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**Comparing quota systems
Sweden-UK-Italy**

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What can influence the success of a quota system?

- The design of the system
- The ambition in relation to the available potential for different technologies
- Other factors
 - Administrative structures and procedures
 - Cultural views and behavior regarding market conditions and regulation

Research why the results of different quota systems differ are missing

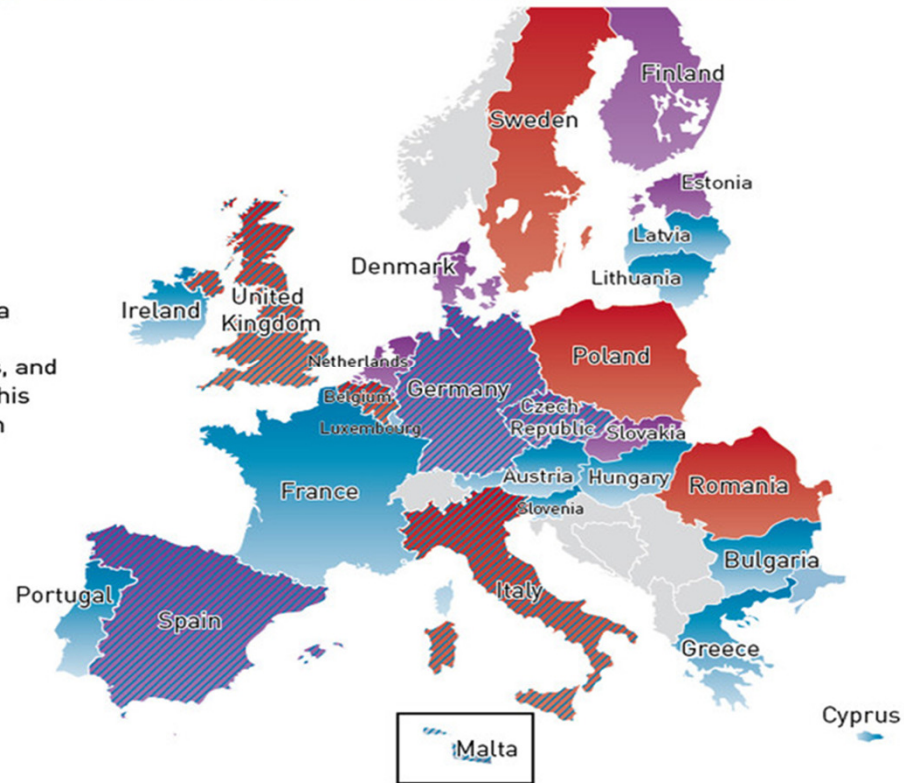
- Why are some systems successful, others not?
- Could poor systems be amended and how?

Overview of support instruments for electricity from renewable energy sources in EU Member States

- Quota obligation
- Feed-in tariff
- Feed-in premium
- Other instruments

Notes:

- 1) The patterned colours represent a combination of instruments
- 2) Investment grants, tax exemptions, and fiscal incentives are not included in this picture unless they serve as the main support instrument



Source: Fraunhofer ISI et al. ; Status: 02/2012

www.renewables-in-germany.com



Content

- Comparing the design of schemes in Sweden, UK and Italy
- Some results from the Swedish Elcert Scheme
- How to tackle big cost differences for different technologies in a quota obligation scheme.
 - Example from US
- Conclusions

Why quota based certificate schemes?

According to the Swedish government:

- Promote competition between producers
- Technology neutrality foster competition between technologies
- Possibility to internationalize

Comparing the design of the quota systems Sweden-UK- Italy

The Swedish elcert system 1(4)

Parameter	Sweden	UK
Target	Increase of 25 TWh (20% of the consumption) of RES from 2002 to 2020*	Legally committed to meeting 15% of UK's energy demand from RES by 2020
End of scheme	2035	2037
Eligible plants receive certificates during	15 years, but not beyond year 2035	20 years. The RO closes to new applicants at the end of March 2017
Size of the certificate	1 MWh	1MWh
Life length of the certificate	Unlimited banking No borrowing	To be cancelled within 18 months
Eligible production*	Technology neutral <ul style="list-style-type: none"> • All new RES plants • Energy efficiency increase of existing plants • Totally renewed plants can get another 15 years period • Bio fuels according to sustainability criteria 	ROCs are banded according to technology, with some technologies benefiting from multiple ROCs per MWh, others face a fraction of 1

* Norway has a target of 13,2 TWh 2020 and 2020

** More or less the same definition in Norway. Peat is eligible in Sweden but not counted as RES

The Swedish elcert system 2(4)

Parameter	Sweden	UK
Quota	Yearly quotas to 2035 stated in the Elcert law. Review every 5th year. (Separate quota curves in Sweden and Norway)	Obligations on suppliers rising to 15% by 2015 and then on the headroom principle till 2027, after which the ROC is fixed
Quota obliged parties	<ul style="list-style-type: none"> Suppliers Customers buying from Nordpool Electricity intensive industry exempted (ca 40 TWh, 25 %) End-users producing their own electricity with a consumption less than 60 MW exempted 	<ul style="list-style-type: none"> Suppliers
Valid certificates	Elcert from Sweden and Norway	UK
Non compliance fee	150% of the last years average weighted price*	Buy out price imposed on suppliers which miss obligation target. These funds are then distributed to suppliers based on pro rata delivery of obligation

The Swedish elcert system 3(4)

Parameter	Sweden	UK
Grid connection costs	<ul style="list-style-type: none"> The same regulation as for conventional power Producer pays: <ul style="list-style-type: none"> Grid connection to the public grid Costs for upgrading the local and regional grid if needed 	Generator and supplier pay distribution and transmission costs
Priority access	No	No
Quota compliance	Sufficient certificates (electricity sales times the quota) shall be available on the quota obliged party's account 31 March each year	Supplier obligation as proportion of their sales
Balancing costs	The producer	The producer

The Swedish elcert system 4(4)

Parameter	Sweden	UK
Pricing	Totally free - no price regulation	No price regulation
Price information	Daily prices announced by brokers (mainly two)	
Trade	Bilateral or via broker. No trade over any exchange.	
Transactions	Carried out in the TSOs accounting system. The price for each transaction has to be notified. Used for calculating the non-compliance fee.	Wholesale exchanges Balancing mechanism also in play
Customer costs	No regulation how to charge the customers: <ul style="list-style-type: none"> - For fixed electricity price contracts the elcert cost is normally included - For spot related price contracts the elcert cost is normally charged separately 	Suppliers pass the cost onto the consumer. In 2011 this was estimated to add £20 to the average household bill



What about Italy?

