



Joint Session of the ECE Timber Committee and the FAO European Forestry Commission

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Wood as a Renewable Energy Source – Market and Policy Issues

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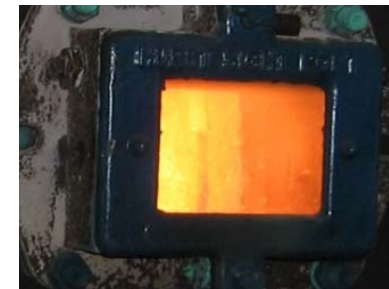
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USA



Wood Energy: A Renewable Source

- Woody biomass or fuel wood: Renewable feedstock.
 - ❖ Primary: Logging co-products; Removal of excess biomass (fuel treatments); Fuelwood extracted from forestlands;
 - ❖ Secondary: Primary and secondary wood processing mill co-product and pulping liquors;
 - ❖ Tertiary: Urban wood residues;
 - ❖ Dedicated energy plantations
- Energy security: Potential for local generation of energy, reduce dependence on foreign sources.

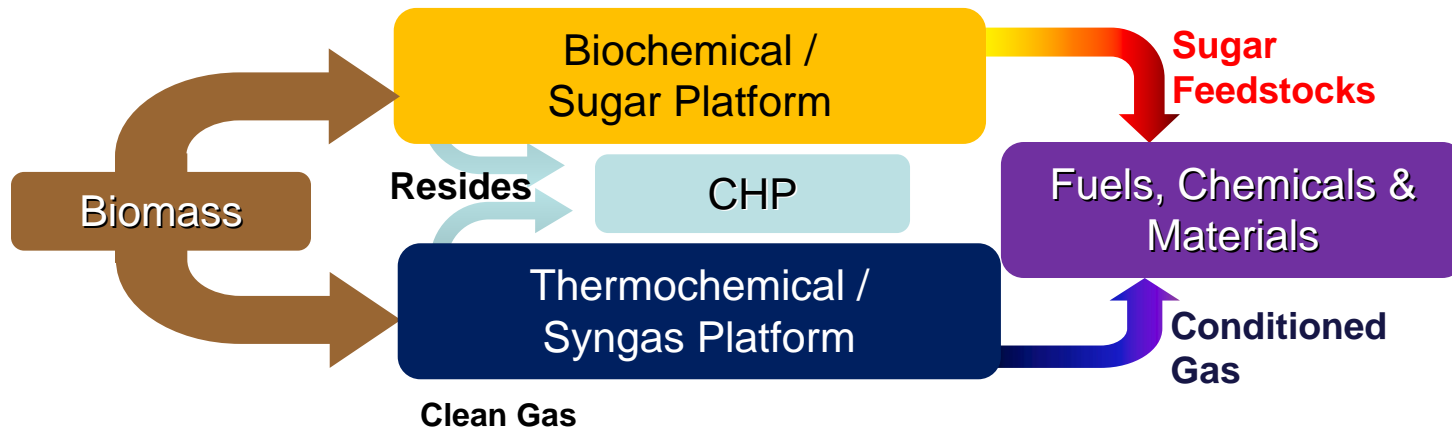


Wood Energy Conversion

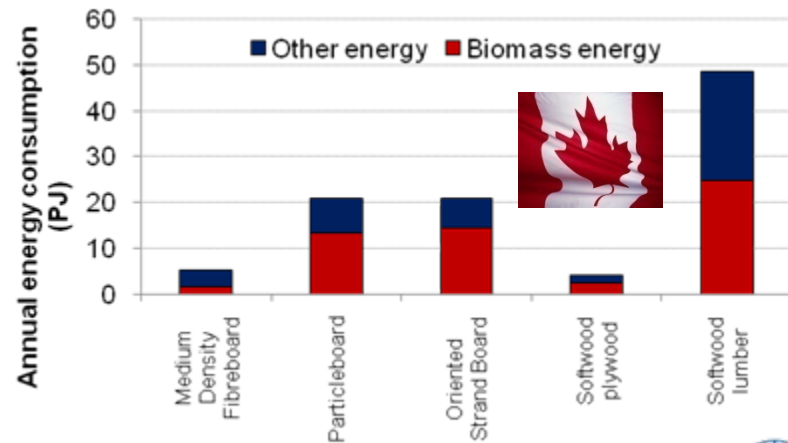
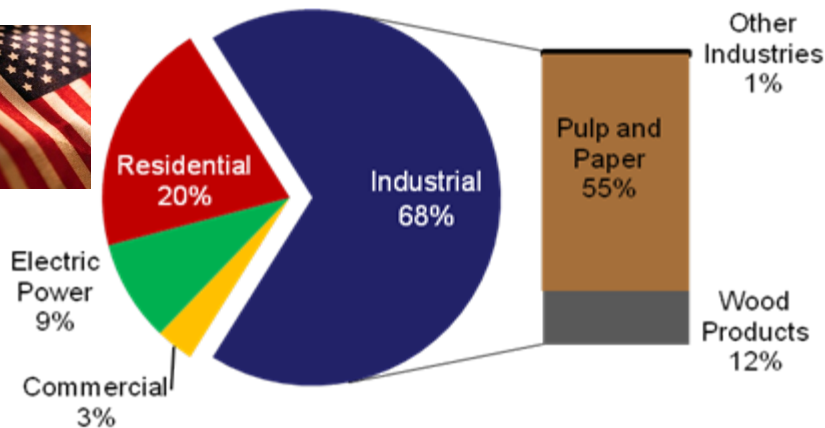
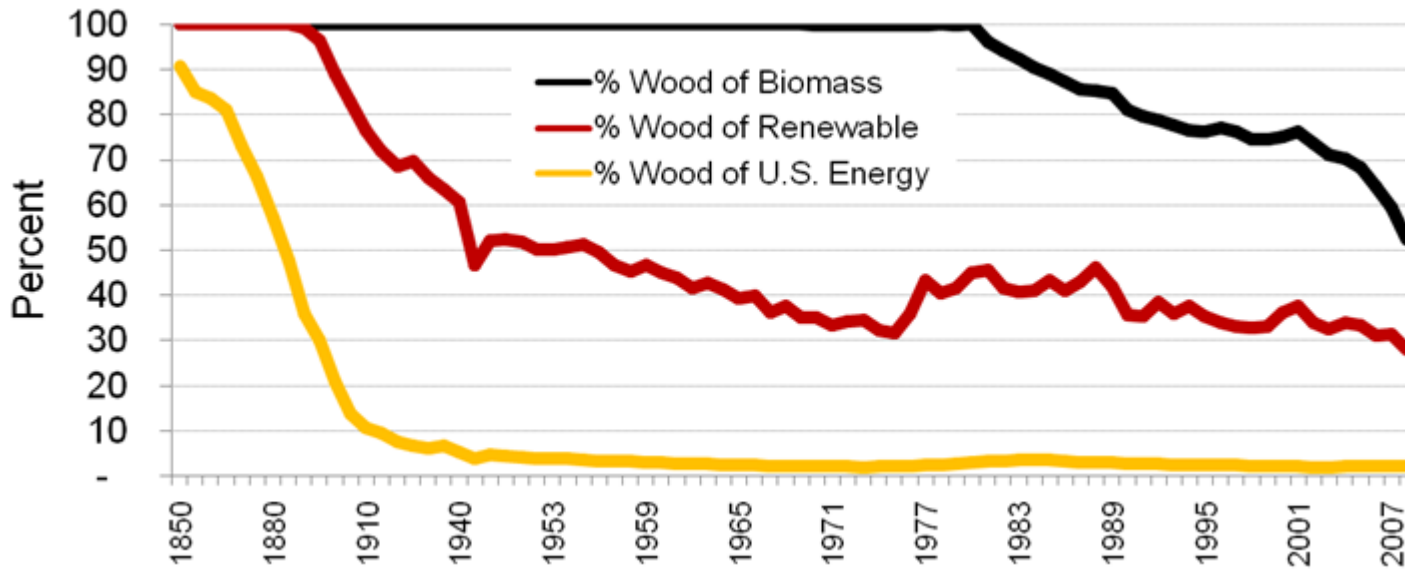
- **Direct combustion:** Heat generation (90% efficiency), as in district heating systems and individual modern house boilers; CHP (65-70% efficiency); Electricity generation (35% efficiency).



