

Tradable Green Certificates – a cost-efficient policy driving technical change or a rent generating machine?

Anna Bergek

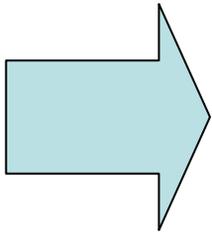
Staffan Jacobsson

Background: Essentials of the Swedish TGCs system

- Initiated 2003, duration to 2030 – total turn-over about 100 billion SEK
- Short term aim: add 17 TWh new 'green' power by 2016
 - Rapid rise in output of 'green' power: 6.5 (2003) -13.2 (2007)
- Quota based system where investors get income from sales of
 - Power in the 'ordinary' market
 - Green certificates (about 2.3 eurocents per kWh the first four years) to power traders who are obliged to fill the quota
- Supposed to promote cost efficiency and technical change
 - Government explicit that costs are cost to consumer
- How has it met the cost and innovation challenges?

Estimates of the share of rents in payments to power suppliers 2003-2030 (1)

- Rents associated with ensuring a liquid market for certificates (costs incurred 2003-2013)
 - Plants that already existed in 2003 were incorporated into the TGC scheme to ensure liquidity (until 2013)
 - Estimate with price of certificates SEK 150, 200 and 250 (most recently SEK 375)



Rents amount to SEK 13-30 billion (with reasonable estimate SEK 23 billion)

Estimates of the share of rents in payments to power suppliers 2003-2030 (2)

- Rents created when technologies with higher costs drive up marginal costs and price
- To assess the magnitude of these we assume
 - From 2014, offshore-based windpower raises price of certificates to SEK 300-370
 - Prior investments break even at a price of SEK 200
 - Established plants in the period 2003-2013 are granted certificates for 15 years (10 TWh)

