The Role of Subsidies to Facilitate Transitions to Low-Carbon Technologies

The case of Concentrated Solar Power in Spain.

Climate Policy Initiative - Launch Event
The Road to Copenhagen

Berlin, 12th November 2009

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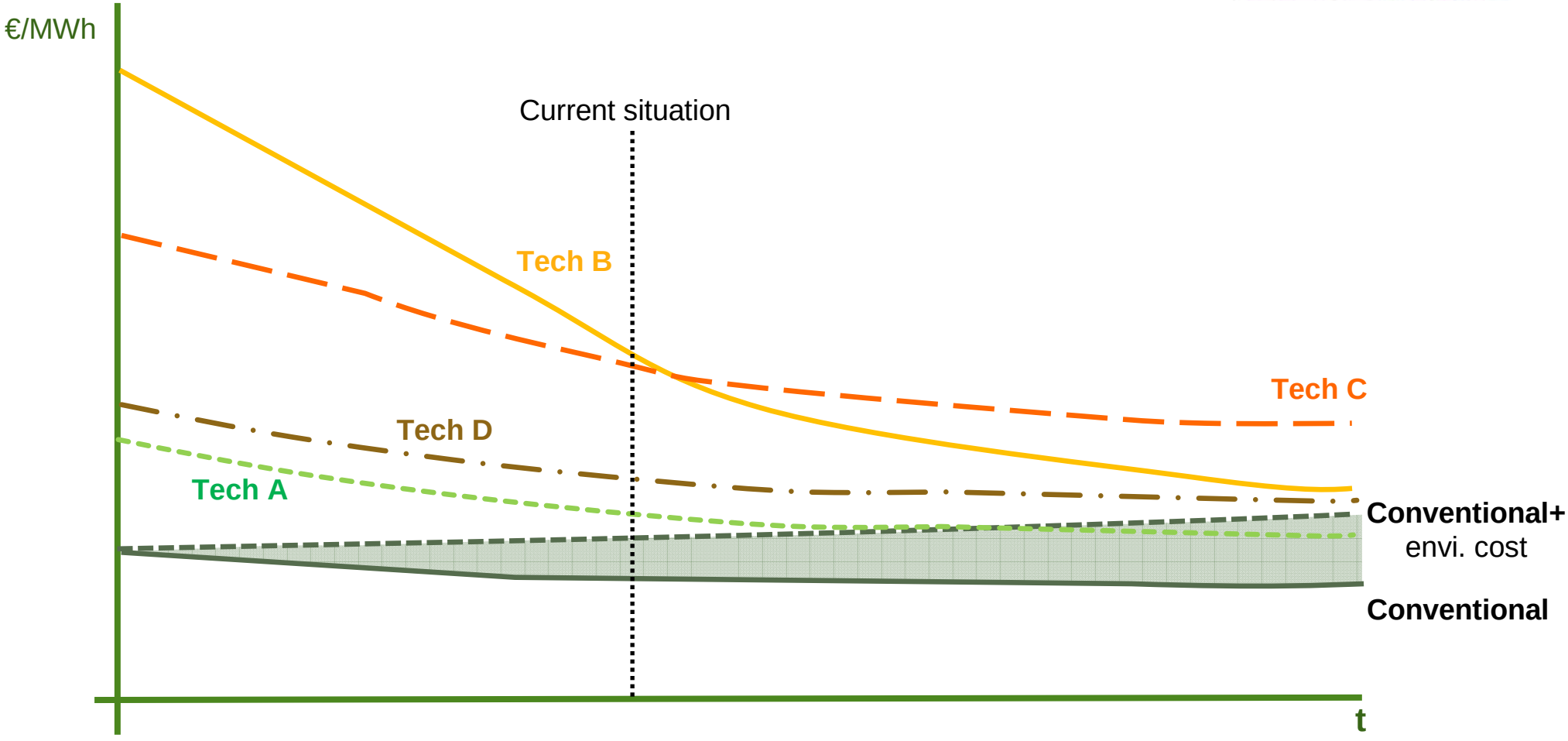
Just two messages…

Policies to promote renewable energies need to be adapted to the situation of each technology in terms of technology development, potential, cost and other issues.

Not properly defined subsidies have negative impact: what works for one technology may not work for other.

We need to look at the renewable technology situation from a dynamic perspective.



Tech A	Tech B	Tech C	Tech D
Near competitiveness. Mature technology.	Far from competitiveness but constant reduction of cost. High level of installed capacity.	Slow tech. development in the past. No recent developments. Technology uncertainty. Important competitive gap from conventional tech	Mature technology. Without economic and technical barriers. Logistic barriers.

The case of Concentrated Solar Power (Tech C)

First developments in the early 90s in USA, but from 1990 to 2005 "*the long solar night*".
Revival in 2005 due to the new regulatory framework passed in 2005 in Spain.

