‘Green’ business development in Latvia and Norway
NORWAY
POWERED BY NATURE

Agriculture, fish and shipping

Growth of hydro electric power

Oil-fuelled economy

Source: Innovation Norway
NORWAY’S PRIORITY SECTORS

Source: Innovation Norway
## Technology status and Norwegian capabilities

### Power sources
- Hydro power
- Onshore wind power
- Offshore wind power
- Solar energy
- Ocean energy
- Bioenergy
- Geothermal power
- Energy storage

### Implementation segments
- Smart grid
- Green data centres
- Sustainable buildings
- Clean water
- Waste treatment
- Energy efficient industry
- Sustainable shipping
- Low emission oil and gas
- Sustainable transportation
- Green services

Source: Innovation Norway
Hydro power

- 98.5% of electricity in Norway is hydropower
- Rainpower: Leading global supplier of turbines
- Advisor – Supplier of critical technology – Investor

Source: Innovation Norway
Onshore wind power

- Increase 30% annually, 2nd largest source in Norway
- Blaaster AS: Testing 3MW low-cost direct driven turbines
- Next generation wind turbine, grid integration services and investor

Source: Innovation Norway
Offshore wind power

- 10 000 offshore turbines installed in Europe by 2020
- Statoil Hywind: The world’s first full-scale 2.3 MW floating wind turbine, 10 km off the coast of Norway
- Everything below and floating on the sea, erection and maintenance services, certification services, investor

Source: Innovation Norway
Solar energy

- Pioneer in photovoltaics – one of the fastest-growing renewable power sources
- Elkem Solar: 7 500 mty production of super clean solar grade silicon with one-fourth of the energy consumption
- Upstream technologies for solar panel production, investor in solar power plants

Source: Innovation Norway
Ocean energy

- Huge ocean power potential – no proven technology
- Flumill: Innovative helix concept for tidal energy
- Tidal and wave power prototypes and demo versions

Source: Innovation Norway
Bioenergy

- Bioenergy is carbon neutral, and resources are close by
- Borregaard Biorefinery
- Production of bioenergy from forestry, farms and ocean

Source: Innovation Norway
• Thermal energy is utilized to produce hot water or steam
• Norwegian Center for Geothermal Research facilitates the development and exploration of geothermal energy
• Research and services

Source: Innovation Norway
Energy storage

• The world is looking for energy storage opportunities
• Powel: software for optimizing production, based on fluctuations in demand, supply and market conditions
• Expertise in transmission and adjustment of demand/supply

Source: Innovation Norway
Smart grid

- Reduces energy consumption and avoids peak loads by controlling supply and demand
- Energi Trøndelag: Energy management of 400 corporations
- Solutions and services for smart energy markets

Source: Innovation Norway
Green data centres

- Huge data centres require energy, cooling, space and infrastructure for storing and processing data
- Green Mountain: Powered and cooled by renewable energy
- Sustainable operations through favorable conditions

Source: Innovation Norway
Sustainable buildings

- Buildings use 40–50% of energy, emit 40% of CO₂, consume 50% of materials and generate 25% of total waste
- Snøhetta: Eco-efficient and exceptional designs
- Data modeling of design and construction processes

Source: Innovation Norway
Clean water

- World’s second biggest challenge: Lack of fresh water!
- Biowater Technology: Wastewater treatment and reuse systems
- Energy neutral water treatment technologies, micro/nano technologies, no dig solutions

Source: Innovation Norway
Waste treatment

- Waste causes greenhouse gases, and contaminated water and soil, which could cause health problems
- Cambi: Biogas, heating, electricity and fertilizer from sludge
- Recycling and biogas from organic and household waste

Source: Innovation Norway
Efficiency in energy-intensive industry

- Energy-intensive industry uses 25% of Norway’s electrical power
- Hydro Aluminium: 30% cut in power consumption from improved aluminum technology
- Power use reduction, regeneration from off-gases and cooling water

