

# Nordregio



Photo: Kjell Nilsson

# Staff and economy

- 37 staff members (29 researchers)
- 13 nationalities
- Annual turnover: ca 4 million Euro
- Annual grant from Nordic Council of Ministers: ca 40% of budget
- National and international research funding and commissions

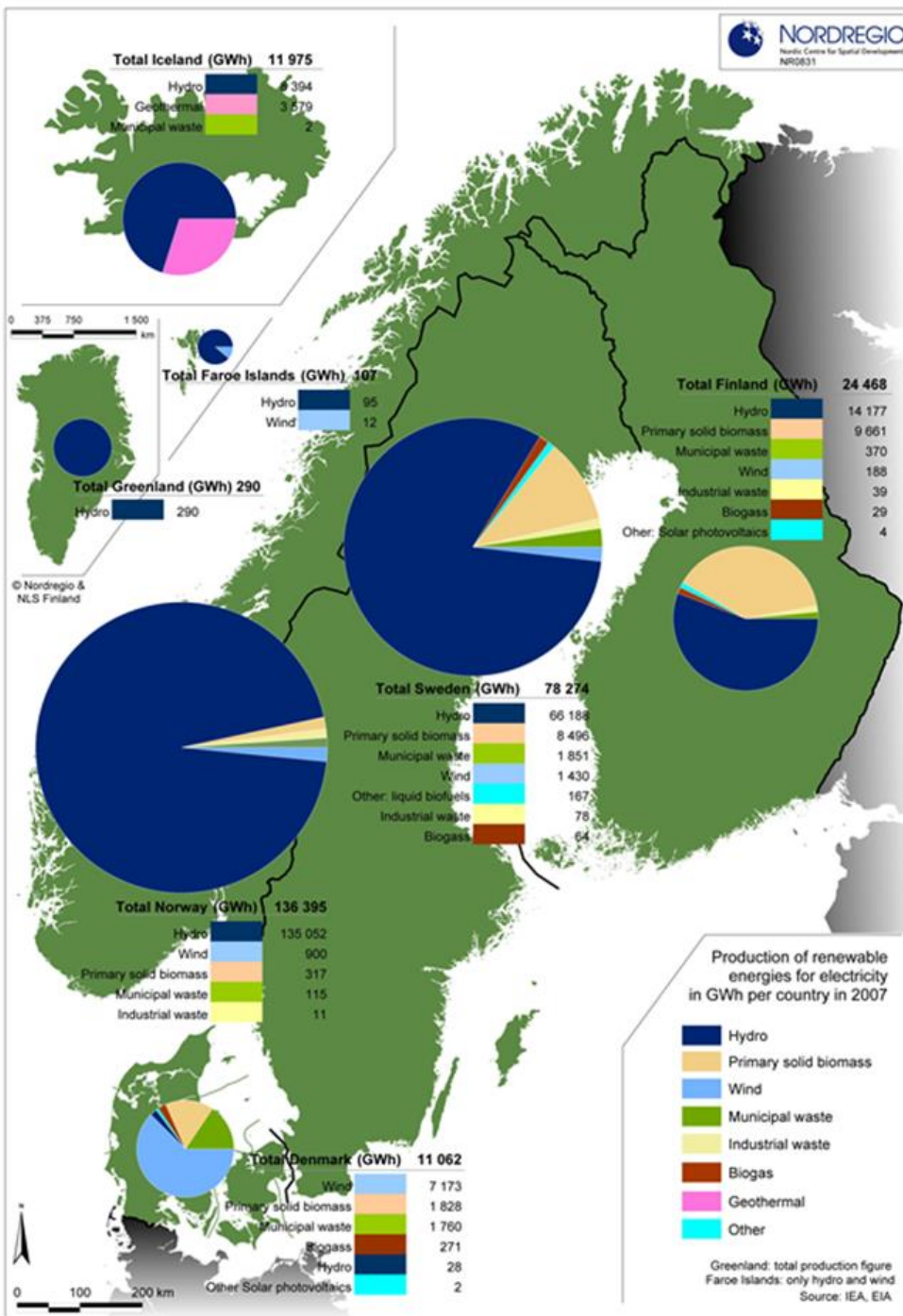


# Main research themes

- Demography, socio-economic analysis, rural development
- Urban planning, sustainable Nordic city regions
- Green growth, bioeconomy, innovation and entrepreneurship
- Sustainable development
- Regional policy and governance systems



Photos: Karin Beate Nøsterud/norden.org, VisitDenmark, Nicolai Perjesi



# National sources of renewable energy

# Scenario 1: Bioenergy potential from forest residues excluding stumps in Finland, Norway and Sweden

Bioenergy potential in GWh

— National Boundary

— Regional Boundary

15 - 120

121 - 350

351 - 600

601 - 1,100

1,101 - 1,700

1,701 - 2,500

2,501 - 3,100

3,101 - 3,700

3,701 - 4,400

Non production

Percentage of tree species



Pine

Spruce

Broadleaved

Estimations based on average roundwood removals 2004-2008

Shares of residues:  
Stems (SE,FI): 15%  
Stems (NO): 5%  
Branches and tops: 35%  
Stumps: 0%

