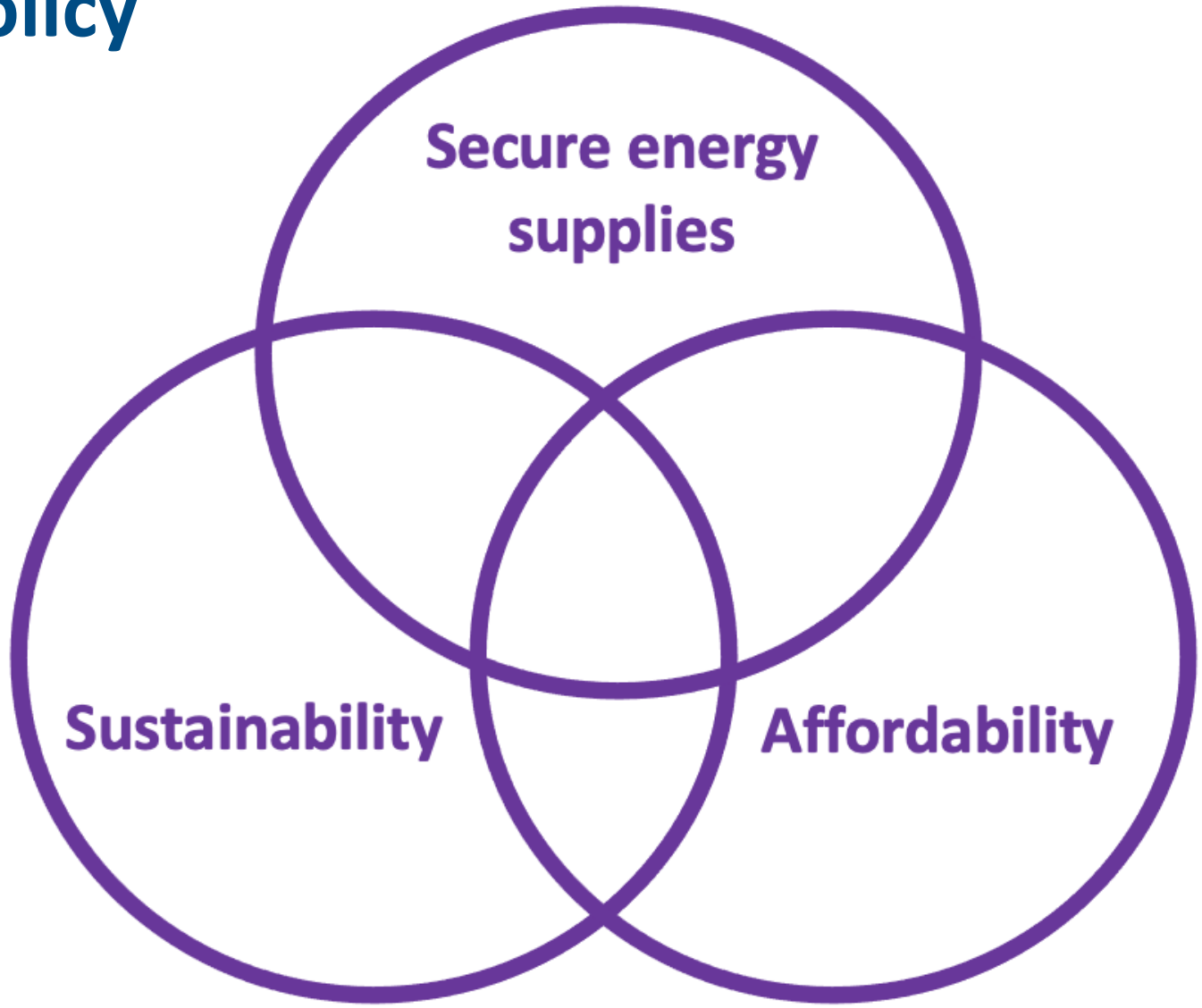
Volatile geopolitics: malicious attacks and cyberattacks on infrastructure, supply chains, and trade

Climate change: extreme weather damage, increased cooling demand

Key policy options:

- Phase out fossil fuels, use sustainable energies
- Strengthen energy infrastructure
- Produce energy systems and fuels domestically

EU energy policy



WHY SWITCH to Sustainable energy supplies ?