Source: Innovation Norway
Sustainable shipping

- Shipping is a major source of CO2, NOx and SOx emissions
- Fjellstrand: World’s largest battery-powered ferry – 120 vehicles, 360 passengers, recharges in 10 min
- Solutions for emissions reduction and water treatment

Source: Innovation Norway
Low emissions from oil and gas production

- Oil and gas industry account for 25% of Norway’s emissions
- Technology Center Mongstad: World’s largest facility for testing and improving CO2 capture technologies
- Oil and gas industry emissions reduction technologies

Source: Innovation Norway
Sustainable transportation

- Norway: Highest density of electric vehicles in the world
- Think: From pioneer in electric vehicles, via Ford ownership, to bankruptcy. But they paved the road for others
- Incentives and infrastructure for electric vehicles

Source: Innovation Norway
Green Services

- Private and public sector services represent 74% of employment and 56% of gross domestic product
- Det norske Veritas (DNV): Classification, verification, certification, energy advisory, maritime, oil and gas
- Consulting and engineering services

Source: Innovation Norway
LATVIA
INDUSTRY DIVERSITY

- Food industry: 24.9%
- Wood processing: 23.2%
- Production of metals and metal articles: 14.0%
- Chemical industry and related industries: 7.7%
- Production of other non-metallic mineral products: 6.2%
- Other industries: 5.2%
- Production of electrical and optical equipment: 4.5%
- Light industry: 4.4%
- Paper industry and publishing: 3.9%
- Production of vehicles: 3.8%
- Production of machinery and equipment: 2.2%
HIGHEST ELECTRICITY CONSUMPTION FROM RENEWABLE ENERGY SOURCES
Share of electricity generated from renewable energy sources in electricity consumption (2008)
Source: Eurostat

LATVIA 41.2%
LITHUANIA 4.6%
ESTONIA 2%
CZECH REPUBLIC 5.2%
POLAND 4.2%
EU 27 16.7%
‘Green’ business areas in Latvia

- eMobility
  - Charging infrastructure
  - High-speed transportation
  - Various transport modes

- Renewable energy
  - Waste recycling
  - Renewable resources
  - Others

- Energy affectivity
  - Wind energy
  - Solar energy
  - Wave energy
eMobility in Latvia
Charging infrastructure and producers

46 charging stations

Source: Zaļo Tehnoloģiju Klasteris
eMobility in Latvia
High-speed transportation

• ~ 20 electric vehicles registered in Latvia

• Electric race car producer - eO

• Grant program for purchase of electrical vehicles
eMobility in Latvia

various transportation

• Blue Shock Bike – producer of various electric bikes
Renewable energy

Waste recycling

- Paper recycling – 4 companies
- Plastic, PET recycling – 10 companies
- Glass recycling – 8 companies
- Metal packaging recycling – 8 companies
- Dangerous goods recycling
Renewable energy

Wind energy

- Several wind parks along the coast line
- Coast wind capacity 600MW. Used 5%
Renewable energy
Renewable Resources

• Biomas resources
  • Pellet production – Latvia 3rd largest producer in Europe ~ 1,1 milj. t

• Briquet production – annual production increase 25%

• Biogas production -> 60 producers. Exceeding 60 MW power
Renewable energy
Solar energy

• solar grid connected power plants

• Solar off-grid power plants

• Solar thermal systems – used and produced in Latvia

Source: Solar energy Association
‘Green’ business environment

‘Green’ technology cluster
http://www.kbi.lv/lat/left/60/zalo-tehnologiju-klasteris

Waste management association
www.lasua.lv

Wind energy association
www.windenergy.lv

Biomass association
www.latbio.lv

Latvian biogas association
www.latvijasbiogaze.lv

Solar energy association
http://www.saulesbiedriba.lv/
‘Green’ business in cluster

Members of the cluster – leading & related companies

Cluster initiative management

Institutions VATP, LTRK, VEA, SEA, AEA, LATEA, Local authorities

Universities and research centers – VeA, LiepU, DU..

SIEMENS

Baltic Wind Park

ELTUS

AMOPLANT

SCHÜCO

VA

ELP PLASTIC

BLUESHOCK TAXI

VATP

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