Østfoldforskning

SUSTAINABLEINNOVATION

LCA and Carbon footprint when purchasing “green” power

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Hanne Lerche Raadal and Anne Rønning

Ostfold Research (Østfoldforskning), Norway

Content of the presentation

- Introduction and background
  - Guarantees of Origin, Electricity Disclosure and Residual Mix
- Aim of the study
- Materials and methods
- Results
- Conclusions and Recommendations

Energy Trading and Environment 2020

- A research project supported by the Norwegian Research Council
- Time schedule 3.5 years, 2009-2012
- Ostfold Research project manager
- Fortum Markets project owner
- PhD as a part of the project:
  - Environmental Documentation of Energy in Trading Systems

Fortum
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Høgskolen i Østfold
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IFE
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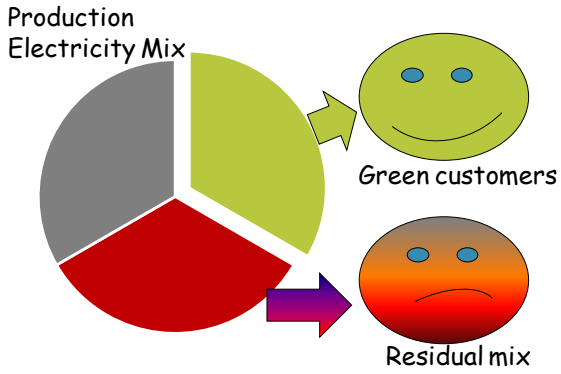
Østfoldforskning

The mission of the Energy Trading and Environment 2020 project

Develop guidelines for best practice within the existing regulation of Electricity Disclosure to:

- Help *consumers* **compare electricity from different sources** in a transparent and trustworthy way.
- Help *suppliers* use a **harmonized** electricity disclosure as a tool for informing energy consumers about the origin of electricity.
- Help *producers* show the **environmental footprint** from renewable energy production.



Guarantee of Origin (GO)

- Defined in the Renewable Energy Directive (2009/28/EC):
  - An electronic document which has the sole function of providing proof to a final customer that a given share or quantity of energy was produced from renewable sources as required by Article 3(6) of Directive 2003/54/EC.
  - Standard size of 1 MWh
  - Specific information requirements
    - Energy source and start and end dates of production
    - Whether and to what extent the installation has benefited from investment support
    - Whether and to what extent the unit of energy has benefited in any other way from a national support scheme, and the type of support scheme
    - Etc.