Certificati Verdi started already 1999

- Obligation on producers and importers
- Some parameters not decided long-term, like the yearly quota
 - A lot of debate about the quota obligation
- A lot of exemption possibilities, ca. 45% of all electricity production and imports exempted
 - Green imports exempted
 - Producers <300GWh
- The demand for certificates reduced and consequently a pressure on price
 - Most producers used the fixed buy out price stated by the authorities

Reasons for changing the ROC system to a CfD



- Consensus is that the RO will not deliver the scale of long-term investment needed (£110bn by 2020), at the pace required.
- Green lobby has long pushed for FIT and so have investment houses/pension funds etc. who want nice safe returns and other people to carry risks.
- Political consensus that the measures (4) outlined in Electricity Market Reform are better positioned to meet the challenges of decarbonization and security of supply

Reasons for changing the ROC system to a CfD – cont.

- In theory FiTs provide higher degrees of certainty to investors. Contracts for Difference have been adopted as they are considered least cost to the British consumer – not only for renewables – also for low carbon technologies (e.g nuclear)
 - A guaranteed price (per technology/project?) with CfD, covering the difference between the guaranteed price and the electricity price
- A huge number of amendments of the scheme/schemes may have caused some uncertainty of the RO system
 - Banding – continuously updated
 - Head room – changing the obligation to balance the supply of certificates stabilising the certificate price
 - The headroom and banding, makes the ROC scheme more like a premium model
 - The buy out price is modified every year



Why does the Swedish system work?

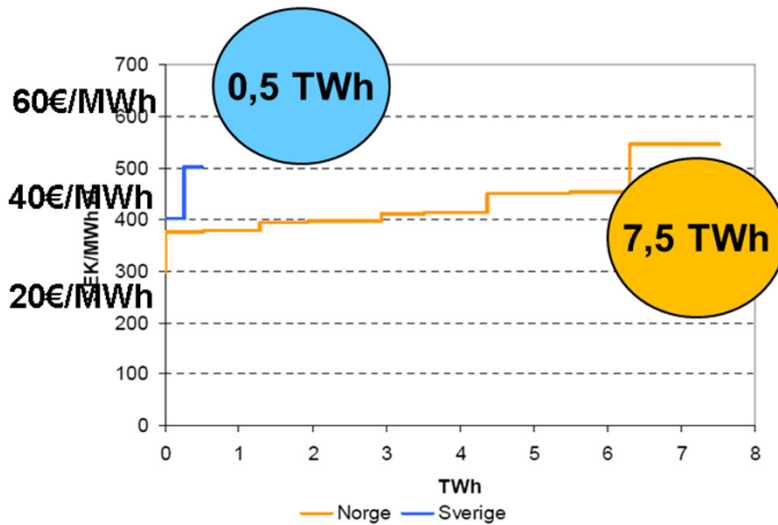
- Politically stable – accepted by two different governments
 - Cooperation with Norway strengthen the stability
 - Clear rules regarding reviews – every fifth year
 - Very few amendments
- The design parameters decided long term after an introduction
- Market prices without any political influence
 - Cap and floor though the first two years
- Flat supply curve due to a lot of on-shore potentials

BUT

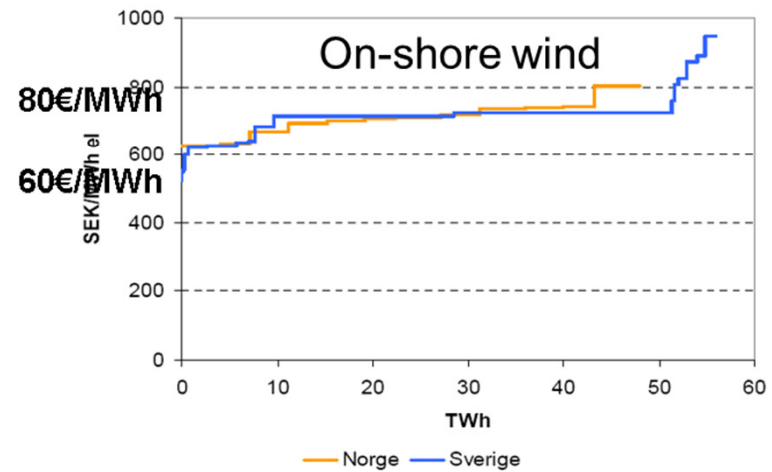
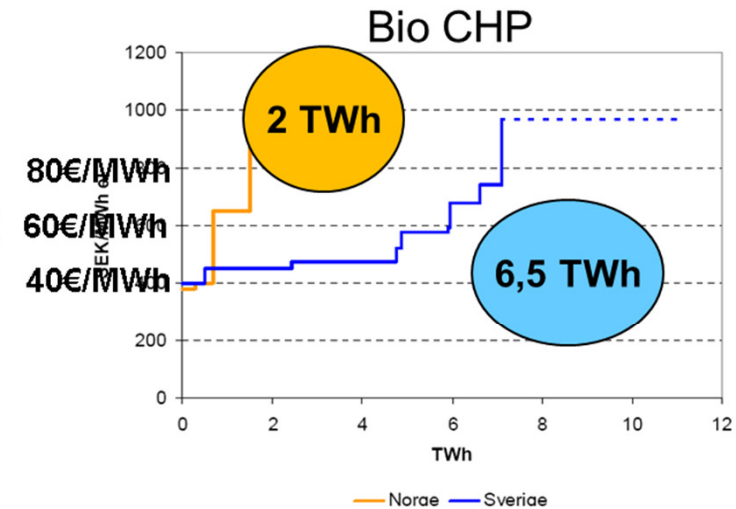
- Surplus situation causes lobby activities to raise the quotas
- Offshore wind not profitable causes lobby activities for additional support instrument



