



## Poliittisten ohjauskeinojen vaikutus – biotuotteet ja bioenergia tulevaisuudessa

**S2Biom-projektin and BEST-ohjelman seminaari - Biomassan käyttö tulevaisuudessa biotuotteisiin ja energiaksi**  
**Antti Arasto**

# Why do we want to use biomass?

- Climate effect
- Domestic raw material
  - Creating jobs
  - Balance of trade
- Security of supply
- Excellent / only raw material for certain applications
  
- Biomass use can be roughly divided into three categories, based on end use product
  1. Unique products that maintain material properties of wood, e.g. fibre products
  2. Products that replace fossil ones, e.g. biobased platform chemicals
  3. Energy products, e.g. biodiesel

# SUOMEN MERKITTÄVIMMÄT VIENTITUOTTEET 2015

1.

Paperi ja kartonki  
7,0 mrd. EUR



4.

Selluloosa  
1,8 mrd. EUR



6.

Sahatavara  
1,6 mrd. EUR



2. Dieselpolttoaineet  
3,4 mrd. EUR



3. Ruostumattomat  
teräslevyt  
2,5 mrd. EUR



5. Moottoriajoneuvot  
henkilökuljetuksiin  
1,7 mrd. EUR



7. Sähkögeneraattorit  
ja -moottorit  
1,3 mrd. EUR



8. Erikoiskoneet ja -laitteet  
1,0 mrd. EUR



9. Maansiirto-, kaivuu,  
yms. koneet  
1,0 mrd. EUR



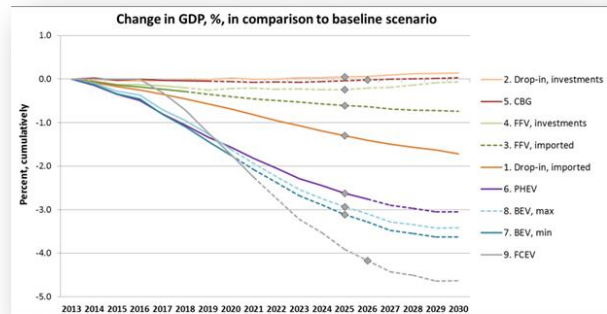
10. Sähkömuuntajat ja  
taajuusmuuntajat  
1,0 mrd. EUR

Kuva Valmet Automotive

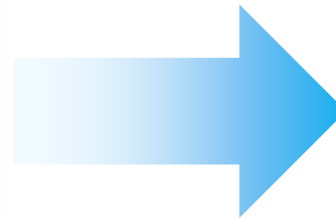
Kuva ABB

Kuva Planmeca

# From decarbonising transport sector in Finland to solutions for decarbonised world



VTT-VATT Traffic 2030



**Driver for Finland and Finnish export industry**

**EC 2030 targets and following Government Program of Finland**  
 ” To increase the share of renewable transport fuels to 40 % by 2030”  
 ”To stop using coal in energy production and to halve the use of imported oil for domestic use

**COP 21**  
 to keep a global temperature rise this century well below 2 degrees Celsius and to drive efforts to limit the temperature increase even further to 1.5 degrees Celsius above pre-industrial levels.

