



Seventh US-EU Energy Regulators Roundtable

Climate change – impact on energy regulation and infrastructure

- *Swedish and European experiences* -

Yvonne Fredriksson, Director General
Energy Markets Inspectorate, Sweden

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European Commission's proposals:

'The Green Package', proposed on 23rd January 2008:

- **EU Renewables Directive**
- **Phase III of the EU Emissions Trading Scheme**
- **Energy End Use Efficiency and Energy Services**

The aim of The Green Package is to ensure that the EU meets its climate change and renewable energy targets, as agreed by Member States in January 2007

- **Reduce greenhouse gas emissions by 20% by 2020**
- **Improve energy efficiency by 20% by 2020**
- **Source 20% of energy from renewable sources by 2020**

EU Renewables Directive

In 2007, Member States agreed that the EU should meet 20% of its energy needs from renewable sources by 2020

- **Includes 10% target for biofuels in transport fuel**

In 2008, The proposal for the Renewables Directive:

- **Sets overall binding targets**
- **Gives each country its own target percentage and non-binding, interim targets**
- **Establishes rules relating to administrative procedures, electricity grid connections (see next slide), guarantees of origin and support schemes for the use of renewables**
- **Sets binding targets for the consumption of renewables in transport and establishes sustainability criteria for biofuels**

EU Renewables Directive – Grid access

Priority access for renewable generation would no longer be voluntary.

Commission's proposals would compel Member States:

- **To provide priority access to the grid system for electricity from renewable sources**
- **To develop grid infrastructure**
- **To review cost sharing rules**

There are concerns about the effects, including:

- **Intermittent renewable sources will reduce security of supply and complicate the operation of the networks**
- **Will require massive investment, very quickly**
- **Will affect market functioning**
- **Will increase consumer prices**

Phase III of the EU Emissions Trading Scheme

Phase III aims to reduce GHG emissions by 21%

There will no longer be National Allocation Plans

- **These had the potential to be distortionary**
- **Replaced by one EU-wide cap and the stock of allowances within that will be divided between the member states.**
- **Stock of allowances will fall by 1.74% (36-37kt of CO₂) per year**
- **Around 60% of allowances will be auctioned in 2013**
- **Full auctioning in power sector from 2013**

Will include more industries, including:

- **aviation, subject to political agreement**

Member States were required to submit National Energy Efficiency Action Plans (NEEAP) to the Commission in June 2007:

- **Present national strategies for achieving their adopted energy savings target by 2016:**
 - 9% improvement in energy efficiency by 2016
 - Based upon projected energy consumption
- **Commission has produced an assessment**
 - 17 NEEAPs submitted (out of 27 Member States)
 - Several present comprehensive strategies
 - Most present a business-as-usual approach
 - Appears to be a gap between the political commitment and the proposals

Renewable energy support schemes: Some questions to be addressed

Does different support systems matter?

Which are the best solutions to regulate and balance the increasing vulnerability in the electricity system?

Could the investments costs be included in the tariff or will subsidy be necessary?