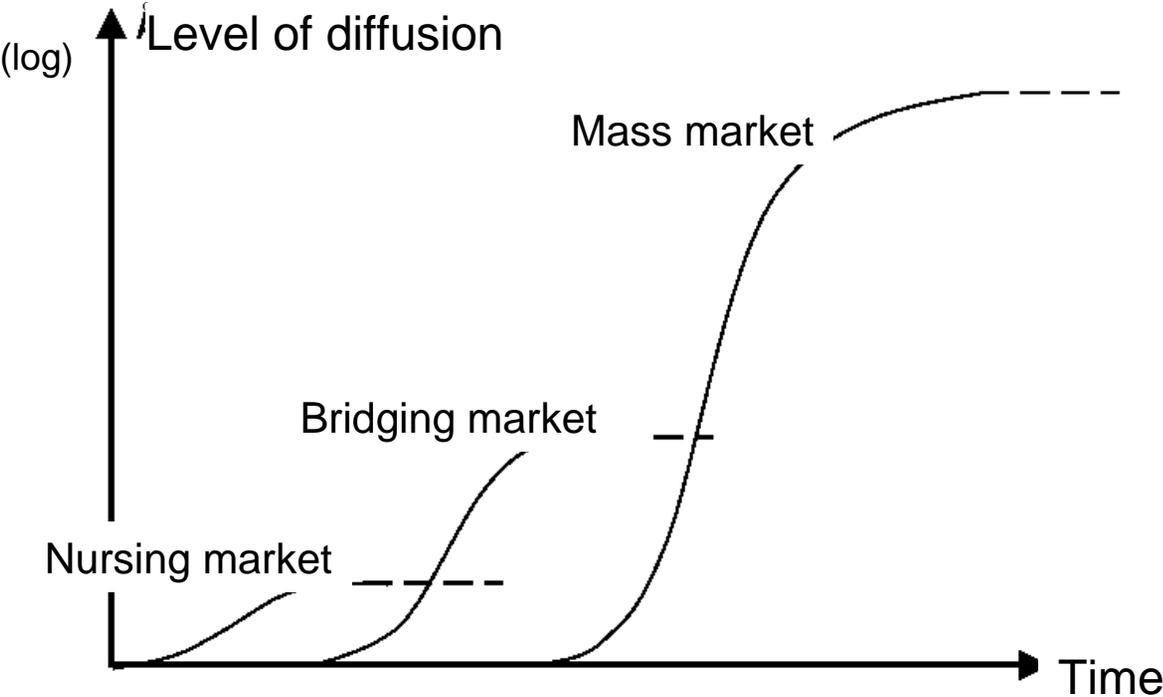


10-18 billion SEK of rents are generated

Estimates of the share of rents in payments to power suppliers 2003-2030 (3)

- Adding these two rents lead to a sum of between SEK **23 and 48** billion in rents that are given to a) owners of existing plants and b) owners of plants established in 2003-2013
- As a share of turnover (total turnover minus transaction costs/margins and sales tax) these rents constitute between **32 and 50%**.
- *A 'cost efficient' scheme involves very high support to industry and very high rents – the cost challenge is not met*

TGC's as driver of technical change (1)

