eceee 2022
Summer Study on
energy efficiency
6 – 11 June

AGENTS OF CHANGE

D.Osso, N.Chatagnon, M.Berthou, H.Bosche, C.Dronet, J-M.Lauruol - EDF Lab / TREE
A.Orcibal - EDF ICRS / BI
E.Gasparotto - EDF Marketing / DSEF

From Energy efficiency obligation to carbon savings certificate to achieve carbon neutrality: does it fit the path?

June 2022

Introduction – some European targets in constant evolution

Long-term strategy (2050):

- **carbon** neutrality (Green Deal)
- **decarbonisation** of the building stock (EPBD)

Mid-term strategy (2030):

- 36% of **final energy** and 39% **primary energy** savings (Climate Target Plan)
- 39% for **final energy**, 42% for **primary energy** and 55% of **renewables** (Fit for 55)
- -55% of **GHG** (Green Deal)
- **zero-emission** in new buildings (EPBD)
- -61% **GHG emission** (EU-ETS)
- 32% of **renewable** in final consumption (RES)
- After 2024, 1,5%/yr. of **final energy** savings (article 8) (EED)*

→ Energy Efficiency Obligation (EEO)

one target, one scheme?

*EED 2021 proposal

European EEO scheme: where is the carbon?

Energy efficiency incentive & tax price

Primary principles of an EEO scheme

1 Unit of savings

- Global obligation level to define the amount of savings to be achieved during a defined period
- Obligated parties (utilities – DSO or retailers) which share the target to be achieved
- Portfolio of eligible actions to be implemented
- Control process to deliver EEO certificate as a means of accounting for savings
- Penalty in case of non-compliance
- Cost recovery mechanism to finance the EEO scheme

3 Calculation of savings

2 Calculate the allocation

1 Defining the unit of the EEO obligation

Unit example:

- Primary energy (toe) (Italy, Poland)
- Final energy (PJ in Denmark, TWh in France)
- Carbon dioxide like in CERT in UK
- Bill savings like in ECO in UK

UK example:

- Final energy: Energy Efficiency Standards of Performance (EESoP 1994-2002)
- Final energy with carbon weighting: Energy Efficiency Commitment (EEC 2002-2008)
- GHG: Carbon Emissions Reduction Target (CERT 2008-2012)
- Bill savings: Energy Company Obligation (ECO 2013-2022)

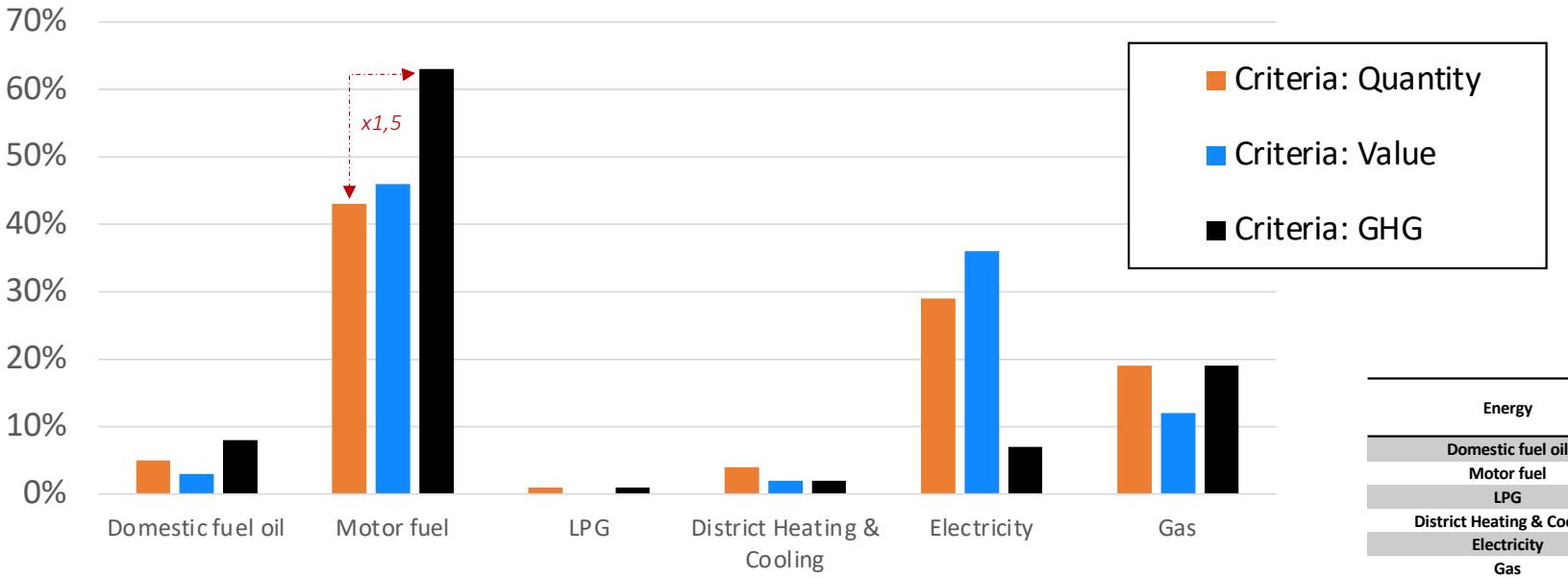
2 The path of least resistance: sharing the obligation