**Sustainable, decarbonised world**

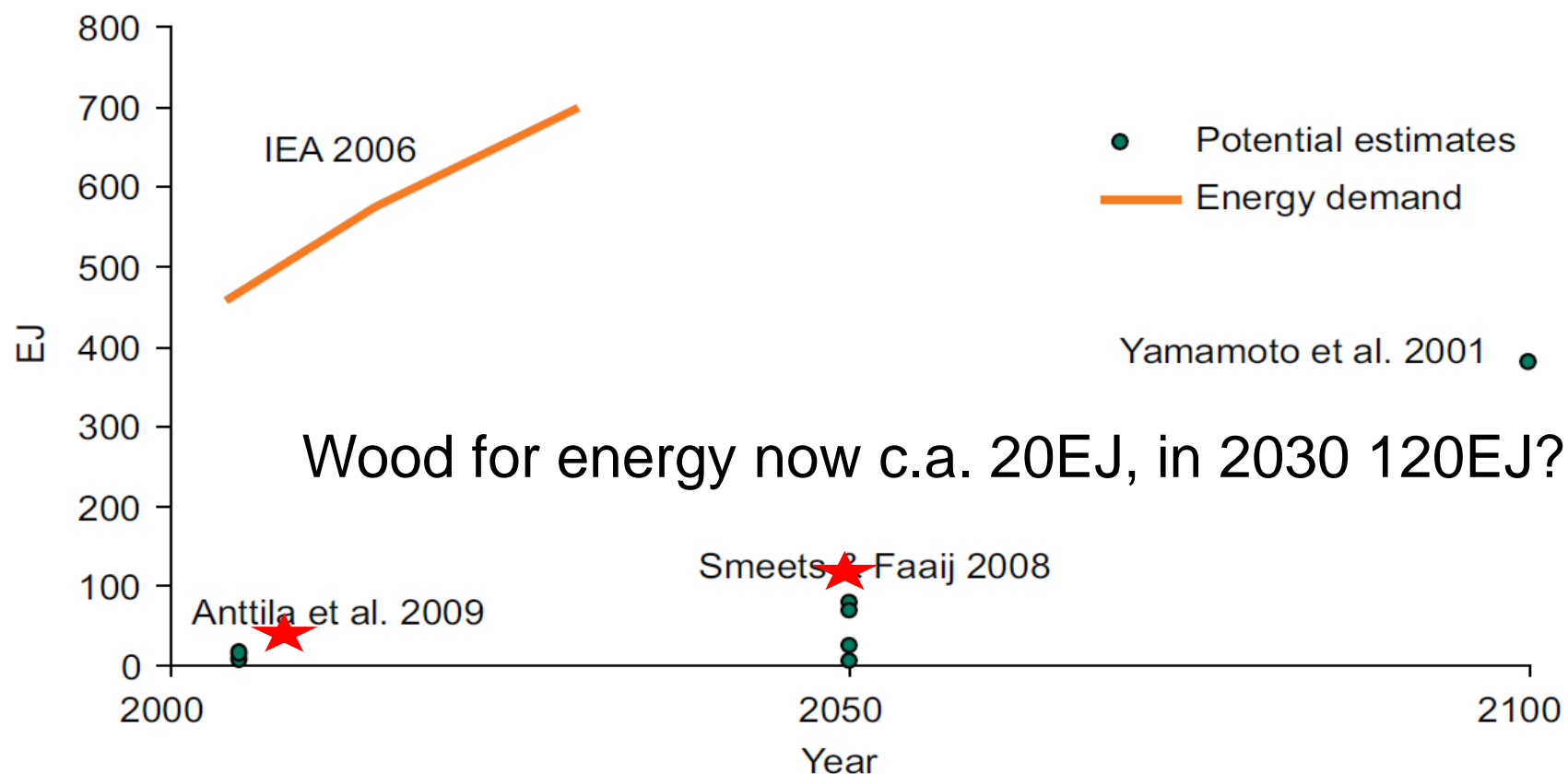
- Energy
- Metal industry
- Chemical industry
- Cement
- Etc...



## EC 2030 climate & energy framework

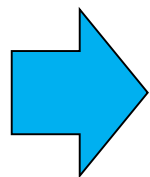
- The 2030 climate and energy framework sets three key targets for the year 2030:
  - At least 40% cuts in **greenhouse gas emissions** (from 1990 levels)
  - At least 27% share for **renewable energy** (non binding)
  - At least 27% improvement in **energy efficiency** (non binding)
- To achieve the at least 40% target:
  - EU emissions trading system (ETS) sectors would have to cut emissions by **43%** (compared to 2005) – to this end, the ETS is to be reformed and strengthened
  - non-ETS sectors would need to cut emissions by **30%** (compared to 2005) – this needs to be translated into individual binding targets for Member States.

