



Energy research Centre of the Netherlands

# COUNTRY REPORT the NETHERLANDS

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Pitea, Sweden, 18 October 2011



## NL RENEWABLE ENERGY

### *political developments: energy report 2011*

- Modern industry policy: NL energy sector is strong, green jobs
- More renewable energy ahead:
  - short-term: EU-goals by subsidies and supplier obligations
  - long-term: innovations
- Room for all energy options: nuclear necessary, CCS needed with coal, energy efficiency, renewable energy
- Green Deal: green and growth

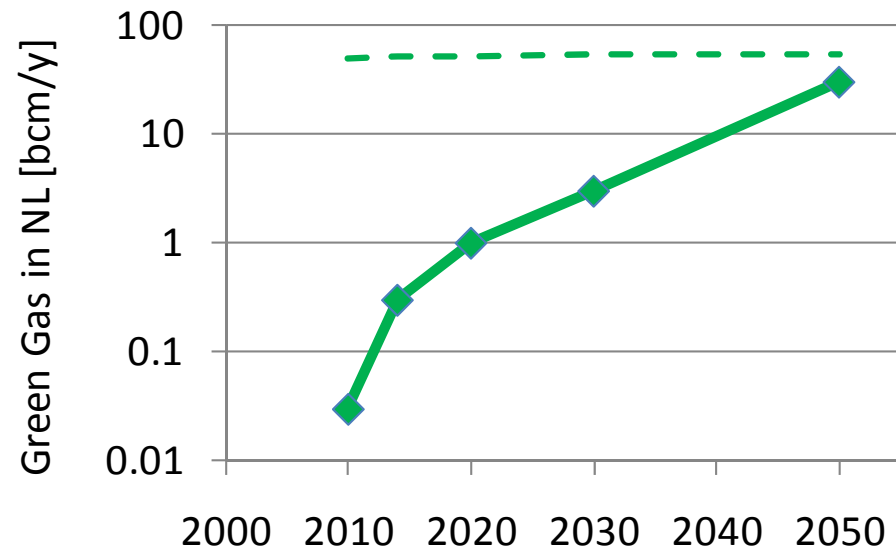
## NL RENEWABLE ENERGY *Green Deal*

- Deal between industry and government
- 59 deals signed October 3<sup>rd</sup> 2011



## GREEN DEALS

- Green Gas:  
production volumes



- Renewable Energy North of Netherlands: BioMCN, Green Gas 0.2 bcm in 2015, 0.5-0.75 bcm in 2020
- Large-scale co-firing: keep 10% biomass in coal power plants unchanged till 2015 (when supplier obligation is assumed to start) despite reduced subsidies
- ... plus 56 others

## HoSt

### *small CFB gasification technology for difficult fuels*

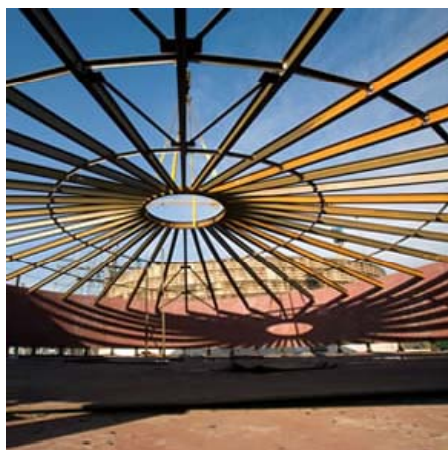
- Portugal: 3 MW<sub>th</sub> CFB gasifier, OLGA, gas engine, status: commissioning on wood and chicken manure
- 3 ton/h paper-rejects plant in NL, gasifier – cooler – cyclones – boiler – steam, start-up in 2013/Q2, investment subsidy granted, tests in Portugal



## BioMCN

### *Methanol Chemistry Netherlands*

- The largest 2<sup>nd</sup> generation biofuels plant worldwide
- 30-40% glycerin in Natural Gas reformer, ~150 kton/y bio-methanol (~150 MW<sub>bio-methanol</sub>)
- Planned: gasification (Siemens) of 1500 kton/y waste wood for 400 kton/y methanol, applied for NER300



## NUON (Vattenfall)

- 250 MW<sub>e</sub> coal-based IGCC, ability to co-fire biomass
- Biomass co-firing ongoing (<10% e/e); significant extension of co-firing is under investigation, but implementation of it will depend on government decision on new incentive systems for co-firing in NL
- MAGNUM-project postpones coal/biomass gasifiers