Regional division:

Finland: Forest Centre Regions

Norway: NUTS3 Regions

Sweden: NUTS3 Regions

Estimations on bioenergy potentials:

Faculty of Landscape Management and Nature Conservation at the University of Applied Sciences in Eberswalde

© Nordregio & NLS Finland



**NORDREGIO**

Nordic Centre for Spatial Development

NR0847

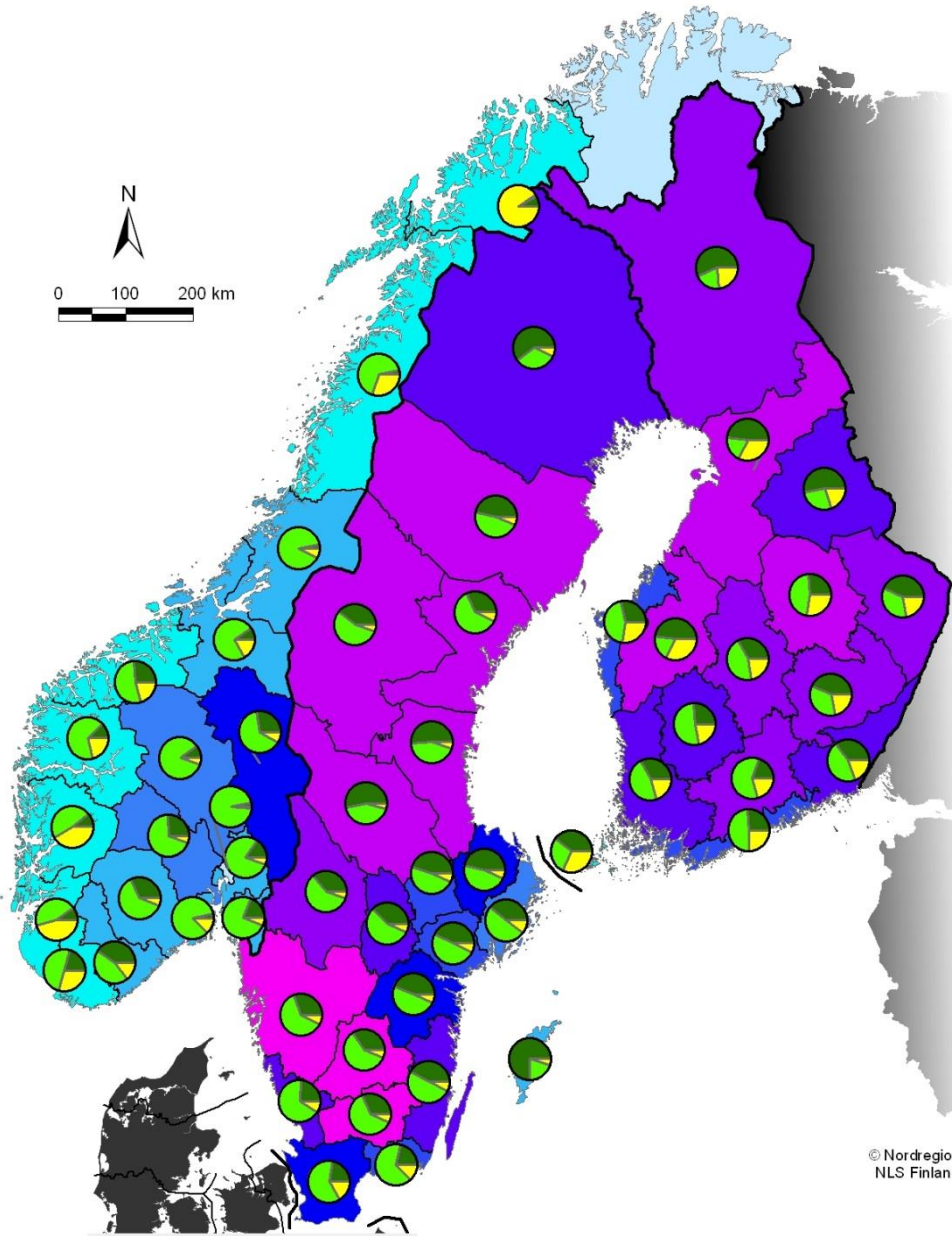
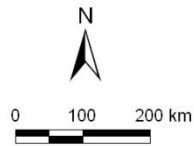


Eberswalde University for Sustainable Development  
University of Applied Sciences

