Energy security - Emergency response for oil in IEA countries

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On no one quality, on no one process, on no one country, on no one route, and on no one field must we be dependent….. Safety and certainty in oil lie in variety, and variety alone.

Winston Churchill

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ENERGY SECURITY

ES – Definitions

"[…is the] uninterrupted availability of energy sources at an affordable price" *IEA*

"[…is the] effective management of primary energy supply from domestic and external sources, reliability of energy infrastructure, and ability of energy providers to meet current and future demand" *WEC*

"Adequate energy supplies at reasonable and stable prices to sustain economic performance and growth…. assess[ed] in terms of availability, accessibility, acceptability and affordability" *APERC*

"Sustainable production and use of energy at reasonable costs in order to facilitate economic growth and improve the quality of people's lives" *WB*

"Continuous availability of energy in varied forms, in sufficient quantities and at reasonable prices" *UNDP*

"Secure adequate energy at reasonable prices necessary for the people's lives, and economic and

ES - How it is measured

Global Energy Institute

- Global fuels
- Fuel imports
- Energy expenditures
- Price and market volatility
- Energy use intensity
- Electric power
- Transportation sector
- Environmental

World Energy Council

- Security of supply and energy delivery
  - Diversity of primary energy supply
  - Energy consumption in relation to GDP growth
  - Import dependence
- Resilience
  - Diversity of electricity generation
  - Energy storage
  - Preparedness (human factor)

APERC (not exhaustive)

- Internal
  - International agreement oil emergency
  - Local stability
  - Piracy threat
  - Primary energy diversity
  - Ease of doing business
- External
  - Chokepoint
  - Export stability
  - Piracy threat
  - Oil export over GDP

ES – Temporal dimension

- **Short-term energy security** focuses on the ability of the energy system to react promptly to sudden changes within the supply-demand balance
- **Long-term energy security** deals with timely investments to supply energy in line with economic developments and sustainable environmental needs

Lack of energy security is thus linked to the negative economic and social impacts of either physical unavailability of energy, or prices that are not competitive or are overly volatile

