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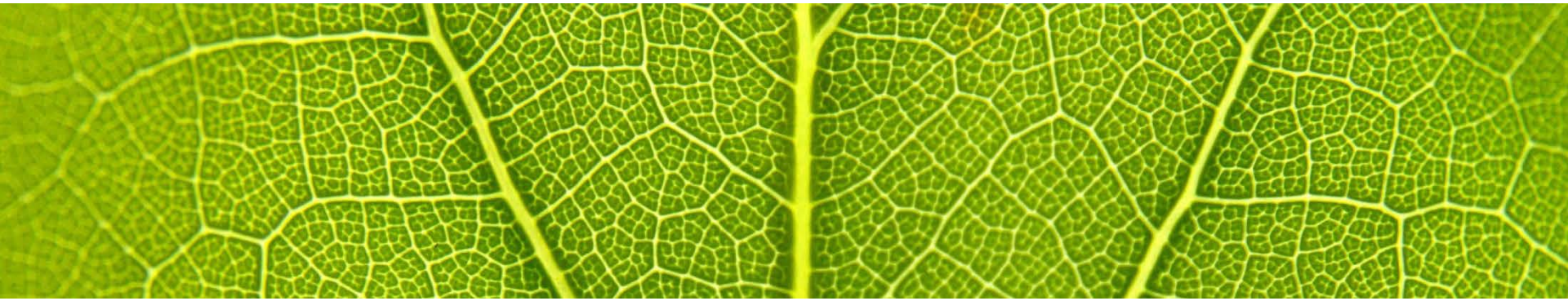
sustainable energy for everyone

beyond 2020



Interactions between EU GHG and Renewable Energy Policies

How can they be coordinated?

21/10/2013

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Based on a joint paper with Pablo Del Rio, CSIC

Co-funded by the Intelligent Energy Europe Programme of the European Union

Content

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Outlining the problem and the arguments:

Are GHG policies sufficient to meet the European climate targets or are additional renewable energy policies required?

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- Currently **20-20-20 EU targets** for GHG reduction, energy efficiency and renewable energy (RES) are in place

- Should the three target approach be continued **beyond 2020** or should there be a focus on carbon-only target and technology-neutral climate policies?

- Underlying question: Are distinctive targets and policies for RES and GHG complementary and supportive of each other OR are they in conflict, thereby negatively affecting each other?

- *→ This question will be discussed for the interaction between the EU emission trading scheme (ETS) and RES-E support*

Arguments in favour of a " GHG only" approach

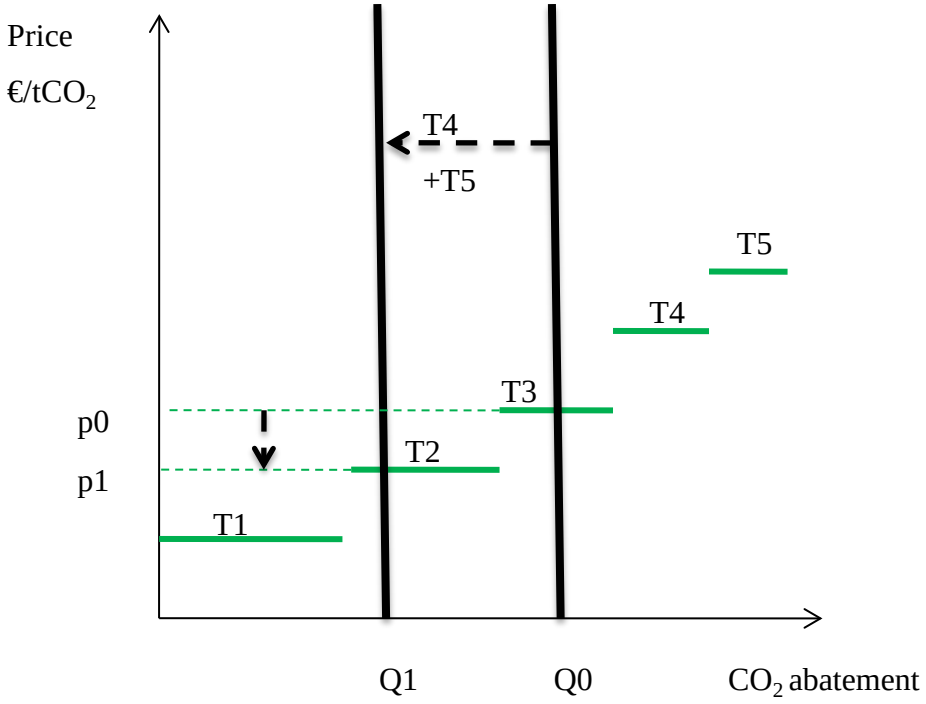
- **RES-E support is an expensive way to mitigate GHG emissions in the short term**. High-cost abatement technologies are forced into market. ETS-only approach is more efficient (static efficiency).
  - BUT this is not true in the medium and long term due to dynamic efficiency