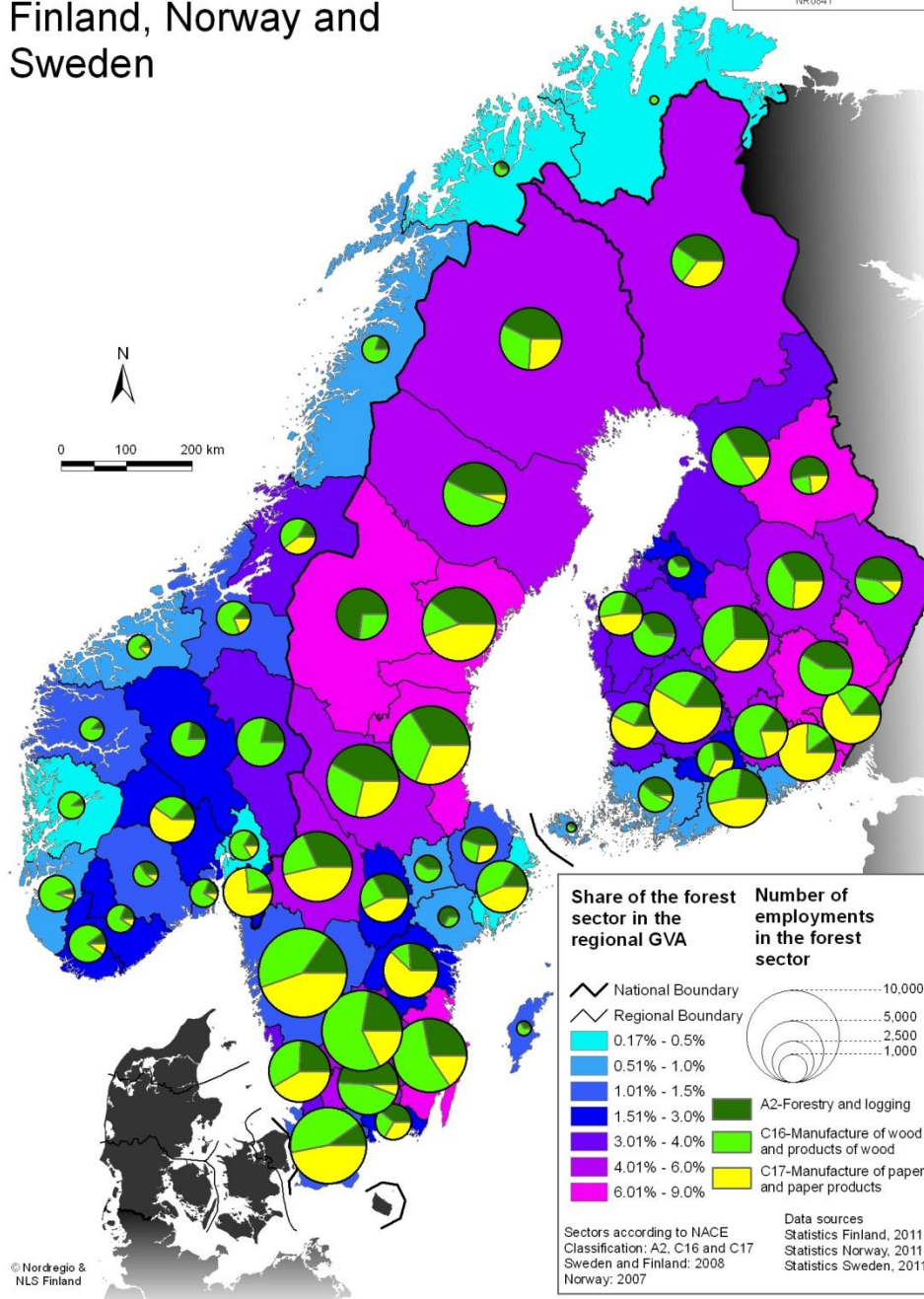


**NORDREGIO**

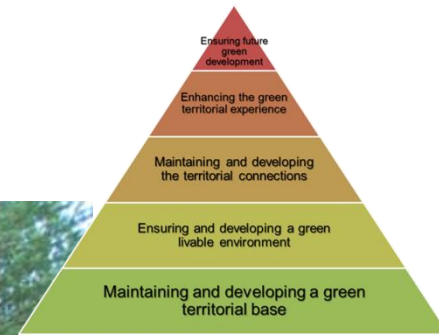
Nordic Centre for Spatial Development



# Employment by the forest sector in Finland, Norway and Sweden



# Employment by the forest sector



Ensuring future  
green  
development

Enhancing the green  
territorial experience

Maintaining and developing  
the territorial connections

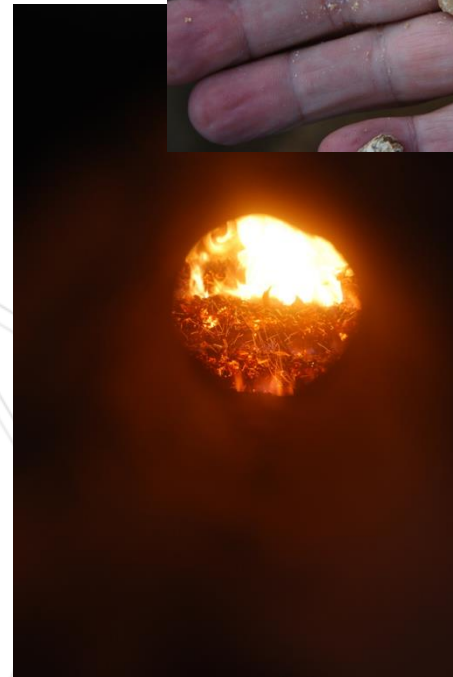
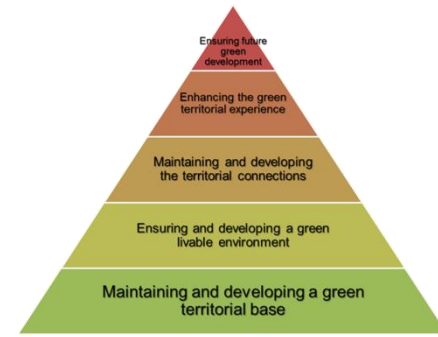
Ensuring and developing a green  
livable environment

