Interactions between climate and energy policies

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Analysis based on…

Journal publications:

* DEL RÍO, P. (2009). "Interactions between climate and energy policies: the case of Spain". *Climate Policy* 9(2), 119–138
* DEL RÍO, P., HOWLETT, M. (2013). Beyond the "Tinbergen Rule" in Policy Design: Matching Tools and Goals in Policy Portfolios. Annual Review of Policy Design 1, 1-16.
* DEL RÍO, P. (2014). On evaluating success in complex policy mixes: the case of renewable energy support schemes. *Policy Sciences* 47(3) , 267-287
* HOWLETT, M., PUNG HOW, Y., DEL RIO, P. (2015). The parameters of policy portfolios: verticality and horizontality in design spaces and their consequences for policy mix formulation. *Environmental and Planning C: Government and Policy*.

EU-funded projects:

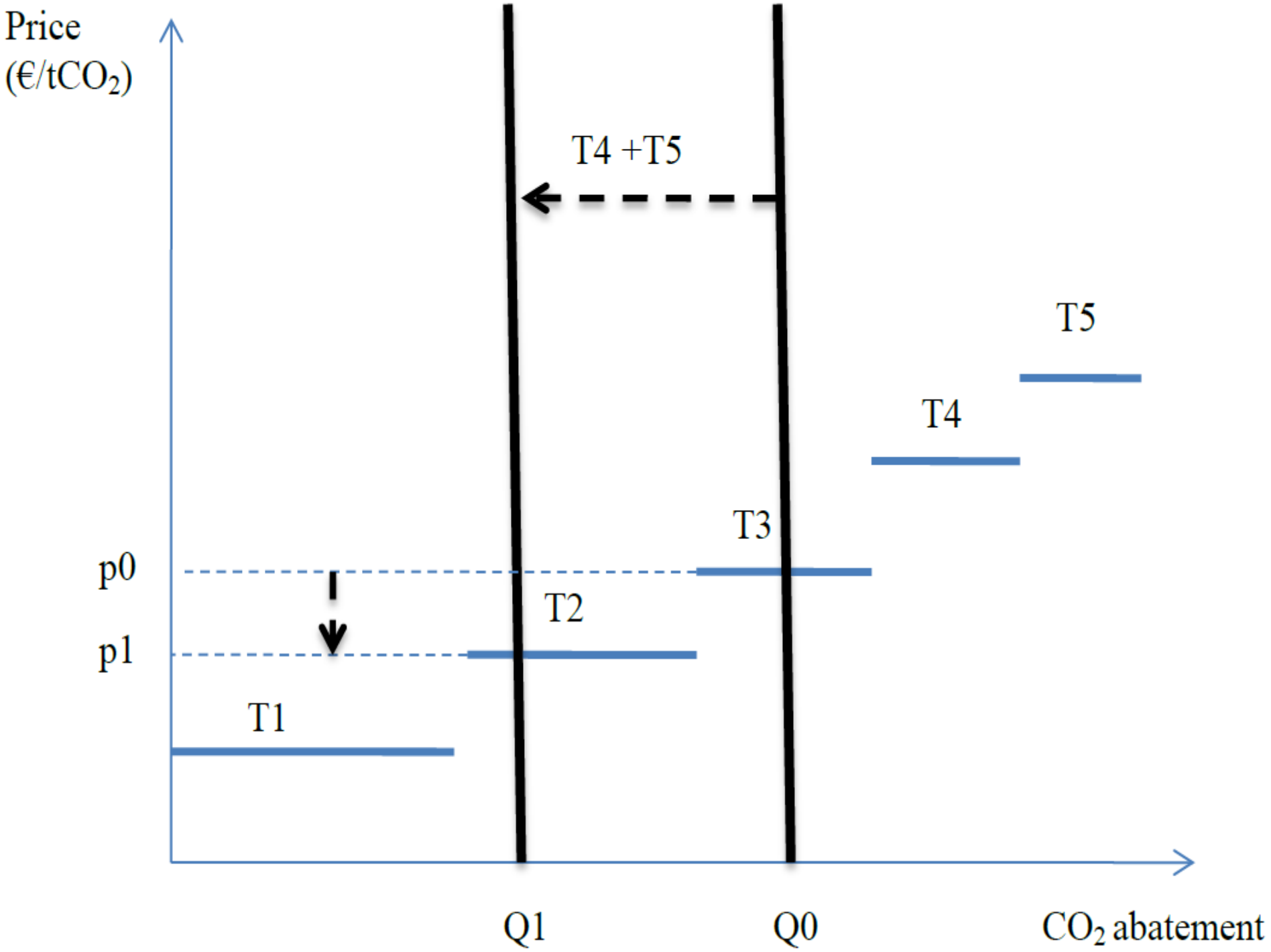
* BEYOND2020 project. http://www.res-policy-beyond2020.eu/
* TOWARDS2030 project. http://towards2030.eu/

Main messages

* Mainstream perspective.
* The alternative view: several goals, market failures. Political economy factors. *Second best*.
* Combinations are required. Why should we have dedicated RES-E support with an ETS?
* Types and costs of combinations.
* Conflict in combinations due to interactions.
* Can conflicts be mitigated? Trade-offs, choice of instruments/design elements, coordination.
* The interactions in the Commission proposal.
* The way forward.