Source: IEA

SUPPLY RISKS

SR– Many risks

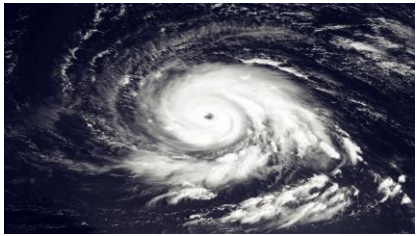
Social unrest

Sabotage

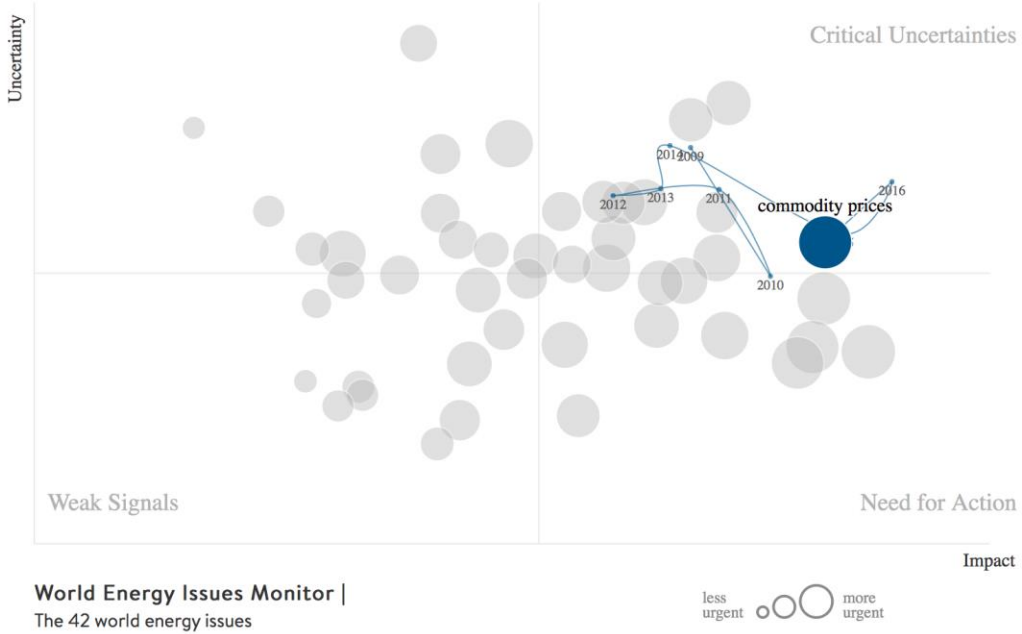
Accident

Cyber

Climatic events

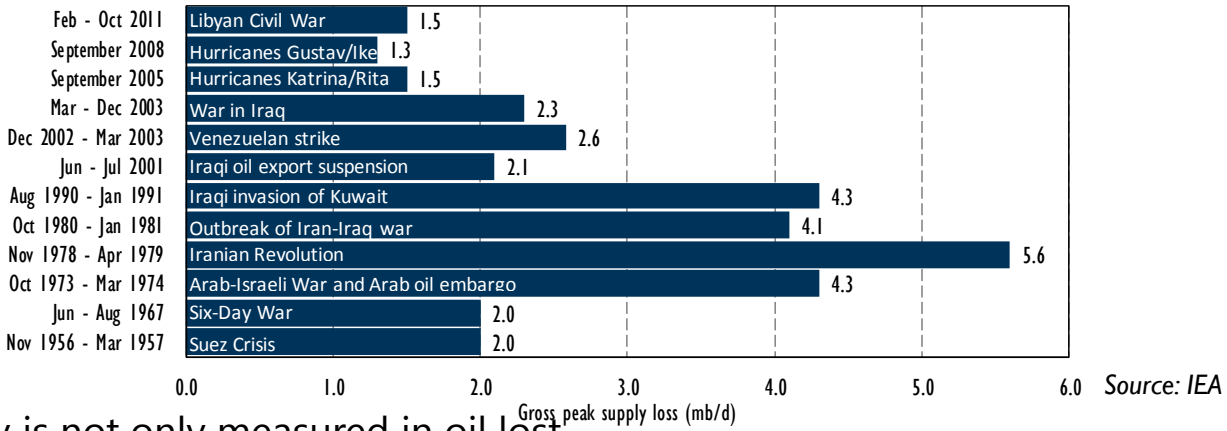


SR–Energy issues monitor 2009-2017



Source: WEC

SR– Major oil supply disruptions

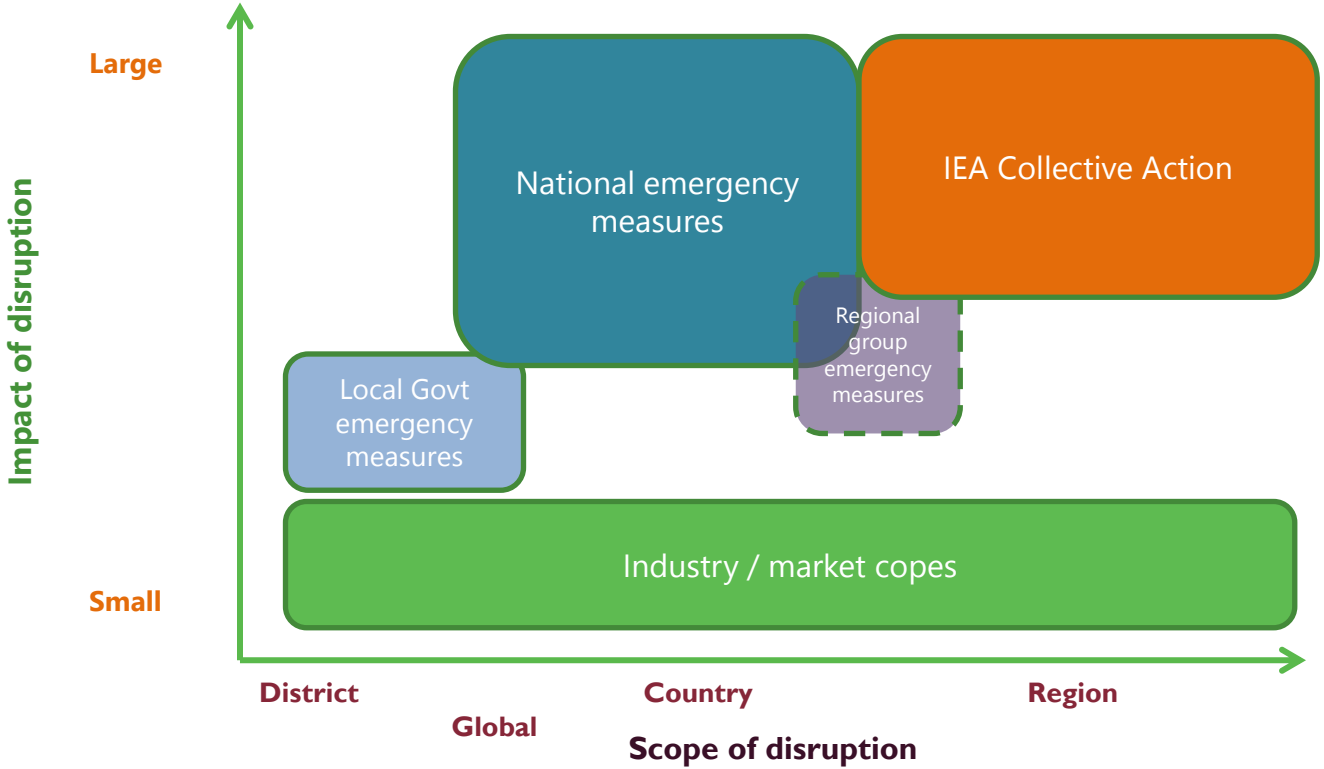


Source: IEA

