New modes of governance of low carbon investment in de-optimized power sectors: The impossible challenge of efficiency and equity

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• 1. Comparative effectiveness of low carbon mechanisms in power markets

• 2. Which way to monitor distributional effects?

A distributional problem appears after a threshold of low carbon technologies (capacity and energy)

– Physical threshold at around 15% of energy and 30-40% of capacity
– Cost threshold: € 10-20 milliards when total market revenues of production around € 30-40 billion
– Who pays?
Part One
Effectiveness of low carbon arrangements in power markets
Farewell to the Useful former vertically integrated utility model for dealing with public policies

Area service monopoly allowed planning and programming

Monopoly License with public service obligation: geographic price equalization, social tariffs,

Nationalized monopoly: industrial policies (promotion of large sized technologies and national manufacturers)

Optimal mix investment (caveat: error of forecasting)

Blessful era of dispatchable technologies

Tariffs aligned on average cost for all the consumers
(eventually horo-seasonality with non linear tariffs with capacity price under the so called mariginalist tariff)
Inclusion of the public service obligation and industrial policy costs in the tariffs

Eventual distributional issue:
Some cross-subsidisation for large consuming industries if industrail lobbying as in some European countries

• Quite controlable if solid doctrine like LRMC tariffs in France
• Norm of consumer protection (stronger with the PUC culture in the USA than in Europe)
US approach to decarbonisation in power sector

Why not the carbon price to trigger low carbon technologies development (RES-E, CCS, new nuclear) or less emitting one? (Besides market failures in matter of learning process which was the rationale of subsidies on investment and on production either by tax credit, public subsidies and now by FIT financed by levy)

• The Clean Power Plan’s EPA in the US proposes three options to states regulators
  – Cap and trade (so carbon price)
  – Baseline and credit (standard and tradable performances certificates; so an implicit carbon price)
  – Clean energy obligation (a general RPS)

• So explicit confidence to carbon pricing effects with choice 1 and choice 2

• Possibilities of success in the USA because the transitional option of gas power production (not the case in the EU)
In the European Union

- Carbon tax in some countries for non ETS sector
- ETS with grand fathering (carbon rent for the generators)
- Then ETS with auctioning

But the climate policy has de facto annexed in the EU (the famous 3x20)

- the former RES-E programs based on FIT, renewable obligation (equivalent to RPS in the USA)
- the energy efficiency programs (DSM, Energy efficiency obligation, CERT in the UK, etc.)

In fact no confidence at all in the price signal of the carbon pricing
Overlapping of instruments (with some negative trade offs)
Package of instruments covering centralized and decentralized technologies

Two functions:
- To add a support for non-mature technologies and transfer the overcost onto the consumers
- To transfer the main part of the risks on the consumers (or on the public budget)

- Feed-in tariffs
  - presently to be replaced by different types of feed in premiums,
  - auctioning for medium sized projects in the EU, but just for expose the RES-E producers to hourly market price

- Auctioning for long term contracts for new RES-e or large sized RES-e (France, UK, NL, DK, etc.)

- Obligation of green certificates on the suppliers (UK, Sweden, Belgium, Poland) or in the past on producers (Italy)

How to maintain incentive to control project costs and technology risks on the operators?

Incentive also to efficient operations
Farewell to the market regime model

The market model with decarbonisation public policy is in first based on planning and then on some forms of markets

- Out of market entries of RES-E (FIT, RO/RPS, auctioning)
- Need of LT arrangements for large sized low carbon technologies

Only the residual system is supposed to be optimizable by the text book approach

End use pricing

- Wholesale price (sourcing costs ) +
  - uniform levy for capacity +

  discriminatory levy for decarbonation policy +

  Possible discrimination of transmission costs

So Possible huge implicit cross- subsidization (under political discretion) :

Difference of end use prices between consumers
## Comparison of characters of main mechanisms

