



Rome, 23rd June 2011
Parallel Session

Present and future role of forest resources in the socio-economic development of rural areas

Parallel Session 2

Forests, agroforestry and bioenergy.

Supply Plan and Biomass Cycle Eco-Efficiency

Authors

(Savini P., Grohmann F., Frattegiani M.)

Corresponding author

(Francesco Grohmann)¹



Regione Umbria

***¹Regione Umbria – Servizio Foreste ed
Economia montana***

fgrohmann@regione.umbria.it

Umbria region: “the green heart of Italy”



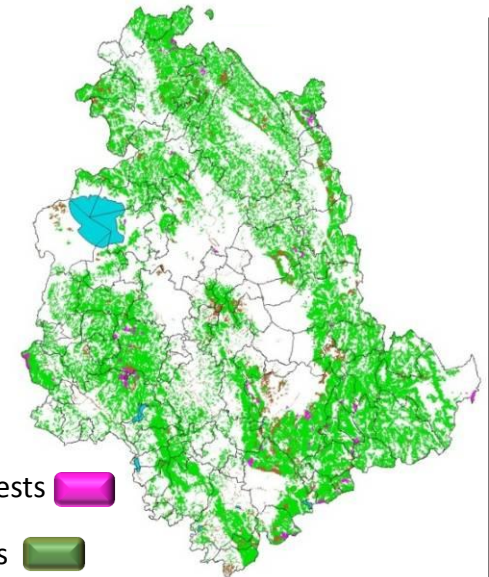
Forest area is in constantly enlargement : 44% of total regional area – 371.574 ha (in Italy 29%)

Public property: 28%

Coppices: 87% of total forest area (in Italy 42%)

Over than 90% of timber production is fire-wood

Over than 74% of public forests are planned thorough a FMP



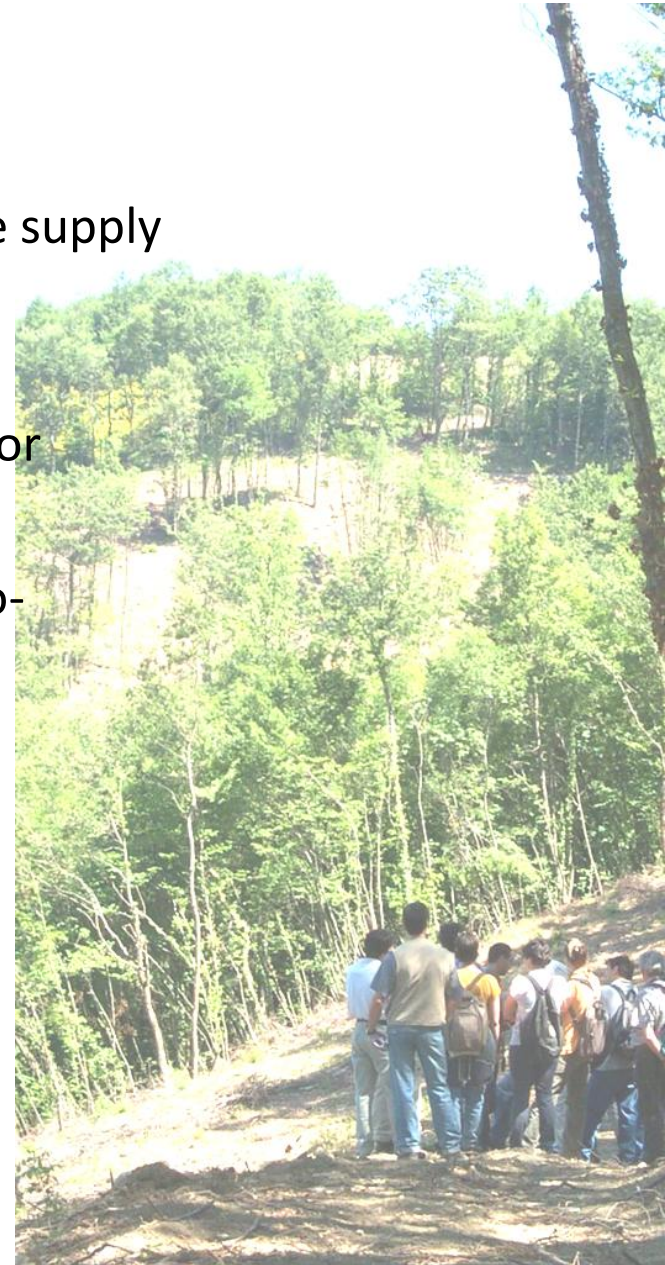
Methodologies

Criteria:

