



# Climate challenges – opportunities in renewable energy

Bergen 26 October 2010

Wenche Teigland

Executive Vice President of Energy, BKK



# Agenda:



Increased focus on new renewable energy production as part of the climate solution

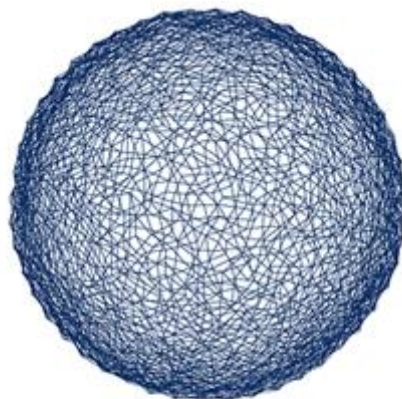


National and international commitments



Opportunities in new renewable energy production

# Climate on the agenda



COP15  
COPENHAGEN  
UN CLIMATE CHANGE CONFERENCE 2009

**BELLONA**

**Bellonameldingen**

(2008-2009)

Norges Helhetlige Klimaplan



Høringsskissen  
Oslo, 6. mai 2009



# Milestones in international climate policy

**1988:** The UN's climate panel established

**1992:** The Climate Change Convention signed in Rio de Janeiro

**1997:** The Kyoto Protocol – extension of the Climate Change Convention

**2005:** IPCC report – significant milestone for our industry

**2005:** The Kyoto Agreement – quantified emission requirements until 2012

**2007:** The Bali Plan – basis for new international agreement

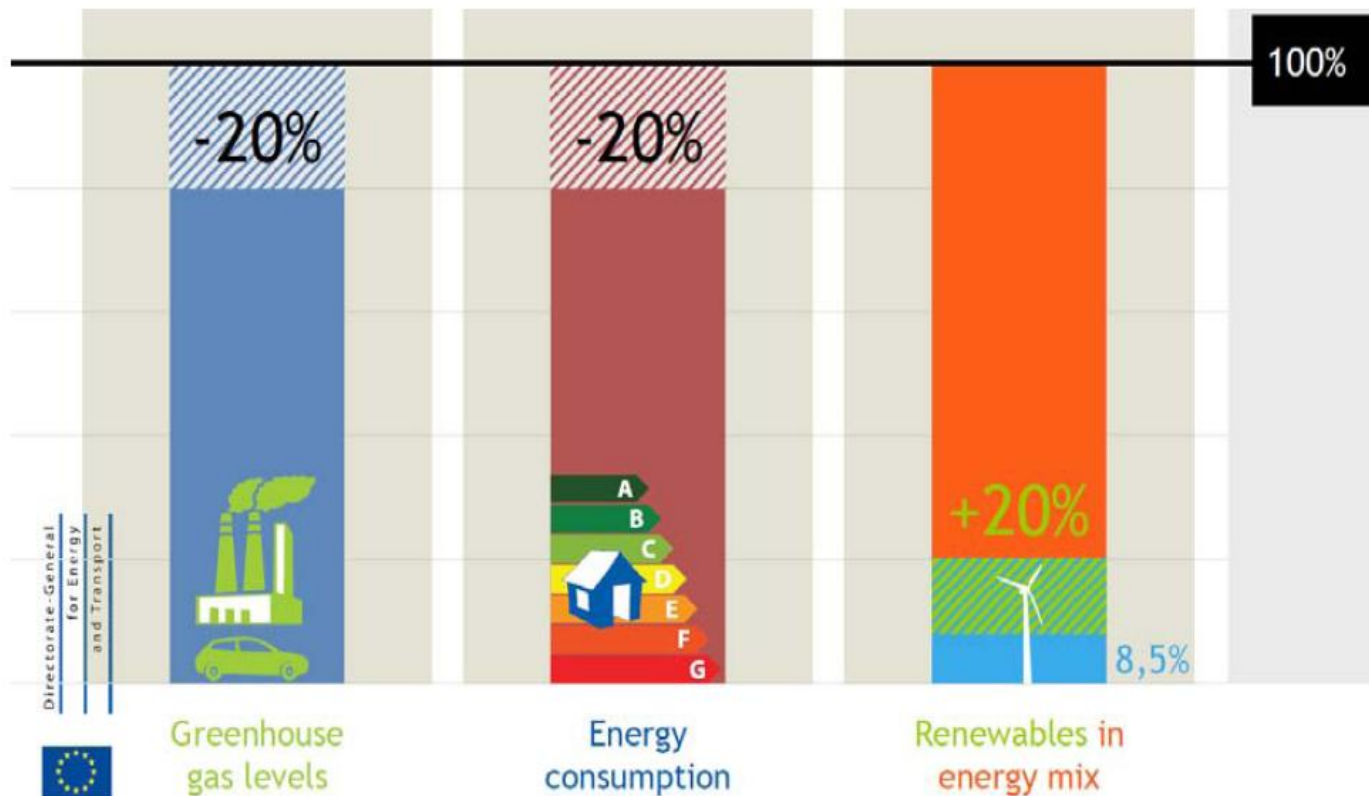
**2009:** COP15 – new climate agreement scheduled to be adopted in December last year