<table>
<thead>
<tr>
<th>Principles</th>
<th>Type of arrangement</th>
<th>Autonomy let to generators in investment decisions</th>
<th>Role of the current market</th>
<th>Public governance</th>
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<tr>
<td><strong>Decentralized coordination:</strong></td>
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</table>
| Price instrument                    | Fixed FIT (with obligation of purchase)                   | Freedom of timing                                 | No responsibility of RES producers on markets (priority access) | 1. Regulator determines annual payment on long term by technology.  
|                                     |                                                          | Orientation of choice by technology FITs           |                           | 2. Tuning of FIT for new contracts                                                |
| **Decentralized coordination:**     |                                                          |                                                   |                           |                                                                                   |
| Quantity instrument                 | Clean energy obligation on suppliers                      | Freedom of timing and choice of technology         | Responsibility of intermittent producers on balancing and energy markets | Regulator definition on target trajectories,  
<p>|                                     | Renewables obligation                                    | (in fact technology bands)                         |                           | On buy-out price, (penalty) on technology bands                                    |
|                                     | Renewables Portfolio Standard (RPS)                      |                                                   |                           |                                                                                   |
| <strong>Centralized coordination:</strong>       |                                                          |                                                   |                           |                                                                                   |
| Auction for contracts with public agency | Fixed price contracts (physical)                  | No technology neutrality (issue of learning investment) | Responsibility of producers | Regulator defines timing of auction, target by technologies                       |
|                                     | Contracts for difference CfD (financial)                 | Neutrality in future                              |                           |                                                                                   |
|                                     | Variable premium FIT                                     |                                                   |                           |                                                                                   |</p>
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<thead>
<tr>
<th>Principles</th>
<th>Type of arrangement</th>
<th>Advantages</th>
<th>Limitations</th>
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<tbody>
<tr>
<td>Decentralized coordination:</td>
<td>Fixed FIT (with obligation of purchase)</td>
<td>Simple and adaptive</td>
<td>1. Risk of overcapacity by technology</td>
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<tr>
<td>Price instrument</td>
<td></td>
<td>Effective</td>
<td>2. Exposure to regulator capture risk</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>3. A bit less incentive to operational efficiency</td>
</tr>
<tr>
<td>Decentralized coordination:</td>
<td>Clean energy obligation</td>
<td>Less rent than with FIT</td>
<td>1. Addition of market risks (wholesale energy, certificate price)</td>
</tr>
<tr>
<td>Quantity instrument</td>
<td>Renewables obligation</td>
<td>Revelation of informations</td>
<td>2. Risk of illiquidity of exchanges if vertical arrangements</td>
</tr>
<tr>
<td></td>
<td>Renewables Portfolio Standard (RPS)</td>
<td>Total cost control by buy-out price</td>
<td>3. Risk of regulatory capture (Banding)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Supposed to control installed capacity</td>
<td>4. No respect of the capa. obj.</td>
</tr>
<tr>
<td>Centralized coordination:</td>
<td>Fixed price contracts or CsD (financial contracts</td>
<td>1. No asymmetry of information on price</td>
<td>Difficulty with price reference for strike price</td>
</tr>
<tr>
<td>Auction for contracts on LCTs</td>
<td>Variable premium FIT</td>
<td>2. With CsD, Revenue stability on long term</td>
<td>Transaction cost</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(difference with fixed Premium FIT)</td>
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Part 2. The monitoring of distributional effects

- Who pays? Management with endemic practices related to the historic norms of consumers protection

- Development of cost containment practice
The debate is not yet appeared in the US because the yet limited costs of the RPS and DSM in the bills  

source NREL, May 2014
But great awareness to protect the consumers by the PUCs

The exemplary recycling of the carbon rent in the Californian ETS with free allowances:

Utilities receive free allowances
But are required to auction them and rebuy it
→ Reveal the cost of the allowances to be passed through in the tariffs
All auction proceeds have to be paid back by utilities to customers through flat “climate credits” ($35/semester in 2014)
More than offset price increase to low-income households
Who pay in Europe?

Before reforms, the cost of the public service obligation and the industrial policy imposed to utilities was internalized in the budget of the utilities.

After reforms and decarbonisation policies (ETS introduction in 2005):
1. The carbon rent is remained in the hands of generators (even the emitting ones).
   No investment at all in low carbon equipment (CCS from instance).

2. In general, small consumers (households and SMEs) pay in each EU-member for the FIT costs.

2 bis When it is a RO obligation, more difficult to observe who pays
   • But alignment of the market price offers on the buy-out price penalty whatever the price of the certificates (in the UK and Nordic countries for instance).
## Who pay?