Potentials for new RES production 2012-2020

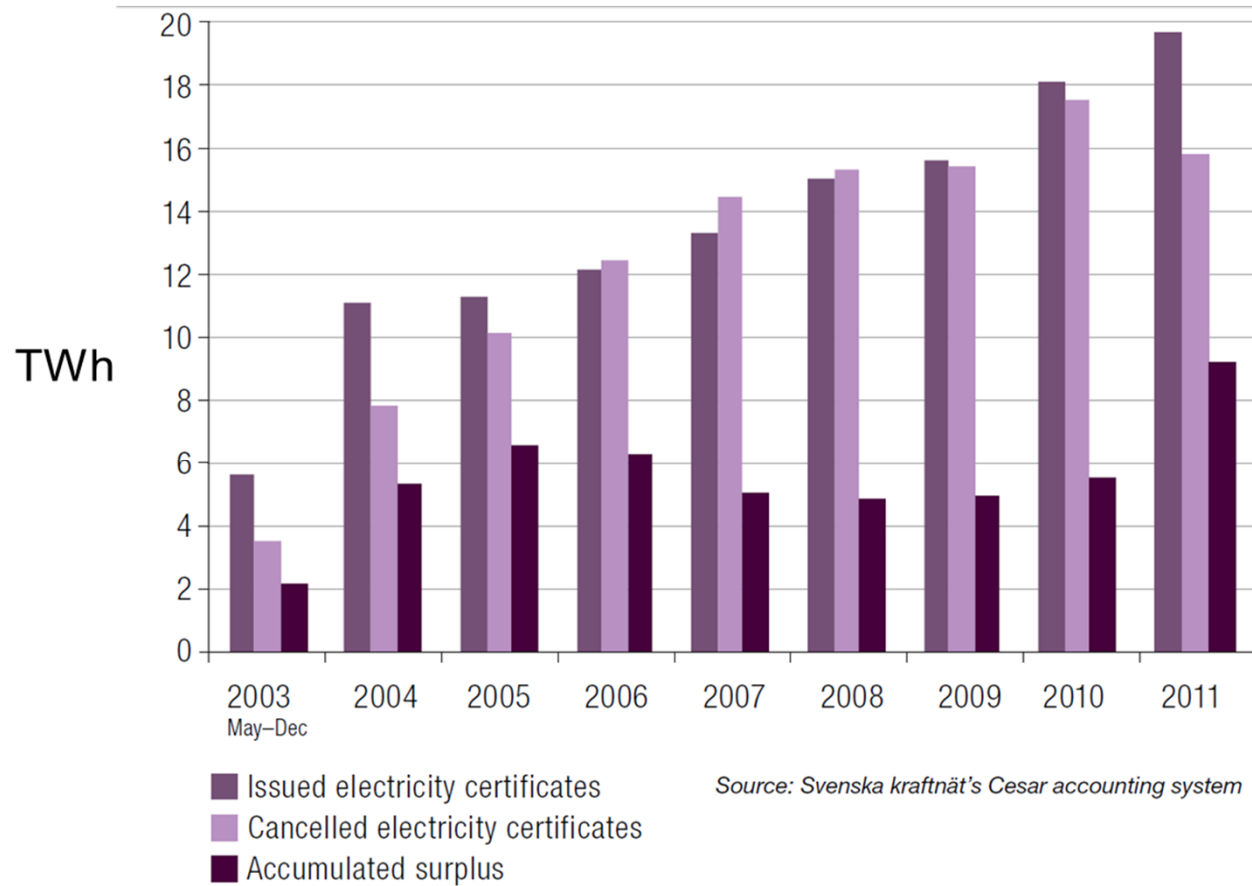


Marginal production on-shore wind
Marginal cost 60-75 €/MWh

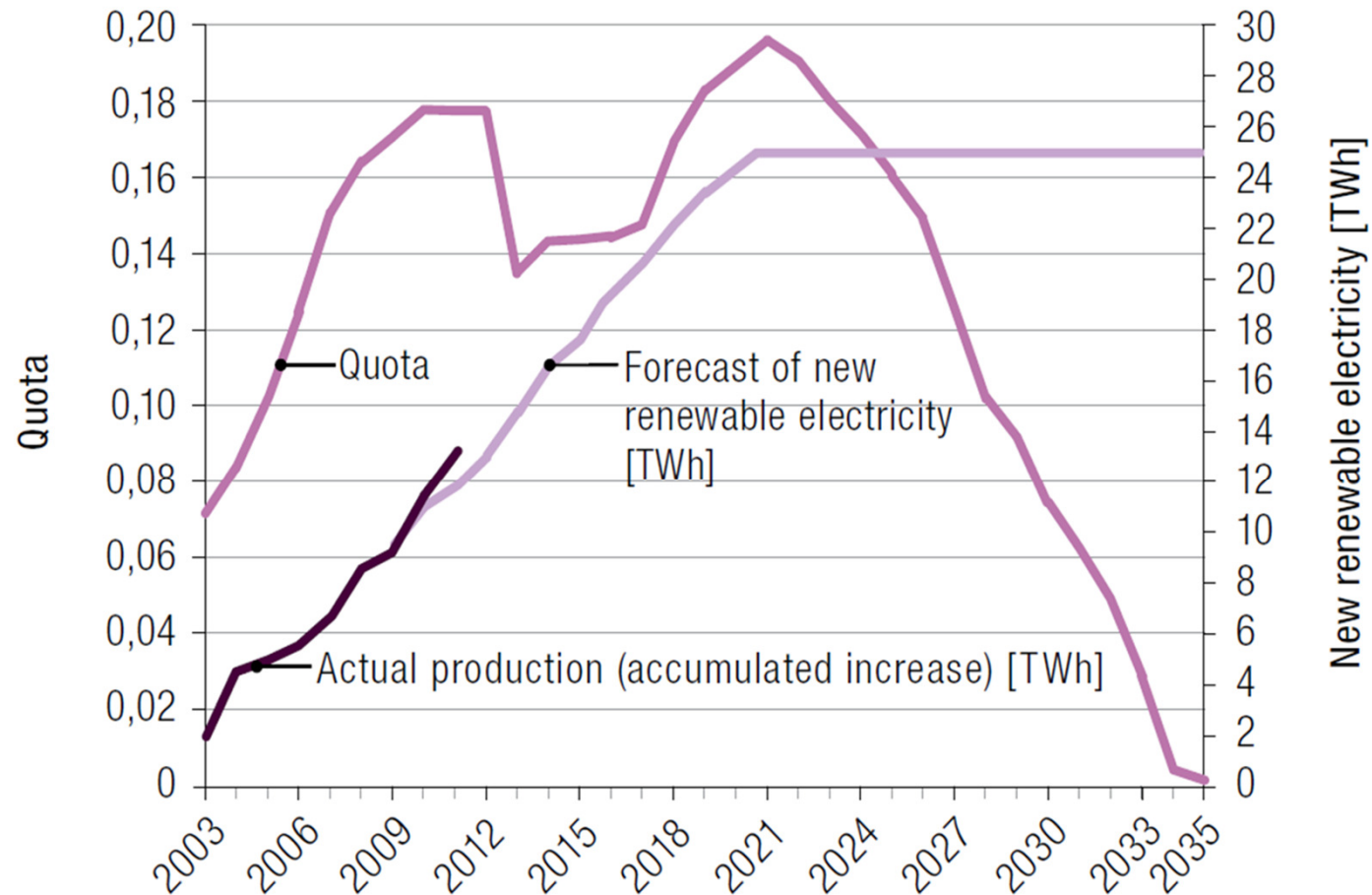