# The biofuture – massive demand for energy biomass in IPCC report



# Energy sector is in transition

- Record low oil price  
BRENT below \$28  
(19.1.2016)
- Environmental awareness  
all time high  
Paris COP21 global  
agreement
- Verge of revolution of  
renewables  
Consumers to prosumers



## Energy paradigm change – NOW!

## The growing risks of stranded fossil fuel assets

With the gradual shift to a low-carbon society, investment in

**Energiayhtiöt valittelevat sähkön tuottajahintaa - Hallitus päättää pian uusista tuista**  
Hallitus selvittää kapasiteettimaksuja keväällä kotona ja pohjoismaissa.  
Lue lisää

**India sets off in hot pursuit of solar power goals**  
5.1.2016 18:00  
Energia The Financial Times

**Sähkö on nyt poikkeuksellisen kallista – näin säästät laskussa**  
19.1.2016 klo 20:00  
HS TV

**Sähkörajoituksista on suunnitelmat - aluksi sähkökatkoo pari kymmentä tuntia**  
oilijat Jari Sarasvuo, Vesa Linja-aho ja Vikke Hyvönen kertovat, miten sähköautolla...

**Sähkötehon tarve 14 900 megawattia**  
Sähkönkulutus ennätyslukemissa  
Sähkötehon tarve harppasi 14 900 megawattiin 7.1.2016. Kantaverkkooyhtiö Fingridin mukaan tämä on kaikkien aikojen ennätys.  
Lue lisää

**Investors pump money into equipment as country eyes 100GW installation milestone.**

**Korea carmakers face tough year after missing targets**

**Hurja pakkasen nosti sähkönkulutuksen kaikkien aikojen huippuun - ennätys rikki jo toistamiseen tänään**  
KOTIMAA Päivälehti 2016-01-19

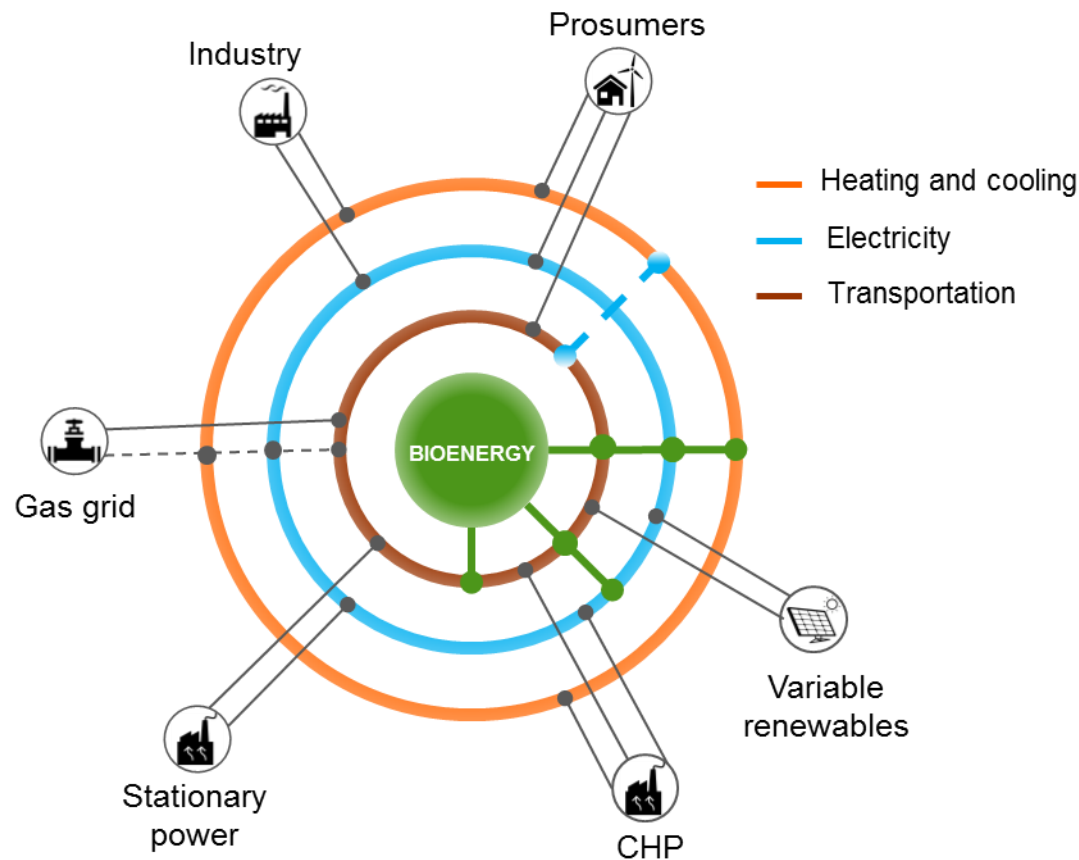
**Sähkönkulutukseen tehtiin kaikkien aikojen ennätys**  
7.1.10:39 ENERGIA

