

**IEA task 33 seminar
Innsbruck May 3, 2017**



Meva Energy in short

- Biomass gasification based on entrained flow gasification
- Two applications:
 - Decentralized renewable CHP
 - Decentralized renewable gas production
- Standard plant dimensions of 1.2 MWe and 2.4 MWth (CHP) or 3,5 Mwgas (gas application)
- One commercial plant for local district heating/power production sold to local Swedish utility Pite Energi
- Developed to utilize **pulverized biomass fuels**, such as wood dust, straw, rice husks, bark
 - Only known working technology
- Close development and market cooperation with global engine and generator (genset) manufacturer Cummins Inc.
- European cleantech venture investor KIC InnoEnergy has invested 2.9 MEUR in Meva Energy.

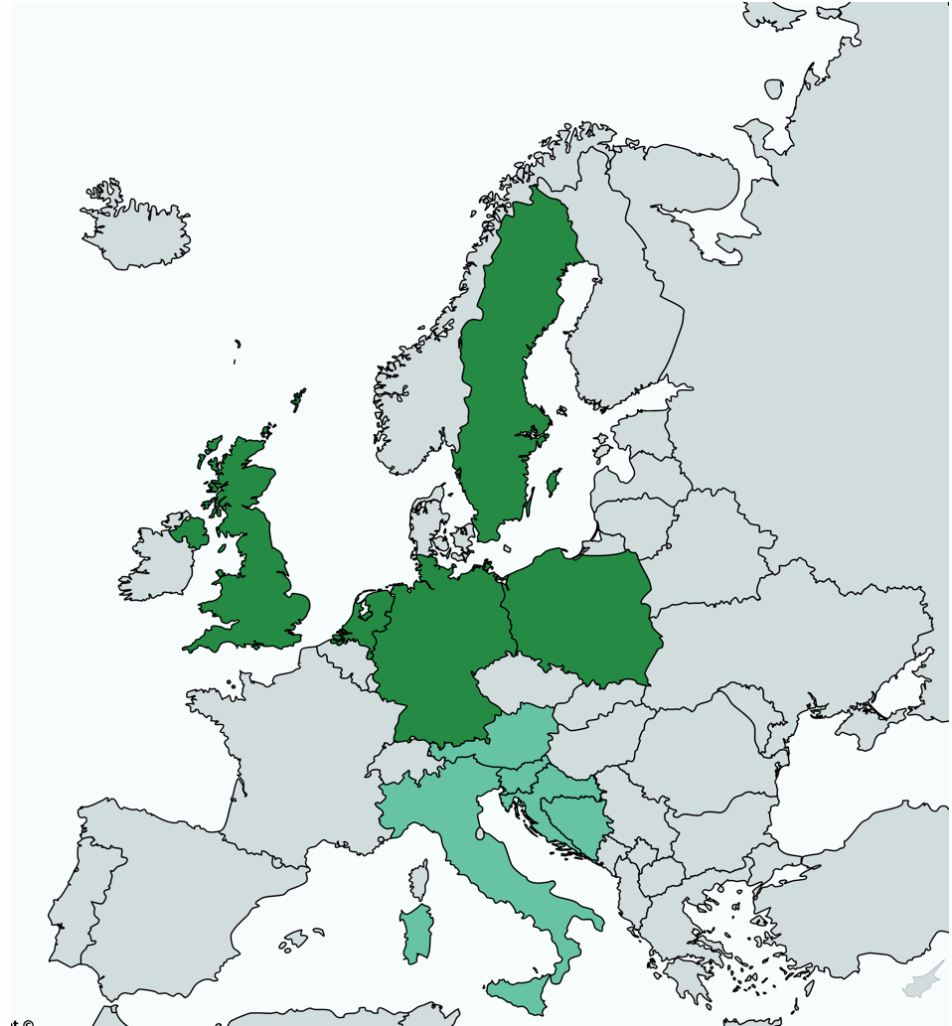


The Hortlax plant: heat delivery system



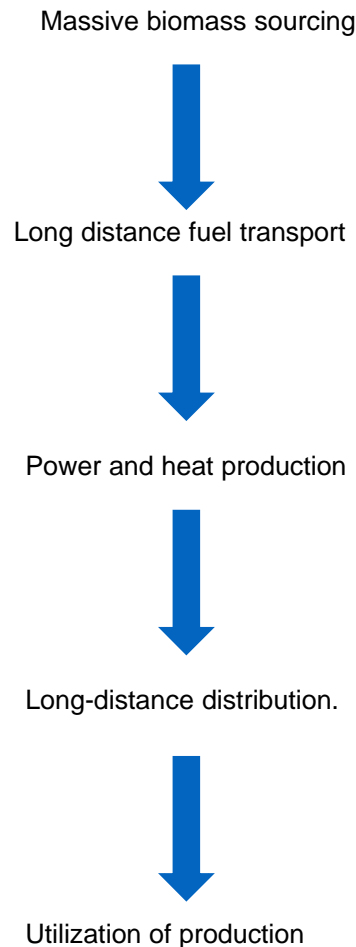
The market and applications

- Huge total accessible market is over **10 billion EUR**
- Short term focus on Europe and in particular UK, Poland, Netherlands, Germany and Scandinavia. Also requests from Italy and the Balcans.

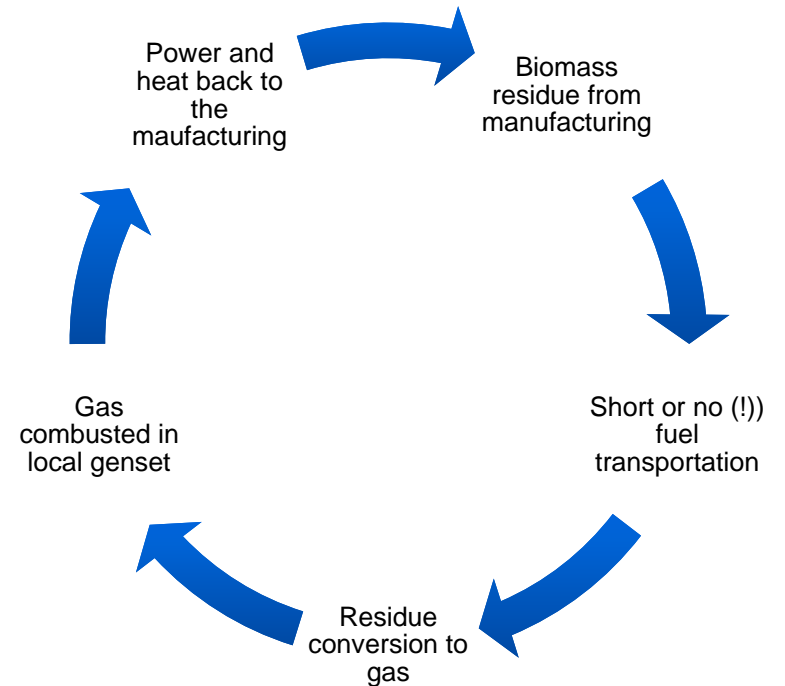


The driver: shift from centralized to decentralized power and heat

Centralized linear energy system



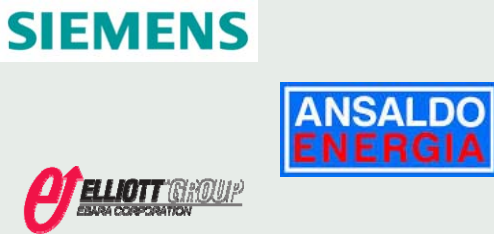





Decentralized circular energy system