Maintaining and developing a green  
territorial base

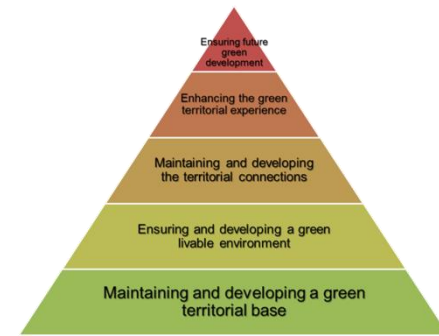


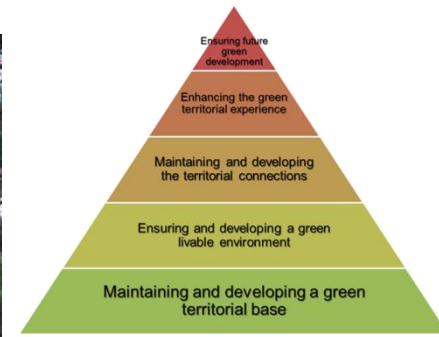
**NORDREGIO**  
Nordic Centre for Spatial Development

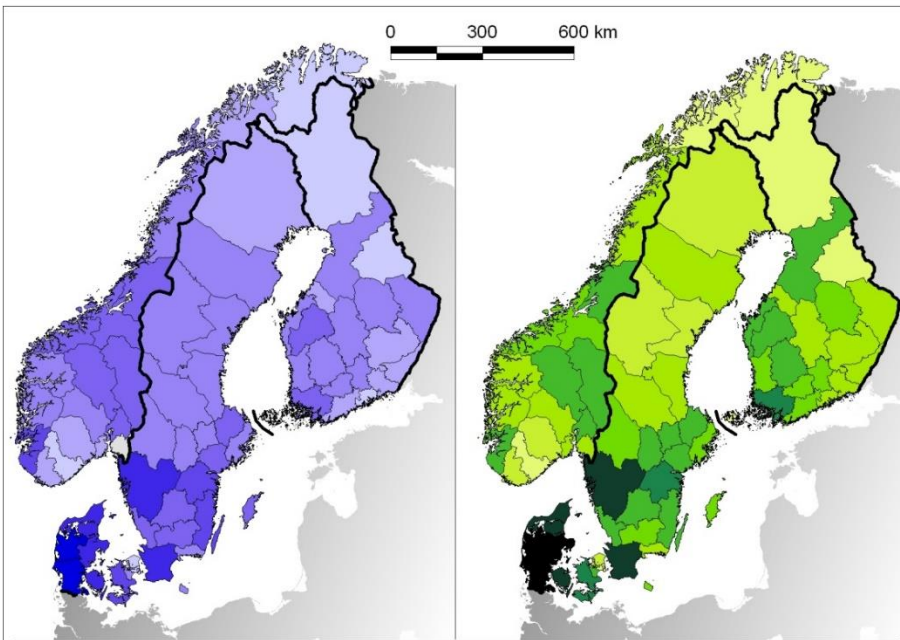








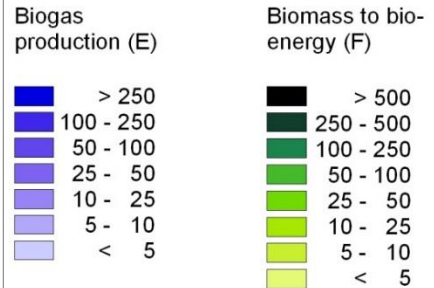




**E: Biogas:** based on 100% livestock manure, 20% grain straw, in 500 kW bio-gas plants with 7500 working hours/year\*

**F: Total man-years** for conversion of biomass to bioenergy

**Bio-energy production in man-years**



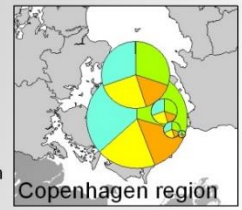