- Disruption severity is not only measured in oil lost
- Other factors are key in evaluation:
  - Commercial inventories, duration, spare capacity, lost crude quality, seasonality, logistics etc.
- Each disruption must be assessed individually – market context is critical

COLLABORATIVE RESPONSE

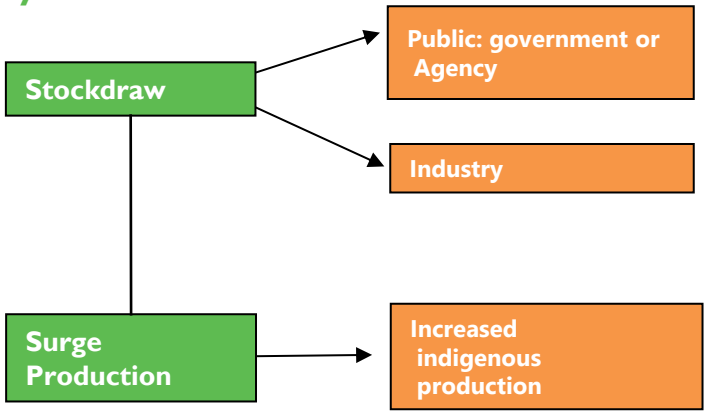
CR–Who deals with an oil disruption?