Some results from the Swedish Elcert Scheme

The Swedish Elcert scheme, issued and cancelled certificates



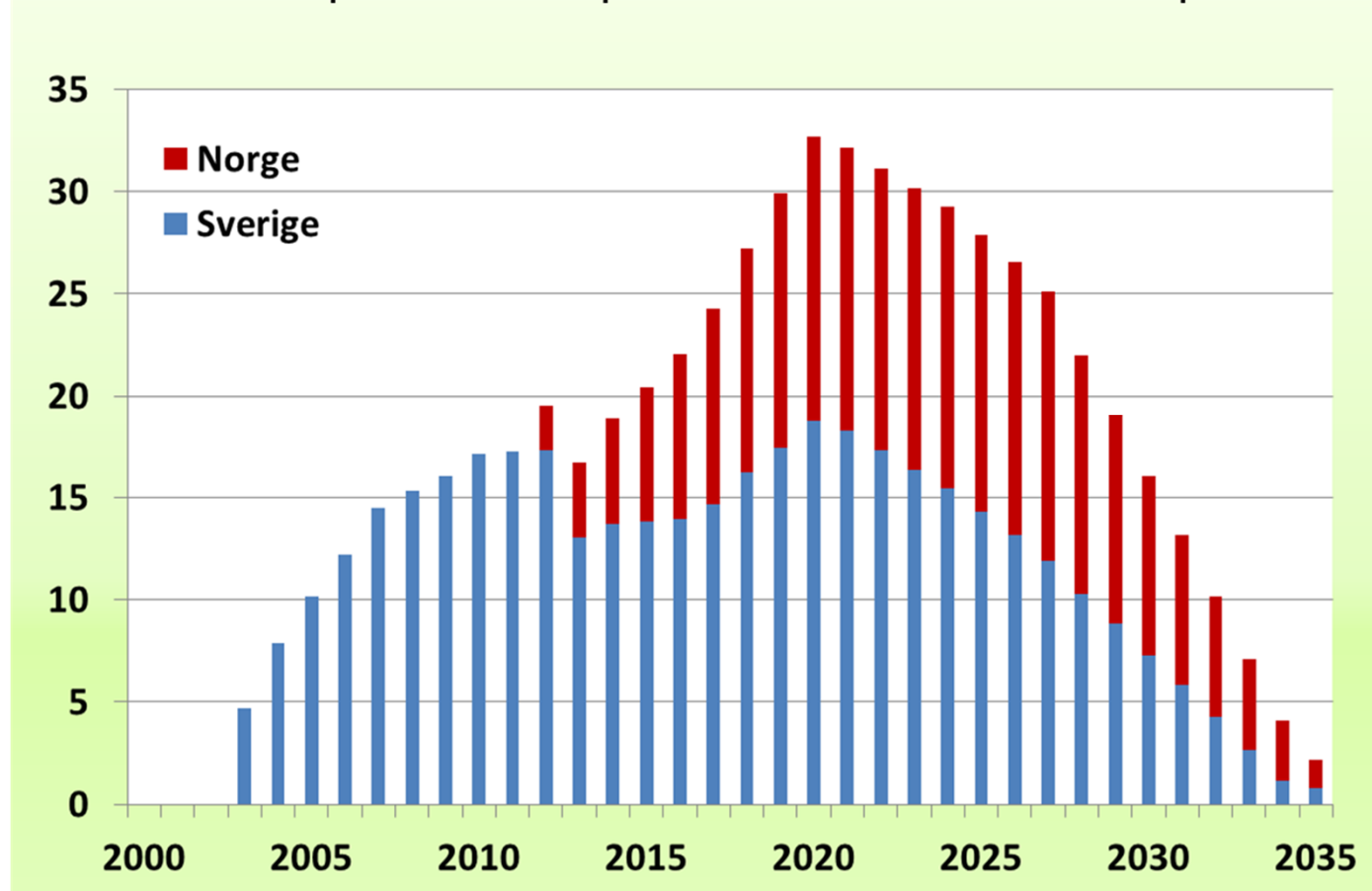
Swedish Quota 2003-2035 and new production