- **Biochemical:** Enzymatic or chemical processes to produce ethanol.
- **Thermochemical:** Biomass to fuels conversion using a combination of heat and pressure in the presence of catalysts.



Wood Energy Market Shares

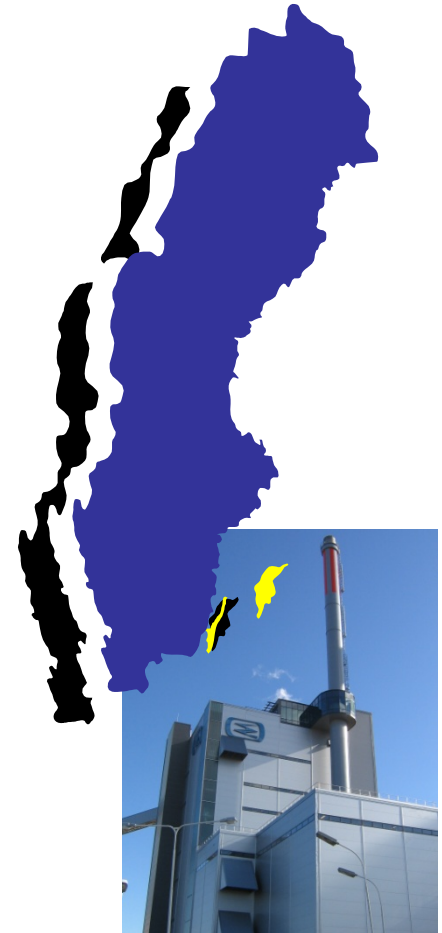


Wood Energy Market Shares

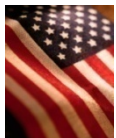
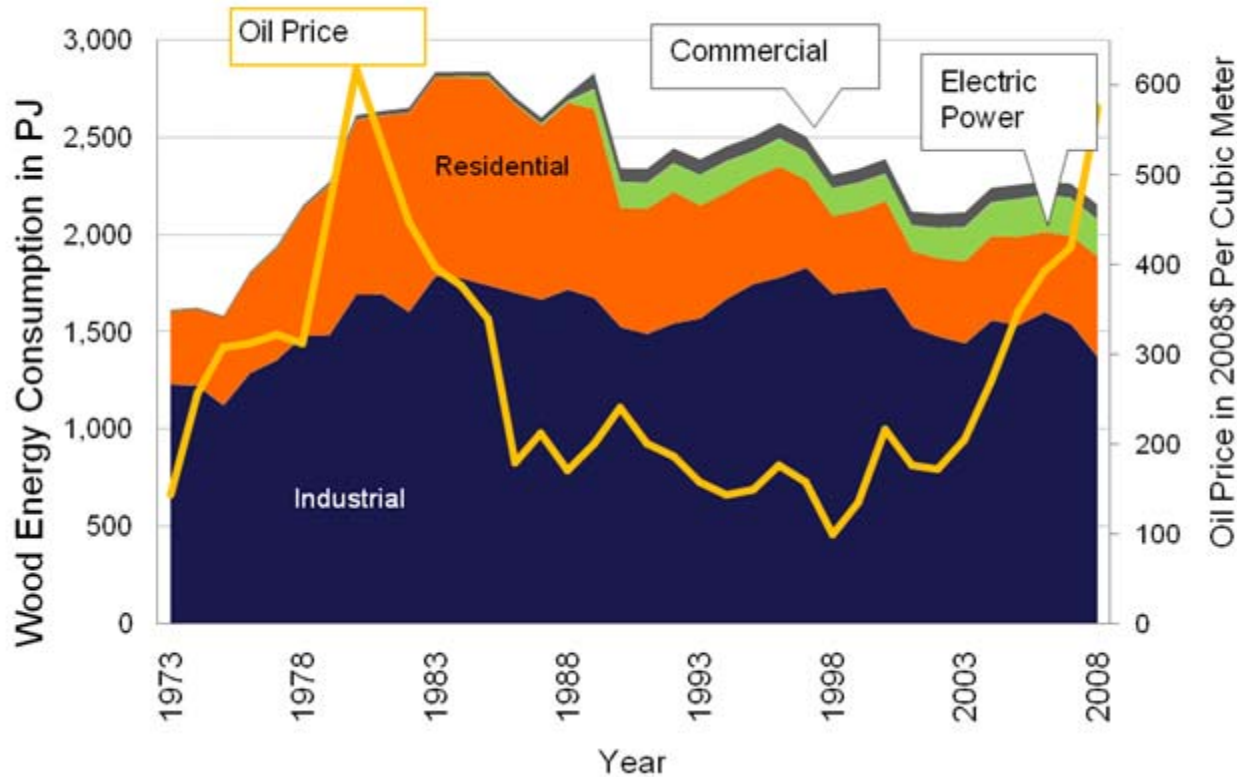


- Sweden's renewable sources set to reach at least 50% of the country's total energy use by 2020.