<table>
<thead>
<tr>
<th></th>
<th>Germany</th>
<th>Italy</th>
<th>France</th>
<th>Spain</th>
<th>UK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household s and SME</td>
<td>62€/MWh</td>
<td>36€/MWh</td>
<td>8 €/MWh</td>
<td>Most charge than industry</td>
<td>Uniform levy to be added to the present RO cost and CERT cost of the suppliers</td>
</tr>
<tr>
<td></td>
<td>Explicit in the bill</td>
<td>SME more than households</td>
<td>CSPE explicit in the bill</td>
<td></td>
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<tr>
<td>Energy intensive industries</td>
<td>0.5€/MWh (5% of the total cost)</td>
<td>0 ?</td>
<td>Free tax threshold of 7 GWh/y</td>
<td></td>
<td>Non explicit in s contracts</td>
</tr>
</tbody>
</table>

- CSPE: Certified Small Power Electrics
- RES: Renewable Energy Sources
- CHP: Combined Heat and Power
- RO: Renewable Opportunities
- CERT: Certified Emission Reductions
- SME: Small and Medium Enterprises
## The need of cost containment procedure

<table>
<thead>
<tr>
<th></th>
<th>Present total costs</th>
<th>Explicit cost containment with cap</th>
<th>Payment by discriminatory levies</th>
<th>Partial non payment of</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>€20 billion per year</td>
<td>€20 billion</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Spain</td>
<td>€11 billion per year(21% with CHP)</td>
<td>?</td>
<td>Yes ?</td>
<td>Transformation tariff deficit in a restructured fund in 2009 (funded by 10% of bills) Tax of 7% on the electricity utilities (2013)</td>
</tr>
<tr>
<td>Italy</td>
<td>€12 billion</td>
<td>€12.5 billion</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>France</td>
<td>€5.5 billion (with CHP )</td>
<td>Not yet</td>
<td>Partly</td>
<td>Govt debt to EDF : 2.5 billion</td>
</tr>
<tr>
<td>UK (without the Renewable obligation)</td>
<td>£5.3 billion</td>
<td>£7.6 billion in 2020</td>
<td>Uniform levy to be added to the RO cost of the suppliers</td>
<td></td>
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</tbody>
</table>
Procedures of cost containment are in development
The UK case of the levy control

(Levy funded expenditures on FIT, CfDs and Warm front, but not RO, and CERT)

• Cost transparency (regular publication of anticipated cost)
• Control of the increase with definition of a cap
  – Need of credible scenarios of development of different measures to make cost anticipation
  – To test the interactions between options (for instance CfDs for large RES-E, nuclear, feed in tariff for small technologies)
    • Scenarios within the cap and scenario outside the cap
    – Methods based on a model of investment choices and market simulation (strike price)

• Creation of a board for the control of expenses but not the outcomes
• (for instance, no advice to give about the selected CfDs and their costs):

  Question mark: what would happen with the nuclear CfDs if the cap will stay fixed in the future?
  One HP contract CfD = 4.5 billion

• Some self adaptation: if above the cap, decrease of the Feed in tariffs

• Could it serve as a commitment?

Alternative: to control FIT premium by a cap + limit of installation per year and technology (Germany, Spain)
As a conclusion

From an Institutionalist perspective:
The effectiveness of a regulatory and organisational model depends upon:
1/ its internal consistency and  2/its coherence with the institutional environment (competition rules, soft laws) (Aoki, 2004).

– Is there still a consistency?
– all the market coordinations are definitively distorted for short term and long term coordination
– Increasing discrepancy between market price and LRMC/average costs  
  • Illustrative case In Germany households and SMEs pay a RES-E levy higher than the energy cost

  No more normative reference  (compass is there but no more magnetic North)
– Competition policy regulator likes his compass but there is no more North

A test about the redistributive question
Second best theory (Lipsey et Lancaster, 1956) is it valuable?
  Ramsay Boiteux approach about the charge to be supported by different group of taxpayers or consumer groups : charge inversly porportional to price elasticity

Could it be a justification? The magnetic North has disapppeared
Constant exposure to lobbying pressures and kabbalist interpretations of the competition law at the EU level