



# TAPIO

## Forestry Development Centre Tapio

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Licentiate in forestry



**Bioenergy  
Promotion**



**Baltic Sea Region**  
Programme 2007-2013



**TAPIO**

# Project results on sustainability criteria for bioenergy production and use in BSR

- *Aino Martikainen, Fachagentur Nachwachsende Rohstoffe e.V. (FNR): "Criteria for sustainable bioenergy production - comparison between project results and other sustainability and certification initiatives"*
- *Timo Weckroth, Forestry development Centre Tapio (FDCT): Sustainable bio energy production criteria (BP)- examples of Finnish applications in Forestry*

# Sustainable bio energy production criteria (BP)- examples of Finnish applications in Forestry

Debate in “Helsingin Sanomat” 29.9.2010

”BURNING WOOD FOR ENERGY IS NOT  
SUSTAINBLE”

## Puunpoltto ei ole kestävä

**M**ari Puoskari perusteli puun energiakäytön lisäämistä uskonnuksella: ”Puuta poltettaessa ilmakehään pääsee hiiltä, joka olisi sinne päätynyt joka tapauksessa puun lahoessa.” (HS Miellipide 26. 9.)

jos päätelyssä olisi järkeä, kaikki maailman metsät voitaisiin polttaa, eikä sillä olisi vaikutusta ilmastoomme.

Puun palaessa sen sitoma hiili siirtyy ilmakehään, vaikka asiaa ajattelisi kuinka mutkikkaasti. Hiilikierro tarkoittaa, että metsässä samanaikaisesti kasvaa ja lahoaa puuta. Polttaminen voidaan toki rinnastaa lahoamiseen. Tasapaino kuitenkin muuttuu, jos lahoaminen nopeutuu, mutta kasvu ei.

Ilmakehässä on hiiltä noin 15 tonnia hehtaaria kohden. Talousmetsimme hiiltä on varastoitunut tuplasti tuo määrä. Paljonko hiiltä metsissämme olisi, jos niitä ei olisi tehokkaasti hyödynnetty menneinä vuosisatoina? Missä tuo hiili on nyt?

Ilmaston kannalta looginen olisi ainoastaan pyrkimys lisätä metsien biomassaa. Tukitoimet tulisi kohdentaa metsien suojeleluun, ei niiden polttoon.

Miika Meretoja  
ilmansuojeluasiantuntija  
Turku

“If arguments for wood energy are reasonable, all forests in the world could be burned and it would not have any influence in our climate.”