**2010:** ?



# The EU's climate policy

## EUS 20-20-20



# National climate policy



# Great opportunities in renewable energy



# More new renewable energy wanted



SJER JA: EUs fornybardirektiv er viktig om vi skal få på plass et marked for grønne sertifikater, sier statssekretær Heidi Sørensen (SV) i Miljøverndepartementet. Foto: Scanpix

## Statssekretær Heidi Sørensen: -Ja til EUs fornybardirektiv

Statssekretær Heidi Sørensen har i motsetning til olje- og energiminister Terje Riis-Johansen ingen problemer med å si at Norge bør implementere EUs fornybardirektiv.

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Av Jannicke Nilsen Publisert: 19.11.2008 kl. 10:15

På direkte spørsmål om Norge bør implementere EUs fornybardirektiv svarer statssekretær Heidi Sørensen (SV) i Miljøverndepartementet bekræftende.

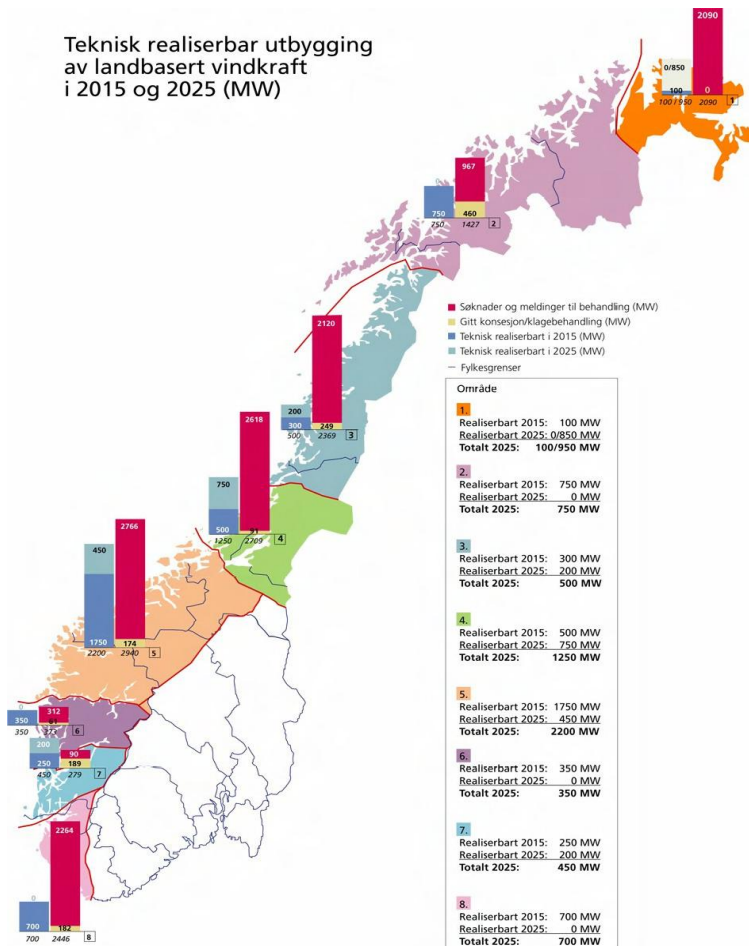
- Vi mener det (EUs fornybardirektiv, red.anm) er relevant for Norge. Direktivet er viktig om vi skal få på plass et marked for grønne sertifikater,

### Les også:

- [Store besparelser i grøn energi](#)
- [- Vi har dårlig tid](#)
- [- Norge må si ja til fornybardirektiv](#)
- [EUs klimapolitikk vakler](#)

