Emerging market for Green Certificates

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1. What is a certificate system?
2. How certificates system works
3. What are the benefits of certificates
4. Case studies
   - The case of harmonisation in EU (RECS)
   - The case of the certificates market in the US

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Certificates provide Information of the added Value of green Electricity

Environmental Benefit

Certificate

MWh

Electricity

Market for Certificates

Market for Electricity

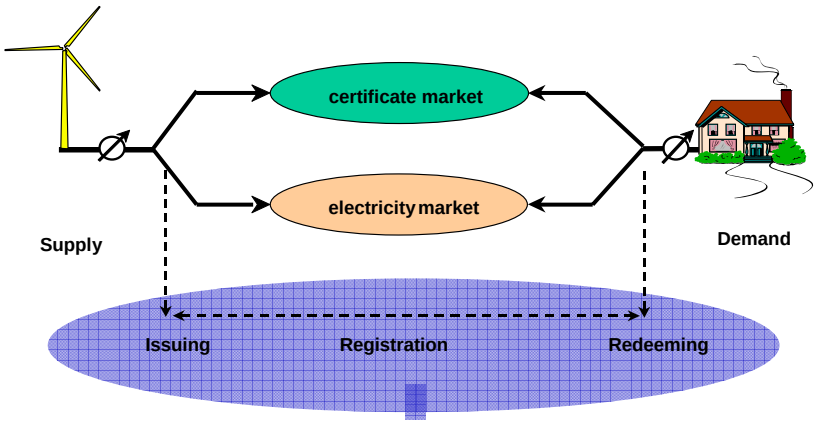
Certificate = Guarantee of Origin

Market for green Electricity

What is a Green certificate?

- Various types and denominations
  - Green Certificate, TREC, TRC, REC
  - Tradable Renewable (Energy) Certificate/Credits
  - Renewable Energy Credit / Green tags
- piece of information
- represents the benefits (aside from the physical electricity) associated with electricity generation by renewable sources
- It is a commodity which can be traded

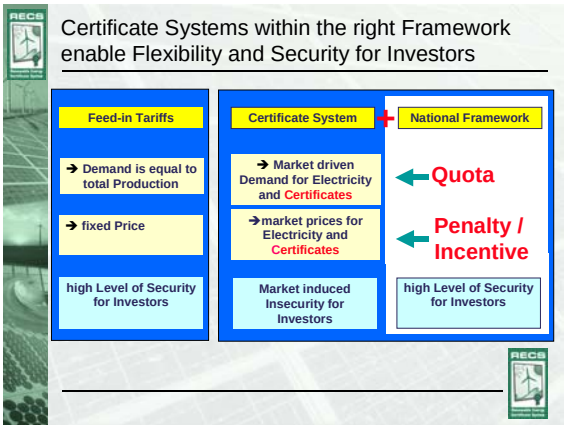
How does a certificate system work



Rationale of Green Certificates

- The main idea is to separate physical flux of electricity from its environmental benefits
- create a market where Green certificates can be traded distinct from the market for the supply and demand of electricity
- gives flexibility by allowing green producers of electricity to reach easily green consumers
- **Green certificates** could be generated and sold anywhere in the world where there is demand!

Demand must be created through the right regulatory framework



Source: Energy Information Administration: International Energy Outlook 2006

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What information is provided through certificates

- paper form
- electronic form

- Unique identification number.
- Generator.
- Date of issuing and the period of production covered by the TGC.
- Unit, amount (if the value of TGCs is not standardised).
- Location (country and region) of the plant.
- RE Source (solar, hydro, wind etc.).
- Technology (type of unit, size, age etc.).
- Capacity of the plant.
- Expiration date of the certificate (could be infinity).
- Direct support received for the production of renewable electricity.
- Indirect support (for instance dispatch priority) received.