Electricity Disclosure

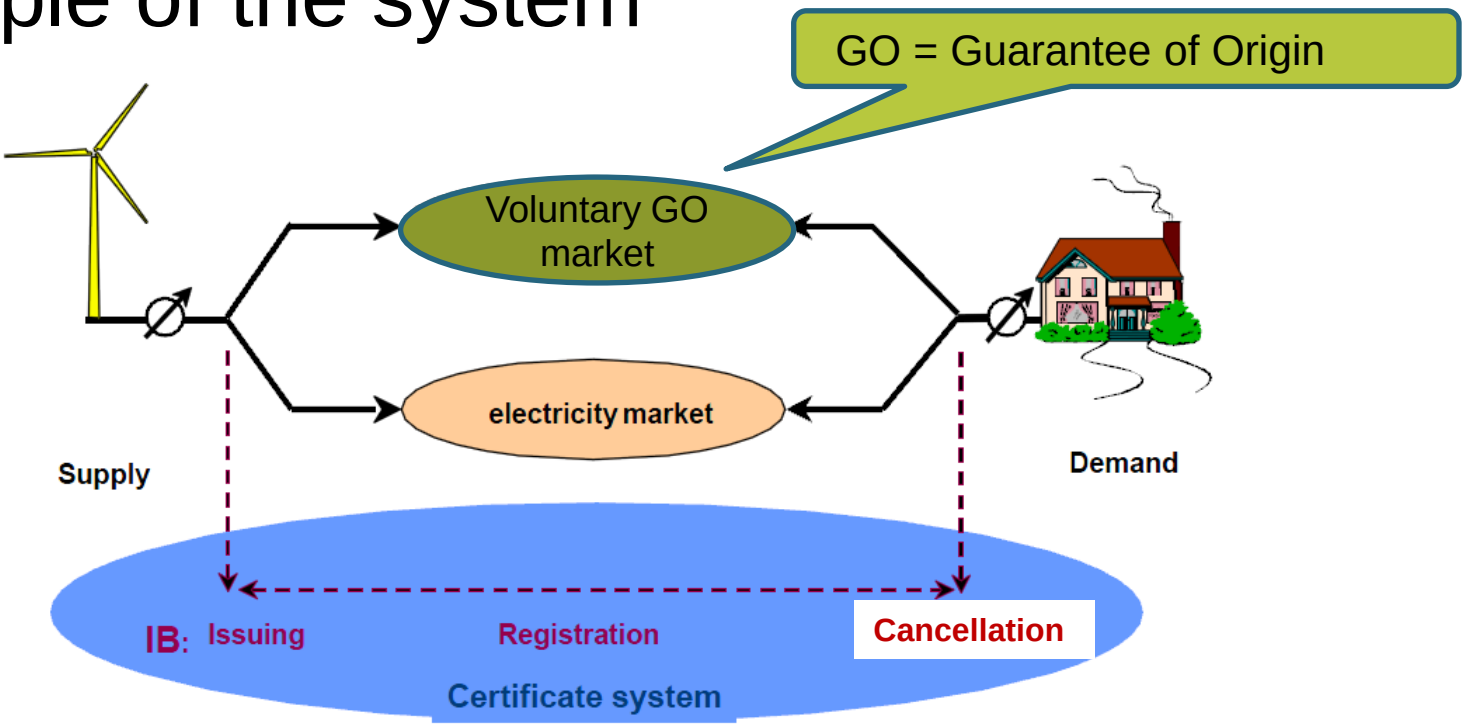
- The Electricity Market Directive 2009/72/EC, Article 3(9):
  - All suppliers of electricity are required to disclose their electricity portfolio with regards to:
    - energy source
    - environmental impacts, specifying
      - the emissions of CO_2
      - the production of radioactive waste

Attributes = The disclosed indicators, representing the environmental information associated with the electricity generation processes.