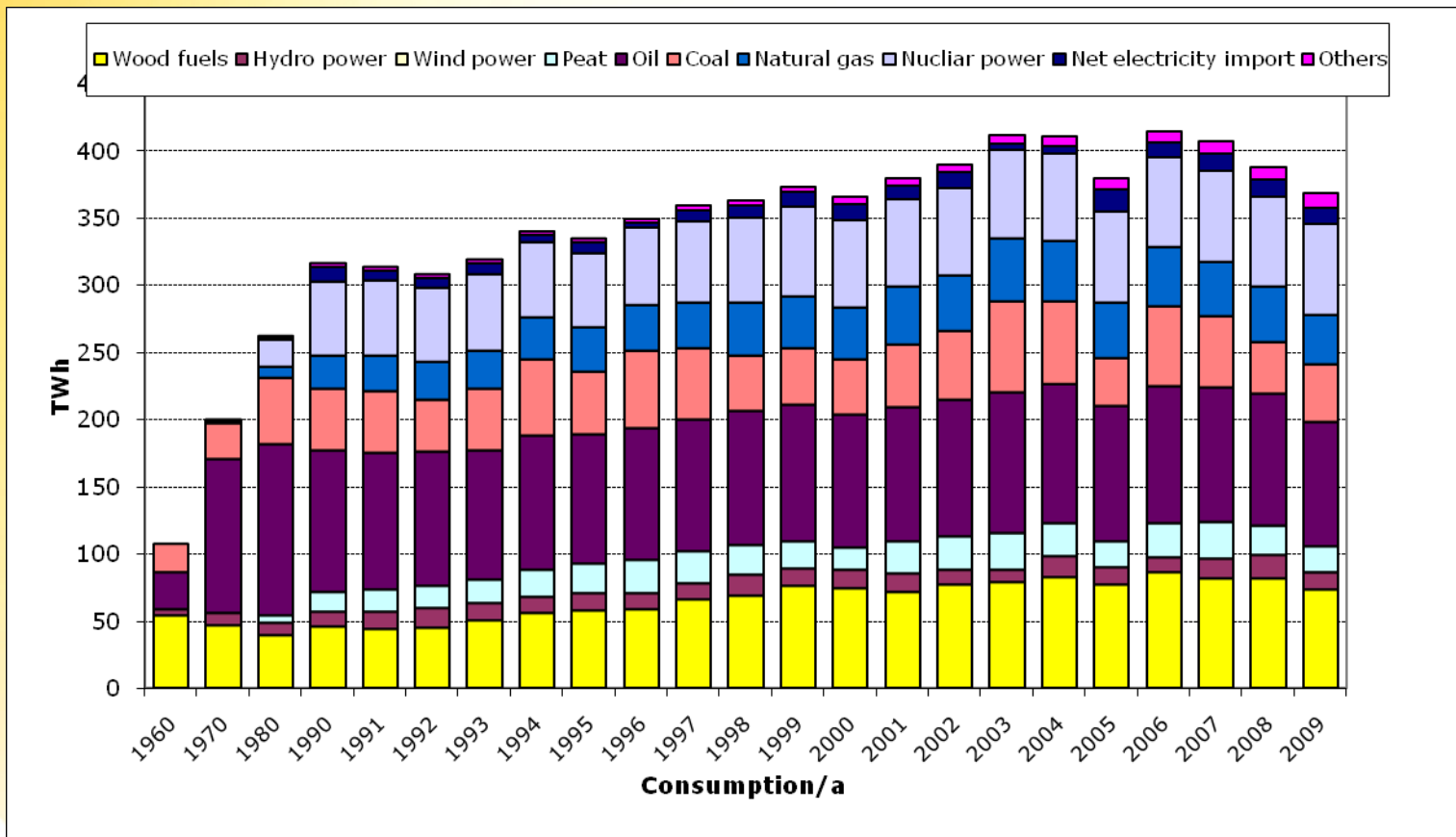
Expert of climate conservation

## TARGETS OF RENEABLE ENERGY (Fin)

| TARGETS FOR USE OF ENERGY RESOURCES IN FINLAND, Twh/a |             |             |            |           |
|---|-------------|-------------|------------|-----------|
|   | 2005        | 2008        | 2020       | % (05/20) |
| <b>GROSS CONSUMPTION OF ENERGY</b>                    | <b>381</b>  | <b>391</b>  | <b>429</b> | <b>49</b> |
| <i>Imported energy</i>                                | <b>265</b>  | <b>258</b>  | <b>275</b> | <b>4</b>  |
| <i>Fossile energy</i>                                 | 177         | 179         | 166        | -6        |
| <i>Other imported energy</i>                          | 88          | 79          | 109        | 24        |
| <b>Domestic energy</b>                                | <b>114</b>  | <b>133</b>  | <b>154</b> | <b>35</b> |
| <i>By-products from forest industry</i>               | 57          | 59          | 57         | 0         |
| <i>Forest chips</i>                                   | 6           | 8           | 25         | 317       |
| <i>Small scale use of fuel wood</i>                   | 13          | 15          | 12         | -8?       |
| <i>Peat</i>   | 19          | 23          | 20         | 5         |
| <i>Water power</i>                                    | 14          | 17          | 14         | 0         |
| <i>Heating pumps</i>                                  | 2           |             | 8          | 300       |
| <i>Biofuels for traffic</i>                           | 0           | 11          | 7          |           |
| <i>Other domestic renewable energy</i>                | 3           |             | 11         | 267       |
| <b>Renewable energy total</b>                         | <b>94</b>   | <b>110</b>  | <b>134</b> | <b>43</b> |
| <b>END USE CONSUMPTION OF ENERGY</b>                  | <b>303</b>  | <b>306</b>  | <b>327</b> |           |
| <i>Renewable energy total</i>                         | <b>87</b>   | <b>102</b>  | <b>124</b> | <b>43</b> |
| <i>Share of renewable energy</i>                      | <b>28,7</b> | <b>33,3</b> | <b>38</b>  |           |

Source: Ministry of Employment and Economy

# Gross consumption of energy in Finland 1960-2009



# System flowchart for (chopped) fuelwood

## SYSTEM ENVIRONMENT

Setting of system boundary  
& allocation methods

### Production of fuelwood

Felling of fuelwood

Cutting and splitting

Transportation

Use/Combustion of fuel wood

Use of waste / ash

# PEFC -Finland

- **Criterion 5: “Sustainable methods shall be used in energy wood harvesting”**

**PEFC standard is revered to recommendations “*Harvesting and production of energy wood*” (Tapio)**

***Recommendations are edited by Tapio in cooperation with forestry researchers and other scientific institutes and interest groups (25 different stakeholders)***

