



유럽의 바이오에너지

네덜란드 정부 정책

- In 2020 ten percent of all energy consumption has to come from sustainable resources
- In 2010: five percent sustainable

Actual situation

- *2.4% of the total energy supplies, produced in the Netherlands are from sustainable sources. This is in increment of 0,6% since 2004. The main cause is the increased introduction of co-firing of biomass (mainly wood pellets) with coal and wind energy.*


재생에너지원에 대한 정책

- EU: Kyoto target of 8% Green house gas emission reduction in 2008–2012
- EU White paper on RES (1997): increase share from 6% to 12% by 2010
- RES-E directive (2001): 22% % electricity from RES by 2012
- Liquid biofuels directive to replace gasoline and diesel: : 5.7% by 2010
- RES-Heat: no target yet (similar to White paper)



Impact on EU: present demand

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- 📌 For EU-15 the present RES-E and RES-H demand corresponds with 142 million m³ round wood equivalents, of which 21 million m³ is supplied directly from forests, whereas the rest is being supplied by agricultural and wood processing residues
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Impact on EU: demand 2010

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- 📌 For EU-15 the total demand by 2010 will increase to 214 million m³ round wood equivalents, of which 35 million m³ will be supplied directly from forests,
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- 📌 This is an increase by 14 million m³ of wood
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Impact on EU forest sector

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-  Compared with the total annual production of industrial round wood in the EU-15 (i.e. 230 million m³), this is a 7% increase only, which the forestry sector should be able to provide easily
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바이오매스에서 에너지 생산을 위한 전환 경로

- Heat
- Green electricity (power)
- Combined heat and power (CHP)
- Liquid and gaseous motorfuels
- Cogeneration in coal plants
- Stand alone bio energy plants
- Pyrolysis

목질계 바이오매스 환산인자


-  Energy-content of 1 m³ of fresh wood = 8,2 GJ (GJ=10⁹ J)
-  1 m³ of wood produces 666 kWh electricity (at 30% conversion efficiency of the energy-input)
-  Average household uses 3400 kWh electricity (i.e 5 m³ r.e) plus an additional 1800 m³ of natural gas (2002 data)
-  To produce 1 billion kWh of green electricity an input of 1,5 million m³ of fresh wood is needed

네덜란드의 바이오매스에서 전기 생산량 (2005)

In GWh

Incinerating plants	1001
Co-firing	3310
Other biomass power plants	235
Biogas from landfills	127
Biogas from sewer sludge	119
Other biogas	39
Total	7020





Total Net. Electricity consumption: 114.293 GWh








바이오매스 기반의 숲과 자연의 주요발생원

- - 📌 Traditional fuel wood
 - 📌 Wood processing residues
 - 📌 Post consumer wood
 - 📌 Forest biomass (logging residues)
- 📌 Pruning and felling from parks and landscape plantings
- 📌 Dedicated energy crops
- 📌 Residues from nature conservation
- 📌 Residues from other vegetation like road side banks, river and canal banks etc.

전통적인 목재 연료

-  Non-transparent market
-  Probably 200.000 tons/annum
-  No alternative supply for bio energy but an important source of income for small holders, selling fuel wood on the private market. In the Netherlands heath from fuel wood represents about 42% of all produced sustainable heat.
-  Main sources are: thinning of hardwoods, pruning and cutting from gardens etc.

목재 가공 잔유물 1

-  Bark
-  Saw dust
-  Chips
-  Shavings
-  Off-cut

Most residues, used as bio fuel are processed into wood pellets.

목재가공 잔유물 2

- From round wood industry ± 160.000 oven dry tons
- From processing and other branches 405.000 oven dry tons.