## ESSENT (RWE)

- 600 MW<sub>e</sub> coal-fired PF boiler
- 5% biomass: CFB, cooler, co-firing, demolition wood
- ~5000 h/year, cooling remains bottle neck
- Subsidy scheme for this plant will end in 2013
- Small improvements being carried out,
- Major changes (e.g. cooler, feeding) depend on politics

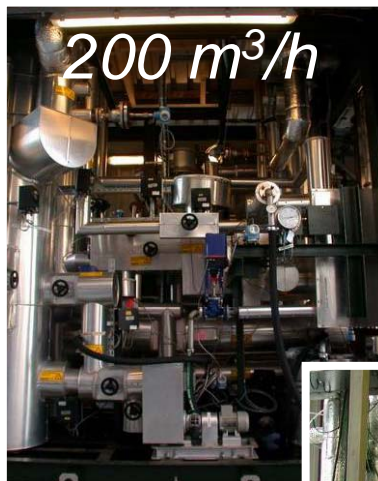




# DAHLMAN

[www.dahlman.nl](http://www.dahlman.nl)

- Dahlman Renewable Energy: 4 fte
- [www.renewableenergy.com](http://www.renewableenergy.com)



DAHLMAN



## HEVESKES ENERGY

- Heveskes Energy will construct syngas plant
- Technology: oxygen driven gasification technology by 7Hills and based on 3-years operational experience
- Feedstock will be high-caloric waste (RDF)
- [www.heveskesenergy.nl](http://www.heveskesenergy.nl)
- Project Delfzijl: 10 ton/h RDF, start-up 2013



