A successful example of energy generation from forest biomass: E.ON Gardanne

Antoine Mugnier
Head of biomass fuel sourcing France

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## Provence Plant: from coal to biomass

<table>
<thead>
<tr>
<th></th>
<th>Former coal Plant</th>
<th>Expected biomass Plant</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power</strong></td>
<td>250 MWe</td>
<td>150 MWe</td>
</tr>
<tr>
<td><strong>Fuel</strong></td>
<td>100 % fossil</td>
<td>13 % fossil / 87% biomass</td>
</tr>
<tr>
<td><strong>Running regime</strong></td>
<td>Half-peak</td>
<td>Base</td>
</tr>
<tr>
<td><strong>Electric production</strong></td>
<td>2500 h/yr ≈ 600 GWh</td>
<td>7500 h/yr ≈ 1 125 GWh</td>
</tr>
<tr>
<td><strong>Efficiency</strong></td>
<td>33.8 %</td>
<td>40% (+ heat = 49%)</td>
</tr>
<tr>
<td><strong>Carbon footprint</strong></td>
<td>1 143 kg CO₂eq/MWh</td>
<td>245 kg CO₂eq/MWh</td>
</tr>
</tbody>
</table>
2 years of work, 250M€ financed by E.ON, start-up date early 2016
A diversified supplying plan, adapted to Mediterranean location

Consumption (Kilo ton per yer)

- Local forest chips
- Green wastes
- Imported forest chips
- Recycled wood
- Fossil fuel

2016:
- Local forest chips: 124
- Green wastes: 168
- Imported forest chips: 456
- Recycled wood: 85
- Fossil fuel: 127

2023:
- Local forest chips: 216
- Green wastes: 372
- Imported forest chips: 183
- Recycled wood: 85
- Fossil fuel: 127

2026:
- Local forest chips: 325
- Green wastes: 445
- Imported forest chips: 0
- Recycled wood: 85
- Fossil fuel: 127
Geographical origin of forest biomass

Mobilization per region

- 50% - Provence-Alpes-Cote d’Azur
- 33% - Languedoc-Roussillon
- 17% - Other regions
E.ON, an additional customer for non-collected wood

Current consumption:
- 1.3 Mton/year

Forest growth:
+ 5 Mton/year

Wood stock in the Mediterranean Forest (PACA + Languedoc-Roussillon)
186 Mton

P4B consumption:
- 0.38 Mton/year

65 million € / 400 jobs
Forest dynamics: price

- Reduce collecting costs
- Pay for marginal cost

Governement wishes:
- Increase wood collection

Current market:
- Current price
- Private forest owners payment

Current volume:
- Volume on the market t/year

Wood collecting costs €/t

Curved line of marginal cost of forests

E.ON encouraged a performing industry: more wood on the market at the same price
Forest dynamics: price

Wood collecting costs €/t

Current price

Current market

Current volume

Volume on the market t/year

Government wishes:
Increase wood collection

Private forest owners payment

Curved line of marginal cost of forests

E.ON may pay above the market price if it corresponds to real complementary rallying costs: need of traceability

- Reduce collecting costs
- Pay for marginal cost

Pay wood at marginal cost for wood products with a value above the market price
« Wood plus »: E.ON strategy to expand harvest

- Forest wood
- Urban green wastes
- Clearing for brushwood to prevent fire
- Agricultural green wastes
- Recycled wood

Total engaged expenses: 1M€ (total fuel costs around 65M€/yr)

1. Partnership with Société Forestière
2. Working protocol with the Cevennes National Park and support to innovative initiatives
3. Testing of agricultural green wastes collection
4. Support to innovative initiatives
5. Sorting platform for recycled wood in cooperation with Véolia
6. Optimization of green wastes collection and fire risk control