Source: Bill no. 2009/10:133; Svenska kraftnät's Cesar accounting system

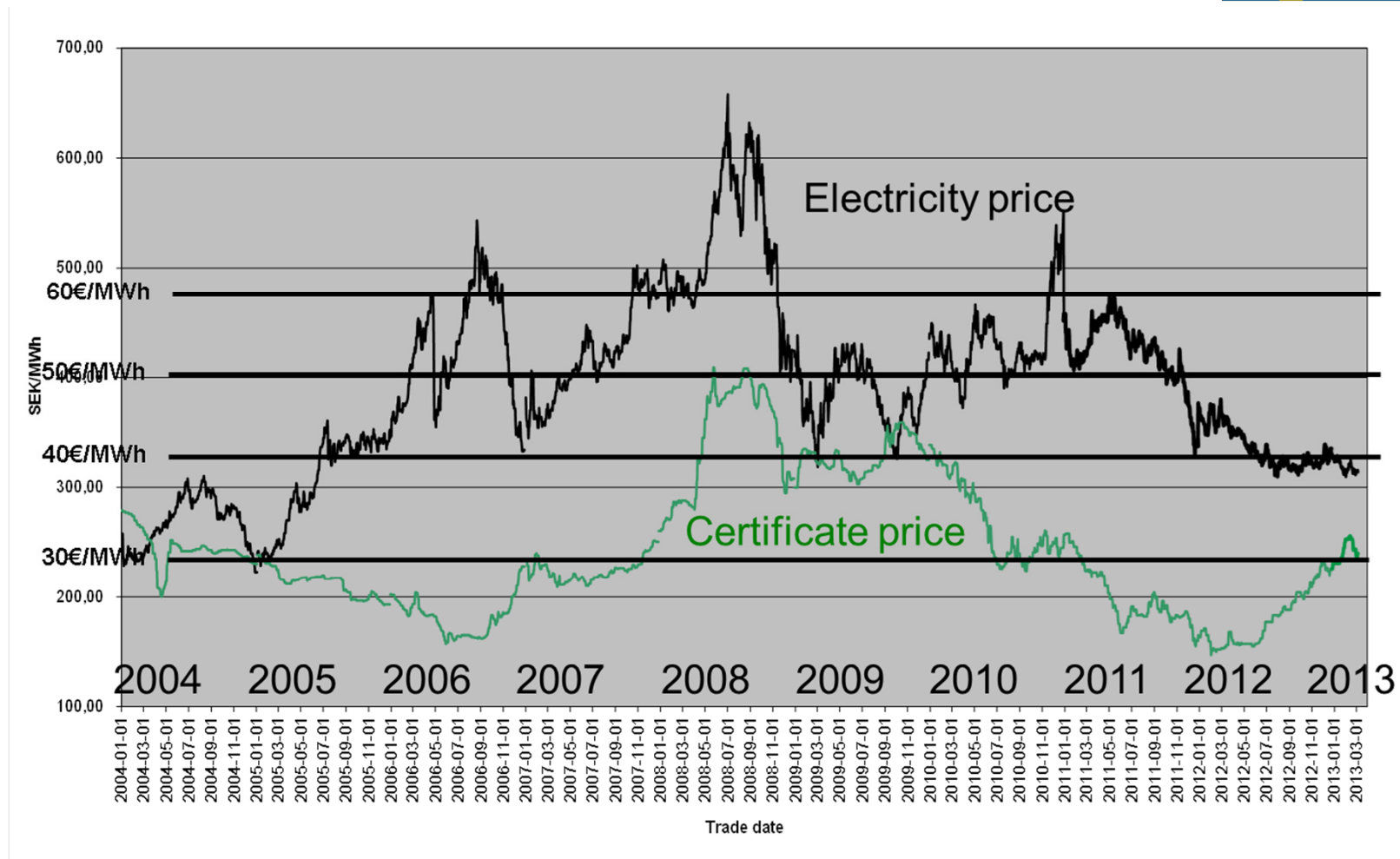
Quotas in Sweden and Norway

TWh – but the quotas are expressed in % of sales in respective country