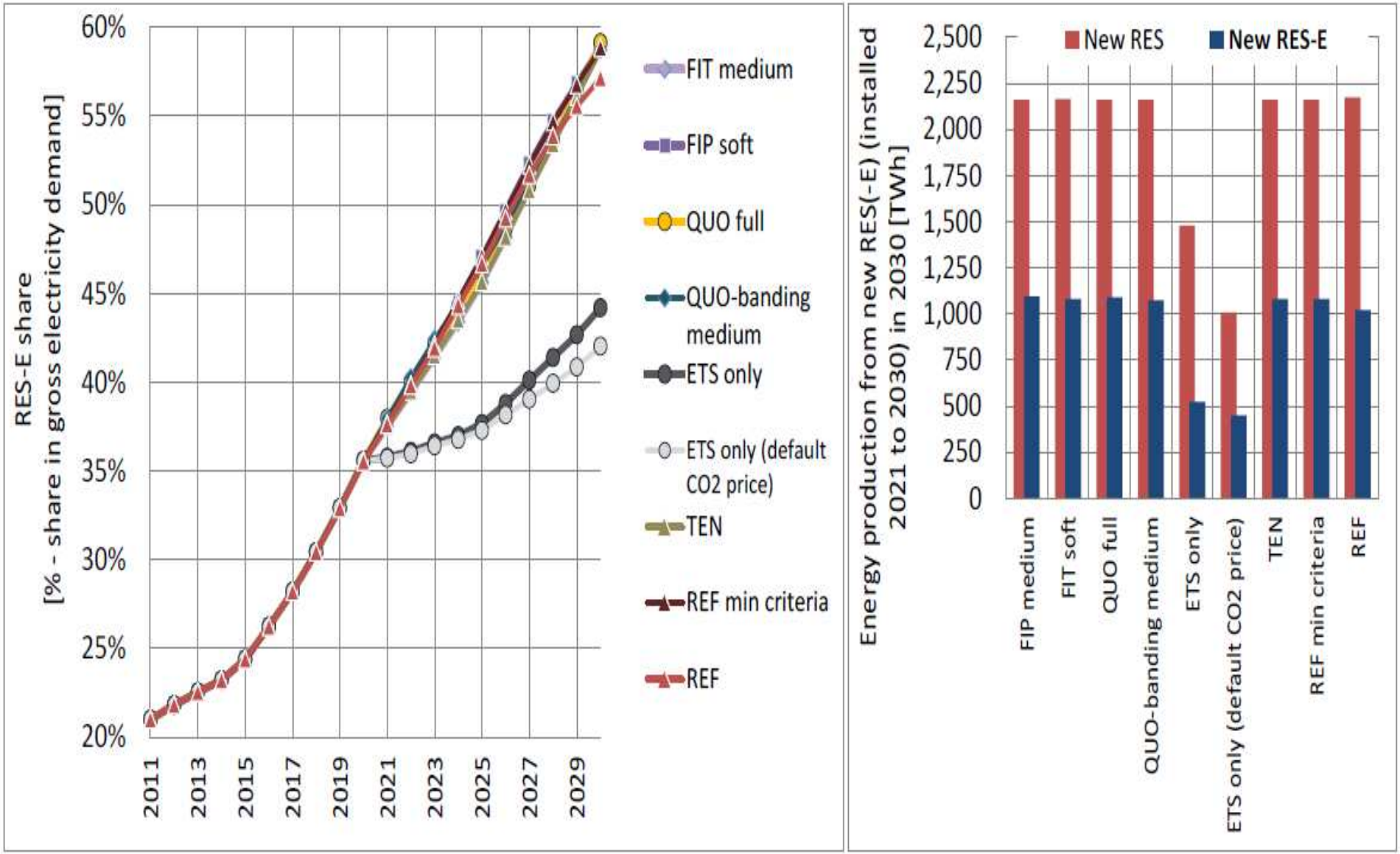
MAINSTREAM VISION

* Dedicated RES-E policy should not be added to an ETS.
* Such combination is:
  * Ineffective.
  * Inefficient.
* Picking winners.
* Technology neutrality.