Source: IEA

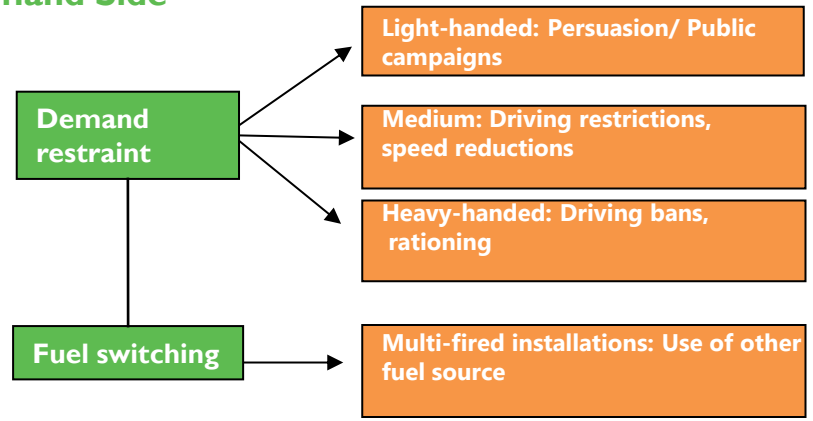
CR–IEA Emergency Response

Supply Side



Adding liquidity to the market with extra barrels

Demand Side



Constraining demand to rebalance market

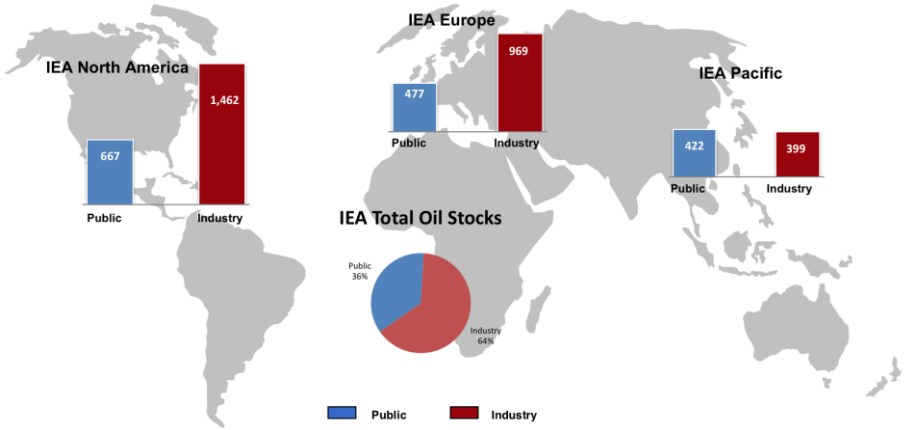
Source: IEA

SUPPLY-SIDE MEASURES

SSM - Measures

- Stock-draw
  - Most commonly used & most effective measure
  - Obligated to hold at least 90 days net-imports
  - 4.2 billion barrels: 1.5 public stocks for emergency
- Production Surge
  - Very limited for non-OPEC
  - Little or no spare capacity outside OPEC
  - Good oilfield practices limit extent of short-term surge