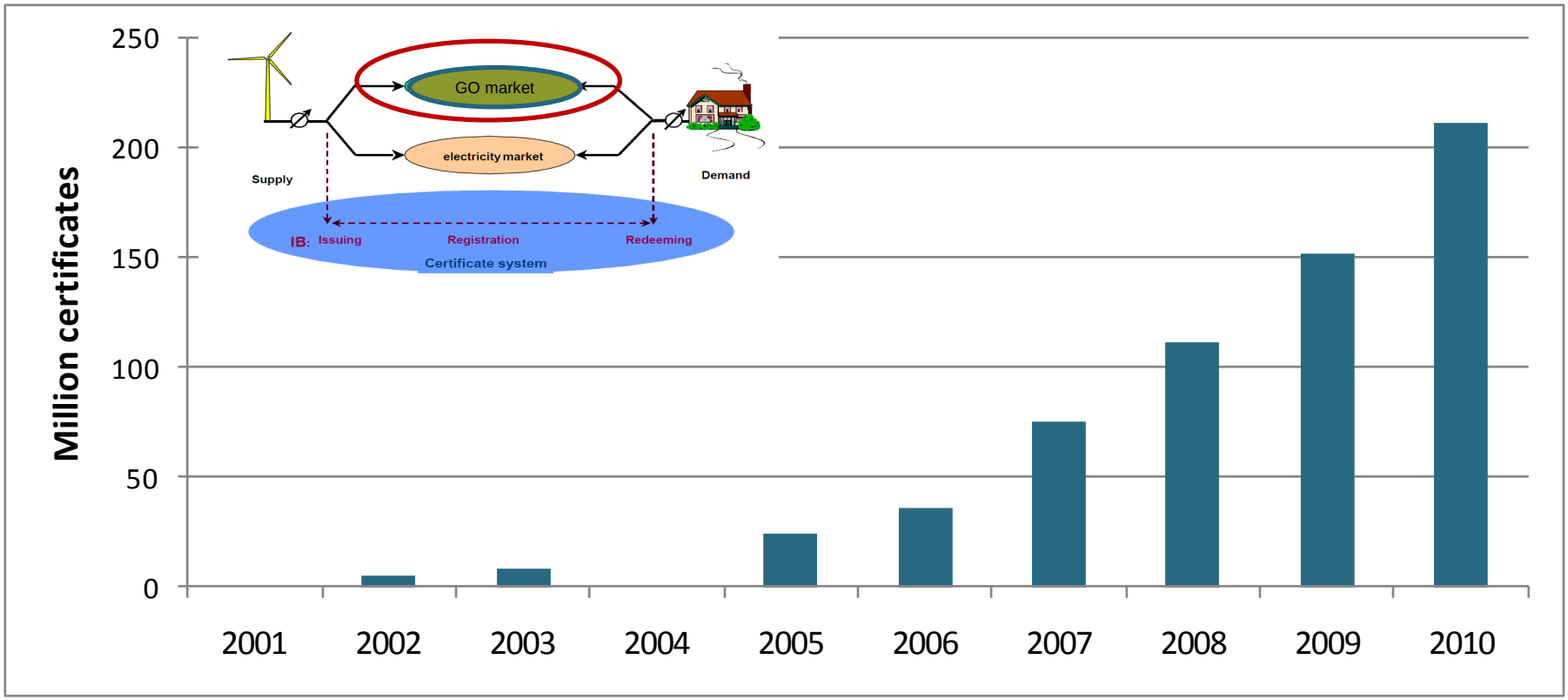
- Objective of Electricity Disclosure:
  - To provide consumers with relevant information about power generation and to allow for informed consumer choice - not to be based on electricity prices alone.

Trading of the ”environmental value” of electricity

Principle of the system



Statistics – GOs in Europe



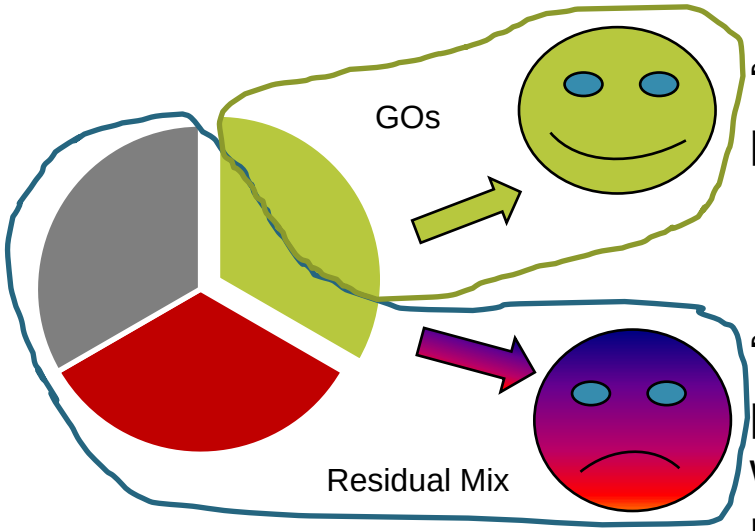
Source: AIB

EECS = The European Energy Certification System

- A harmonised system for international trade of renewable energy certificates, which includes Guarantees of Origin.
- Developed by the Association of Issuing Bodies (AIB), the leading enabler of international energy certificate schemes (18 European members /countries registered).

The link between GO and Electricity Disclosure

Production Electricity Mix (Country or Region)



Customers

“Green” customers purchasing GOs

“Ordinary” customers purchasing electricity without any specific requirements

Electricity Disclosure

Attributes related to the purchased GOs.