**HELSINGIN SANOMAT**  
ISET HSTV SÄÄ PÄIVÄN LEHTI HS ILTA

**KL** Kauppalehti Kauppalehti @KauppalehtiFi Ota yhteyttä

Energia uutiset, uutiskirje 01/2016

# Energy system that is significantly more distributed, interconnected and flexible than today's !





# Opportunities for different type of concepts in the light of framework development – workshop results

Lignocellulosic biomass to liquid energy carrier and drop in chemicals

- **Fermentation of gasification gas from forest residues and straw to ethanol and acetic acid**
- Sustainability criteria of biofuels: + side stream based raw material
- Cascading use of raw materials: +/- Theoretical possibility to utilize e.g. plastic waste (not suitable for material recycling)
- LULUCF: - Effecting raw material availability + Straw not a large carbon sink + Flexible raw material base
- Others: + national economy, demand

Biogenic waste fraction within city limits to energy and drop in chemicals

- **Fractionation and anaerobic digestion of waste fractions from food processing and city effluents into volatile fatty acids (VFAs) and energy**
- Sustainability criteria: + waste based raw material
- Cascading use of raw materials: + waste based raw material
- LULUCF: + Raw material not a carbon sink

Forest biomass to energy

- **Forest biorefinery integrates and pulp production (CHP ja FT-diesel).**
- Sustainability criteria of biofuels: +/- Sustainable use of forest based raw material a key
- Cascading use of raw materials: - raw material for energy use a side stream, not a waste fraction +pulp
- LULUCF: Forest management impact to carbon balance



Sustainable Bioenergy  
Solutions for Tomorrow



# What is expected for success of concept? – workshop results

- Impact to national economy
  - Domestic technology, raw material and positive areal economy impact
- Raw material
  - Verifiable supply chain (added costs, sustainability criteria, consumers market prerequisites as drivers)
  - Utilization of waste streams (carbon sinks and LULUCF)
  - High cascading factor
  - GHG impact of raw material (not reducing carbon sinks)
  - Minimal competition of raw material (waste, manure)
- Technology
  - Efficient use of renewable carbon
  - Moderate investment costs
  - Feedstock flexibility
  - Product flexibility
- Product
  - Existing product, infra, markets and standards



Sustainable Bioenergy  
Solutions for Tomorrow



# Conclusions

- Economic feasibility is a prerequisite for any type of production in short and medium term → if not economic, no investor is interested, no matter how much cascading is involved
- Policy support mechanisms are always subject to politics → to maintain resilience all aspects of sustainability need to be considered (social, economic, environmental)
- Current policy trends seem to be easier on material use of biomass, where as policy changes for energy use are more on the agenda
- Biomass is a constrained resource → it should be carefully directed to most valuable uses and where less options exist



**TECHNOLOGY «FOR BUSINESS»**