EU TARGETS FOR THE YEAR 2020

Reduce greenhouse gas emissions by at least 20 %

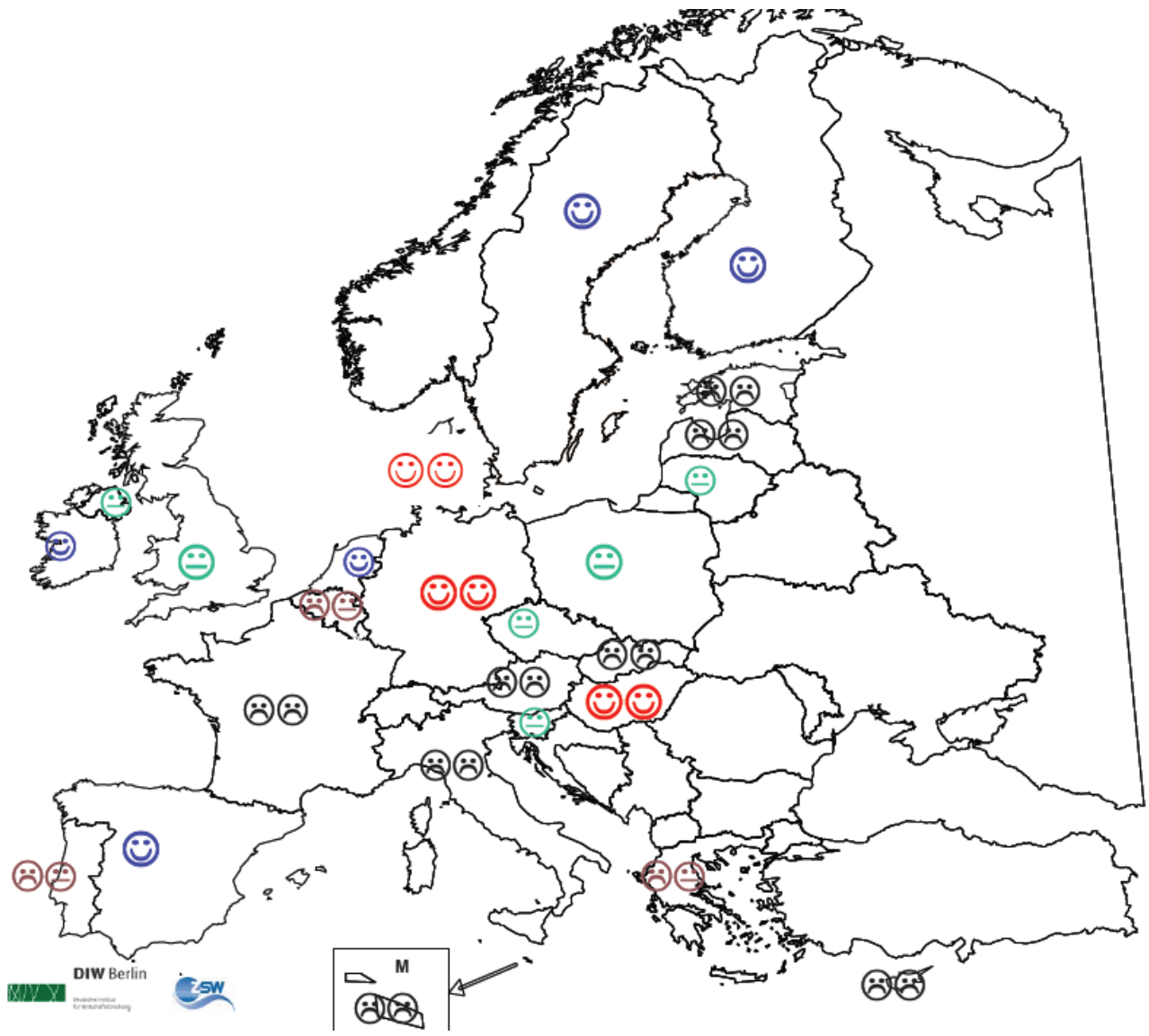
20 % of energy consumption should come from renewables

Energy use should be 20% more efficient

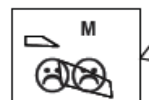
10% biofuels in transport

Measures Taken by EU Countries by January 1, 2007 To Comply With the EU Greenbook 2010 Goals for Renewable Power