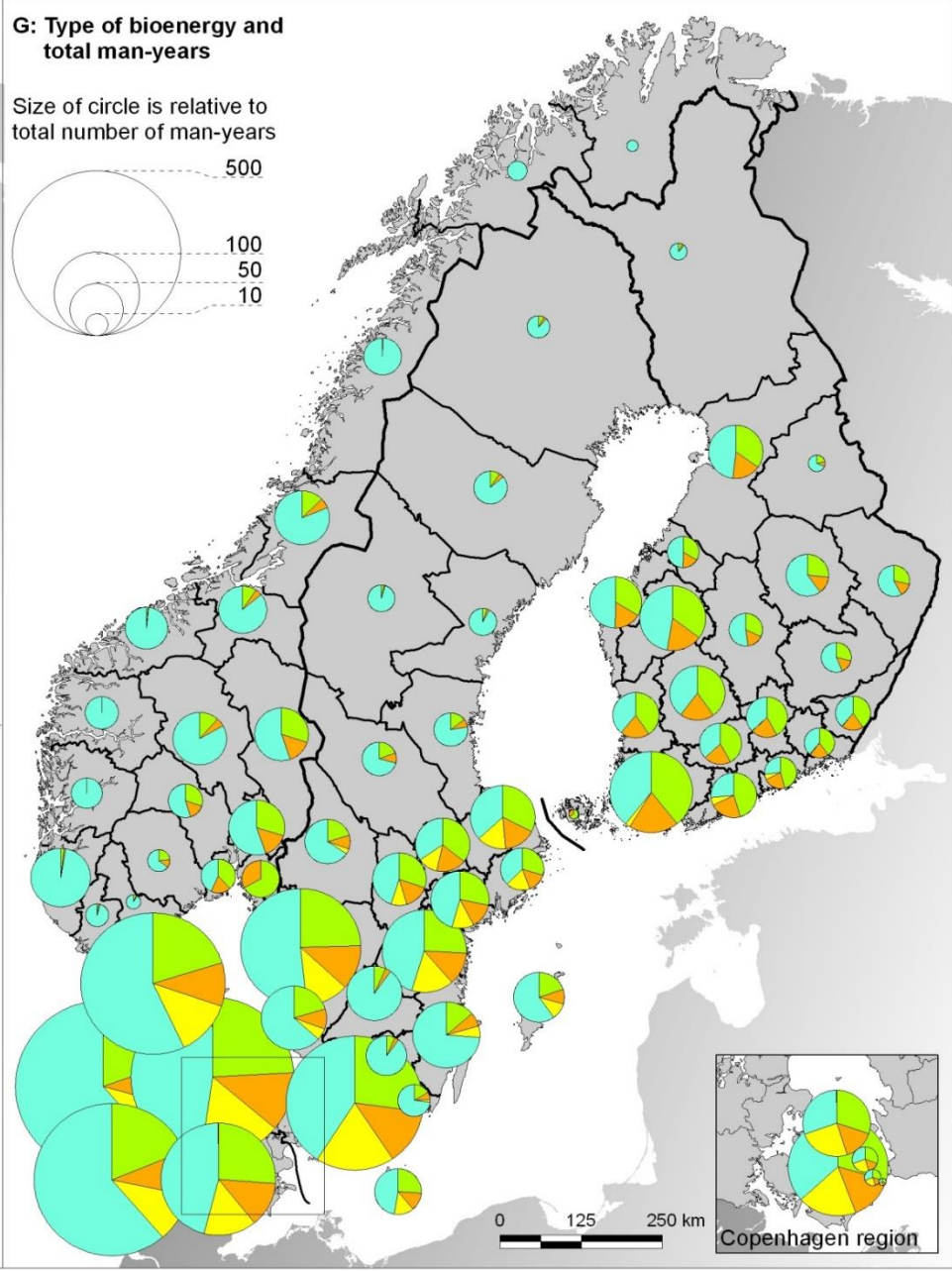
**Distribution of man-years between bioenergy sources (G)**



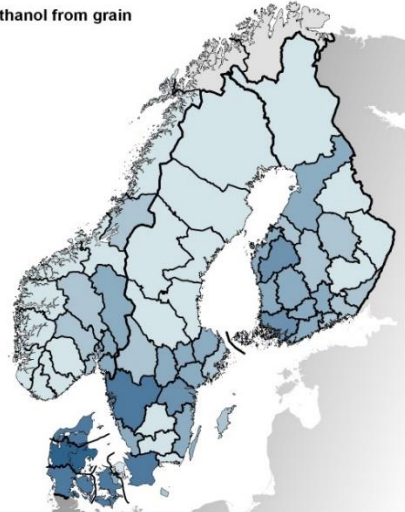
\* Regional availability  
 • Grain = 20%  
 • Grain straw = 20%  
 • Rape = Average yield  
 • Manure = 100%

Figures include both direct and indirect labour activities

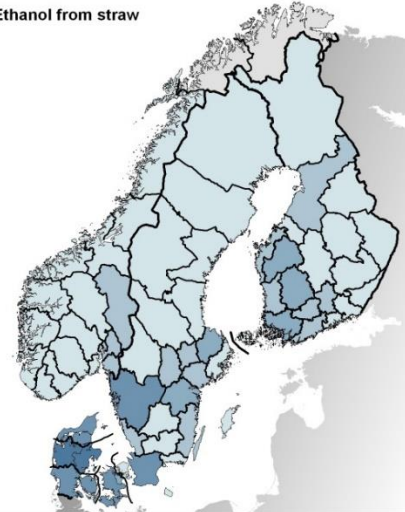
Data source: Nordregio, Faculty of Landscape Management and Nature Conservation at the University of Applied Sciences in Eberswalde, NSIs, TIKE