- Triggered by 40% reduction target in GHG emissions by 2020 from 1990 levels.
- Highest proportion of renewable energy in relation to final energy use of any country in the entire EU (44.7%).
- Wood fuels (27.7 TWh) supply the majority of biofuels (42.2TWh) used for heat production in Sweden.

Source: Swedish Energy Agency (2010).



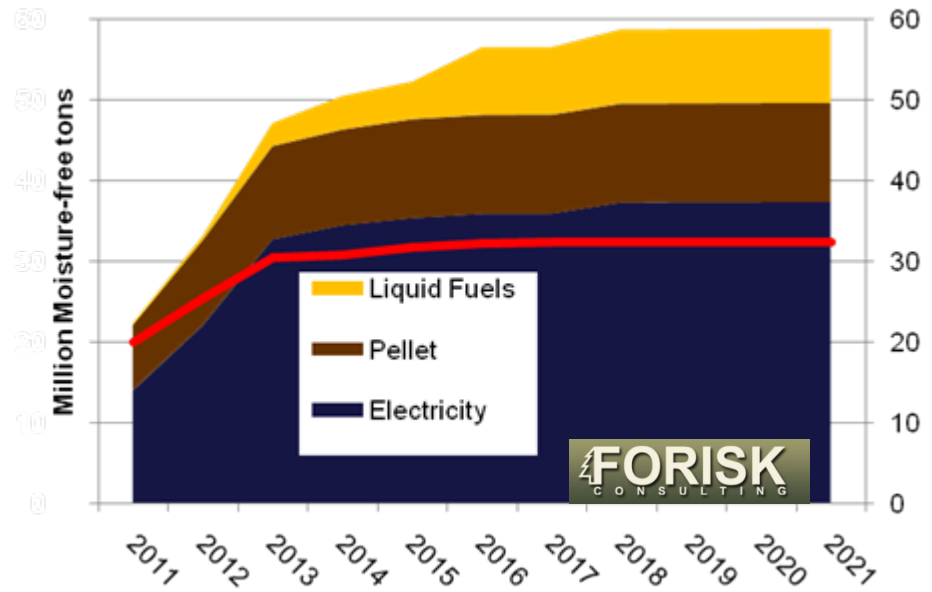
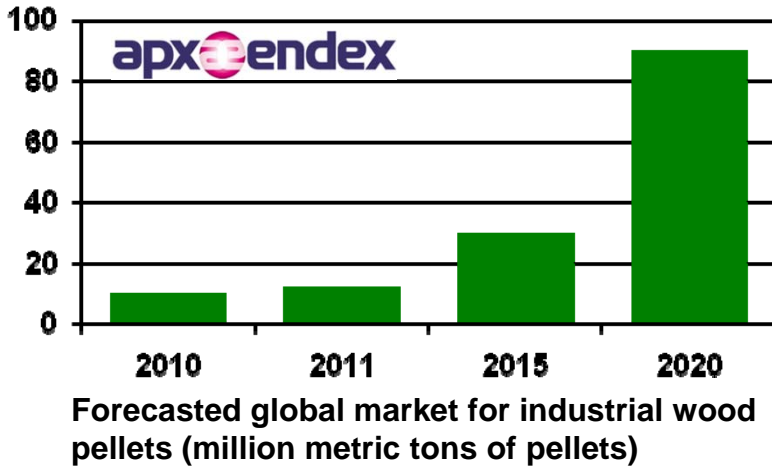
Oil prices and Wood Energy Consumption