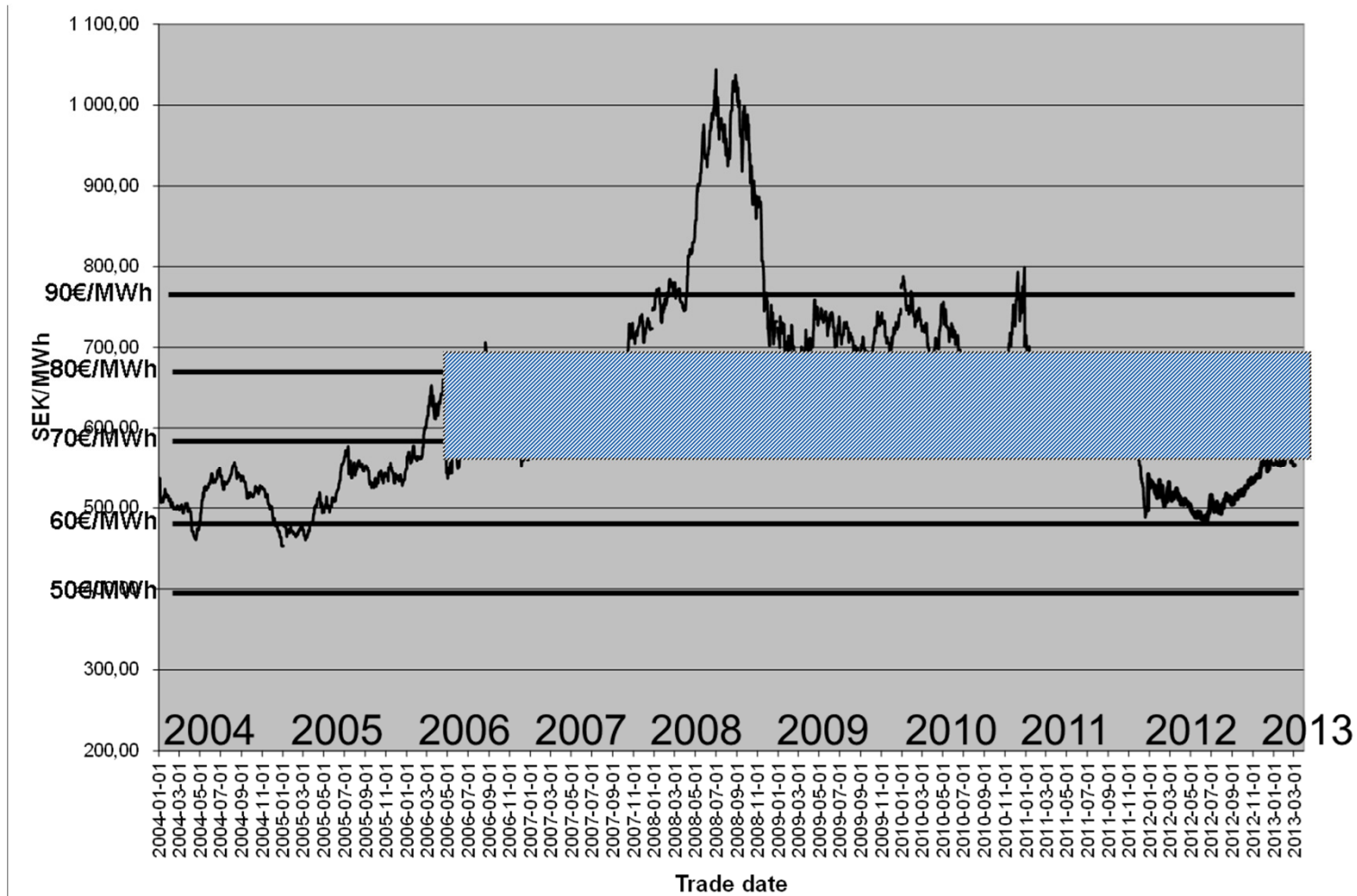


Electricity price and certificate price



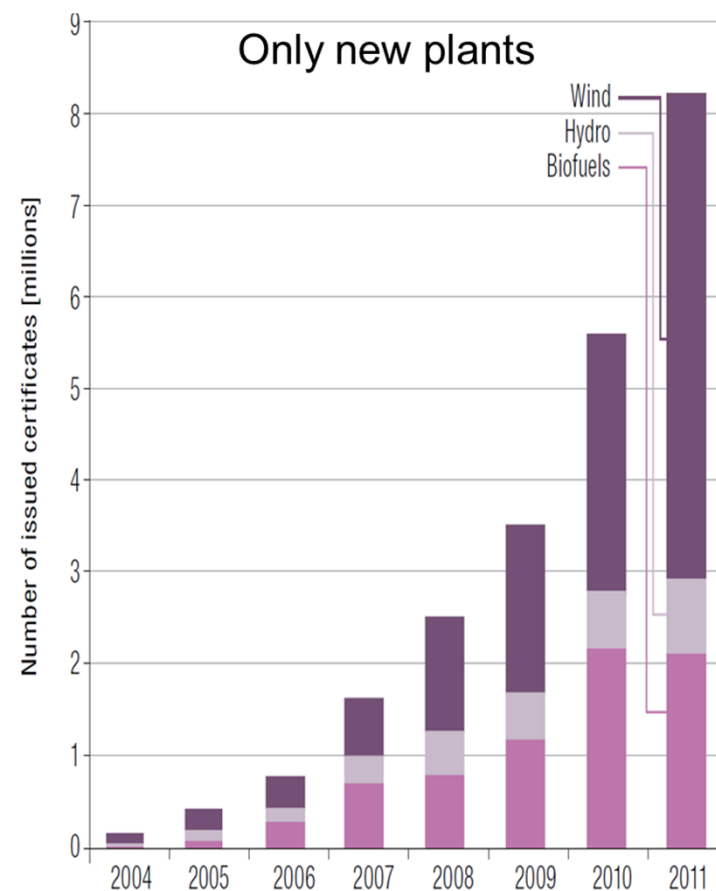
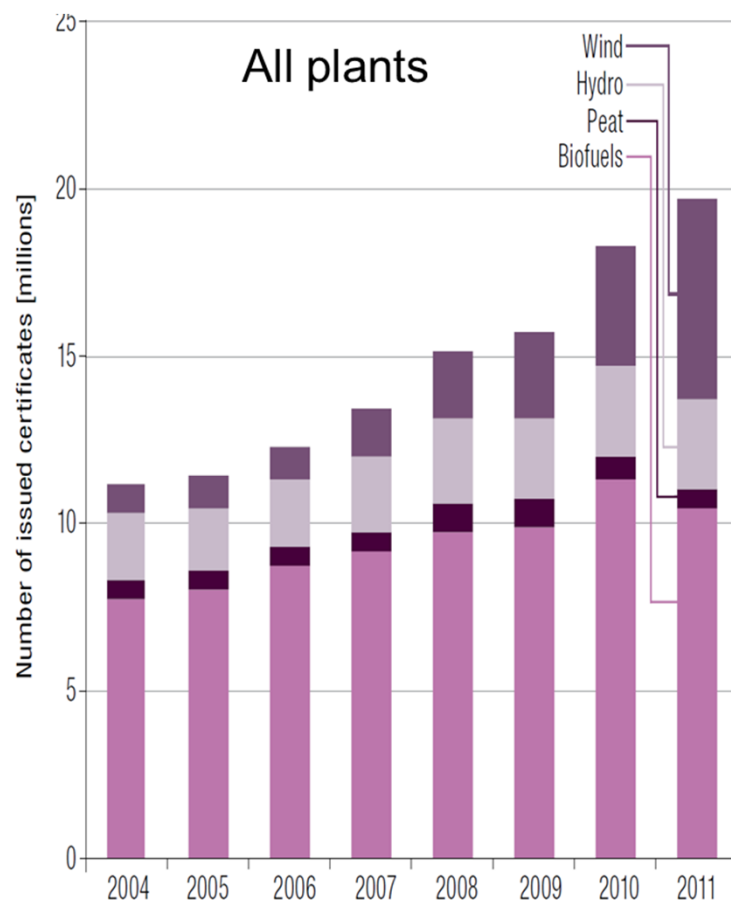