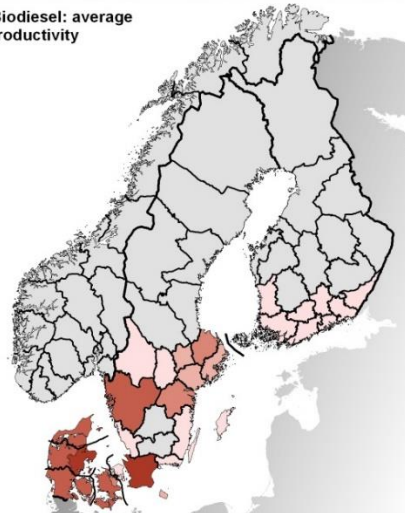
A: Ethanol from grain



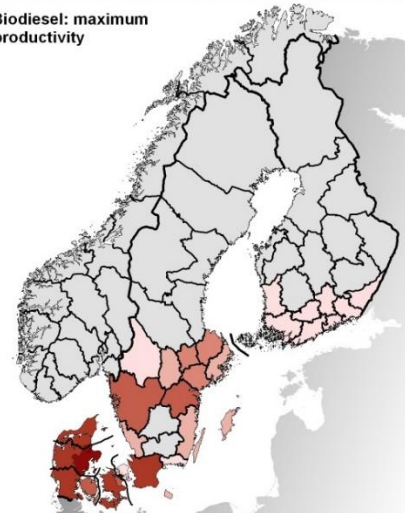
B: Ethanol from straw



C: Biodiesel: average productivity



D: Biodiesel: maximum productivity



**Biodiesel and bioethanol production in man-years**

Man-years for bioethanol from grain (A) & straw (B). Calculations based on 20% for bioenergy, including both direct & indirect labour activities

- > 100
- 50 - 100
- 25 - 50
- 10 - 25
- 5 - 10
- < 5

Man-years for biodiesel, average (C) & maximum (D) productivity. Calculations based on both direct & indirect labour activities

- > 100
- 50 - 100
- 25 - 50
- 10 - 25
- 5 - 10
- < 5

Data source: Nordregio, Faculty of Landscape Management & Nature Conservation at the University of Applied Sciences in Eberswalde, NSIs, TIKE.

# Biodiesel and Bioethanol production

# Biogas



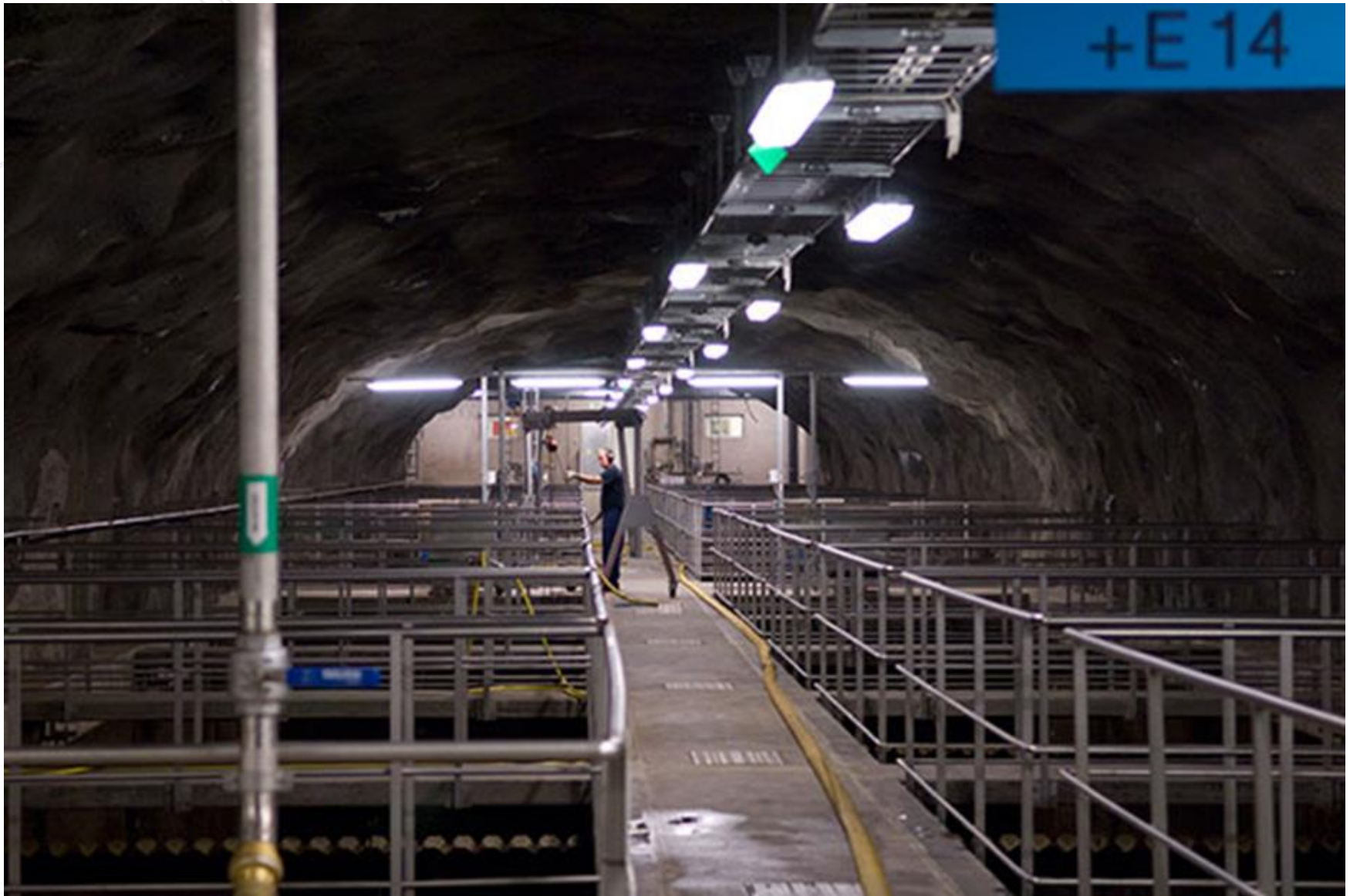
Sweden, produced in 2014, approximately 1.8 TWh of biogas from a total of 277 plants. Of the produced gas 57% is upgraded to vehicle fuel, 24% used for heat production, 3% went to the production of electricity, 11% tray was removed and 4% used for industrial use.