$$\%\ obligation = \frac{criterion^i}{\sum_i^{energy} criterion^i}$$

with criterion:

- ✓ **Quantity** [kWh]
- ✓ **Value** [price (€/kWh)*quantity (kWh)]
- ✓ **GHG** [quantity (kWh)*carbon content ($kgCO_2$/kWh)]

EEO obligation sharing according to criteria in France



Energy	Carbon content (gCO_2e/kWh) - France
Domestic fuel oil	324
Motor fuel	320
LPG	272
District Heating & Cooling	116
Electricity	57*
Gas	227

41-79 gCO_2eq/kWh according to end-uses

3 Choose the eligible action and calculate the savings

- Differentiating the energy savings by energy carrier:
  - in France, no difference in certificates between energies
  - in Italy there are 4 different types of certification
- EEO certificate is directly proportional to GHG mitigation

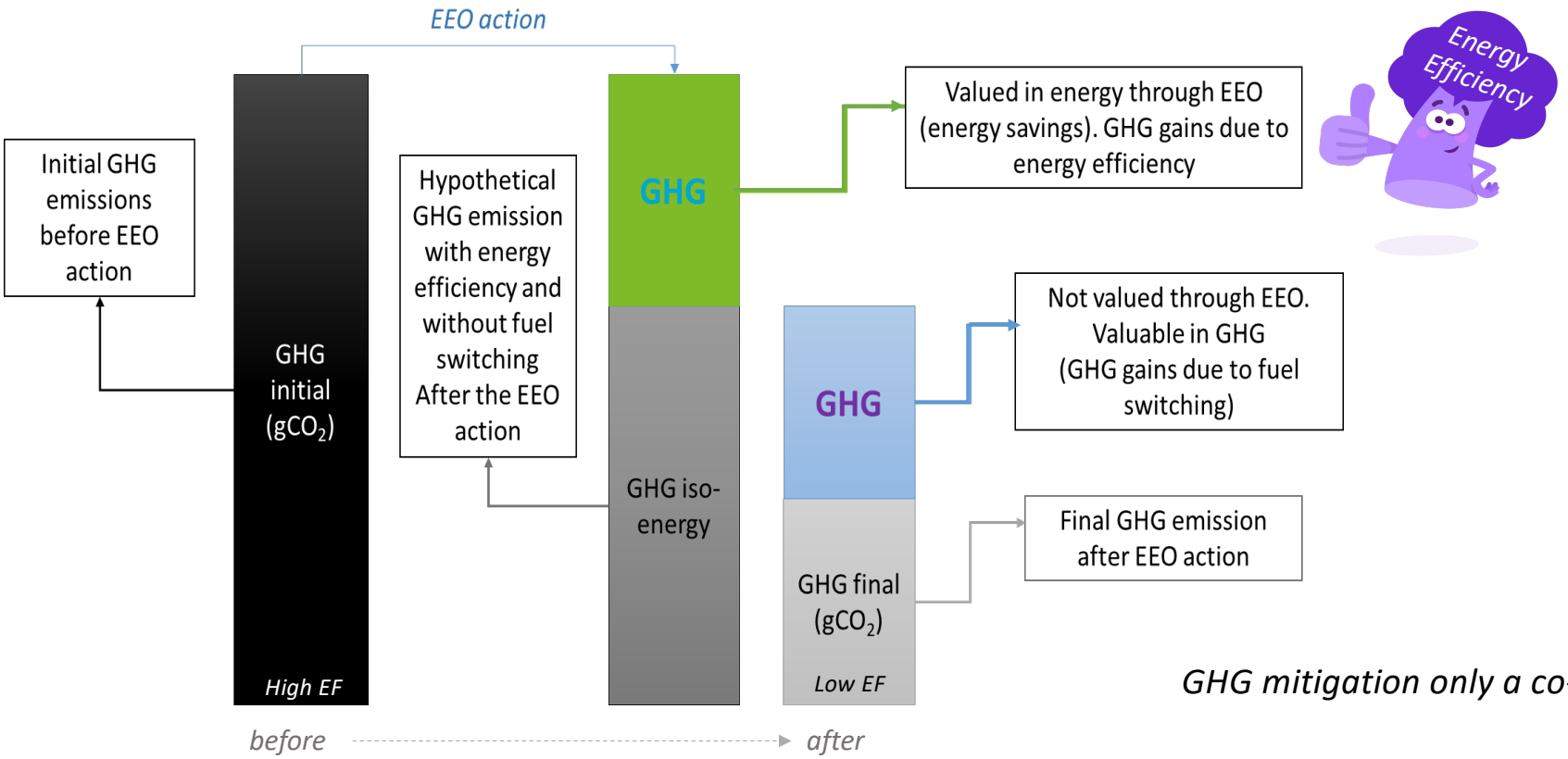
« Stick and carrot » approach to fossil and low-carbon measures

- Prohibit the eligibility of even the most efficient fossil fuel technologies
- Cap the maximum number of fossil fuel technologies

- Bonus to encourage low-carbon measures
- Minimum target of a number of measures

Choice of actions to steer the market towards the more GHG efficient measures

Valuation of GHG mitigation through fuel switching and energy efficiency



GHG mitigation only a co-benefit?

The narrow path of coherence: carbon emission certificate

From energy savings certificate to carbon emission certificate

(in gCO_2) CEC = EEO + CEC