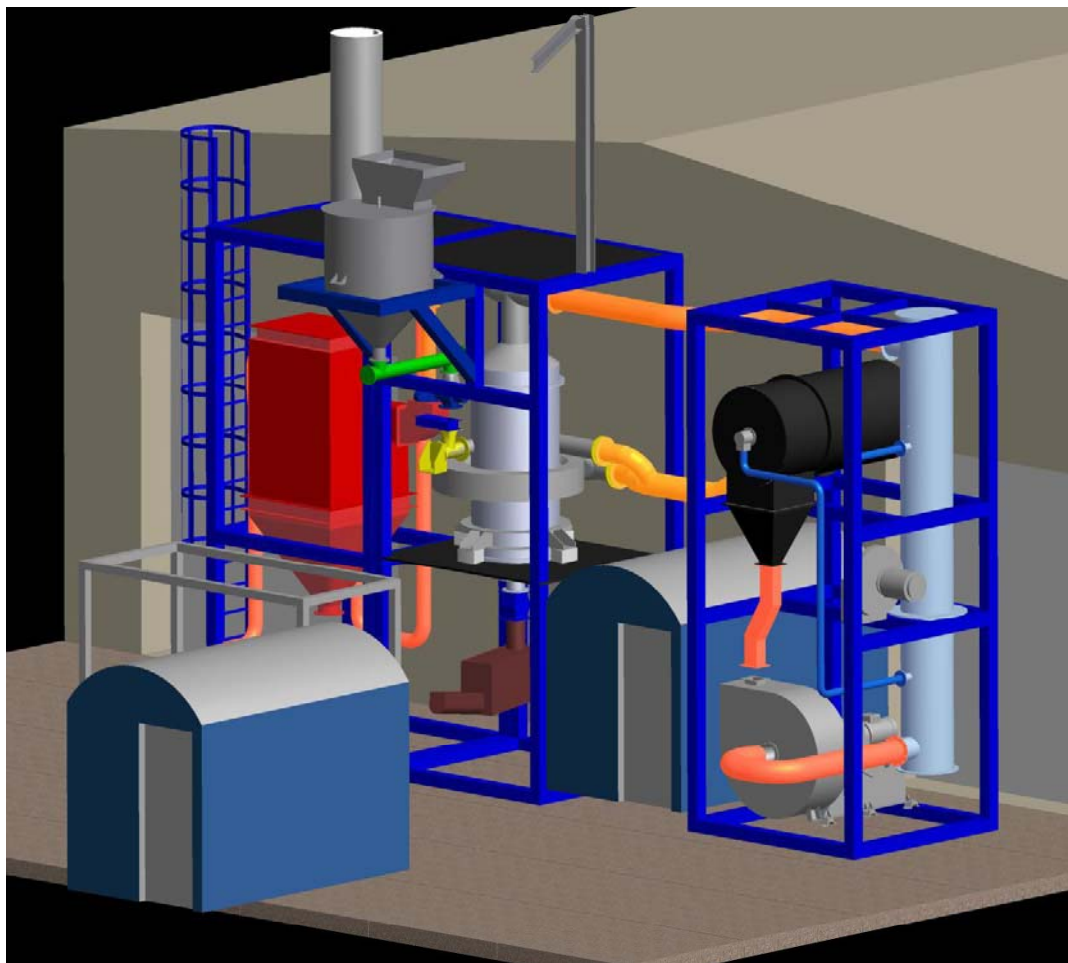
## SYNVALOR

- New multi-stage low-tar concept for all, but more specifically difficult fuels
- Based on Vortex reactor designs
- Aimed at affordable (< 2.500 €/kWe) and reliable technology
- [www.synvalor.com](http://www.synvalor.com)
- CEO Jacques Poldervaart: history in Torbed gasification through Polow Energy Systems.



# SYNVALOR

*Synvalor® test unit*



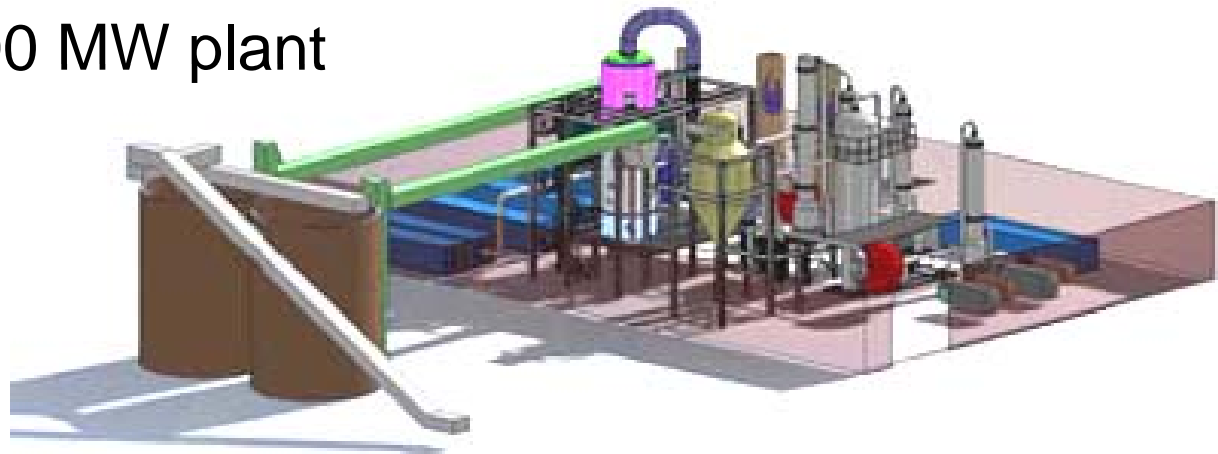
Test facility being erected October 2011 (250-500 kg/h)

First test results expected Q4/2011



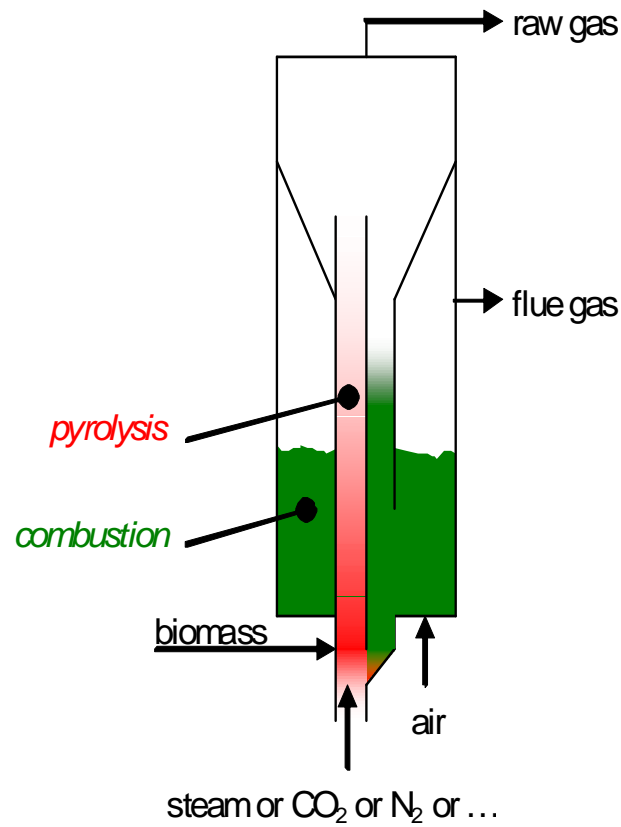
## HVC

- 12 MW (waste wood input) plant in preparation
- Based on MILENA gasification and OLGA tar removal
- Phase 1a: heat production (first few years)
- Phase 1b: additional gas cleaning and SNG production
- Start building 2012
- Phase 2: 50-100 MW plant