- knowledge and planning of forest resources in the supply basin as an indispensable element
- real available energy, as an output of silvicultural intervention plan including in SP, it's the key factor for heaters sizing
- choice and sizing of heaters must be based on eco-efficiency of biomass cycle

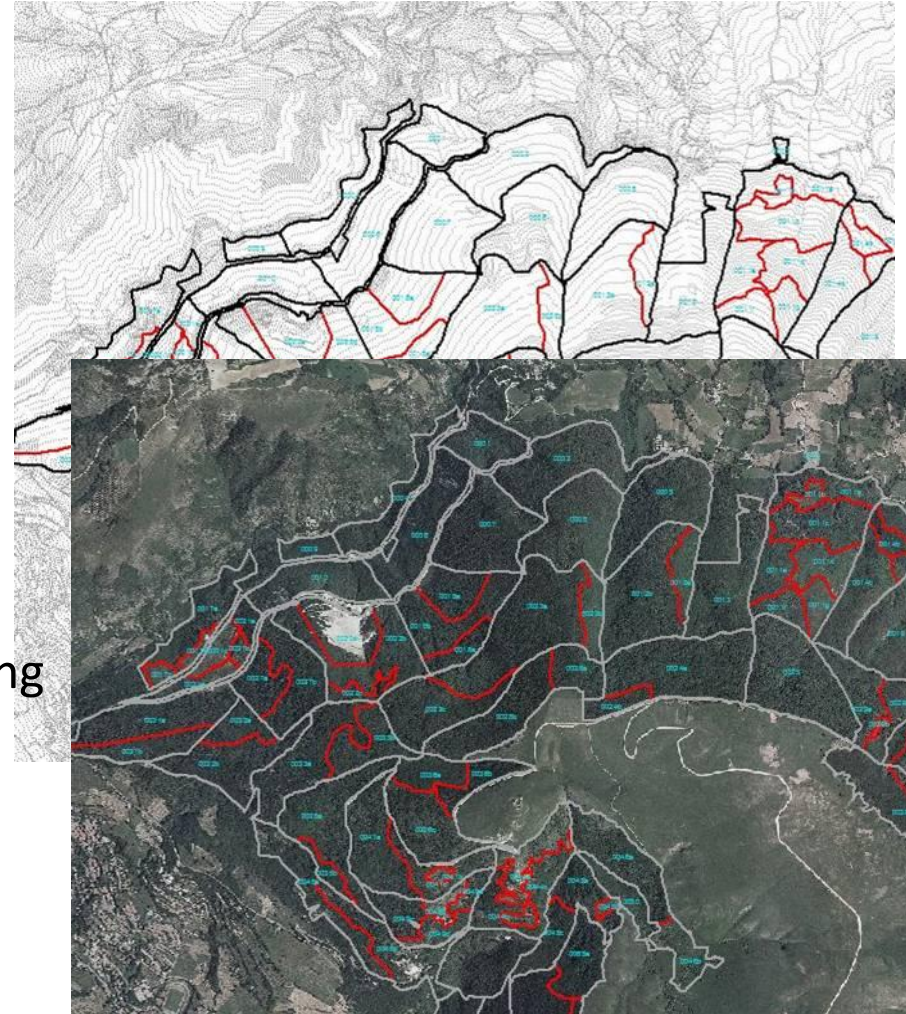
SP phases:

1. planning of forest resources
2. heater choice
3. available energy calculation
4. eco-efficiency supply