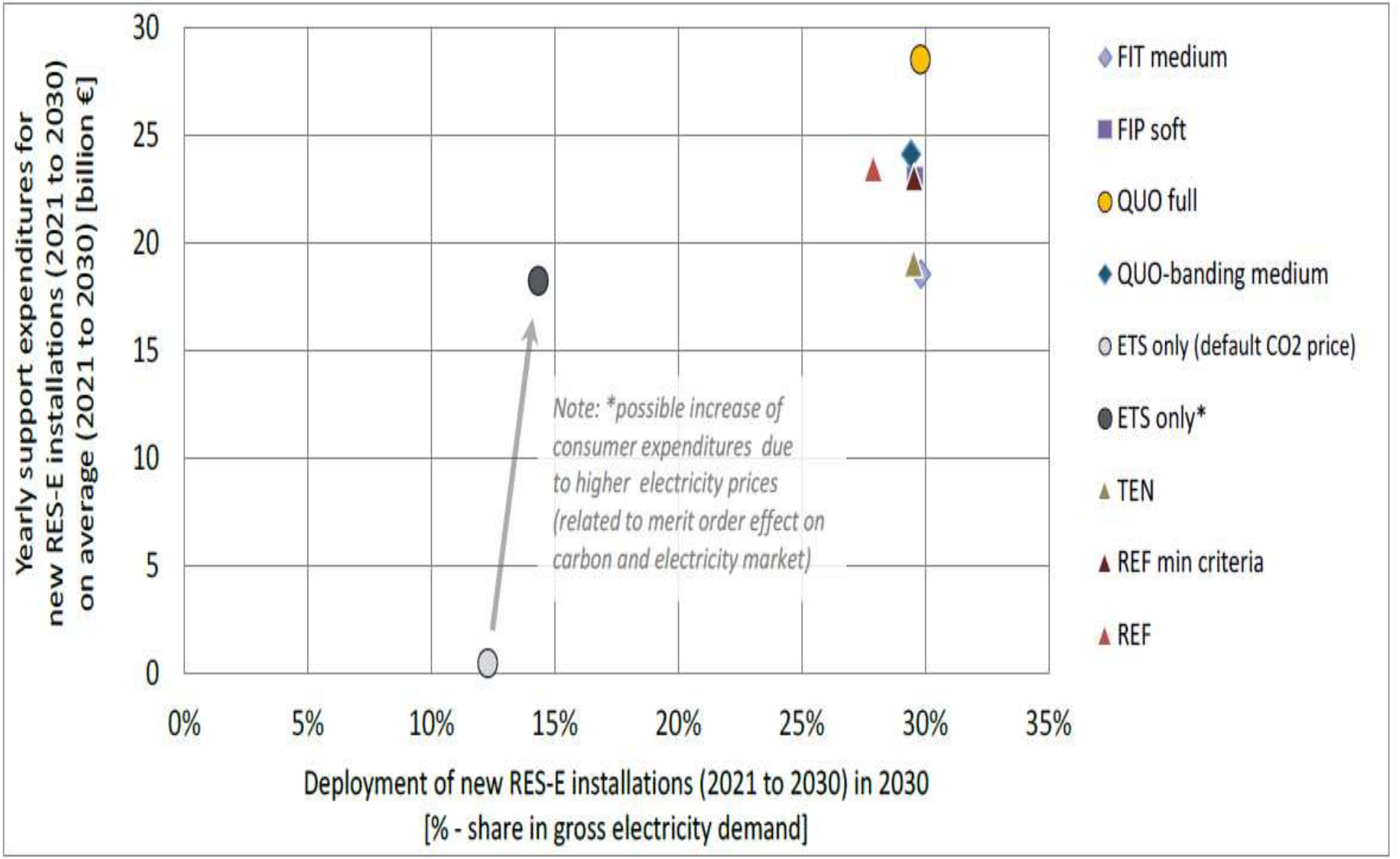

Price
(€/tCO2)
T4 +T5
T5
T4
T3
p0
T2
p1
T1
Q1
Q0
CO2 abatement

Effective and efficient RES deployment in an ETS-only scenario?

* Effectiveness:
  * GREEN-X model: an ETS-only: RES share of 26% in 2030, compared to 31.2% in the other scenarios.
  * Commission's impact assessment: 26.5% in GHG40 scenario.
* Efficiency:
  * From an inter-temporal perspective, ambitious RES-E deployment targets can only be attained cost-effectively by simultaneously promoting different technologies (Ragwitz et al. 2007, IEA 2008a, Resch et al 2009, Huber et al. 2007)
  * Due to learning effects, a higher intermediate RES-E target generates higher costs of RES-E support over the period 2006–2010, but results in lower costs for society over the whole period from 2006 to 2020 (Huber et al 2007).
  * A high level of uncertainty leads to high risk premiums on RES-E investments, thus increasing the cost of capital and making the RES-E projects expensive.