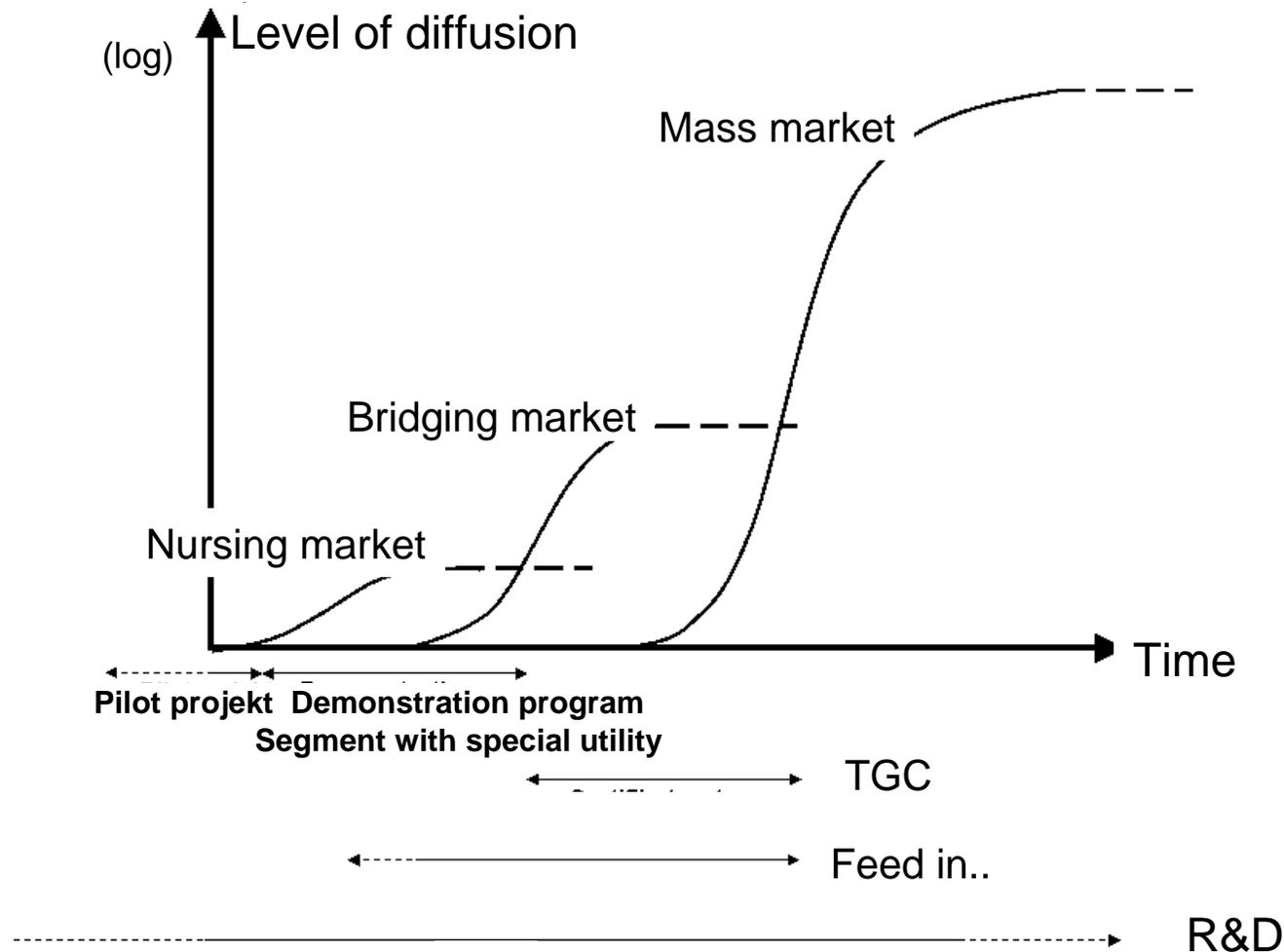


TGC's as driver of technical change (2)

- key features of 'nursing markets'

- Duration:
 - German wind power – 15 years
 - German solar power - 25 years
 - Swedish organic milk – 15 years
 - Swedish mobile phones – 24 years
- Size
 - German wind power – 20 MW
 - German solar power – 50 MW
 - Swedish organic milk – 154 000 tonnes (22,000 cows)
 - Swedish mobile phones - < 30,000 subscribers
- Importance
 - Attracts firms (equipment suppliers) and their resources and gives them incentives to **develop the technology**
 - Link between policy and technical change goes via the **equipment suppliers**: markets are necessary for the technology to be 'put on the shelf' (in a rudimentary form)
 - Not cost efficient but the wrong criteria to use in this phase

TGC's as driver of technical change (3)



TGC's as driver of technical change (4)

- TGC stimulates a *technology follower* (importer) strategy and *not* one driving technical change and an industrialisation of the technology (exception are those technologies where a nation is already competitive – biopower in the Nordic countries)
- *TGC does not meet the innovation challenge*

Conclusions from Sweden

- TGC has not met the cost and innovation challenges
 - Social cost (yes, short term)
 - Consumer cost (no)
 - Innovation/industrialisation (no)
- Choose TGC if the overriding concern is to minimise short term social costs and if play down
 - the significance of rents
 - the value of industrialisation opportunities and technical change
- Evaluate other alternatives (e.g. feed-in) if
 - Society values industrialisation opportunities and technical change
 - It is important to maximize the production of renewable power in relation to the support given to industry (by keeping rents down)

Reflections on consequences of a pan European TGC (1)

- Pan EU TGC will generate enormous rents
 - Scale of the transformation required
 - Vast difference in costs within and between technologies
- How to drive TC and build new capital goods industries?
 - At a country level, we can choose to minimise social cost and neglect the innovation challenge
 - If apply TGC at EU level, there will be no market space for learning and capacity building for new and today costly technologies
 - The EU solar cell industry will collapse
 - EU will miss huge industrialisation opportunities

Reflections on consequences of a pan European TGC (2)

- Can we make it – 2020 vs 2050 and at what costs?
 - Wind and biopower may be enough until 2020, but from where shall we get the tools to decarbonise the power sector and replace much of the petrol (plug-ins) past 2020?
 - Import all new technologies (apart from wind turbines and boilers/turbines) from Japan and China or will the capital goods fall like 'manna from heaven'?
 - If new technologies are forced into the TGC without a prior built up (learning) the rents generated will be enormous
- The risk of fostering wrong technologies (the neoclassical worry) is far less serious than risking to fail to meet the innovation challenge
 - At EU level we don't have the choice to minimise short term social costs and ignore the innovation challenge
 - A pan EU TGC is therefore extremely dangerous proposition