Income for elcert producers

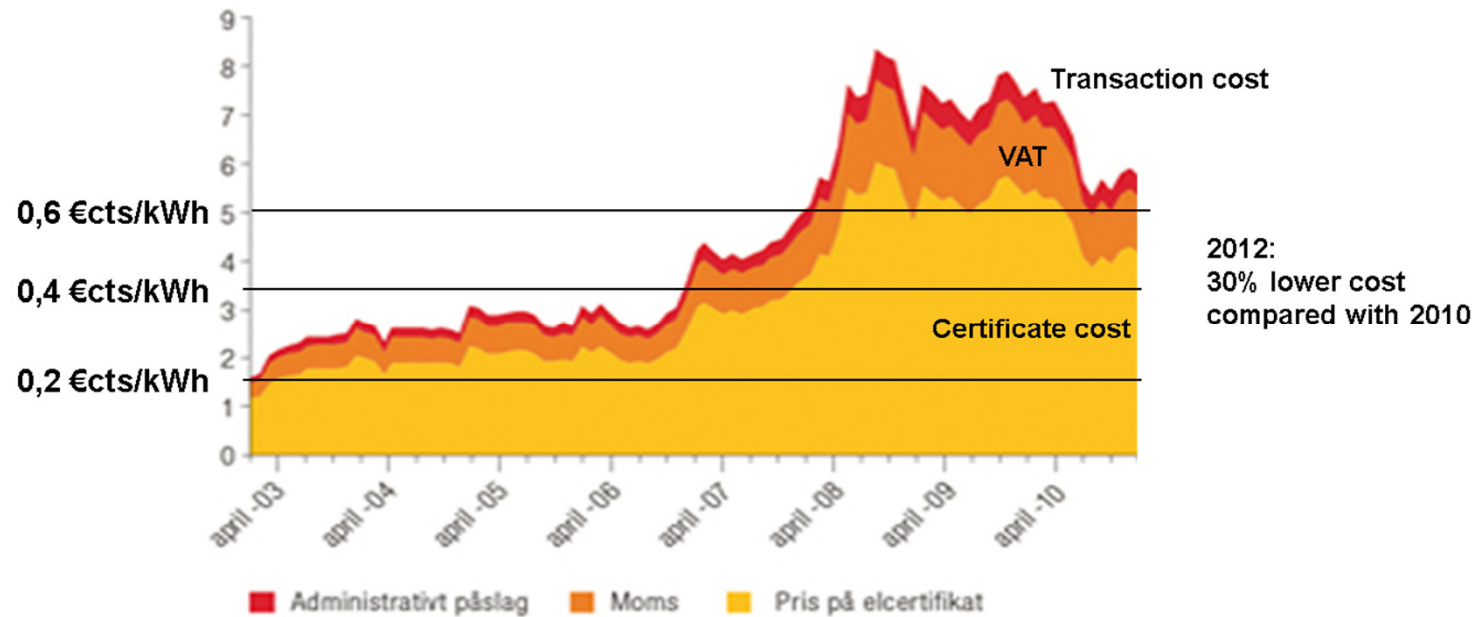




Issued certificates



Customer's cost for Elcert system (comparison with DE)



	DE	DE	DE	DE	SE	SE		
	Total share of RES/EE G	Total customer cost	Total share of RES excl PV and offshore	Customer cost excl PV and offshore	Total share of RES/ Elcert	Total customer cost	Total customer cost ratio DE/SE	Customer cost ratio normalised DE/SE
2011	17%	3,5 ct/kWh	14%	1,40 ct/kWh	13%	0,40 ct/kWh	8,9	3,5
2012	20%	3,6 ct/kWh	15%	1,57 ct/kWh	15%	0,36 ct/kWh	10,1	4,4
2013		5,3 ct/kWh		2,47 ct/kWh				

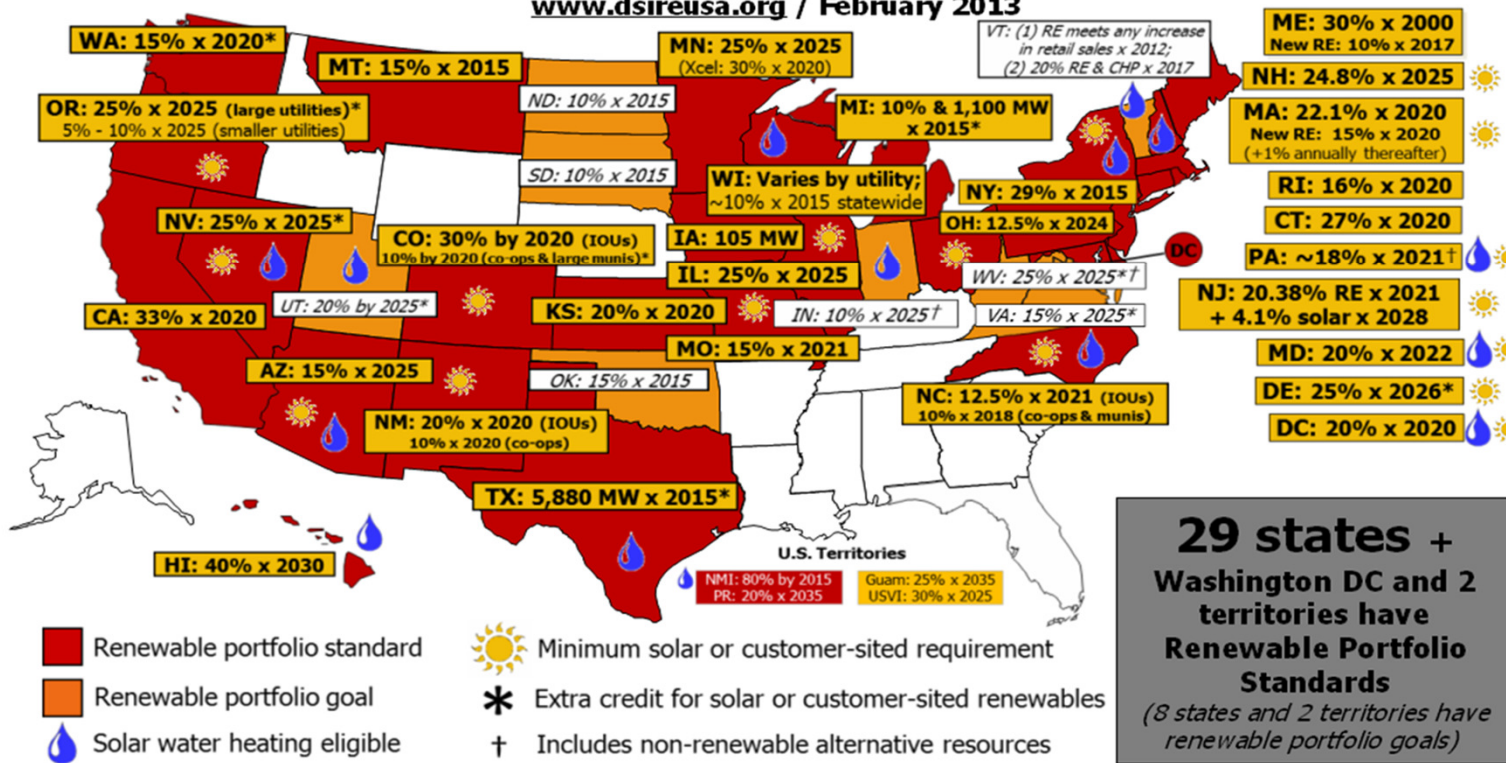
How to tackle big cost differences for different technologies in a quota obligation scheme. Example from US