# Western Norway - Norway's energy capital

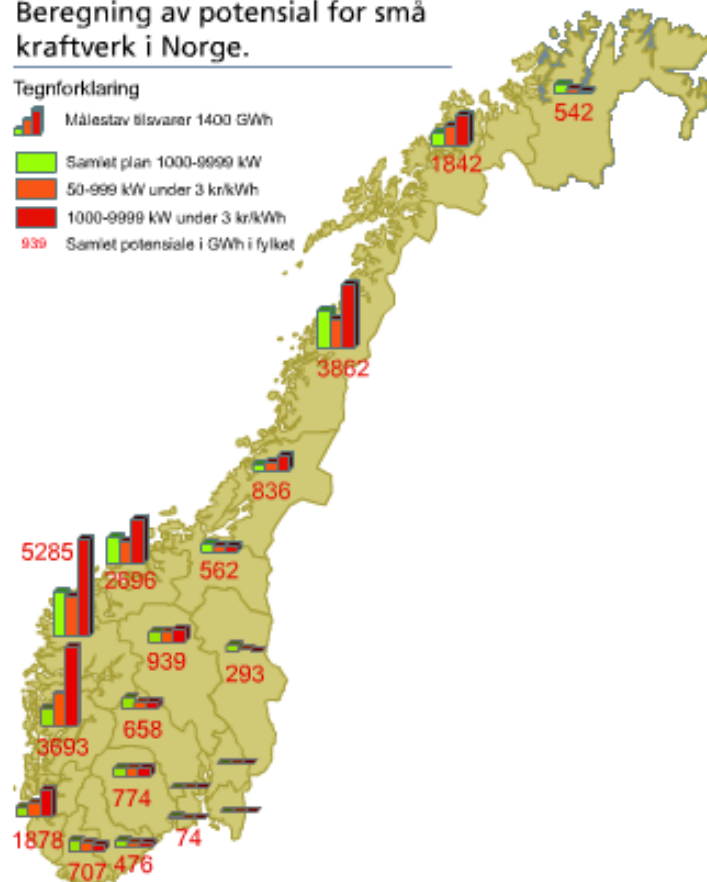
Teknisk realiserbar utbygging av landbasert vindkraft i 2015 og 2025 (MW)



Beregning av potensial for små kraftverk i Norge.

Tegnforklaring

- Målestav tilsvarende 1400 GWh
- Samlet plan 1000-9999 kW
- 50-999 kW under 3 kr/kWh
- 1000-9999 kW under 3 kr/kWh
- 939 Samlet potensiale i GWh i fylket



# BKK – 90 years in Western Norway



# BKK's renewables ambitions

## **Hydroelectric power in Norway**

BKK plans to increase hydroelectric power production in Norway by 750 GWh by 2015 (ref. year: 2005).

## **Hydroelectric power abroad**

BKK plans to increase hydroelectric power production abroad, through, among other things, the companies SNP AfriCa and Himal Power Ltd. Our objective is to have made an investment decision for 800 GWh by 2015 (BKK's share).

## **Wind power**

Together with the Western Norway Alliance, BKK has big plans to produce onshore and offshore wind power. BKK's share of production is 200 GWh by 2015.



# New power – new value creation



# Hydropower is a true renewable source of energy

- Clean and renewable
- Low production cost of electricity
- The energy can be stored, and used when needed
- Easy to adjust
  - balances the energy system which is constantly getting more unregulated power from wind and small hydro
  - Norway as "Europe's battery" – balancing the power
  - less pollution from coal plants in Europe







# New power – new industry

Through the company Vestavind Offshore, BKK is investing in offshore wind power.

In 2009, the company was granted a licence to build Norway's first full-scale offshore wind power plant outside Harøya in Sandøy municipality in Møre og Romsdal.

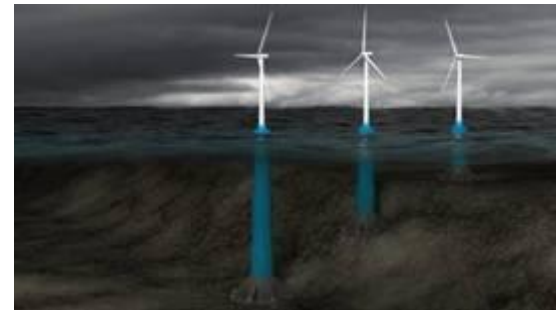
Full realisation can give 1 TWh in annual production

Market potential:

5-10,000 offshore windmills in the North Sea by 2020.

Jobs in industry:

100 windmills create 1,000 new jobs in industry.