Decentralized is totally different ball-game

Power plant type	Centralized	Decentralized
Plant size	> 10 MWe	< 10 MWe
Financing model	Government/ community	Privately
Engineering model	True project, individual design	Modular product, standard blue print
Efficiency	With highly efficient, expensive technology	With low distribution and transport losses
Operational model	24/7, should never stop	Could be operated 24/7, but also be used as fast response units
Supply chain	Linear	Circular
Parties involved	Feedstock seller, feedstock transporter, plant owner, power and heat distributor, end-consumer	Potentially the same company supplying feedstock, producing and consuming power and heat

Meva gasification: efficient power plants, despite small size

Power plant type	Steam turbine	Meva Gasification
Plant size	10 MWe	1.2 MWe
Electrical efficiency level	17%	28%
Companies	 <p>    </p>	 <p>  MEVA ENERGY </p>

VIPP 1.2 Operational Specifications

Consumption

- 1 ton fuel/hour
- Recommended moisture level of feedstock 10%
- Accepts saw dust, bark and wood flour, etc
 - Any pulverized biofuel
- Internal power demand 70 kW

Production

- 1.2 MWe via Cummins gas engine QSV91
- 2.4 MWth
- Engineered for 8,000 hours of annual operation
 - 320 days/year (24 hours/day)



Modular build concept, pre-assembled before sent to site.