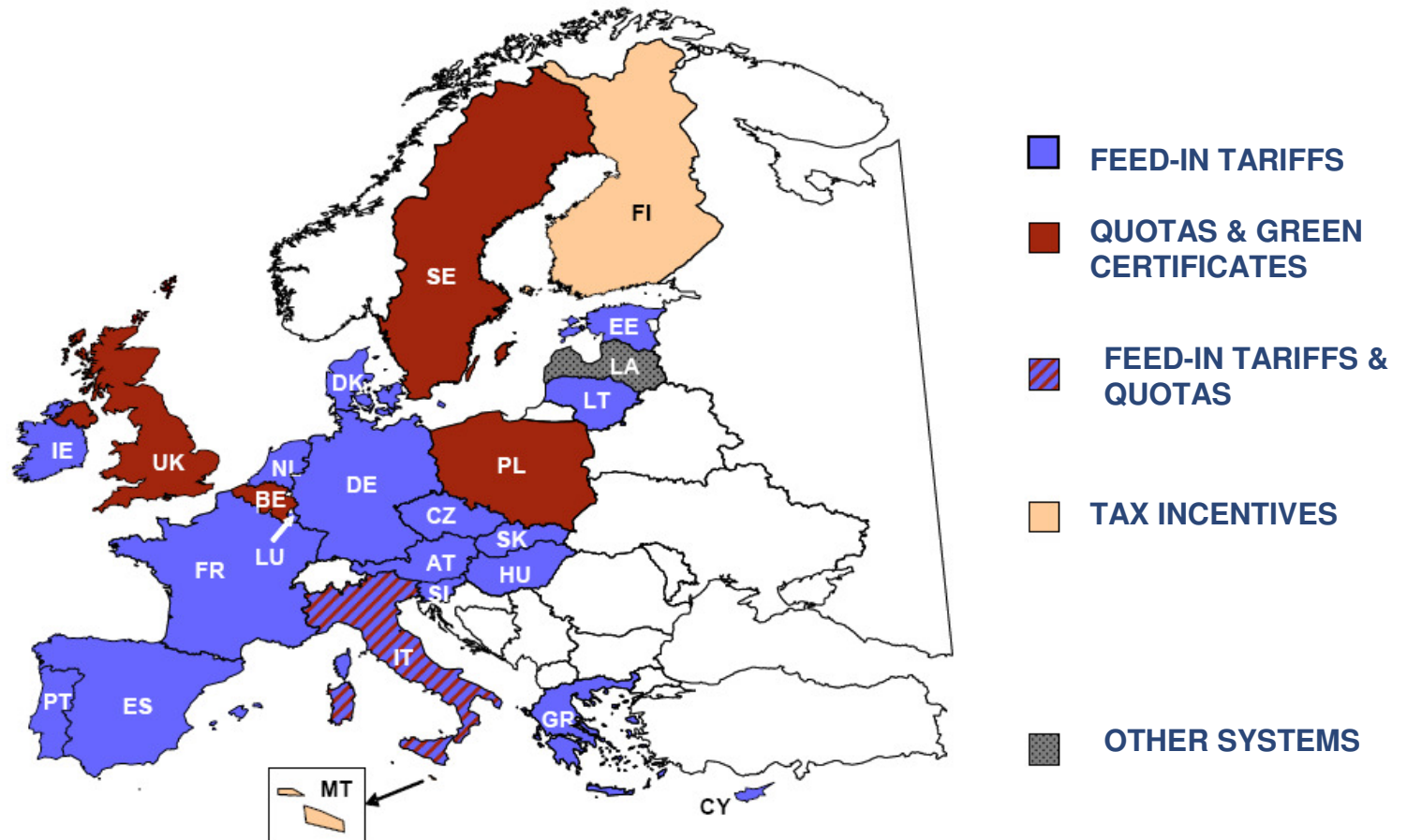
- Exemplary
- Realistic chance
- More efforts needed
- Intensive efforts needed
- Far from reaching the goals



Source: European Commission, 1.1.2007, Dr. Ulrike Lehr, DLR



Support Systems for Renewables in the European Union



Source: Ragwitz et al. 2006, Dr. Ulrike Lehr, DLR

Support system differs with priorities

For Sweden it has been important to choose certificate

- **A principal view of moving the cost for promoting renewables from public financing to the market**
- **Certificate system is market-based**
- **The different renewable sources compete and give thus more cost-efficiency - the cheapest supply comes first**
- **Control over the total volume through quotas**
- **Not great immediate need to increase supply of electricity**
- **Efforts put on developing trade first and domestic supply later**

Other countries like Denmark, Germany and Spain have prioritised price-based systems because of their wish to increase supply especially from wind power

A Comparison Between Support Systems Pros & Contras

FEED-IN TARIFFS

QUOTAS & TRADABLE GREEN CERTIFICATES

ADVANTAGES

Investment security
Predictability of price (medium & long term)
Adjustable

Does not distort market mechanism (competition between fuels)
Predictability of reaching the goals set

Limited risk of overfunding (but quotas should be reduced over time)

Higher risk for investors

DISADVANTAGES

High risk of overfunding (if support not reduced over time)

Experience from different designs

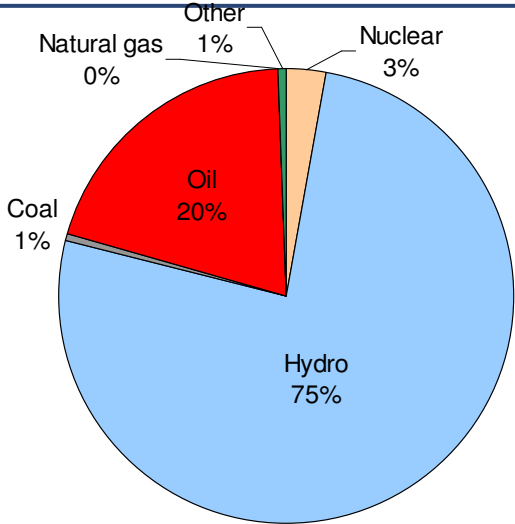
Support system design alone not decisive for effectiveness of promoting renewables

Other factors are often as important:

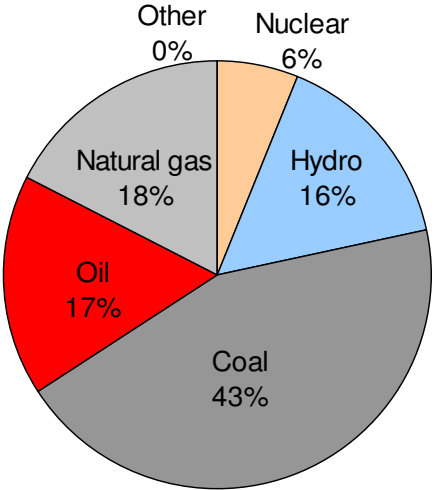
- Domestic energy resources
- Priorities in national energy or fiscal policy
- Structure and function of domestic market
- Regional cooperation

Electricity Generation

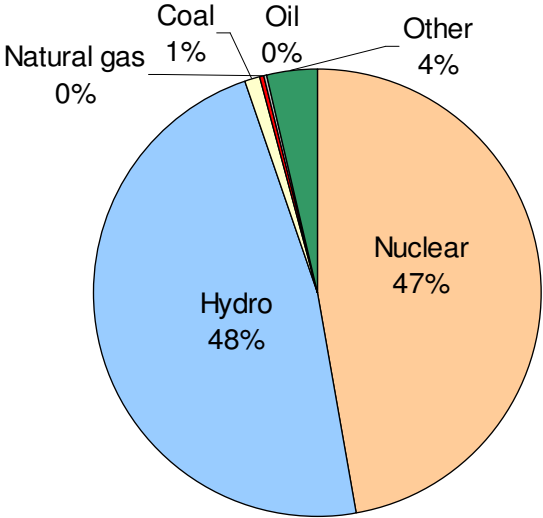
SWEDEN 1974



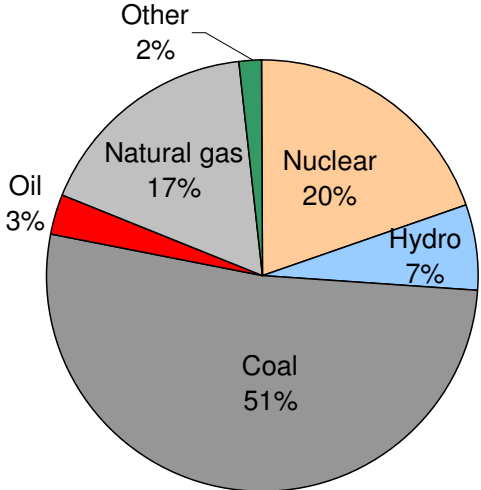
U.S. 1974



SWEDEN 2005



U.S. 2005



Source: IEA

Political targets for windpower

Sweden **+ 10 TWh (2020)**
+ 30 TWh(discussed 2030)

U.S. **+ 20 TWh (discussed)**

How to adapt to + 10 TWh wind in Sweden?

- Increase regulation power with 1400-1800 MW (15 % must be automatic frequency)
- **Develop regulation capacity on the demand side through increased flexibility using smart metering**
- Avoid wind to take over other regulating power
- **Change of rules so that the Transmission System Operator handles the imbalances from wind**
- Wind plants should be spread out geographically in order to keep down regulation needs and costs for balancing power