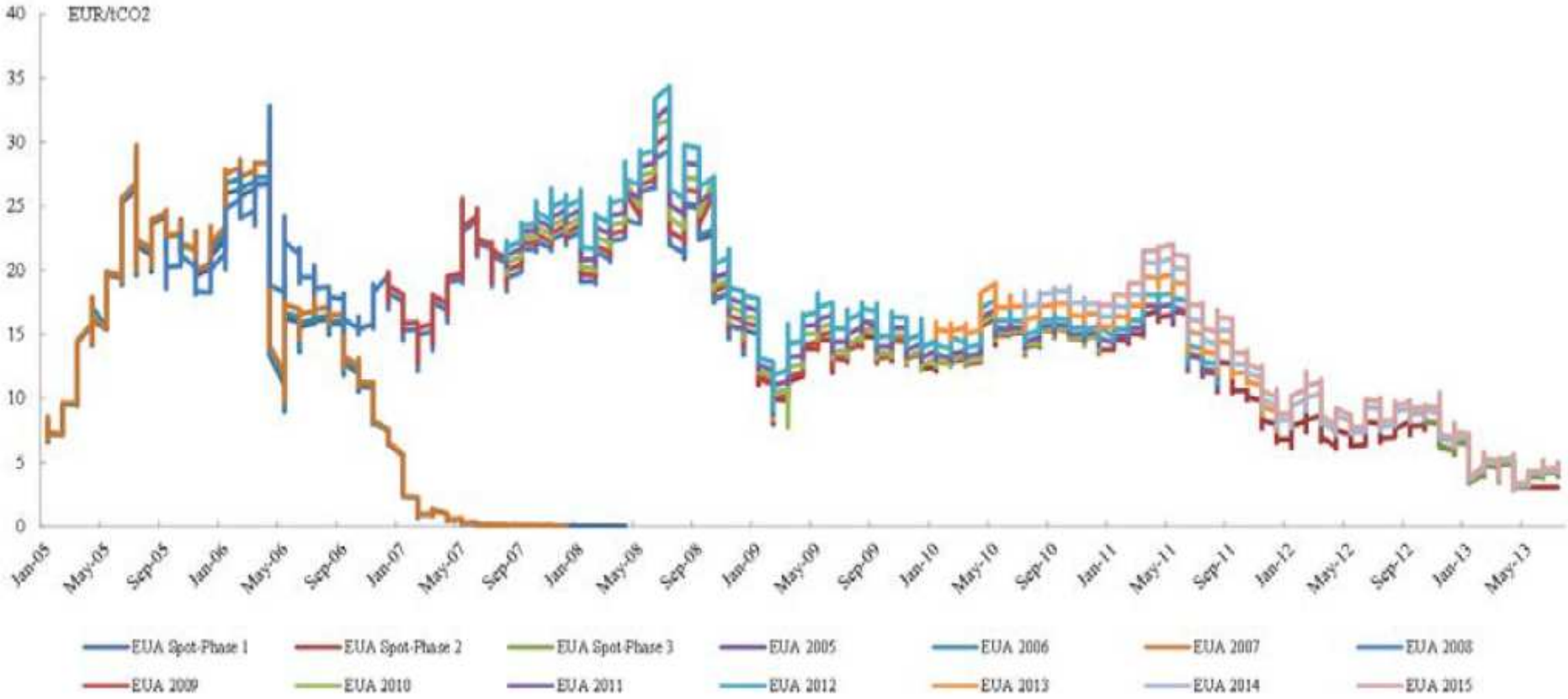


Comparison of the resulting RES-E deployment over time for all RES-E (left) as well as by 2030 for new RES-E and RES installations only (from 2021 to 2030) (right) in the EU-27 for selected cases.



Comparison of the resulting 2030 deployment on new RES-E (installed 2021 to 2030) and the corresponding (yearly average) support expenditures in the EU-27 for selected cases.

CO_2 prices lower than needed to boost renewables



Evolution of EUA futures prices. Source: Bloomberg

ETS: limited in time, space and time.

Effective and efficient RES deployment in an ETS-only scenario?

* An ETS cannot achieve both targets (CO_2 and RES-E deployment) cost-effectively.
* Using an ETS to reach a RES-E quota leads to higher consumer costs than using RES-E deployment instruments for that purpose (Jensen and Skytte 2003, Fisher and Newell 2008, Huber et al 2004).

THE ALTERNATIVE VIEW

* But…
  * 1) Is the mainstream vision so orthodox?
    * General literature on combinations and interactions: *n* objectives, *n* instruments (Tinbergen).
      * Other goals apart from CC mitigation.
    * Several market failures that will make inefficient/ineffective to reach one goal.
      * Insights from innovation economics.
  * 2) Does it include political economy thinking?
    * Political feasibility of a high CO2 price.

THE ALTERNATIVE VIEW

* Assumption: only one goal, one market failure, two assessment criteria (effectiveness and efficiency).
* Reality: three externality problem.
  * Environmental externality.
  * Innovation externality.
  * Deployment externality.
* Each may justify the implementation of an instrument which tackles each externality.