- With a CO2 cap in place in ETS, **RES-E deployment does not additionally reduce CO2 emissions**
  - UNLESS the ETS cap is set with RES-E deployment in mind

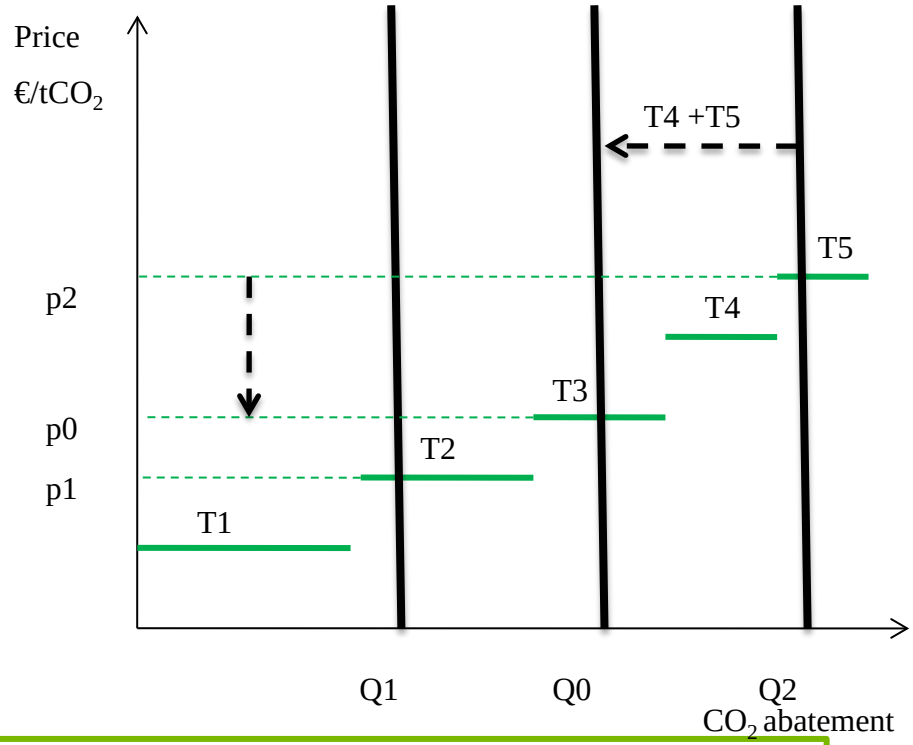
- **The main effect of RES-E deployment is that prices for CO2 allowances decrease**. Low CO2 prices delay investments in other CO2 mitigation options and benefit coal power's economic viability.
  - BUT coordination between ETS and RES-E targets can solve this

CO2 price does not drop if ETS cap is coordinated with RES-E target

Without coordination



With coordination



Negative effects of RES-E support on the EU ETS:
decreasing CO2 price; cheap abatement options are delayed

***But* the CO2 price will only drop if the RES target has not been considered in the ETS cap!**

Note: For the 2020 package RES has already been considered in the ETS cap setting, but some challenges occurred in practice...

Arguments in favour of RES-E support policies and targets

RES-E policies can address different market failures that ETS does not address

- ***Environmental externality***: CO2-emmissions that are not covered by ETS can be reduced by RES policies (e.g. decentralised electricity generation, heating in buildings).
- ***Innovation externality***: The CO2-only approach provides insufficient compensation (price uncertainty in ETS) for necessary innovations in RES technologies, which are needed in the long-term; RES policies successfully address this short term failure.
- ***Deployment externality***: early increased deployment of RES-E technologies result in cost reductions and technological improvements due to learning effects and dynamic economies of scale (dynamic efficiency). RES policies needed for long term cost effectiveness of meeting GHG target.

Arguments in favour of RES-E support policies and targets

With RES-E policies, other goals complementary to GHG emission reductions can be pursued

- ***Security of energy supply***: diversification of energy sources leading to lower fossil fuel dependence and the promotion of a secure energy supply
- Promoting ***technological development and innovation***
- Providing opportunities for ***employment*** and ***regional development***
- ***Economic sustainability*** through a competitive energy system and affordable energy

How negative interactions between both policies can be mitigated by coordination?

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Effect of RES policies on ETS:

- **Decreased CO2 prices due to RES-E deployment**

Solution:

- **Take RES-E policies into account in the CO2 target setting**
  - Ex-ante:
    - predefine RES-E trajectory and deduct resulting CO2 savings from CO2 cap
    - Several uncertainties (e.g. RES-E technologies and CO2 content)
  - Dynamic adjustments:
    - In case of major deviations, adjust CO2 cap automatically according to actual RES-E deployment
    - RES-E policies can be designed in a way to meet a specific growth corridor (i.e. “breathing” cap)

In order to avoid negative interactions between RES-E and ETS policies, targets and support schemes have to be coordinated

How negative interactions between both policies can be mitigated by coordination?