# Green jobs

**PÖYRY** **THEMA Consulting Group**

GRØNNE FORRETNINGSMULIGHETER

Utarbeidet for Stiftelsen Elektroforums medlemmer:

- Elektroforeningen
- Energi Norge
- Industriens forening for elektroteknikk og automatisering
- Norsk Teknologi
- Norsk Industri
- Rådgivende ingeniørers forening

**econ** R-2010-050



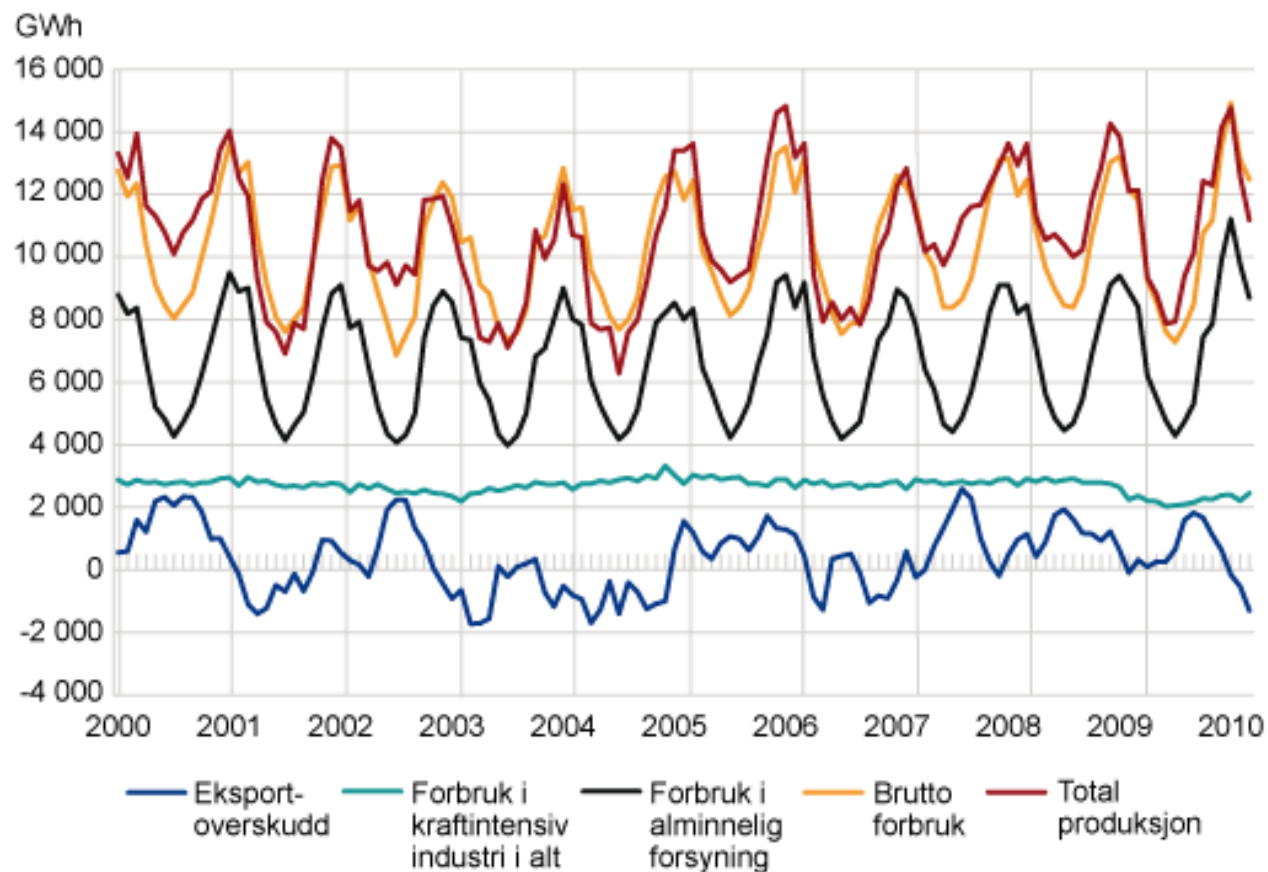
## Major challenges



A photograph of a chalkboard with a handwritten mathematical formula in white chalk. The formula is  $[f^{-1}(x)]' = \frac{1}{f'(y)}$ . The chalkboard has a dark green background, and the handwriting is somewhat blurry and informal.

# The power balance

Produksjon, forbruk og eksportoverskudd av elektrisk kraft per måned. GWh



# National power balance – different power prices



# More network capacity urgently needed

- The power network is a critical social infrastructure that must have the capacity to meet consumption needs today and in the future.
- More lines urgently needed.
- The existing network must be renewed.
- Increased climate focus and demand for renewable energy - Western Norway has rich renewable resources, but production requires network capacity.



## In summary:



General international and national consensus that emissions must be reduced.



Energy requirements must be met, to a greater extent, by renewable sources of energy such as hydroelectric, wind, wave and solar power.



New renewable energy production also represents value creation, technology development and green jobs.



Norway has rich renewable resources, but the capacity in the power network limits opportunities for exploiting the potential.



We are working on tomorrow's solutions. Today.

**BKK - Tomorrow is today.**