ENERGY SUPPLY BENEFITS

1. **Reduced dependence on imports** of fossil fuels
2. **Less conflicts** in international energy markets
3. **Less supply interruptions -** distributed systems are less vulnerable
4. **Citizens are empowered** by renewable energy, and it helps peace building

WIDER BENEFITS

1. **Reduced risks of extreme weather damage**, due to lower GHG emissions
2. **New investment opportunities, green jobs, and lower energy costs**

REPowerEU (2022) - Secure, Affordable, Sustainable energies

Increase target of **renewable energy** from 40% to **45%** by 2030

Become independent of **Russian** fossil fuels by 2027

Increase target of **energy savings** from 9% to **13%** by 2030

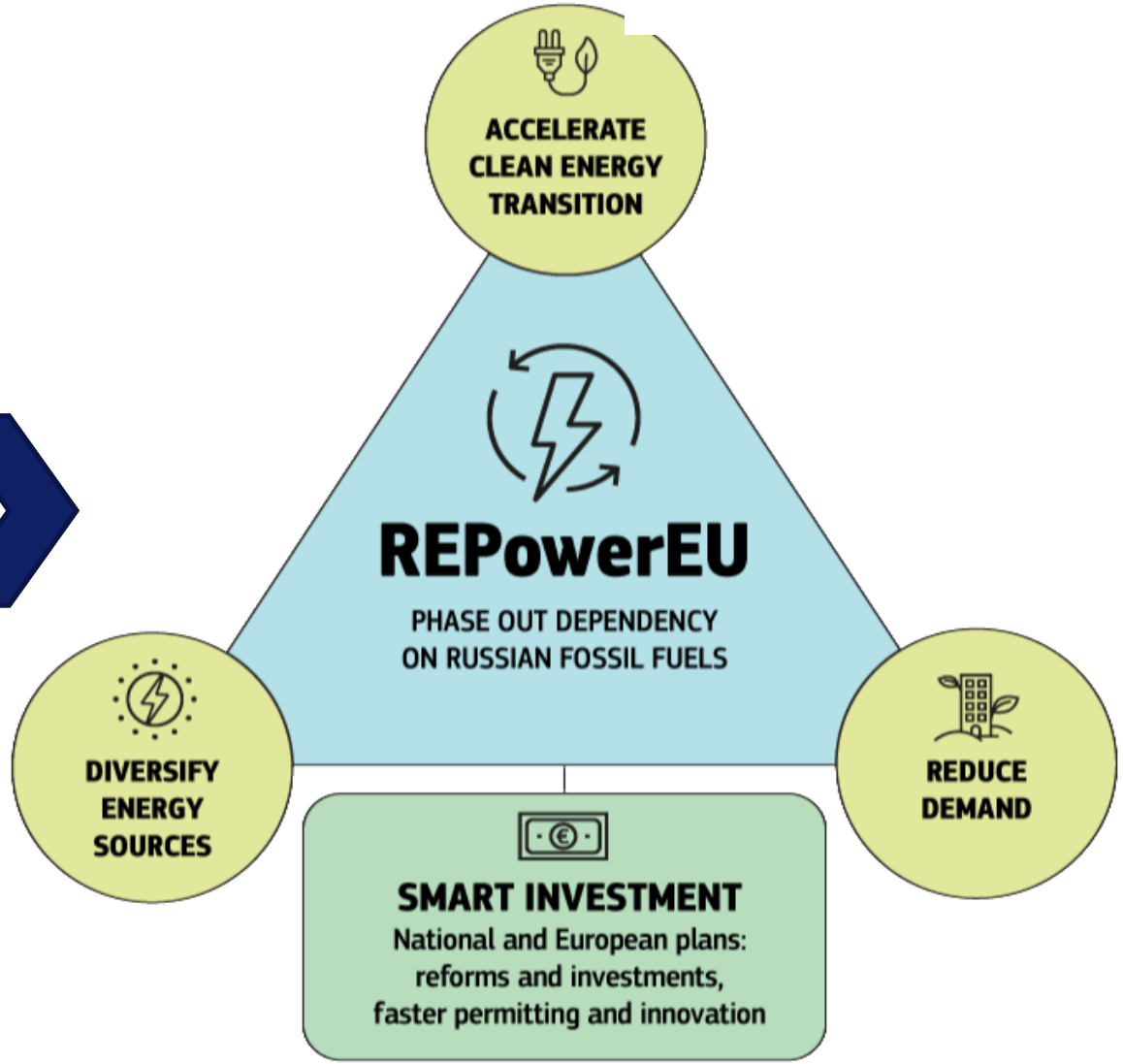


Image: European Commission

BUILDINGS – renovate and ban gas boilers

1. U.K.
Ban on gas and oil boilers in new homes from 2025.

2. BELGIUM
Ban on fossil heating systems in newbuilds from 2025 in Flanders.

3. NETHERLANDS
Ban on new natural gas connections since 2018.

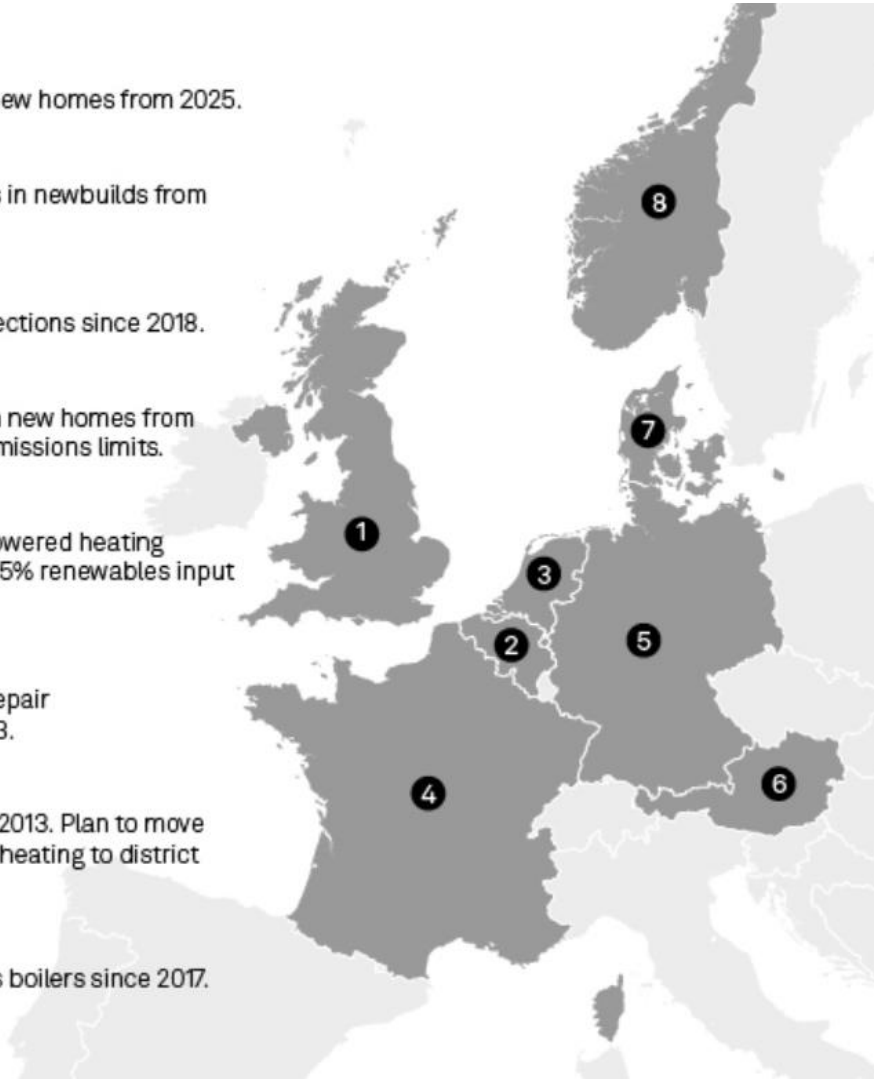
4. FRANCE
De-facto ban on gas boilers in new homes from 2022 due to introduction of emissions limits.