Three module design with main vessels outside

- Three steel skids, preassembled before being shipped to site
- 13 * 3* 2,5 m skid size
- Separate genset container
- With or without walls



The gasifier principle and advantages

Functional principle

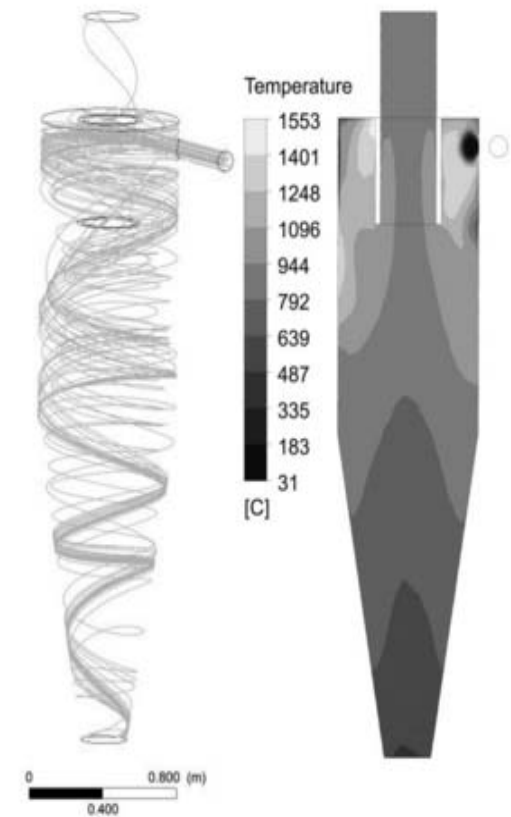
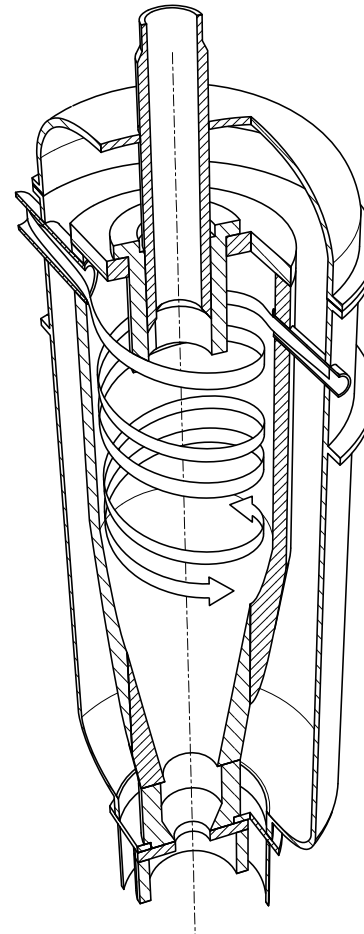
Feedstock is mixed with pre-heated air and blown into the hot reactor at high speed. Ash exits at bottom, biogas exits at top centre.