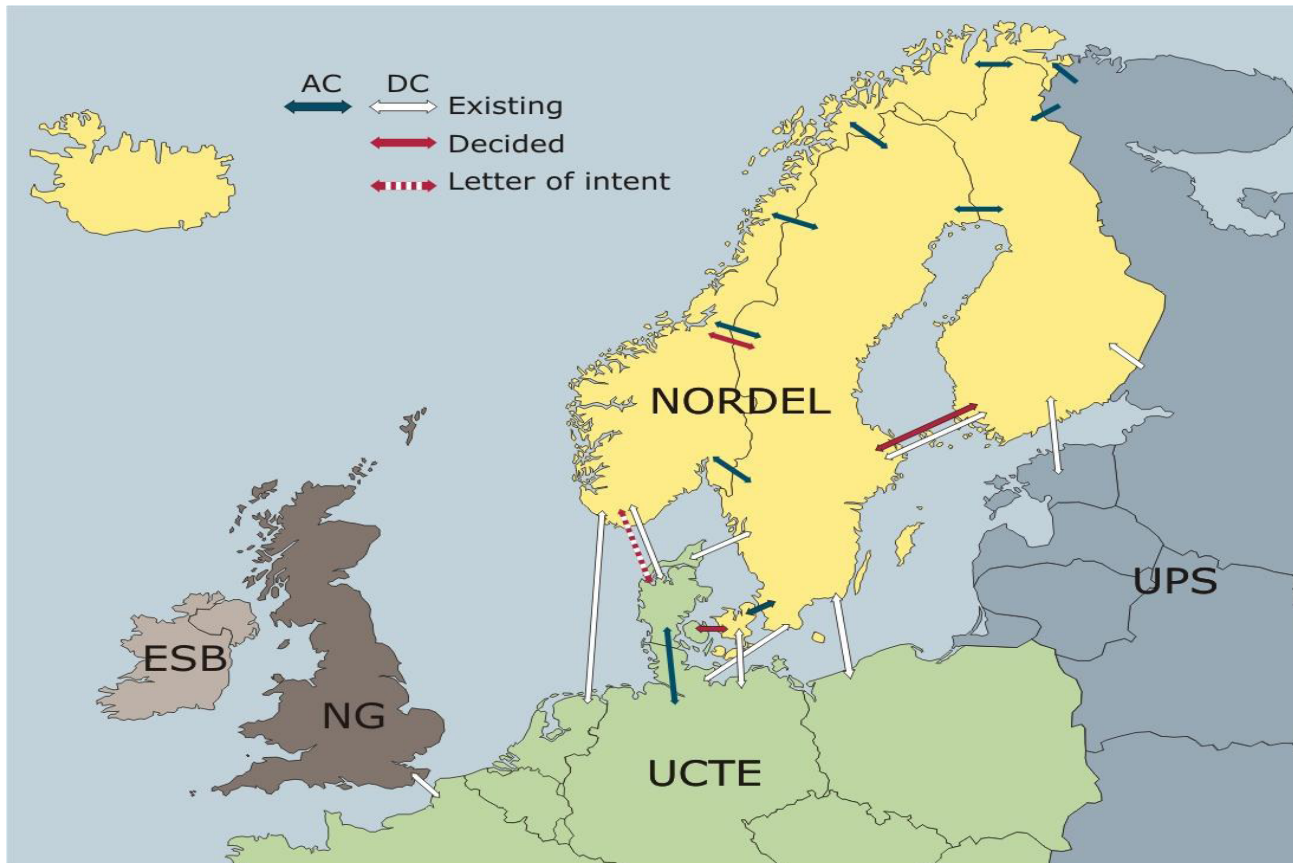
Requirements in the transmission system

- **Need to strengthen the local grids and the system**
- **Only very large plants, several hundreds MW, should connect to the system to avoid disturbances**
- **Smaller plants should be connected on a lower level**
- **The certification system should be modified to give incentives to locate plants especially in the southern part of the country**

Requirements if the target exceeds 10 TWh

- **1 – 2 HVDC cables should be established to a approx cost of 370 MEuro each**
- **4 300 - 5 300 MW regulating power needed for meeting a target of 30 TWh wind power**
- **Total investments and other costs could end up to 15 -17 billion Euro**

External Nordic Investments



Nordic Transmission System Operators total planned external and internal investments –

from 190 M€ 2002 to 810M€ 2012

Costs versus:

- Security of supply
- Functioning of the market
- Climate, environmental impact
- Exporting renewable energy
- Investments leads to increased tariffs
- Costs for investments, balancing and regulating 3.5 billion U.S. \$

Some Swedish answers to the questions

- **Do different support systems matter for market functioning?**
 - **Domestic resources and priorities have till now been important, but when the 3rd Energy Package is implemented it is really hard to see how we could get a well functioning market with such high targets for renewables set up without coordinating the support systems**
- **Which are the best solutions to regulate and balance the increasing vulnerability?**
 - **Spread the windplants geographicly, try to use balancing power directly in windproduction and develop demand side through smart metering**
- **Could the total investments costs be included in the tariff or will subsidy be necessary?**
 - **Hard to see how very ambitious targets could be met if the consumer should meet the total cost-related price on the market**

Finally – ”The One Big Thing (OBT)/ Partners for Cleaner Energy” –

A bilateral cooperation between Sweden and the U.S.

- Started September 2006
- Initiated by the Swedish-American Ambassador
- Aiming to achieve technological break-through
- June 2006 Implementing agreement signed
- June 2007 Implementing arrangements signed
- A bilateral WG between authorities started Nov 2007
- Around 40 Swedish companies identified for cooperation

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Thank you for your attention!

Yvonne