Energy efficiency

Fuel switching

$$CEC = \Delta C_{initial}^{final} * EF_{final} + C_{initial} * \left(\Delta EF_{initial}^{final}\right)$$

Initial EEO (energy savings)

Additional GHG savings

Carbon emission certificate: exploitable certificate potentials in France with energy switch

Industry:

- Electric furnaces: energy savings: 20% - 50% → carbon savings: 85 to 90%
- Heat pumps: energy savings: 75% → carbon savings: 96%
- Mechanical Vapour Compression: energy savings: 78% → carbon savings: 97%

Transportation:

- Ship to shore connection
- Start and stop locomotive and dual mode locomotive
- Efficient vehicle (EVs)

Buildings:

- Heat pump : energy savings: 74% → carbon savings: 94%

Conclusion: The carbon, the energy and the EEO

- ✓ Carbon neutrality requires both a sharp reduction in energy consumption and a response to the remaining consumption with low carbon energy

- ✓ EEOs are not optimised to reduce GHG emissions but are designed to promote energy savings
- ✓ GHG mitigation appears to be a co-benefit

- ✓ several ways to integrate carbon into an EEO scheme
  - ✓ Unit of the certificate obligation
  - ✓ The sharing of the obligation
  - ✓ The eligible measures
  - ✓ Differentiate the energies according to their carbon content

- ✓ Enhancement of existing measures in buildings
- ✓ New potential not rewarded by EEO in industry and transportation


Thanks