THE ALTERNATIVE VIEW

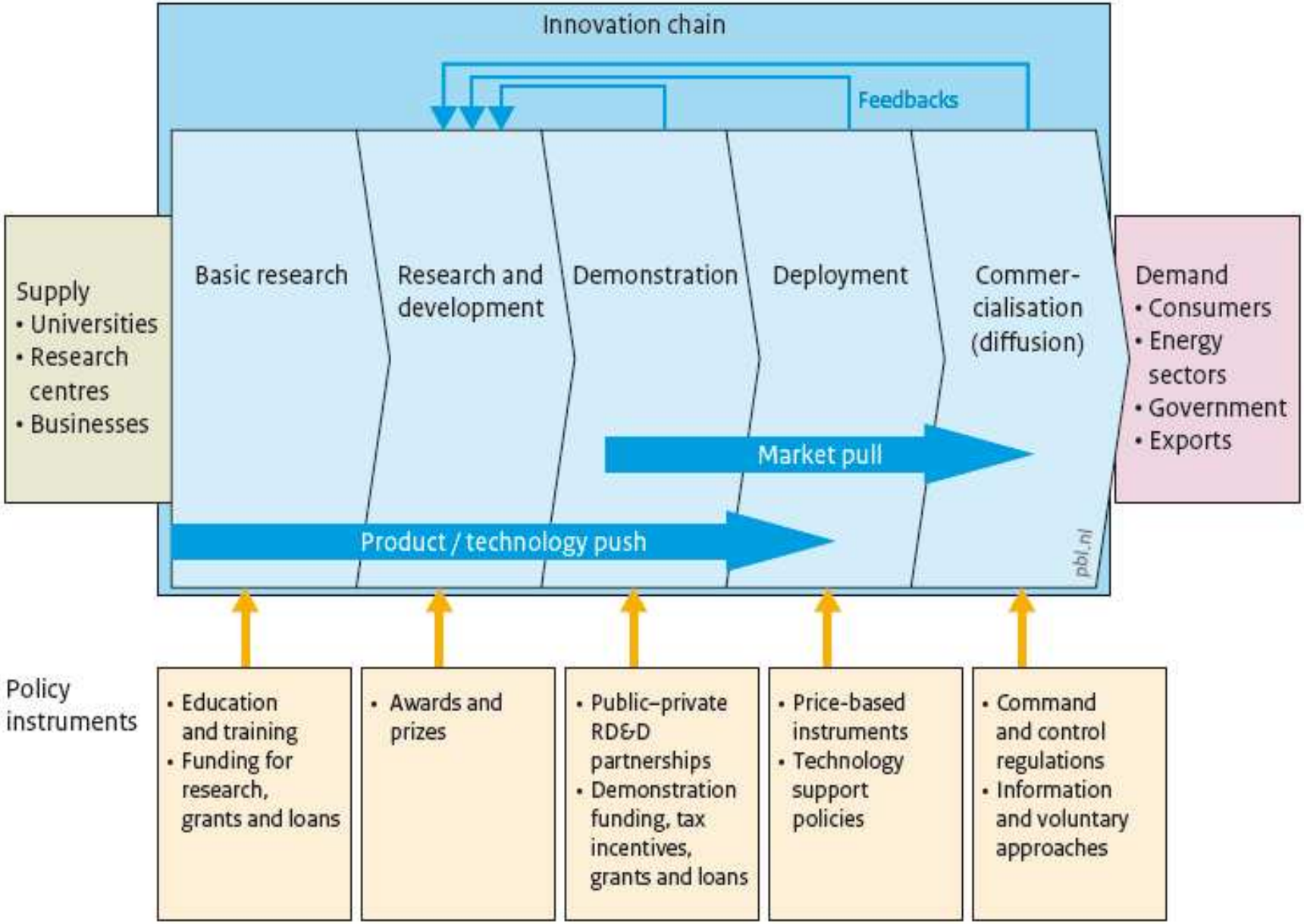
- The deployment externality:
  - The increased deployment of a technology results in cost reductions and technological improvements due to learning effects and dynamic economies of scale.
  - Even companies that did not initially invest in the new technologies may benefit and produce or adopt the new technology at lower costs.
  - Investors can partially capture these learning benefits (patents), but they do not capture all these learning benefits.
  - Thus, investments in the new technology will stay below socially optimal levels.

The innovation and deployment externalities

* "Second aim" of the EU ETS: bring sufficient incentive for cleaner technologies.
* Unfortunately, this has not been the case (Rogge, Dechelepetre, Mazzanti…).
* Should we have expected otherwise?
* Dedicated RES targets and policies are also needed to encourage the necessary supply chain investments and infrastructure planning.

THE ALTERNATIVE VIEW

* Insights from innovation economics:
  * Efficiency requires a dynamic perspective of costs (innovation).
  * A cost-effective approach of achieving targets for 2030 is not necessarily the most cost-effective approach for achieving 2050 targets.
  * Supply-push and demand-pull.
  * Dynamic efficiency.
    * Market creation feed-backs into private R&D
    * Deployment instruments are also innovation instruments!!
      * Both the innovation and deployment externalities.