Attributes related to the Production Electricity Mix, corrected by attributes which have been allocated by other tracking systems (e.g. GOs)
= Residual Mix

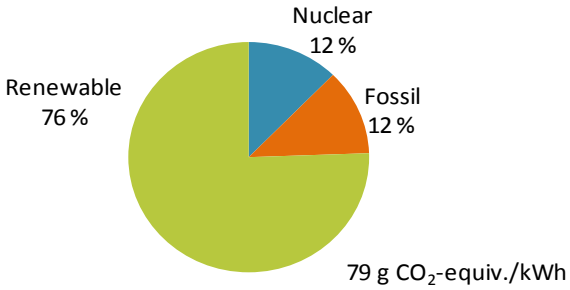
Methodology for Residual Mix calculations

- Methodology for Residual Mix calculations for the European countries developed through several European projects:
  - E-Track (A European Tracking System for Electricity)
    - http://www.e-track-project.org/
  - EPED (European Platform for Electricity Disclosure)
    - http://www.eped.eu/portal/page/portal/EPED_HOME
  - RE-DISS (Reliable Disclosure Systems for Europe)
    - http://www.reliable-disclosure.org/

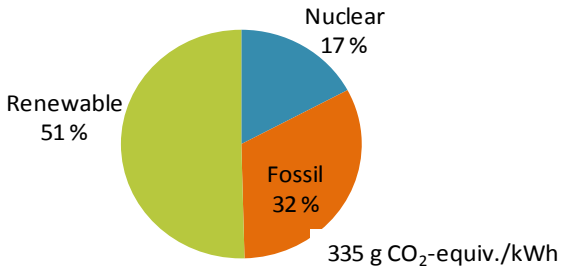
⇨ Best Practice Recommendations for the implementation of Guarantees of Origin and other tracking systems for disclosure in the electricity sector in Europe (Version 1.2, 2011)

The Norwegian Residual Mixes 2008-2010

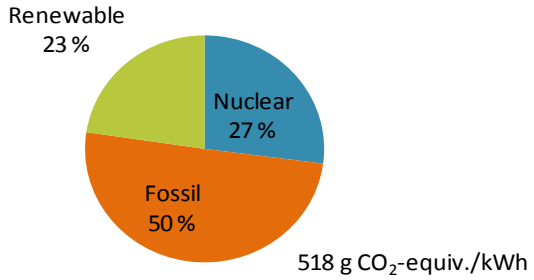
Norwegian Residual Mix 2008



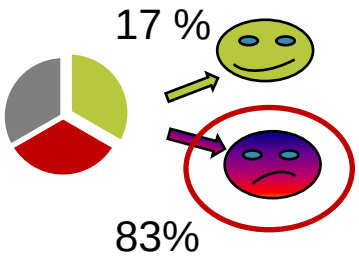
Norwegian Residual Mix 2009



Norwegian Residual Mix 2010



- 83% of the electricity consumption in Norway (2010) should be covered by the Residual Mix
- The rest of the consumption is covered by GOs



Sources:

- RE-DISS calculations (http://www.reliable-disclosure.org/)
- The Energy Trading and Environment 2020 project http://ostfoldforskning.no/prosjektsider/49/Energy%20Trading%20and%20the%20Environment%202020.aspx

