Striking the right balance of policy tools to enable market based development to a low carbon electricity future

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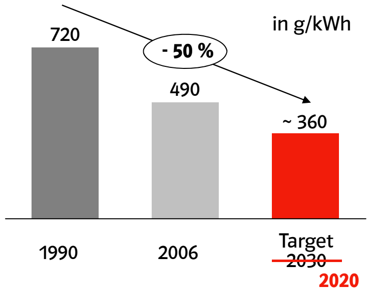
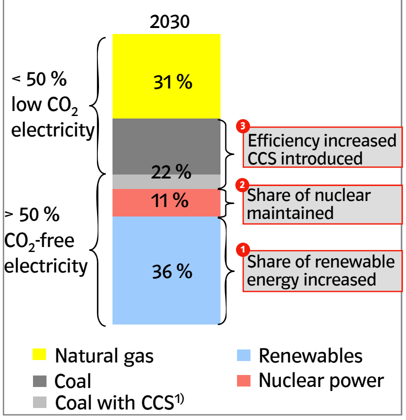
E.ON is setting itself challenging CO_2 reduction targets

E.ON's specific CO_2 emissions



- 50% reduction of specific CO_2 emissions compared to 1990
- Until 2020 reduction down to 360 g/kWh

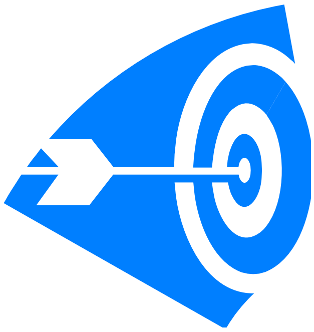
Possible Generation portfolio 2030



1) Carbon Capture and Storage

Well known Policy Instruments

- Emission Trading System
- Direct Financial Project Support
- Tax breaks
- Feed-in Tariffs
- Emission Performance Standards
- Mandatory requirements
- Fuel / CO_2 Tax
- CO_2 price floor



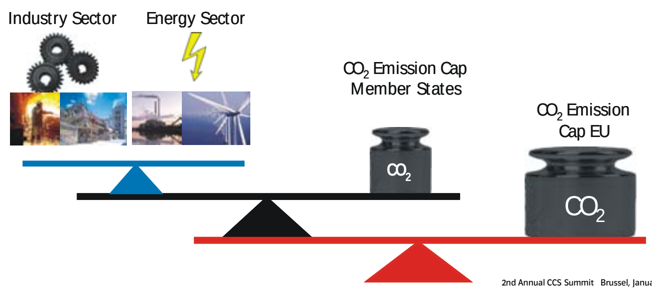
Which Instrument (mix) is efficient and effective to achieve the targets ?

Comparing different Instruments

Emission Performance Standards (EPS)	Emission Trading System (ETS)
• Useful to target local air pollution • Can not guarantee achievement of emission reduction targets • Favours low carbon fuels • Will not work if applied to limited regional areas and/or in combination with ETS	• Market based mechanism to reduce at lowest cost • Effective and efficient in achievement of emission reduction targets • Technology neutral instrument • Will not deliver technology development
Feed In Tariffs (FIT)	**CO_2 Tax (Tax)**
• Will take parts of generation out of competition • Will not deliver overall CO_2 emissions reductions • Instrument for market introduction of new technologies	• Can not guarantee achievement of emission reduction targets • Favours low carbon fuels • No incentives to look for the cheapest mitigation options

Why renewables or emission performance standards can not reduce CO_2 emissions under an Emission Trading System

- **ETS-Cap is acting** not only as upper but also **as lower bound**.
- ETS is based on **free trading of certificates between sectors and countries** to enables lowest cost options to be selected.
- ETS is a **technology neutral, effective and efficient** policy instrument