Innovation chain
Feedbacks
Supply
• Universities
• Research centres
• Businesses
Basic research
Research and development
Demonstration
Deployment
Commer-cialisation (diffusion)
Demand
• Consumers
• Energy sectors
• Government
• Exports
Market pull
Product / technology push
pbl.nl
Policy instruments
• Education and training
• Funding for research, grants and loans
• Awards and prizes
• Public–private RD&D partnerships
• Demonstration funding, tax incentives, grants and loans
• Price-based instruments
• Technology support policies
• Command and control regulations
• Information and voluntary approaches

THE ALTERNATIVE VIEW

* Will there ever be a “high” CO2 price?
  * YES. Then would total compliance costs be much higher than with a lower CO2 price + complementary instruments?
  * NO. Political economy, Public Choice.
* Broaden the list of relevant criteria: social acceptability and political feasibility. http://www.res-policy-beyond2020.eu/
* Otherwise, we will be proposing instruments oR stringency levels which will never be implemented.
* Second best world.

INSTRUMENT COMBINATIONS

* Therefore, combine instruments.
* How should these combinations look like?
  * Efficient, effective.
  * Socially acceptable, politically feasible.
  * Demand pull, technology push policies.
  * CO_2 price, R&DD support, deployment support.
  * Providing technology-specific support is unavoidable.
    * Issue is not if, but how
    * Design elements (e.g., solar PV in Spain).
    * Balance R&D support and deployment support.

INSTRUMENT COMBINATIONS

* Balance R&D support and deployment support.
  * According to EC (2014), total expenditure on renewable support in the EU was 13.7 bn Euros in 2009, 18.6 bn in 2010, 30.1 bn in 2011 and 34.6 bn in 2012.
  * Europe spends on RES deployment more than 100 times what it spends on RES R&D (Zachmann 2014).
  * Spain:
    * Solar PV (2009)
      * RD&D: 6.5 M$
      * Deployment support: 2629 M€
    * Wind (2012)
      * RD&D: 27 M$
      * Deployment support: 1597 M€

Are the costs of the combination too high?

* In other words, what are the extra costs of the "other benefits"?
  * 0% to 0,05% GDP

Table 14: Energy system costs and sub-components[90]

Scenarios with enabling settings (compatible with 2050 GHG objectives):

Indicator		"Carbon values" 2030 / 2050	"Concrete EE measures" 2030 / 2050		
	Reference	GHG40	GHG40EE	GHG40EERES30	GHG45EERES35
Total System Costs in bn €'10 *(average annual 2011-30 / 2031-50)*	2,067 / 2,520	2,069 / 2,727	2,089 / 2,881	2,089 / 2,891	2,102 / 2,925
Total System Costs as % of GDP *(average annual 2011-30 / 2031-50)*	14.30 / 13.03	14.31 / 14.10	14.45 / 14.90	14.45 / 14.95	14.54 / 15.12

Are the costs of the combination too high?

* EC (2014a) improvement in terms of job creation.
  * +0.3% in 2030 in GHG40 w.r.t. reference
  * +0.5% in 2030 in GHG40 +EE + RES30% w.r.t. reference.

Lower cost-efficiency (equimg.) offset by the dyn. ef. benefits and other goals??

INSTRUMENT COMBINATIONS

* Not so simple: complexity.
* Choices involve inherent trade-offs, keep balances:
  * Technology neutrality and technology-specific support.
  * stability vs. flexibility,
  * R&D and deployment support,
  * technology-push vs. demand-pull,
  * market failures vs. policy failures,
  * static vs. dynamic effiiency,
  * short vs. long terms.
  * Sticks and carrots.

INSTRUMENT COMBINATIONS

* Not a panacea. Combinations bring problems:
  * Regulatory capture.
  * Redundancy.
  * Conflicts (1+1 < 2)

Have RES deployment already influenced ETS prices?