Total oil stocks in IEA regions

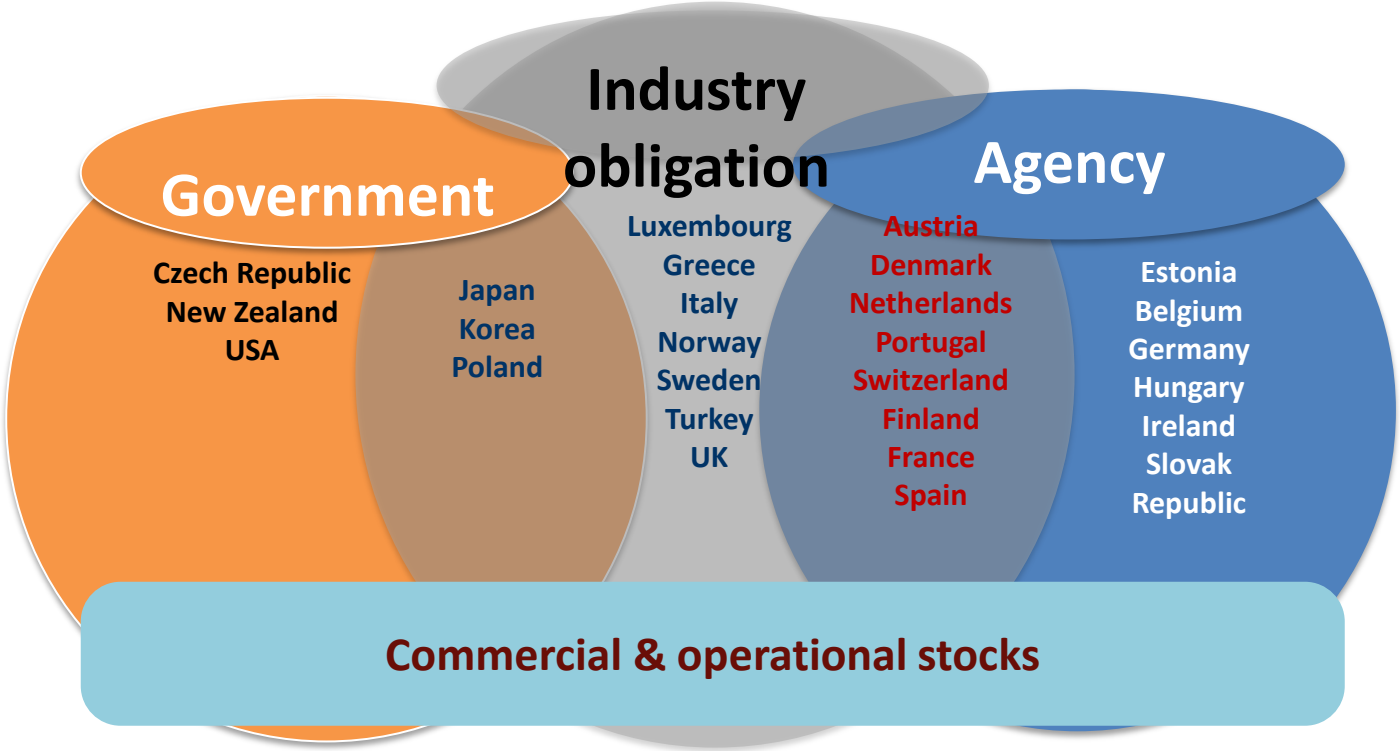


Source: IEA

SSM - Stockholding systems

- Regimes vary across IEA countries
  - Reflect differences in market structure, geography & national policy
  - EU members need to comply with both IEA & EU systems (but same stocks can be used for both obligations)
  - Two general approaches:
    - Industry (compulsory & commercial stocks)
    - Public stocks (held exclusively for emergencies):-
      - Government stocks (financed by government budget)
      - Agency (held / controlled by public bodies including industry owned / operated)

SSM: Stockholding Options



DEMAND SUPPLY MEASURES

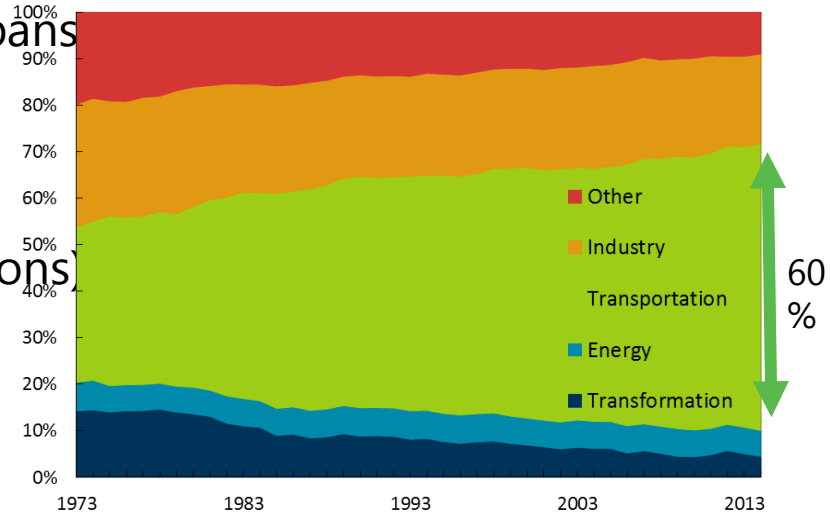
Demand side measures

- Demand restraint
  - Most policies focus on transportation sector
  - Some potential in heating
- Fuel switching
  - Significant decline since 1970s
  - Virtually no potential for short-term switching in transport

DSM - Demand restraint

- Car- and ride-sharing
- Driving restrictions (e.g. speed limits, driving bans)
- Multi-fuel light-duty vehicles
- Pricing and parking policies
- Eco-driving
- Public transit (service upgrades & fare reductions)
- Employer and institutional measures
- Freight trucking…
- Fuel allocation (most extreme)