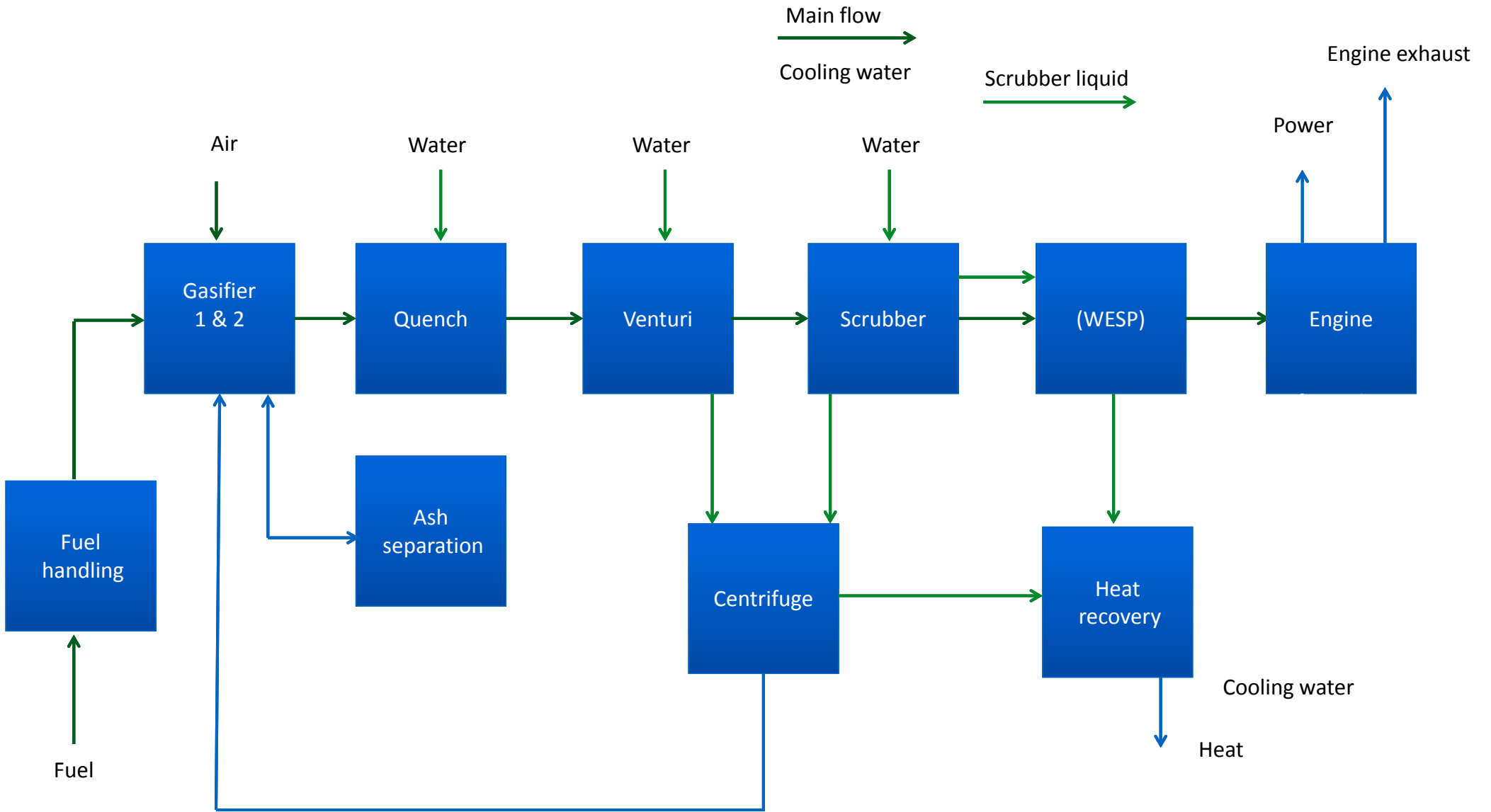
Several key USP:s

Combined reactor and particle separator provides for multi-use of reactor body

Simplicity in design: few moving parts. No exclusive materials: only ceramics and steel.

Most important... **only gasifier accepting low cost small fraction feedstocks** such as saw dust, husks and wood fibre.





Key to profitability: efficient technology

Very **even** gas flow and quality only small variations

- Why important? Necessary in order to function with advanced, lean-burn gas engines
- Cyclone gasifiers have very even temperatures and functionality. No batchwise loading or unloading of feedstock.



**Power
Generation**



Typical gas composition, LHV dry gas: 6.3-6.5 MJ/Nm³

Component	Vol %
CO	20
H ₂	11
CH ₄	3
Ethene, ethyne	2
Bensen	0.2
N ₂	50
CO ₂	12

- Values given for dry gas.
- Dust and moisture levels at engine gas inlet in accordance with Cummins specifications.

Very stable H₂/CO relation: averaging 1.7 with small deviation of less than 3.5%



19 samples taken at Hortlax 20150302 and 20150305.

Meva - a true bioenergy climate game changer according to WWF

WWF: "If Meva would reach **10%** of its available world market, the world's emissions of green house gases can be cut with *17 million tons CO₂- equivalents.*"

17 million tons of CO₂, how much is that?



17 milion tons of CO₂ is equivalent to...

The complete energy consumption of **1,795,000** private homes. As many as all private homes in Sweden.

or



225,000 tanker trucks of gasoline. Put them after each other and the queue will stretch from Stockholm to Rome.

or



Driving a car 66 billion km. That is equal to driving 1.6 million times around the earths circumference.

or



91,000 railcars worth' of coal burned.