Tracking the Life cyclus of certificates

Certification" of the Plant

⇩

Measuring of produced Electricity

⇩

Issuing of Certificates

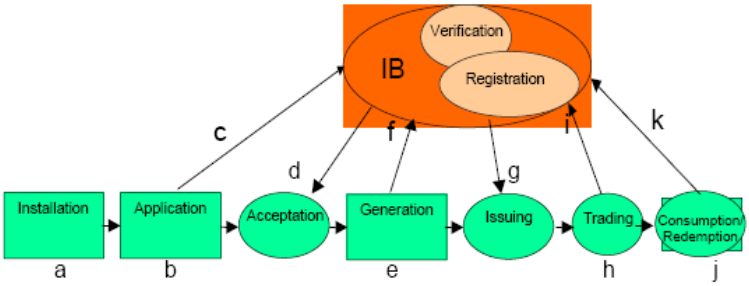
⇩

Transfer of Certificates

⇩

Redemption of Certificates

Life cycle of a Green Certificates



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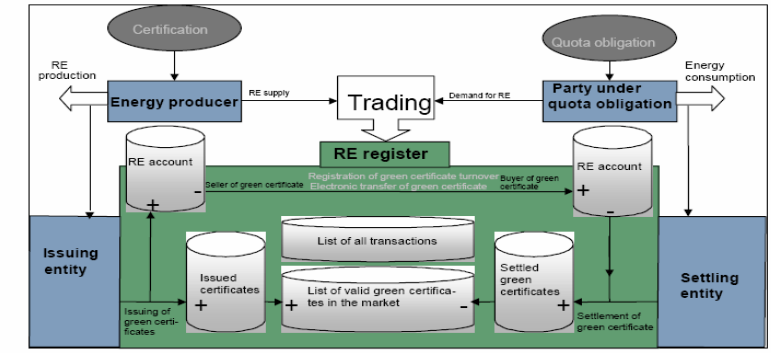
Central registration of certificates



Price Waterhouse Coopers, 1999

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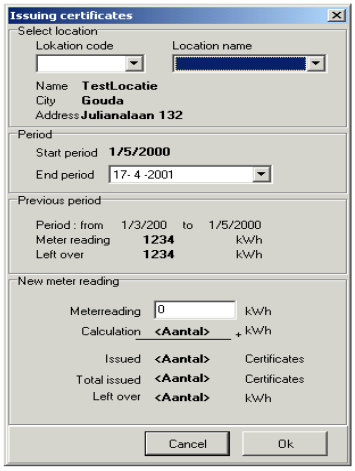
Example: How to issue Issuing certificates



Balance for an account owner

Account owner	<Name> <Address> <City>	**Reference** <id-number account owner>
Date	<dd-mm-yyyy>	
Overview Tradable Green Certificate account for <month/year>		
Last balance	<number> **Tradable Green Certificates reported on** <dd-mm-yyyy>	
Bought	<number> **Tradable Green Certificates**	
Sold	<number> **Tradable Green Certificates**	
New balance	<number> **Tradable Green Certificates**	

See specification print for full details

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How can green certificates be used?

- Monitoring and Statistics:
  - -Proof of RE generation
  - - Labelling
  - - Disclosure (guarantee of origin)
- International trade :
  - -Proof of import/export of renewable energy
- Incentive system
  - – requires Obligations and incentives/ penalties
  - – together with Feed-in tariff
  - – together with tax incentive

Proof of RE generation/Labelling/ Disclosure

- Some suppliers may wish to target “green” consumers by selling them an electricity product with high renewables content
- The labelling body could require Green Certificates to be redeemed in order to verify compliance with label criteria. e.g. generated from hydro plant with a capacity below 20MW
- Within EU it is obligatory that suppliers provide customers with information on the fuel mix for their electricity. Green Certificates can be used as guarantee of origin

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Benefits of Green Certificate Systems

- Green Certificates can be traded across country boundaries
- Green Certificates overcome physical electricity transfer restrictions
- Green certificates promote best practice : it gives incentives to most economical sites , since the physical barrier to trade of RE benefits is removed e.g. even production of solar electricity in tropical countries but green certificates bought by consumers in the North?
- Green Certificates help to remove the requirement that supply & demand of RE occur at same time
- Green Certificates can prove compliance with public support schemes

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Constraints of Green Certificate Systems

- Risk of double counting must be avoided
- Reliable tracking system of the whole life cycles of the certificates is a "must "
- Legal framework has to be stable (obligations, penalties)
- No harmonized market, very scattered systems
- market based prices

Conclusions

- Green Certificates provide information
- Green Certificate systems can be used with many different RE policies
- Green Certificates offer flexibility and transparency for the market
- Green Certificate systems have been proven to be robust and fraud-resistant

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In Europe are many incentive systems in place

National Certificate Systems don´t contribute to a liquid European Certificate Market