Effect of ETS on RES-E support:

- **Low CO2 prices makes conventional coal power more competitive** in comparison to RES-E technologies, thereby increasing the required support level (and thus, overall support cost) for RES-E
- **Price uncertainty in ETS-only approach increases risk premium for RES-E investors**, thereby increasing capital costs and required support levels.

Solution:

- **A well-functioning ETS with meaningful CO2 prices** is a precondition for effective and efficient RES support policies

Example of coordinating RES and GHG targets

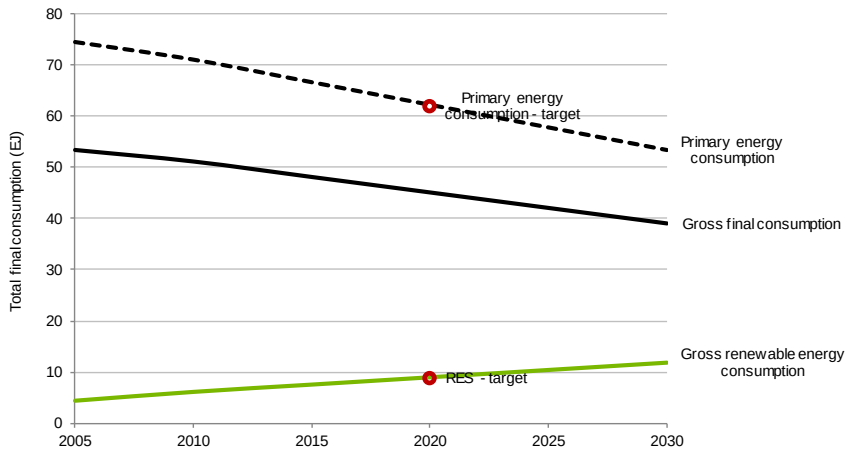
The Ecofys target consistency tool

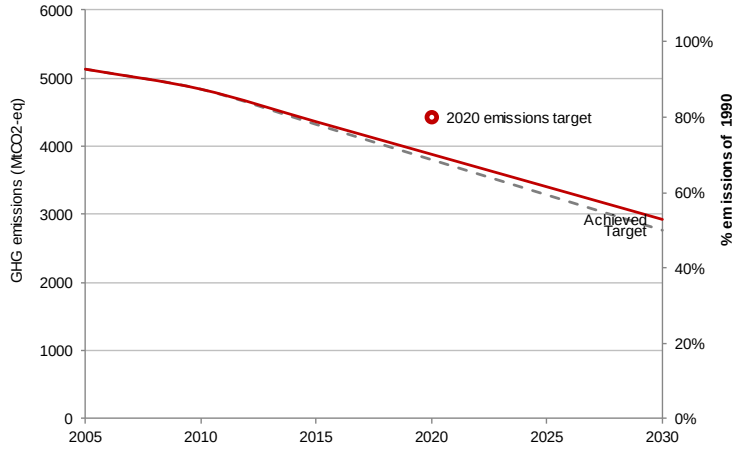
EU-targets tool

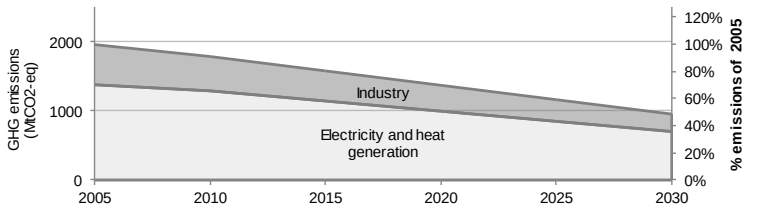
Not for further distribution

Provided numbers are approximations

Top graph: Emissions include energy and non-energy emissions. Bottom graph depicts only energy related emissions







Process emissions not included (but included in ETS)

Use sliders to change targets. The GHG target can be achieved by adjusting the RES and EE targets.
If the 'achieved' emission line is green, the GHG reduction target is met with the set RES and EE targets, else the line is red.

Overall targets

GHG target (WRT 1990)	-50%
non-energy GHG target (WRT 1990)	-50%
Efficiency target (WRT 2010 primary energy consumption)	25%

RES targets

Renewables target 2030 (% of gross final consumption)	30%
RES in electricity (% of total final electricity production)	55%
Biofuel target in transport (% of fuel demand in transport)	12%

Biofuels are assumed to reduce 60% of the emissions, relative to diesel/gasoline. Fuel demand includes all transport modes.

RES in decentral heating (calculated)	24%
Nuclear phase out?	No

Fuel shift

Switch from coal to gas electricity & central heat	30%
Switch from coal to gas in industry and buildings	30%
Electrification of heat	10%
Electrification of transport	10%

Developed by: ECOFYS

Commissioned by: European Climate Foundation

Thank you for your attention!

More information on this question:

In our report

- *"Interactions between EU GHG and Renewable Energy Policies – how can they be coordinated?"*
- A joint report by CSIC and Ecofys within the Beyond2020 project
- Will be published shortly on

  http://www.res-policy-beyond2020.eu/

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