1. Planning of forest resources

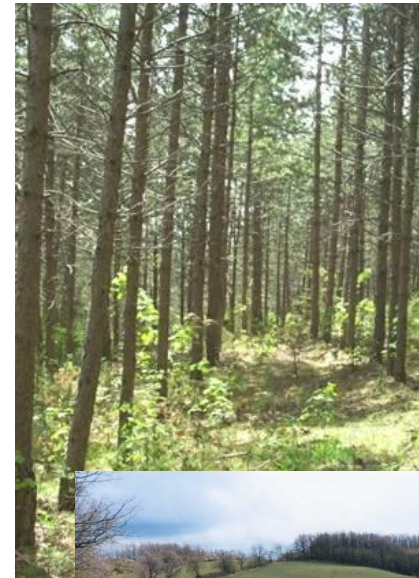
- a. Forest management plan setting guidelines
 - b. *ProgettoBosco* information system for forest management
-
- to draw up a detailed knowledge of forest resources
 - to set a management tool which, respecting forest resources condition, could meet the current ownership needs and the long term functionality of the resources involved



2. Heater choice

Factors

- type of biomass available depending on the FMP silvicultural interventions planned
- heat-producing needs
- characteristics of the buildings where the heaters must be installed
- non-forest biomass availability



3. Available energy

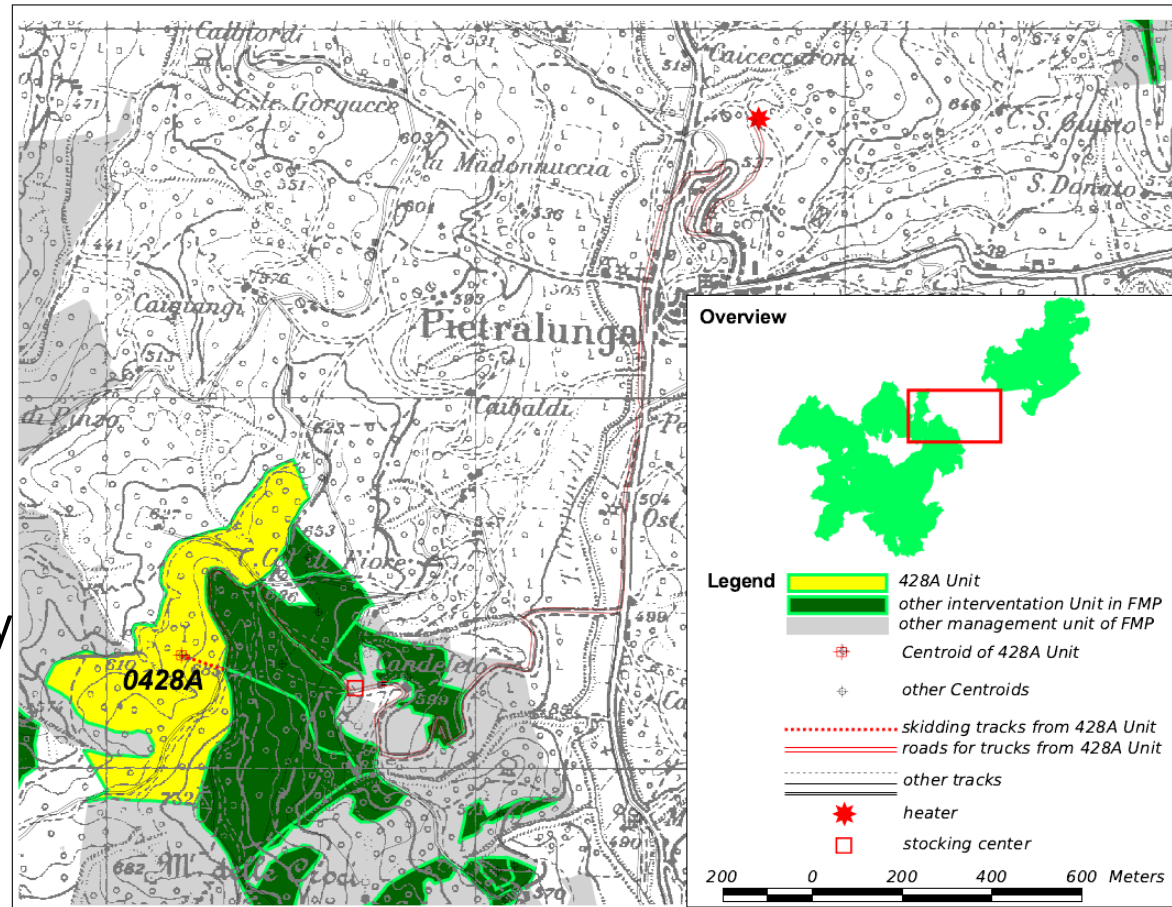
Factors

- Silvicultural interventions planned
- Biomass available during the period of FMP implementation
- Seasoned wood heat-producing
- Heat potentially available from planned interventions
- Heat potentially available per year from planned interventions
- Heat needs per year in number of hours
- Heat available according to the needs
- Efficiency of the heater
- Heat available using a high efficiency heater
- Maximum power supported depending on supply basin availability

3.1 Regional Property of Alta Umbria

Silvicultural interventions areas 846 ha

- 753 ha high forests
- 93 ha coppices
- 15.055 t thinning
- 11.734 t coppicing
- 15.055 t biomass available during the period of FMP implementation
- 60.220.00 kWh heat potentially available from planned interventions
- 4.517 kW maximum power supported depending on supply basin availability