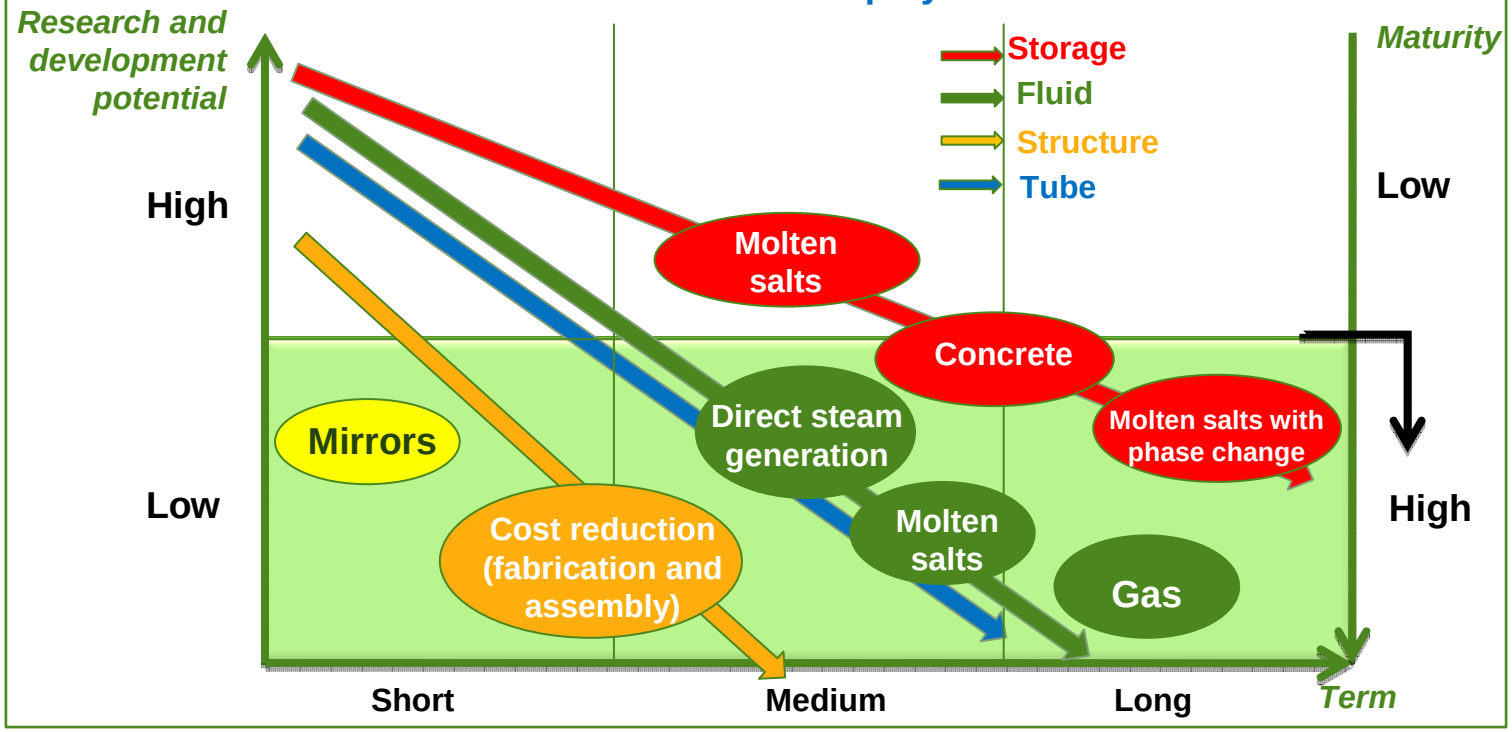
Main elements of CSP

Far from competitiveness.
Cost 4 to 5 times more than conventional sources.

Technological uncertainty.

No recent empirical evidence of its success.

Technological uncertainty in every aspect related to solar thermal deployment



Demo projects → to demonstrate it's possible to count with this technology.
R & D → to reduce cost.

Each technology faces different challenges and regulation must adapt to them.

	Current situation	Support policies
Tech A→ Wind.	Mature technology. Near competitiveness	Market price + premium (until reaches competitiveness).
Tech B→ Solar PV.	Far from competitiveness but constant reduction of cost. High level of installed capacity.	R & D & i. Market innovation + Institutional development to benefit from economies of scale and knowledge.
Tech C→ CSP.	Slow tech. development in the past. No recent developments Technology uncertainty. Important competitive gap.	Demo projects R&D to reduce cost.
Tech D→ Biomass.	Logistic barriers in the raw material supply.	Market price + premium (until reaches competitiveness).. Sectoral policies.

A flexible support scheme must consider the level of technological development, costs and problems associated with each technology.

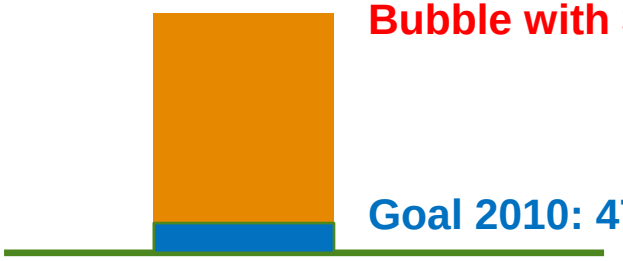
Problems with the current Spanish support scheme with solar technologies

SPANISH SUPPORT FRAMEWORK FOR RE (Main elements):

- **Objectives defined by technology**
- **Premiums differentiated by technology, updated every four years (no retroactivity); without effective quantity control.**

WIND→ Really effective and efficient system for a mature renewable technology.

SOLAR PV→ High premium (440 €MWh) + Important foreseeable cost reduction and technological uncertainty:



Economic impact for consumers!!! 2.500 M. € annually

SOLAR THERMAL→ High premium (300 € MWh) + cost reduction and technological uncertainty.

Economic impact for consumers!!! 1.500 M. € annually

Adverse effects arise from these situation created by regulatory problems:

Negative economic impact.

Increased cost of the electricity system.

Discouraged R&D and innovation .

If retribution does not take into account cost evolution, R&D aimed to reduce cost is not stimulated (did not foster technology innovation)

Did not provide local industrial development.

Bubbles in solar technologies have incentivized massive imports of industrial equipment

Support based on premiums (without control of quantities) are not appropriate for technologies far from competitiveness →

Bubbles → Increase cost of electricity supply→ Reduce public acceptance.

Conclusion

To face world energy model challenges we will need all renewable technologies, considering its differences when defining support schemes.