The main substrates for biogas production were different types of waste such as sewage sludge, manure, source-separated food waste and waste from slaughterhouses and food industry. Energy crops accounted for a very small part of the total substrate.

Besides biogas co-digestion plants and farm biogas plants together produced more than 1.672 million tonnes (wet weight) digestate of which 99% used as fertilizer. Wastewater treatment plants produced 672 000 tonnes of dewatered sludge of which 30% was used as fertilizer.









**NORDREGIO**  
Nordic Centre for Spatial Development



# Upgrading

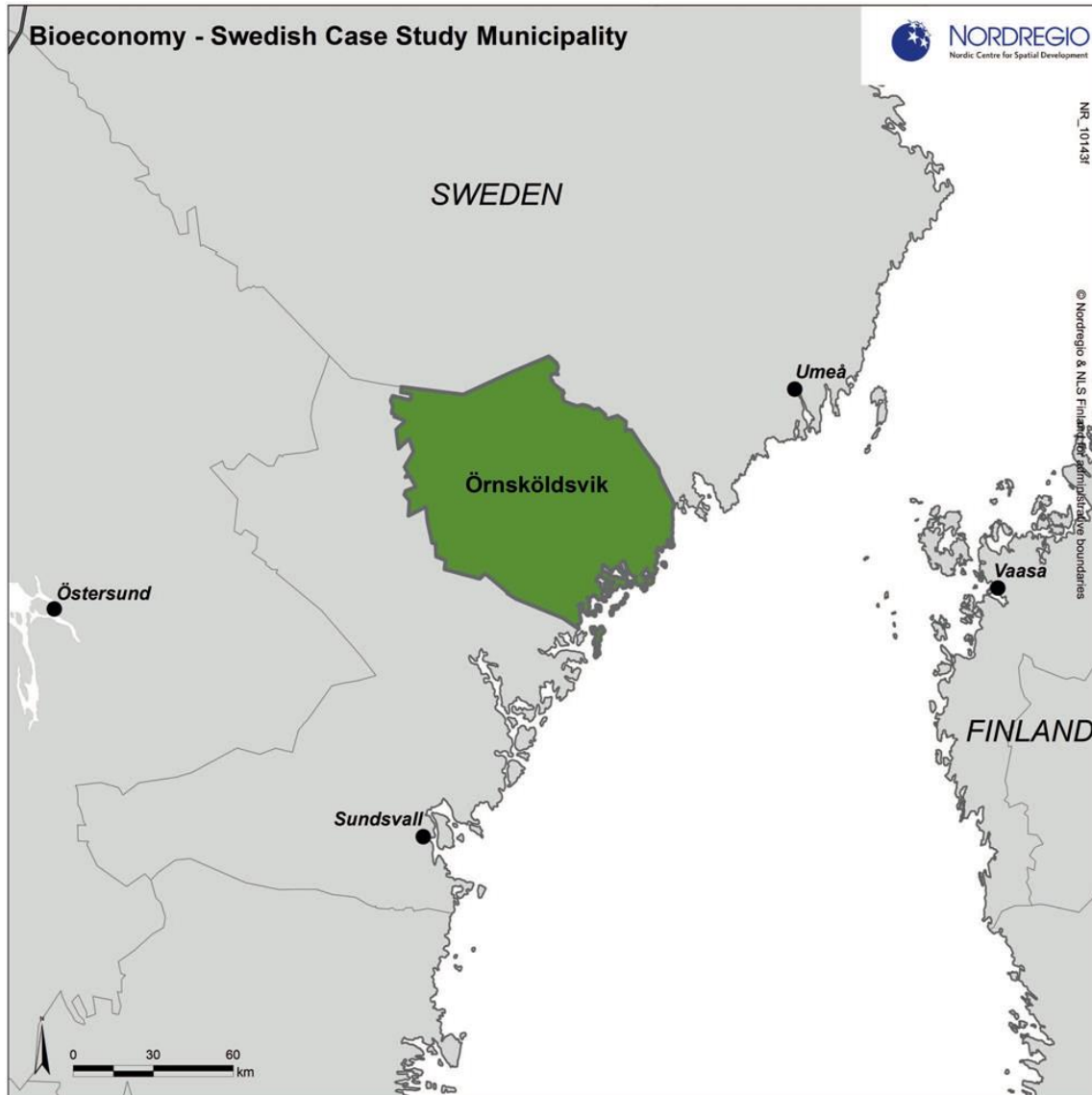








# Biodiesel







## Case study regions



Svartsengi  
Resource Park

EYDE cluster