5. GERMANY
De-facto ban on new fossil-powered heating system via a requirement of 65% renewables input from 2024.

6. AUSTRIA
Sale of new gas boilers, and repair of old ones, banned from 2023.

7. DENMARK
Ban on new gas boilers since 2013. Plan to move 50% of households using gas heating to district heating by 2028.

8. NORWAY
Ban on installation of new gas boilers since 2017.



S&P Global

- **Building renovation rates must rise from 1 to 3% pa**
- **GWP of methane** (20 yr) is >80 times CO_2.
- EU has **65 million** gas boilers
- **New gas boilers** to be banned in 8 European countries

Heat pumps and district heating are efficient alternatives

MOTORISED TRANSPORT – 3 ways to improve energy security

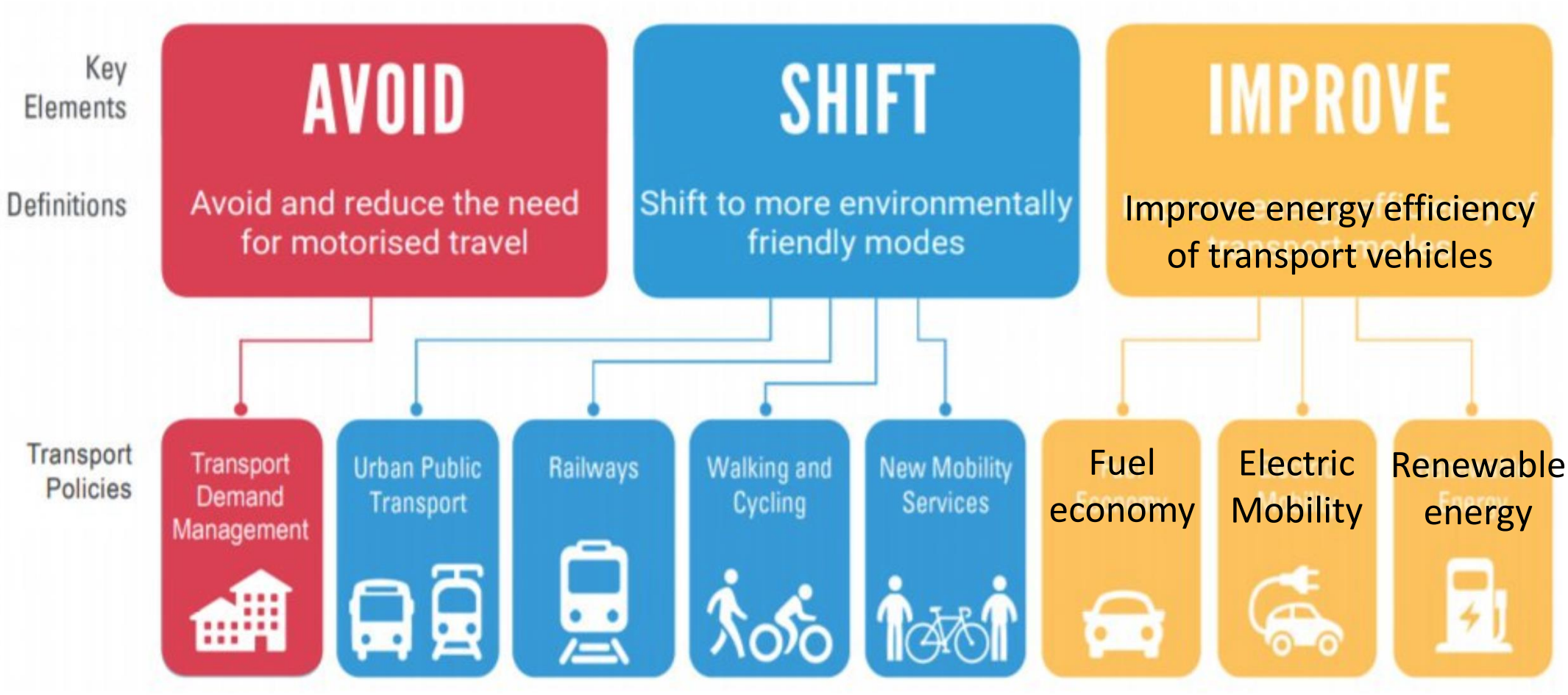
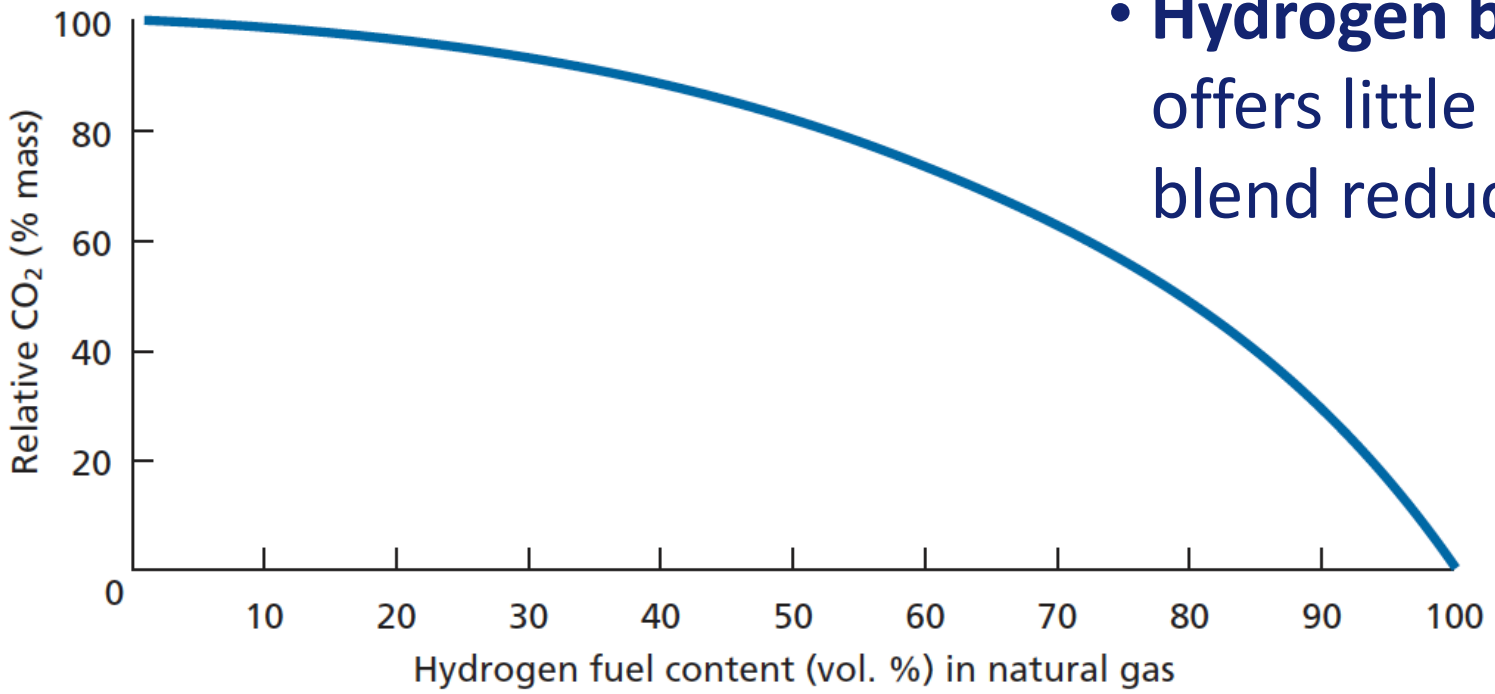