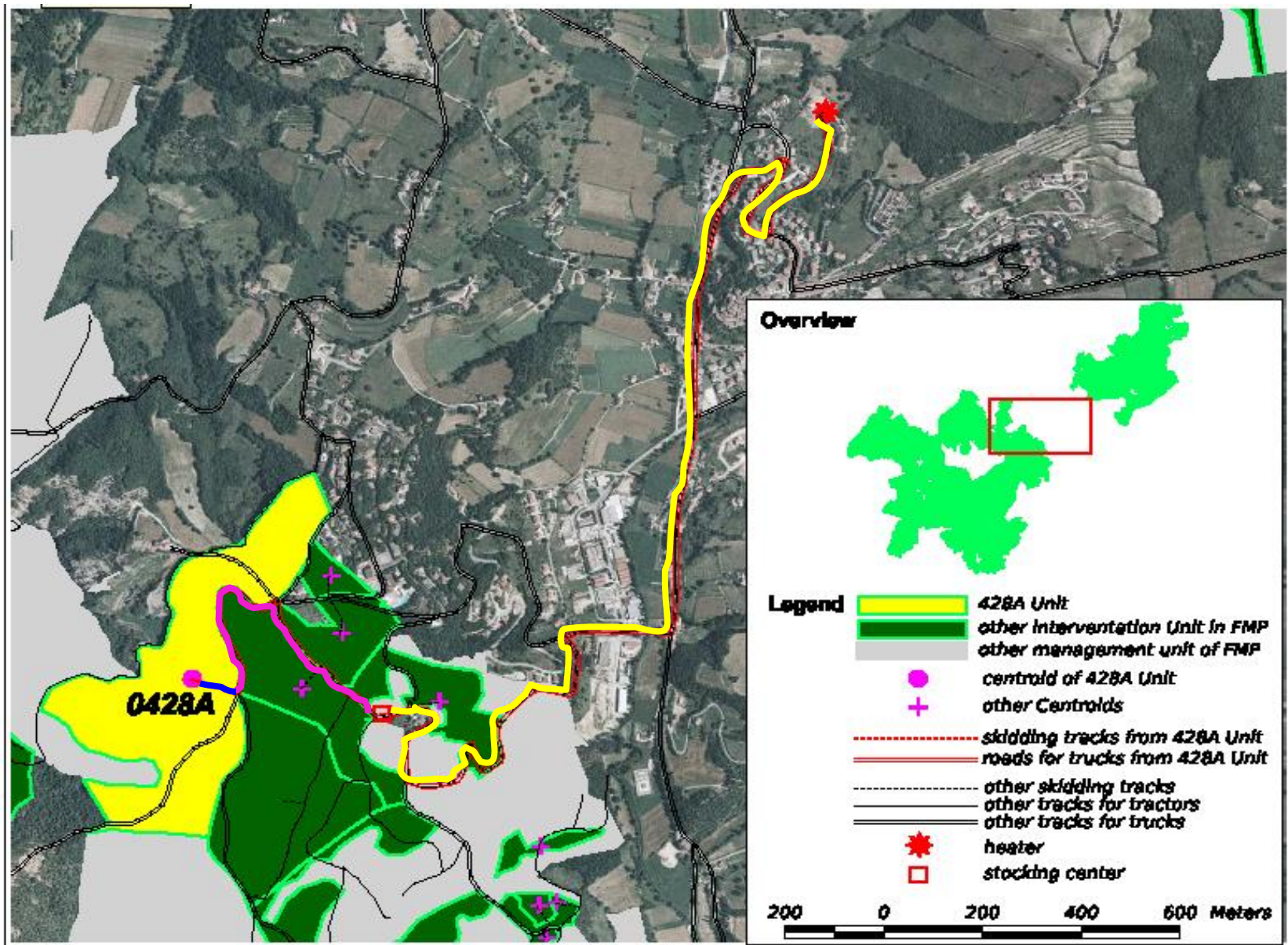


4. Eco-efficiency based Supply

Steps

- Identification of units/subunits that potentially can be used to supply the heater during the period of FMP implementations
- Identification for each unit the respective centroid
- Identification of the distance between centroids and closer road / track
- Identification of landings
- Creation of road map
- Identification of pathways between the heater and landings
- Definition of distance for each zone, joining certain thematic fields to the centroid (polygon code, area, forest type, standing biomass, cutting biomass, intervention date, haul average distance)
- Calculation of CO₂ emissions, adding more data fields to centroid layer and to intervention areas layer (CO₂ emissions for cutting and haul)

4.1 Regional Property of Alta Umbria



Categories of ecological efficiency

- High eco-efficiency: CO₂ emissions between 0 and 6 g / kWh
- Middle - high eco-efficiency : CO₂ emissions between 6 and 12 g / kWh