RES Portfolio Standards in US



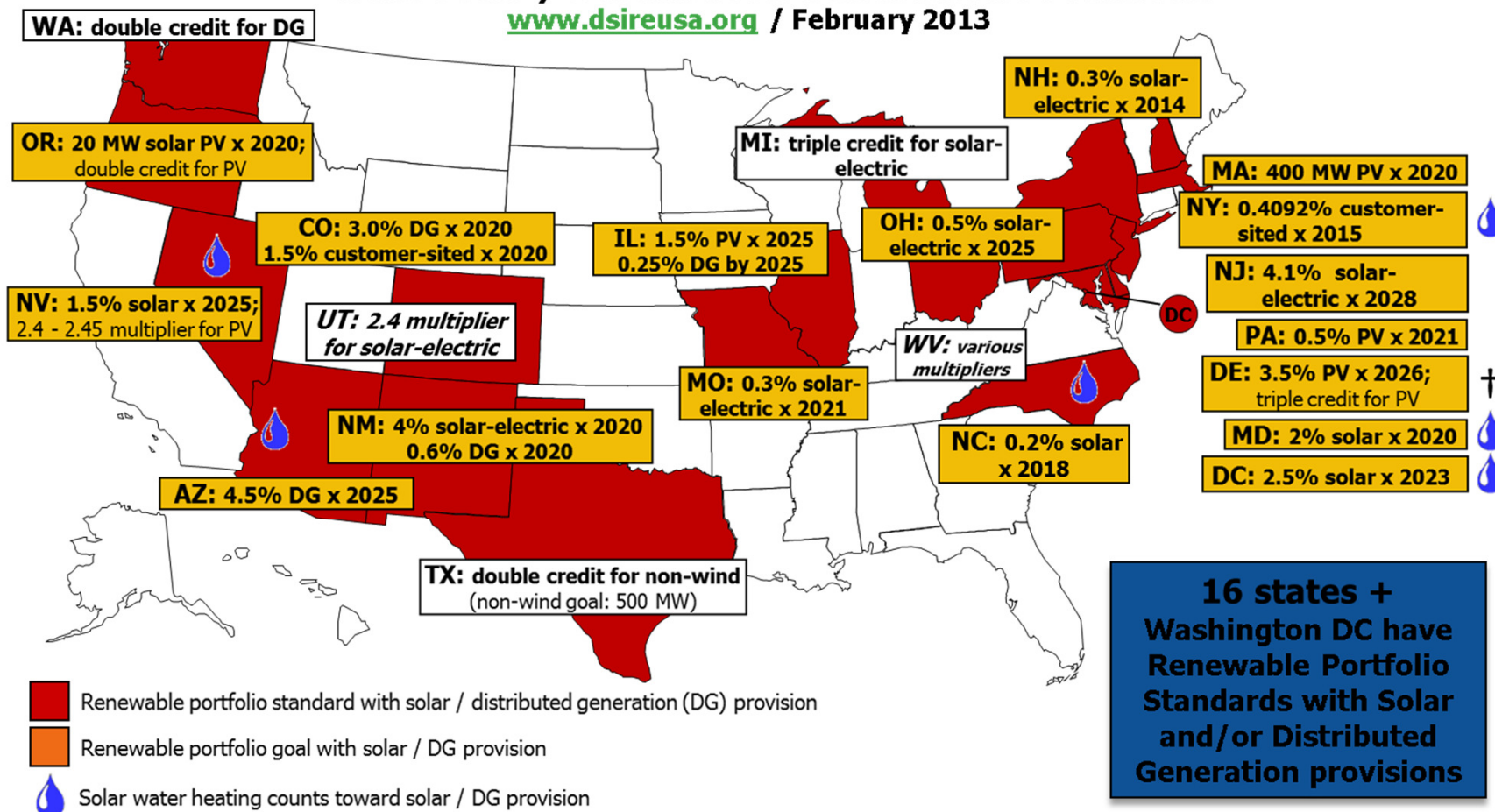
Renewable Portfolio Standard Policies

www.dsireusa.org / February 2013



Renewable Portfolio Standard Policies with Solar / Distributed Generation Provisions

www.dsireusa.org / February 2013



An example from New Jersey

- No federal programmes – investment tax rebates though
- "Class I" (REC) solar energy, wind energy, wave or tidal action, geothermal energy, landfill gas, anaerobic digestion, fuel cells using renewable fuels, sustainable biomass, hydro<3MW
- "Class II" (REC) hydropower 3-30MW, resource-recovery facilities
- Solar Carve-Out (SREC)
- Offshore wind (OREC) will be decided to be a carve-out from Class I as well
- All suppliers must present the required amount of certificates for each class.
 - SREC can be used as a REC

- Import of REC from the other states (12) within PJM area is accepted.
- Import also accepted from outside PJM if the electricity is supplied into PJM

	Certificate	2010	2020
Class I	REC	4,7%	16,0%
Class II	REC	2,5%	2,5%
Solar	SREC	0,22%	3,38%

Conclusions

- A quota system's success depends a lot on how it is designed
- The ambition in relation to the available potential of different technologies are decisive for setting the marginal price
 - This problem can be handled by dividing the system into different classes
 - one for the volume – and one for developing immature technologies
- Competition seems to have an influence on the total costs
- There may be culture differences that have an influence on the success as well