Händelö

Kalundborg

Kemi-Tornio  
Region

NR07575 © Nordregio & NLS Filippid for administrative boundaries



# Industrial Symbiosis A key driver of Green Growth in Nordic Regions

# Industrial Symbiosis

## A key driver of Green Growth in Nordic Regions



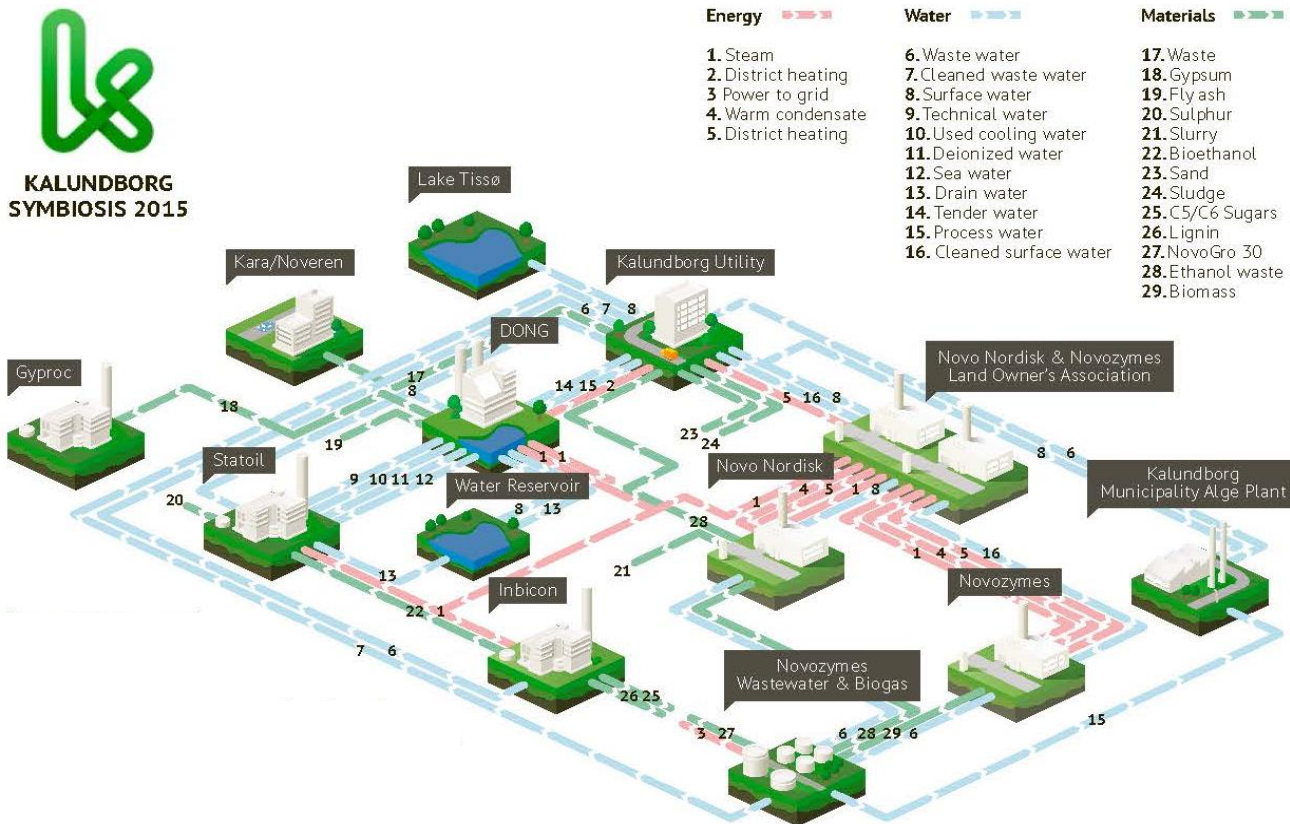
# Industrial Symbiosis

## A key driver of Green Growth in Nordic Regions

Diagram: [www.symbiosecenter.dk](http://www.symbiosecenter.dk)



**KALUNDBORG  
SYMBIOSIS 2015**



**”THE KALUNDBORG SYMBIOSIS WAS DEVELOPED BASED ON COMMERCIAL AGREEMENTS BETWEEN THE PARTNERS.”**

Please have a look at the two  
leaflets available at the front desk

One on our activities in ESPON (GREECO)  
And the other on the Nordic approach to  
Bioeconomy