- Middle eco-efficiency: CO₂ emissions between 12 and 18 g / kWh
- Low eco-efficiency: CO₂ emissions between 18 and 24 g / kWh



Residual biomass

- 4.517 kWh heat available using an high efficiency heater
- 300 kW power of heater installed
- 4.217 kW power available for other biomass heaters



In operational terms to have more than 4.000 kW from Alta Umbria regional property supply basin it means that the sustainable management of forest resources can guarantee the biomass for 14 heaters with the same technical characteristics of the one already installed.

Another application may also indicate, in the case of supply basins that can provide biomass in excess to the installed heater needs, what could be the highest eco-efficiency locations for new heaters



ASSOCIATION
INTERNATIONALE
FORÊTS
MEDITERRANÉENNES



forêt méditerranéenne



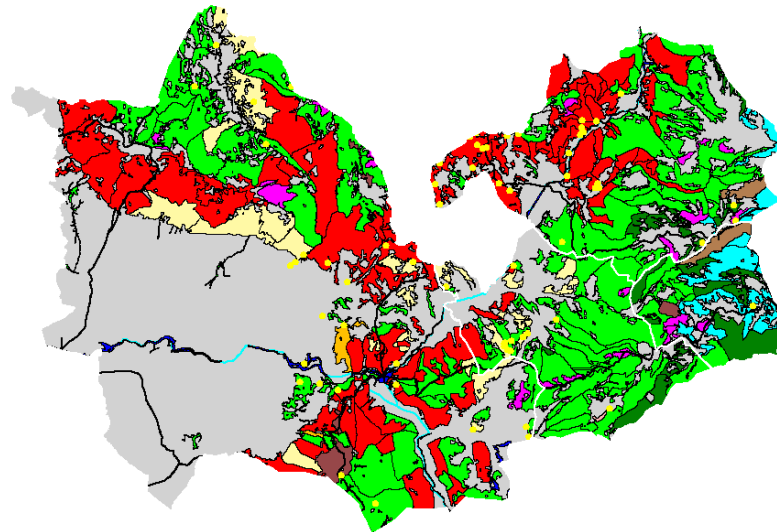
Regione Umbria..



REGION OF
NORTH AEGEAN



FOREST
CENTER
TECHNOLOGY
OF CATALONIA



THANKS FOR YOUR ATTENTION