OECD Oil consumption by sector 1973-2014

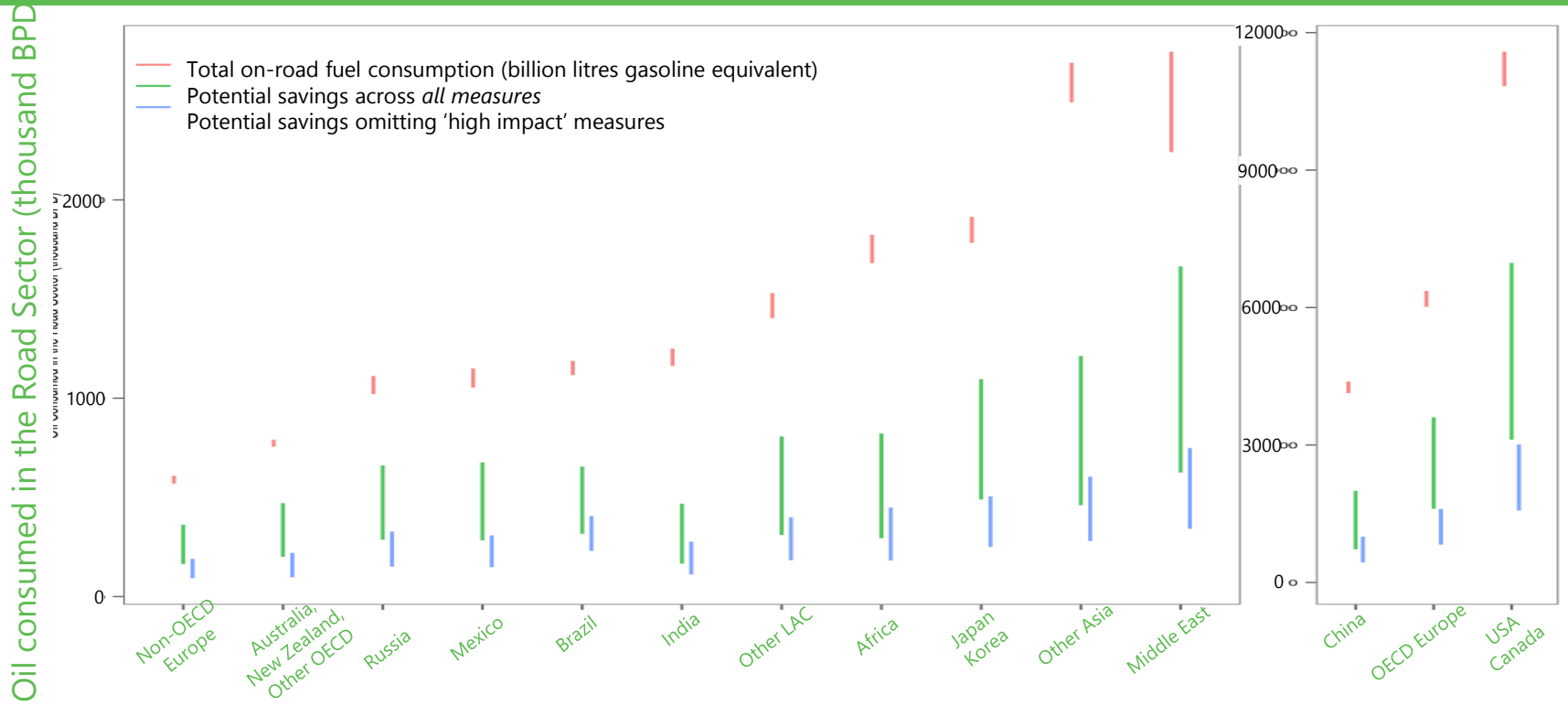


Source: IEA

DSM - Demand restraint

- Short-term supply disruptions require different responses and measures than long-term energy savings promotion
- Oil price signals can help consumers respond to a disruption and subsidies distort price signals
- Rationing should be a last resort
- Most measures require advanced planning
- "Pull" measures preferable to "push" measures

DSM: Regional differences



DSM - Demand restraint - Example

Measure (note that different measures can overlap, so savings cannot be added)	Potential range of oil savings
Car / ride sharing	~ 15%
Driving restrictions - light	~5-7%
Driving restrictions - heavy	~25% - 34%
Ecodriving	~4% - 10%
Freight / logistics	~1% - 4%
Employer / institutional measures	~1% - 4%
Public transit / mode shift	~1% - 2%