Diagram from SLOCAT

INDUSTRY – use Hydrogen and e-fuels wisely, they will be costly

- **Use sustainable H_2 in hard-to-electrify applications** (transport, steel)
- **Monitor hydrogen leaks** - Global Warming Potential (20 yr) is ~30 times CO_2



- **Hydrogen blended with natural gas** offers little GHG reduction (10% blend reduces GHG by ~1%)

Siemens

SOLID BIOENERGY – resources are limited, so prioritise

- **EU Forestry strategy**: do not burn whole trees
  - **EU Forestry biomass cascade**: use wood for high economic & environmental values – construction timber, engineered wood..
    - **Do not replace gas boilers with biomass boilers** unless they burn biomass wastes

Diagram from European Commission

ENERGY POVERTY : “Polluter pays” is not affordable for vulnerable groups / households

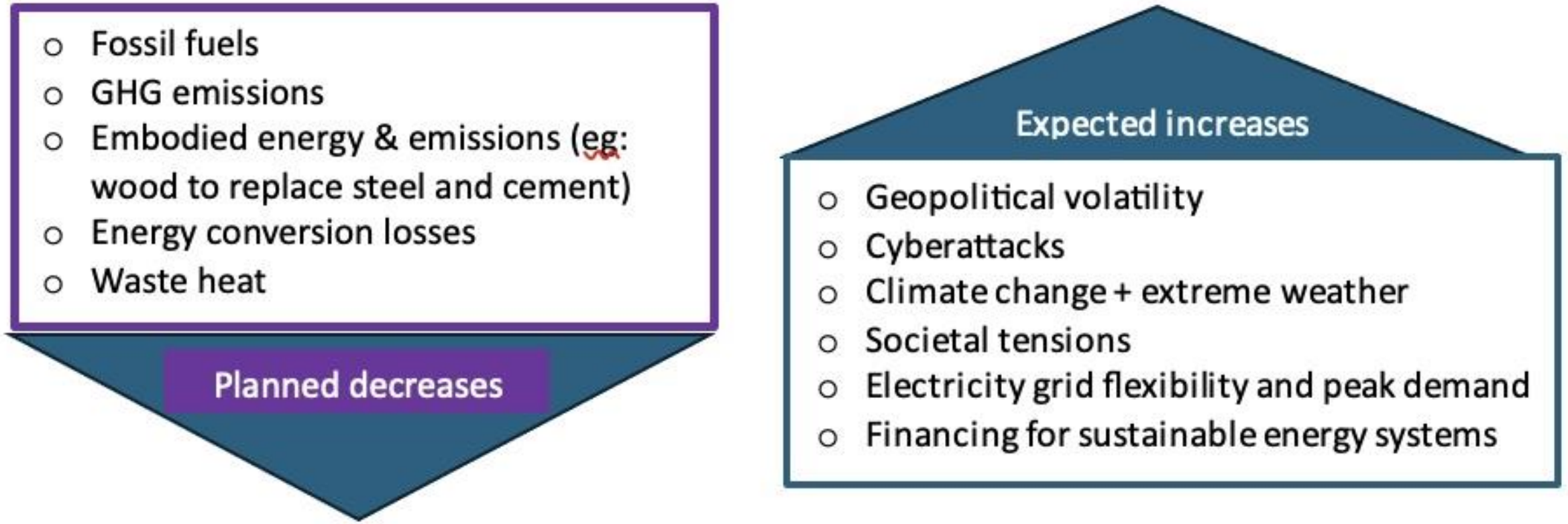
Price increases incentivise energy saving

BUT, vulnerable groups and households need support (eg EU Social Climate Fund):

(i) **for investing in energy efficiency** to reduce energy needs

(ii) **To pay their energy bills**

Future energy scenarios



System and technology investments

- Cyber protection
- Electrification of buildings, industry, transport
- Variable renewable electricity generation
- Electricity infrastructure - strengthening and interconnections
- Electricity and heat storage
- Green hydrogen and e-fuels
- Nuclear generation (large scale and SMR)
- Carbon capture and storage (CCS)
- Circular economy

Energy market design

- Backup electricity generation (for long dunkelflauten)
- Demand response with time of use tariffs
- Energy market integration

Supplier diversification and coordination of fuel purchasing

- Fossil and renewable fuels
- Enriched uranium for use in nuclear power generation

Military and extreme weather protection

- Critical energy infrastructure

Energy security policy priorities (will differ between countries

Concluding remarks for EU policy makers

- **Energy security – phase out fossil fuels**
  Invest in energy efficiency, renewables, and infrastructure.
  Prepare for volatile geopolitics with more cyber and malicious attacks.
- **Sustainability (reduce GHG emissions)**
  Global leadership by Europe, and help others to follow
  Sustainable energies will bring climate benefits for all
- **Affordability - prioritise proven, low-cost options (EE and RES)**.
  Communicate and engage with consumers to reduce energy demand.
  Help strategic industries and vulnerable groups (reduce energy poverty)
- **Science (evidence)-based EU policies** help to build investor confidence

Thank you!