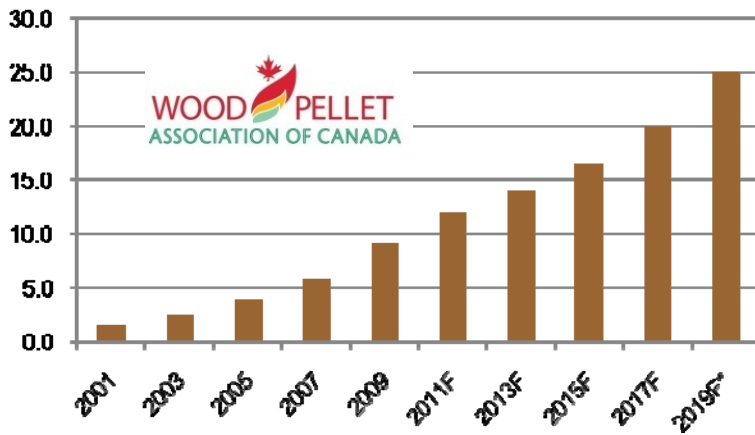
Source: Adapted from U.S. Energy Information Administration
Illinois Oil and Gas Association
(Aguilar et al. 2011).



Wood Energy Forecast



Estimated wood use by announced energy facilities in the U.S. and wood use after applying screens to identify projects that are likely to succeed, as of 25 May 2011 (moisture-free metric tons).



Estimated European wood pellet demand (millions of tons – 5% moisture content)



Emerging Wood Energy Markets

South Korea:

- Committed to 30% GHG reduction by 2020
- RPS for power generation: 2012 – 2%
- Increase ~ 0.5% annually until 2022 – 10%
- Biomass energy target for 2020: 4.2 million tons of oil equivalence
- Pellet equivalent: 10 million tons



Growing Wood Energy Capacity



- Russian Federation 750,000 tons estimated annual production level, 600,000 exported.
- Russian Federation and Europe started to publish export/import pellets data.
- Almost 200 pellet producing companies in the Russian Federation. Two produce over 100,000 tons per year.
- New holding: “Russian Wood Pellets” plans to produce 3 million tons of wood pellets at 13 locations.



Wood Energy Fuel Trading

Industrial Wood Pellet Prices APX-ENDEX.

Prices given in Euros per ton based on delivery CIF Rotterdam and Net Caloric Value of 17 MJ/kg (<10% water content).