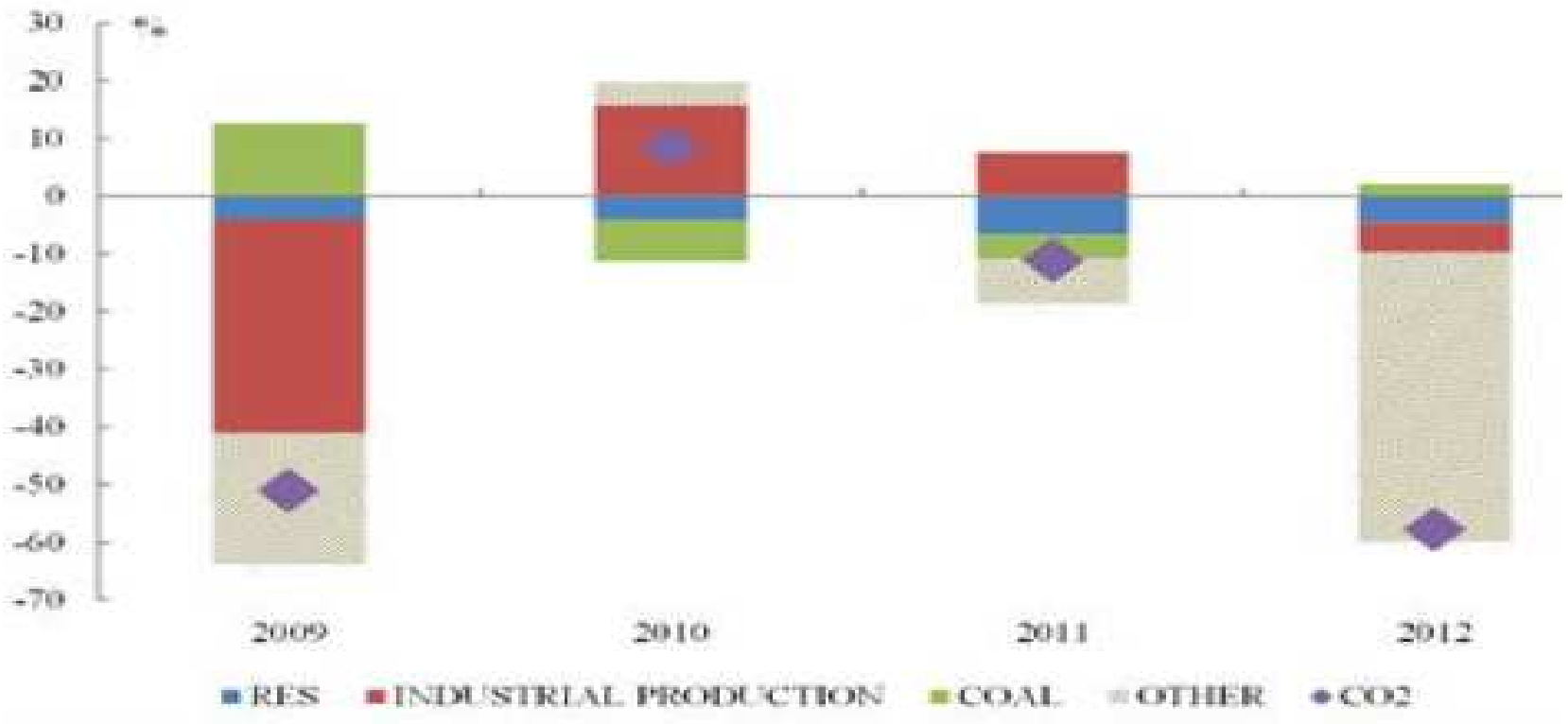
* Assuming *all the increment of renewables in electricity from* 2007 to 2011 was not taken into account in the setting of the cap, this additional abatement would equate to about 10% of the surplus that built up over the period 2008-2012 (Spencer et al 2014).

Have RES deployment already influenced ETS prices?

* EC (2014). "Energy Economic Developments in Europe. European Economy 1|2014":
  * There is evidence that the deployment of renewable production has also contributed to a lesser extent to this ETS market imbalance, therefore lowering the carbon price.

Have RES deployment already influenced ETS prices?

* Decomposition of carbon price changes in 2008-2012.



Have RES deployment already influenced ETS prices?

* EC (2014) impact assessment
  * Carbon price in GHG40 scenario: 40€/tCO2
  * 22€ in GHG40 EE scenario
  * 11€ in GHG40 EERES30 scenario.

MAY CONFLICTS BE MITIGATED?

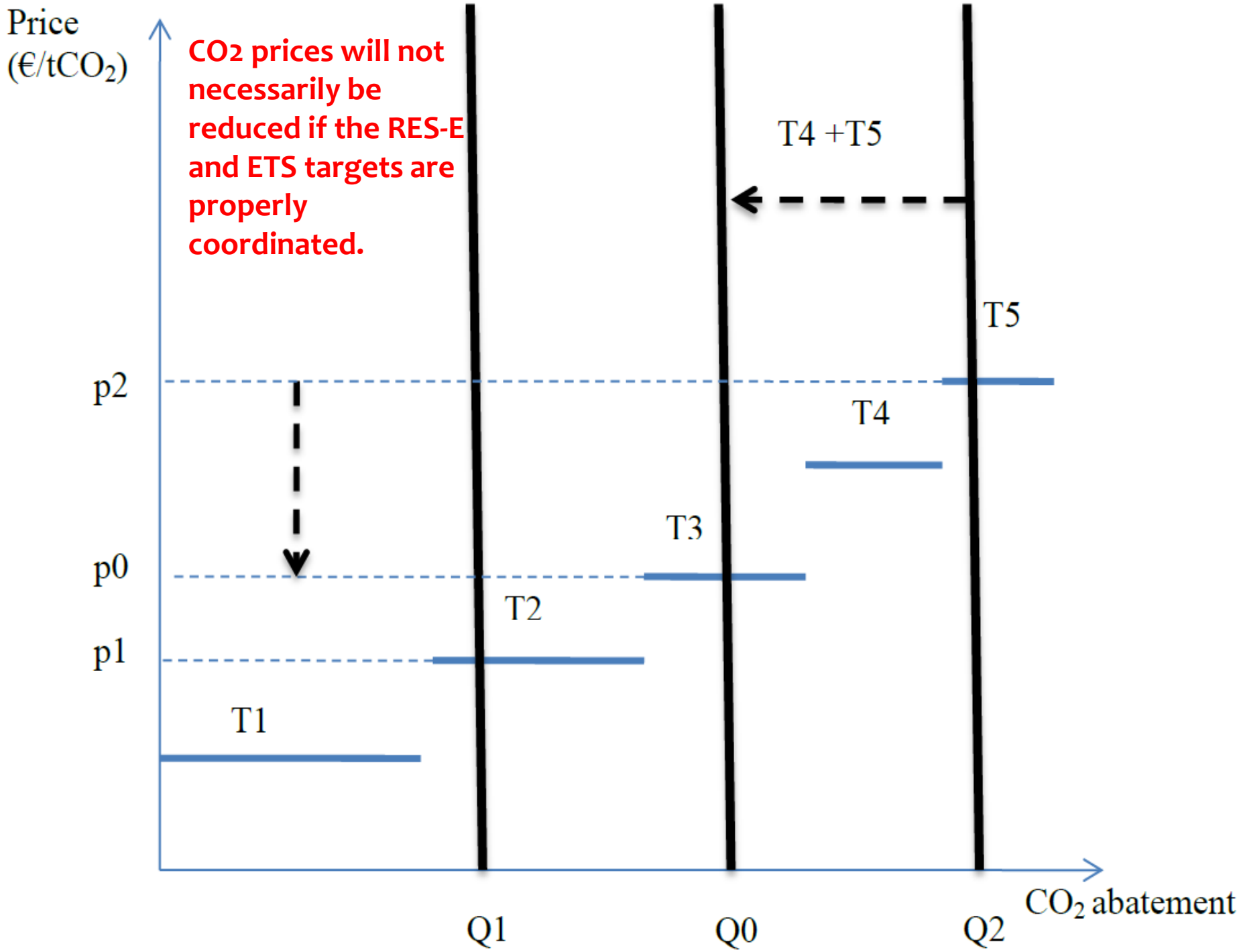
* Instruments and design elements.
* Coordination.
* The magnitude of the interactions will (partly) depend on both.
* Limited role of both.