DSM: Building a policy

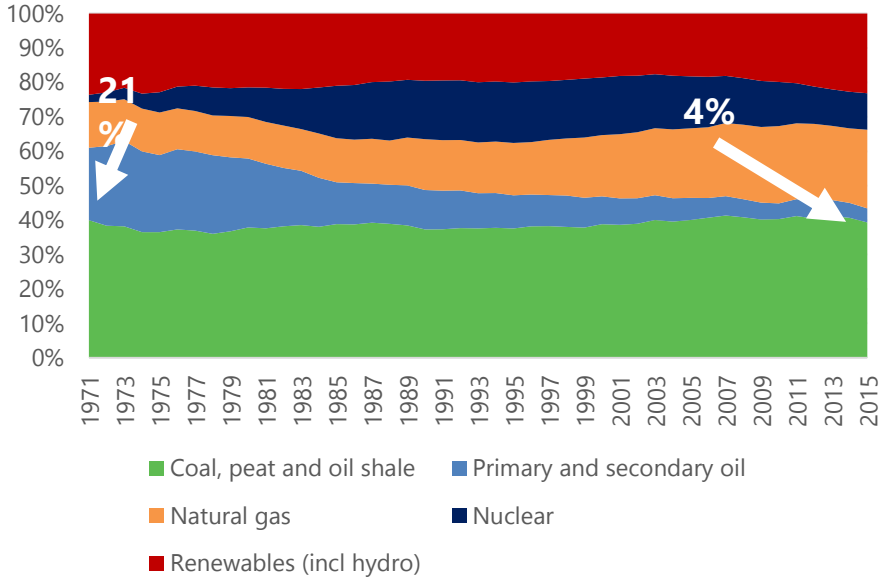
- Steps / considerations to building a policy implementable in an emergency:
  - Primary legislation
  - Secondary legislation
  - Implementation / operational manual
  - Identification of stakeholders
  - Definition of roles, procedures
  - Communication & public strategy
  - Testing & exercises

DSM: Fuel switching (oil)

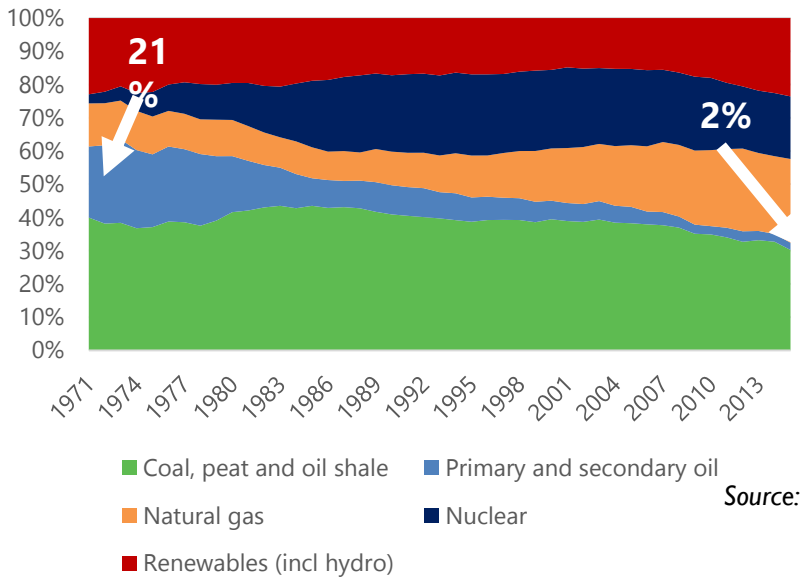
- Seeks to reduce the use of oil during a supply disruption
- Encourages the use of other energy sources alternative to oil:
  - e.g. coal or natural gas instead of oil in electricity production
- Significantly less potential since 1970s
- Oil-fired electricity generation worldwide has declined since 70s:
  - 1973 - 21%
  - 2012 - 4%

DSM - Fuel switching (oil)

World electricity output by source
1971-2015



IEA electricity output by source
1971-2015



Source: IEA

Discussion questions

- Has your country experienced a severe oil supply disruption?
- How did your country deal with it?
- What measures exist in your own country to increase supply/reduce demand in an oil supply emergency?
- What is the scope for regional cooperation in a crisis?