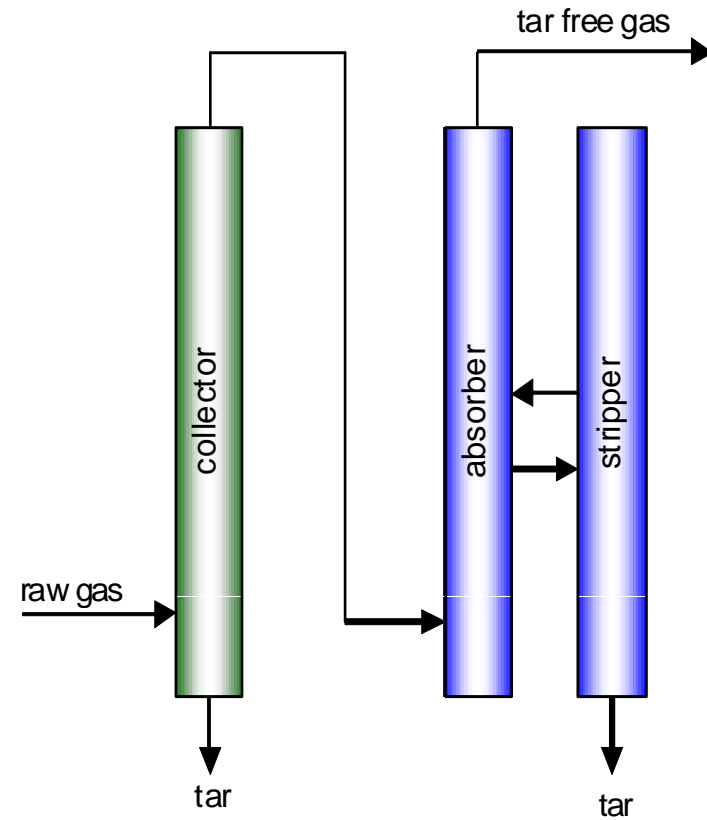


# ECN

## MILENA gasification

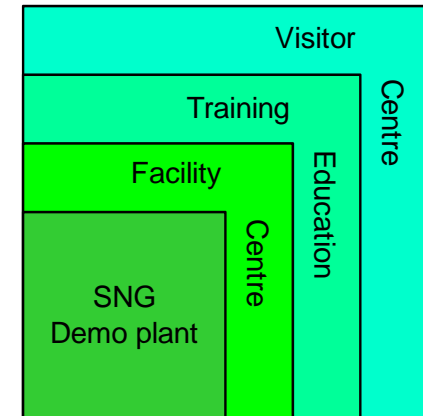


## OLGA tar removal



## ECN

- Generating design data 12 MW HVC demo
- Forming the consortium for HVC-demo
- Preparing expert centre with TAQA
- Estimating costs of bioSNG plant:  
[www.sgc.se/gasification2011/programme.asp](http://www.sgc.se/gasification2011/programme.asp)
- Long-term CAPEX: 1000 \$/kW (biomass-input)
- Torrefaction deal closed, demo being build



## MORE INFORMATION

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publications: [www.ecn.nl/publications](http://www.ecn.nl/publications)

fuel composition database: [www.phyllis.nl](http://www.phyllis.nl)

tar dew point calculator: [www.thersites.nl](http://www.thersites.nl)

IEA bioenergy/gasification: [www.ieatask33.org](http://www.ieatask33.org)

Milena indirect gasifier: [www.milenatechnology.com](http://www.milenatechnology.com)

OLGA: [www.olgatechnology.com](http://www.olgatechnology.com) / [www.renewableenergy.nl](http://www.renewableenergy.nl)

SNG: [www.bioSNG.com](http://www.bioSNG.com) and [www.bioCNG.com](http://www.bioCNG.com)