Country	Start	Supported RES	Demand Driver	Certificate Size	Validity	Target	Flexibility	Imports
Belgium Flanders	2002	wind, hydro, biomass, solar, tidal, waves, Geothermal.	Suppliers	1 MWh	5 years	3% (2004) 5% (2010)	banking	No
Belgium Wallony	2002	hydro <20 MW, wind, solar, biomass, biogas, geothermal,	Suppliers	1 MWh	5 years	5% (2010)	banking	Yes - under the condition of reciprocity
Italy	2002	hydro (after 4/ 99), waste, biomass, solar, wind, tidal	Producer / Importer >100GWh	100 MWh	1 year	2% (2002) 6% (2006) 8% (2008)	borrowing against a penalty price	Yes – if accompanied by actual electricity import and reciprocity
Nether-lands	2001	solar, hydro < 5 MW, biomass, wind	Suppliers	1, 10, 100, 1.000 MWh	1 year	5% (2010) 10% (2020)	no banking	Yes – if accompanied by actual electricity import
Sweden	2003	wind, solar, hydro up to 1,5 MW, geothermal, biofules, waves	End users	1 MWh	Unlimited	Additional 10 TWh until 2010	banking, borrowing	No
UK	2002	hydro (< 20 MW), wind, solar, biogas, biomass, waves	Licenced suppliers	1 MWh	Unlimited	From 3,1% (2002) to 7,7% (2010)	Limited banking and borrowing	No

Existing Green Certificate Systems

- EU : UK, Italy, Belgium, Sweden, etc. – Renewables Obligations
- Netherlands – Certificates facilitate tax exemption
- Europe – private RECS initiative
- US – Several states use Green Certificates + moves to establish a North American Green Certificate market
- Australia – Sustainable Energy (Electricity) Act introduced RE Certificate trading
- South Africa?

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RECS - the only voluntary reliable certificate system

- Harmonised European standard for (national) Tradable Renewable Electricity Certificate Systems
  - Basic Commitment = Overall standard
  - Domain Protocols = (National) implementation
  - Technical specifications interfaces certificates registries
- Comprises all major European utilities – for disclosure and green customers
- Launched in 1998 today implemented in 18 countries: 15 EU members, 2 EU accession countries, + Norway + Switzerland, Slovenia
- Currently no European market, but RECS provides a working exchange platform for diverse TREC systems

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RECS meets high Quality Standards

1. Only Plants selected through a precise Procedure are eligible for RECS Certification
2. Continuous Auditing of the actual Operation is implemented
3. Any Subsidies the Plant receives must be declared on the Certificate
4. Issuing of RECS Certificates is exclusively based on Metering Data (1MWh - 1 Certificate)
5. RECS Certificates have unique Numbers throughout their Lifetimes (5 years)

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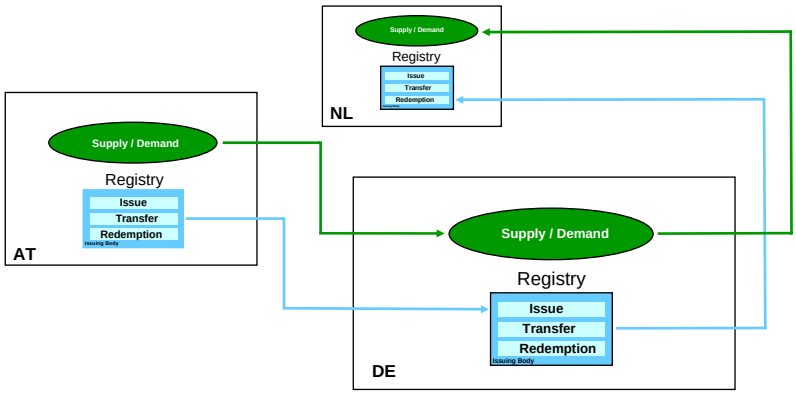
AIB Association of Issuing Bodies

RECS International



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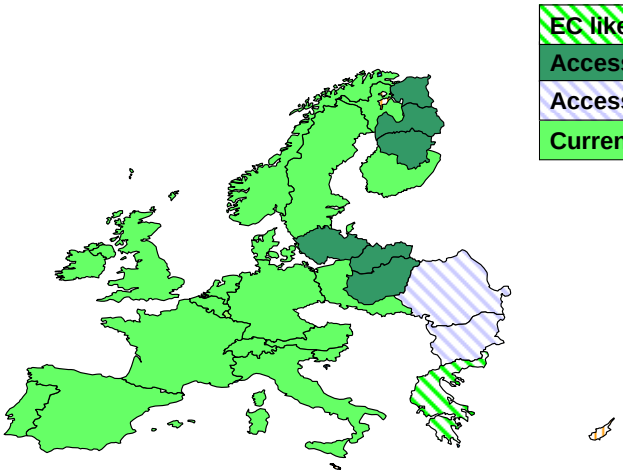
Countries RECS members