# Comparing BP criteria/Instructions Tapio (1)

**Principle and criteria in SBP (Sustainable Bioenergy production/BP)**

***1. Biodiversity***

***Principle:***

**Biomass production and extraction shall not endanger biodiversity at the landscape level. However, special considerations to threatened species shall be taken at the local level. Biomass production shall whenever possible strengthen biodiversity by contributing to landscape variability.**

**Corresponding passage in HEW (Harvesting and production of energy wood/Tapio)**

***6. Nature care in energy wood harvesting: 6.1 Preserving valuable habitats; 6.2 Preserved trees and decayed wood; 6.3 Zones for protecting watercourses and other water protecting procedures***

# Comparing BP criteria/Instructions Tapio (2)

**Principle and criteria in SBP (Sustainable Bioenergy production/BP)**

## **2. Resource efficiency**

### **Principle**

**Natural resources, such as soil, water and land, shall be used efficiently and biomass production or extraction shall not endanger soil status or cause further deterioration of water quality and quantity.**

**Corresponding passage in HEW (Harvesting and production of energy wood/Tapio)**

Not straight passage in HEW. Some instruction are including into chapter 6 (preserving of water quality and quantity). Other chapters handling issues in SBP principle: 3. Combined production of industry and energy wood in pine forests; 4. Harvesting energy wood from thinned forests/4. Nutriment care in whole tree harvesting; 5. Harvesting energy wood from regeneration areas/5.1 Choice of harvesting area/5.2 Harvesting tops and branches/5.3 Harvesting of stumps.

# Comparing BP criteria/Instructions Tapio (3)

## Principle and criteria in SBP (Sustainable Bioenergy production/BP)

### 3. Energy efficiency

#### Principle:

For a sustainable production and use of bio energy the energy balance shall be considered, and the use of fossil energy sources during production of bio energy should preferably be avoided.

Input energy shall be minimized throughout the whole production chain and be distributed and accounted for on all products (main and co-products) based on an average product value

## Corresponding passage in HEW (Harvesting and production of energy wood/Tapio)

Not straight answer in HEW instructions. In the beginning of the instructions there is a chapter 2. Use of energy wood as a part of mitigation climate change. Subchapters are “Carbon balance in energy wood harvesting” and “Carbon emissions in harvesting”.

# Comparing BP criteria/Instructions Tapio (4)

## Principle and criteria in SBP (Sustainable Bioenergy production/BP)

### 4. Climate mitigation efficiency

#### Principle I:

Greenhouse gas emissions (i.e. emissions of CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O in CO<sub>2</sub> equivalents) from bio energy production and use shall be minimized.

#### Principle II:

Biomass production shall not endanger important carbon stocks. Greenhouse gas emissions caused by land-use change shall be low in relation to the amount of greenhouse gas emissions that can be saved in a long-term perspective.

## Corresponding passage in HEW (Harvesting and production of energy wood/Tapio)

Referring to comparing in previous principle.

# Comparing BP criteria/Instructions Tapio (5)

**Principle and criteria in SBP (Sustainable Bioenergy production/BP)**

## **5. Social aspects**

### **Principle I:**

**The production and use of biomass for energy shall not endanger food security or local production of biomass for other applications.**

### **Principle II:**

**Bio energy production should not endanger the conservation of cultural remains and heritages or prosperity of local**

**communities and cultures.**

**Corresponding passage in HEW (Harvesting and production of energy wood/Tapio)**

**HEW includes chapters: 6.4**

**Landscape care and other uses of forest;**

**6.5 Conservation of cultural remains.**



# Comparing BP criteria/Instructions Tapio (6)

| <b>Principle and criteria in SBP (Sustainable Bioenergy production/BP)</b>   | <b>Corresponding passage in HEW (Harvesting and production of energy wood/Tapio)</b>                      |
|--|---|
| <p><b>6. Economic issues</b></p> <p><b>Principle:</b></p> <p><b>Bioenergy production, extraction and use should contribute to an increase in rural activity and to the development of viable business and security in energy supply.</b></p> | <p><b>These issues are not included in HEW because it is emphasized in harvesting and production.</b></p> |

# Conclusions concerning environmental influences of wood energy in chain of custody

- **Nowadays legislation and instructions cover in Finland first phases of life cycle chain (production and harvesting)**
- **In recommendations is emphasis (added to analysis above) for producing sustainably wood energy biomass with high quality and energy content, preventing nutrient loss on the forest site and store energy in the forest parcels and by forest roadside improving energy efficiency of the harvesting**
- **In future R&D should direct to creating models and e.g. “fuelwood carbon footprint counter” for bioenergy actors**

# Thank you!