MAY CONFLICTS BE MITIGATED?

* Different impact on interactions with different instruments.
  * CO_2 tax vs. ETS
  * RES deployment support: FITs, FIPs, tenders, quotas with TGCs.
* Different impact with different design elements.
  * Floor prices on carbon.
  * Cost-containment in FITs.

Coordination

* In principle, targets can be coordinated…
  * *ex ante,*
  * *ex post*
  * *dynamically (regular, announced reviews)*


Price
(€/tCO2)
CO2 prices will not necessarily be reduced if the RES-E and ETS targets are properly coordinated.
T4 +T5
T5
p2
T4
T3
p0
T2
p1
T1
CO2 abatement
Q1
Q0
Q2

Were the RES and ETS targets coordinated?

* According to the Impact Assessment modeling of the European Commission (2008a+b), the 2020 targets for GHG, RE and energy efficiency were coordinated ex ante and also reflected in the ETS cap setting.
* Höhne et al. (2008) calculated that the ETS cap would need to be more stringent in order to reflect the EU renewables and energy efficiency target.

Were the RES and ETS targets coordinated?

* According to the impact assessment (EC 2014), “the impact of the achievement of the renewables target was taken into account in the design of the climate and energy package, with 2020 carbon prices at that time being projected lower due to the achievement of an ambitious RES target”.
* Couldn´t the EC define a RES target and then set the GHG target accordingly?

INSTRUMENTOS-INTERACCION

- *BUT…*
  - *Limited role of horizontal and vertical coordination.*
    - There is certainly a role for coordination between targets and instruments to mitigate conflicts and to promote complementarities and synergies in policy mixes.
    - But, owing trade-offs, the role of coordination is necessarily limited even at the same administrative level.
    - It cannot achieve the highest score in conflicting criteria and balances are unavoidable.
    - The existence of different goals at different administrative levels complicates the role that coordination can play in successful policy mixes. Different goals may create winners and losers at different levels and, thus, lead to unacceptable distributional effects.

The way forward

* The existence of interactions: an integrated approach to climate and energy policy is required.
* Focus: not on the functioning of specific instruments with respect to a single criterion, but on the functioning of the combination with respect to several criteria/goals.
* Wider approach for the assessment of instrument combinations.
* Negative interactions between instruments may not look so negative with a broader approach.

The way forward

* What can we recommend for 2030?
  * EU ETS reform? Credible, sufficiently high signal?
  * Targets for RES.
  * Deployment instruments: FIPs, auctions, FITs.
    * Signal for investments along the whole value chain.
  * Cost-containment measures in deployment support.
  * More balance between deployment and R&D support.
  * Increased EU / MS R&D efforts.

The way forward

- Strengthen EU research programmes and national R&DD support.
- Diffusion stage: a practical approach would be to support those (groups of) technologies that both have a large potential for emission reduction in the long term and also have a large potential for cost reduction.
  - This does not mean picking the winners, but picking the currently most promising options, such as those technologies identified in the (SET) Plan (PBL 2013).
- In designing cost-efficient policies to achieve such a low carbon technology target, support should be technology specific to account for different development stages, generation costs and future potential of technologies.

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