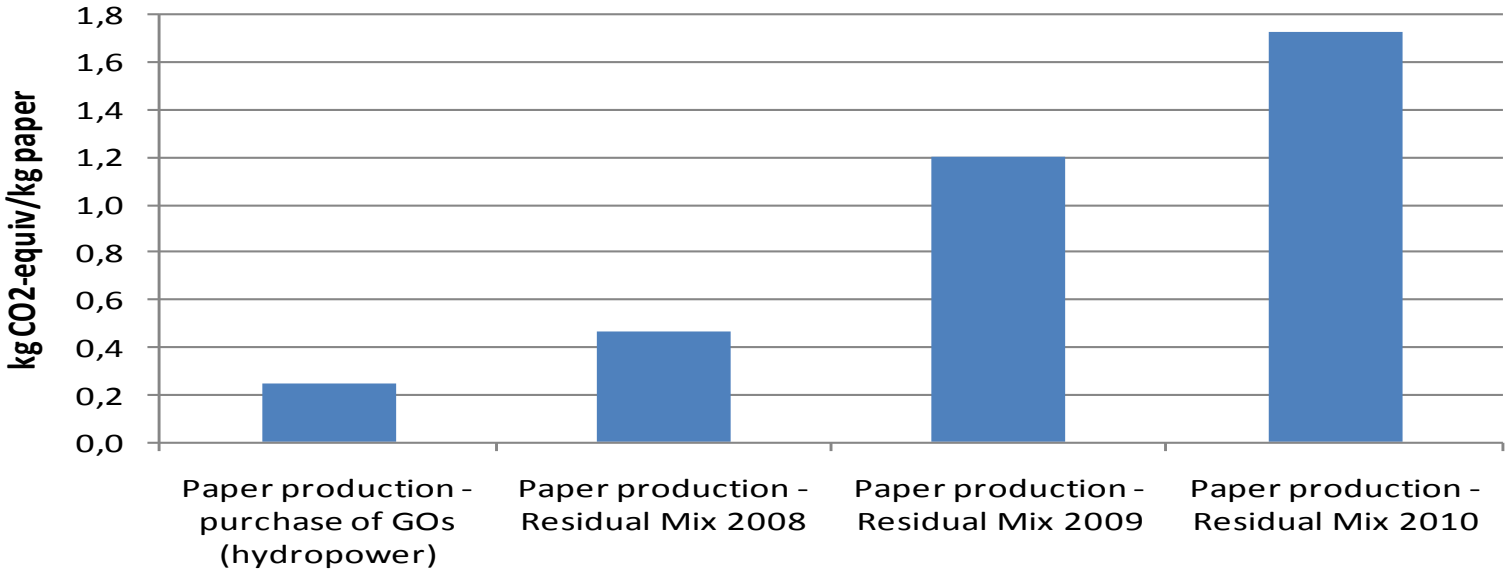
Aim of the study

- Compare the LCA and Carbon footprint results of an electricity customer's voluntary purchase of GOs to the results if not purchasing GOs.
- Study case:
  - The production of newsprint paper (no recycled fibres) (Ecoinvent Database, 2010 [Paper, newsprint, 0% DIP, at plant/kg/RER U]) where the production facility is be located in Norway.

Material and methods

- Attributional approach for the LCA/Carbon footprint
  - The CO_2-emissions related to hydropower are used for the example when purchasing GOs (hydropower)
  - The Residual Mix emissions are used for the examples when not purchasing GOs.
- Average grid losses for Norway (Ecoinvent Database, 2010) are included in the calculation of the CO_2-emissions for all the cases.

Results



- The purchase of GOs gives the best result
- The Norwegian Residual Mix 2010 gives 7 times higher result.

⇨ This shows that the purchase of GOs may have a great impact on the Carbon footprint of a product or services.

Conclusions and recommendations

- The purchase of GOs affects the Carbon footprint of a product/service/company, when using the LCA attributional approach.

- A customer who purchases GOs should use the CO_2-emissions corresponding to the purchased GOs for the relevant electricity amount related to the company/product/service under study for the Carbon footprint calculation.
- A customer who does not purchase GOs should use the CO_2-emissions corresponding to the relevant Residual Mix.

Conclusions and recommendations, cont.

- An important precondition is that it can be documented that the GOs and associated emissions are not double counted.

- In line with the Committee Draft of the new ISO Standard on Carbon footprint of products (ISO 14067, under development):
  - "Specific electricity products" can be used for Carbon foot printing if one can document that there will be no double counting of the consumed electricity.

Conclusions and recommendations, cont.

- Ongoing discussions as to whether GOs should be allowable for calculating Carbon footprints or not.
  - "The use of GOs only rearranges the statistics and does not in itself reduce GHG emissions or generate new renewable power".
  - "The GOs Create a voluntary consumer demand for renewable energy - may increase the production".

- The Greenhouse Gas Protocol Initiative is currently working with specific GHG Power Accounting Guidelines for the Corporate Accounting and Reporting Standard (Scope 2).

Thank you for your attention!

Questions?