Major Developments:

- ❑ **November 2008:** APX-ENDEX launched Industrial Wood Pellet index to increase price transparency;
- ❑ **July 2010:** Announced cooperation with Port of Rotterdam, confirmed by Letter of Intent
- ❑ **November 2010 :** Based on positive outcome on growth potential and need for exchange trading, APX-ENDEX and Port of Rotterdam decided to develop biomass markets
- ❑ **January 2011 to today:** Project to launch the first biomass exchange traded contracts;
- ❑ **Launch is planned for 2011 Q4**



Public Policies and Wood Energy

- **Mandatory Rules and Regulations**
 - Mandated Renewable Portfolio Standards (RPS), green building standards
- **Policies Providing Public Services**
 - Knowledge transfer, technical assistance, outreach and research
- **Financial Incentives**
 - Tax programs, grants, loans, cost-share, production incentives, and many others (includes net metering)

Source: Aguilar, F.X. and A. Saunders*. 2010. Policy Instruments Promoting Wood for Energy Uses: Evidence from the Continental U.S. *Journal of Forestry*. 108(3):132-140.



Wood Energy: US Policy Effectiveness

- Financial incentive tools are most effective US federal incentives resulting in reduced production costs, adoption of technology and lower capital cost.
- Eligibility of *open-loop* (i.e. not relying on bioenergy dedicated crops but coming from materials harvested from working forests and industry residues) biomass plants for Renewable Energy Production Tax credits favoured greater use of woody materials in the electricity sector.
- Regulatory policy instruments setting renewable energy targets have encouraged the use of biomass as an eligible renewable energy feedstock.

Source: Aguilar et al. (2011)



Renewable Energy Policies: U.K.



- **Renewables Obligation Certificates:** Tradable certificates issued for electricity generated from renewable sources. All licensed electricity suppliers to source a proportion of all electricity supplied from eligible renewable sources. Proportion of renewable electricity to grow to 15.4% by 2015-2016.
- **Feed-in-Tariffs (FIT):** Deployment of small-scale (< 5MW) low-carbon electricity capacity by guaranteeing a fixed payment per kWh of electricity generated. Also pays for any unused electricity exported to the grid.
- **Renewable Heat Incentive***:** Long-term guaranteed payments made quarterly over a 20-year period. Payments available to renewable heat installations of all sizes. Domestic biomass boilers could receive about 4.75 pence /kWh.



Wood Energy Growth: Uncertainty



Competition: Woodworking and furniture sector “*faces growing competition for wood from the renewable energy sector, due to subsidies and other measures promoting the use of biomass, of which wood makes up a major share*”

(Preliminary Draft Opinion issued by European Economic and Social Committee’s Consultative Commission on Industrial Change).



GHG net emissions: US Environmental Protection Agency deferred for three years GHG permitting requirements for CO₂ emissions from biomass-fired and other biogenic sources. Time to review available technical information on biogenic emissions and develop accounting options for CO₂ from stationary sources.



European Environment Agency: GHG accounting standards should fully reflect changes in carbon stored by ecosystems; uptake and loss of carbon from them due to production and use of bioenergy.



Conclusions (1)

- ❑ Global wood energy markets driven primarily by demand in the EU and its renewable energy commitment 20-2020. Industrial pellets dominate trading.
- ❑ Large investments in industrial pellet production capacity.
- ❑ Canada and the US remain the major suppliers of woody biomass feedstocks to the EU, Asia, primarily industrial pellets.
- ❑ APX-ENDEX and Port of Rotterdam created a wood energy commodity contract exchange market, to be launched in the Q4 2011.



Conclusions (2)

- ❑ The Russian pellet market is developing, corporations and partnerships are being founded increasing production capacities
- ❑ The US Environmental Protection Agency will revisit and assess greenhouse gas emissions from different biomass sources and energy generating technologies and rule whether biomass energy generation will require CO₂ emission permits.
- ❑ Unknown impacts of: (1) an alteration in public policy supporting wood energy (2) findings about CO₂ neutrality of wood energy.



Acknowledgements



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