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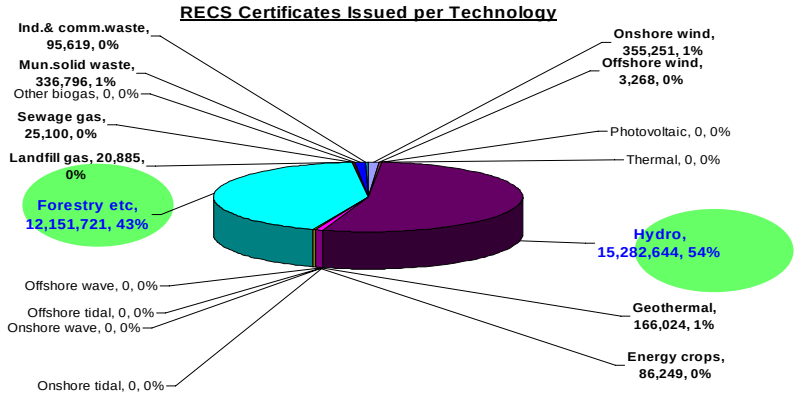
Certificate Issued by technology



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Certificates in the USA

- 14 of 19 RPS states in USA uses Certificates to demonstrate compliance
- There is also a strong voluntary market which cannot be neglected
- Prices can vary a lot on the compliance markets
  - From 0.70 US cents/MWh (Maine)
  - To 35-49 US dollar/MWh (New England)
- Prices on the voluntary market
  - From 2 US dollar to 6 US dollar (new generation)
  - But some sources like 200 US dollar/MWh
  - From 1 US dollar to 3 US dollar (existing generation)

Market size in the USA

Table 1

Estimated REC Market Size And Value In 2004 And 2010

Compliance markets could quadruple in five years.

	Current REC Market Size (million MWh)	Current REC Market Value ($ millions)	2010 REC Market Size (million MWh)	2010 REC Market Value ($ millions)
Compliance Markets	8-13	$140	45	$600
Voluntary Markets	3	$15-$45	20	$100-$300
Total	11-16	$155-$185	65	$700-$900

Source: National Renewable Energy Laboratory

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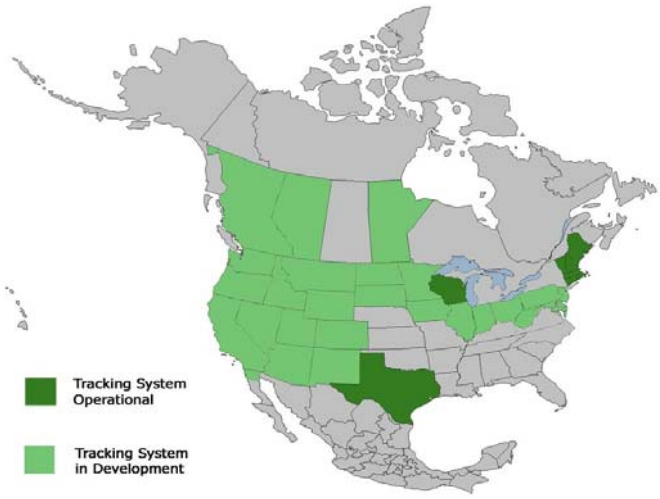
Tracking system in the USA



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Use of certificates in the USA

- Certificates can be sold
  - Bundled with the electricity to local retailers
  - Unbundled at a regional or national level
- Certificates can be aggregated from small systems
- Certificates can be sold in advance of generation

The future of TREC in the USA

- National registration?
  - State registration currently so a generator can be in several tracking systems and issue REC in each tracking system
- Link with the emission certificate market?
  - Currently RE not eligible or there is no rules to allow participation
- Clarity of the system for end-users?
  - Currently, the system tends to get too complex to be understood
    - E.g. sale of certificate without the totality of their environmental attributes, sale of certificates without corresponding electricity

Conclusions

- Green Certificates provide information
- Green Certificate systems can be used with many different RE policies
- Green Certificates offer flexibility and transparency for the market
- Green Certificate systems have been proven to be robust and fraud-resistant
- Green Certificates will be used in an growing market