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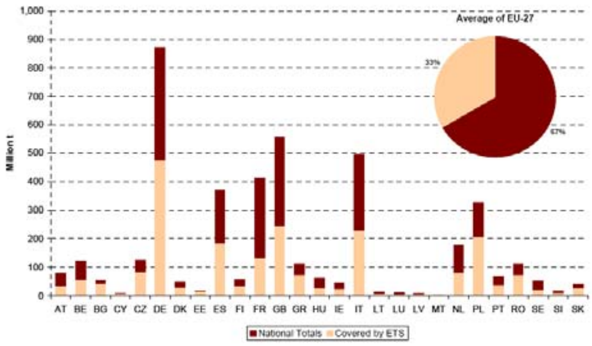
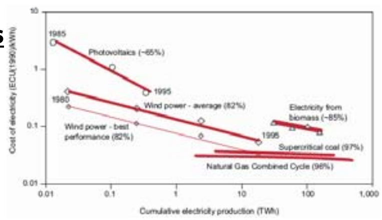
The European Emission Trading System (ETS)

- Started in 2005 and covers about 10000 installation in the EU, **covering about 50% of Europe's CO_2 emissions**
- **Market based mechanism** to reduce CO_2 emission at lowest cost
- The CO_2 **cap determines overall emissions** and the carbon floor price
- Reducing emissions due to a recession will lead to reduced certificate prices and vice versa.
- The **ETS is an effective and efficient instrument** to reduce CO_2 emissions.



Feed-In Tariffs

- **Many Member States in the EU have Feed In Tariffs** or Feed in Premiums for renewable energies in place.
- The driver for Feed In Tariffs is the **politically requested deployment** of available renewable technologies.
- The aim is to **bring down the cost to a competitive level** by technology learning and innovation
- The level of **support is not linked to the CO_2 emission** reduction but to the cost for there deployment
- Feed-In Tariffs are taking increasing **shares of the electricity market out of competition**
- Feed-In Tariffs **do not reduce CO_2 emissions** but support the decarbonisation of the power sector
- **Feed-In Tariffs can not deliver a fixed emission reduction target** as the control parameter is the electricity production and not emissions.



Emission Performance Standards (EPS)

- Used in the past to reduce NOx, SOx and particle emissions
- **Unsuccessfully introduced for CO_2** in a number of States in the US, even when not conflicting with other policy instruments such as ETS.
- **Discussed** as a option **for the deployment of CCS**
- Key driver for EPS has been **local air pollution**
- Introduction of **EPS can lead to postponement of investments** and/or shut down of old plants or extended use of them.
- EPS **can not guarantee the achievement of global reduction targets**
- EPS will **not** lead to the realization of the **lowest cost measures** to reduce CO2 emissions.

Max.
1000
g_{CO2} / kWh

Conclusions

- Market based mechanisms will work most effectively if they are not distorted by other regulations
- Feed In Tariffs support the market deployment of technologies but are not efficient for CO_2 emission reduction
- EPS for CO_2 Emissions from power generation are not compatible with the ETS and will neither support the introduction of CCS or reduce the global CO_2 emissions under a cap and trade system.

- ETS is key instrument for climate change mitigation, supporting CCS and RES
- EPS will slow down or stop the replacement of existing power plants
- EPS and Feed in Tariffs do not reduce overall CO_2 emissions in an ETS
- CCS deployment will require additional financial incentives
- Policy instruments should not have interdependencies to be effective and efficient

Impact on the Electricity Market

- ETS will **favour low carbon technologies** in power generation
- ETS is **increasing electricity prices** due to additional costs for CO_2 certificates
- **ETS will drive emission reductions at lowest cost** but not necessarily in the power sector
- **Feed-In Tariffs distort the electricity market**, setting wrong price signals.
- **Feed-In Tariffs neglect** the additional costs for **back up power**
- **EPS will distort the ETS**, specifying additional requirements only for a subset of emitters in the ETS
- **EPS could delay or hinder new investment in fossil power generation**, reducing the security of supply in the future.