



LABORELEC

From R&D to operational assistance







**Return of experience on
certification of imported
biomass pellets**

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ELECTRABEL BIOMASS POWER PLANTS						
SITE + % biomass		UNIT	Hardcoal MWe	Biomass products	CAPACITY ton/jaar	Green power MWe
Belgium RUIEN 15%		UNIT 3	130	Olive cake	35.000	12
		UNIT 4	122	Wood dust	50.000	14
		UNIT 5	190	Bio-dust Wood chips	150.000 100.000	35 17
Belgium RODENHUIZE 30%		UNIT 4	268	Olive cake Wood pellets	35.000 300.000	9 68
Belgium LANGERLO 8%		UNIT 1	258	Sewage sludge	30.000	4
		UNIT 2	258	Olive cake Wood dust	35.000 100.000	10 28
Belgium AWIRS 100%		UNIT 4	0	Wood pellets	400.000	80
Netherlands GELDERLAND 9%		UNIT 13	635	Wood dust	60.000	17
Poland POLANIEC 10%		8 UNITS	1680	Wood chips	600.000	150
TOTAL			3541	Biomass	1.871.000	482
				Essentially imported	920.000	212
				Essentially local origin	831.000	240

Belgium: green certificates

Flanders : obligation 3,75% x 50TWh= 1,875 TWh, 1GC=125 €

- green certificates granted according to energy balance of supply chain and reference [STAG PP](#)

$$\# GC = net MWh_{el} - electricity\ use - fossil\ MWh_p * 55\%$$

Wallonia : obligation 7,00% x 23,5 TWh=1,65 TWh, 1GC=100€

- green certificates granted according to proven sustainability, CO₂ balance of supply chain and reference [STAG PP](#)
- All fuels have reference CO₂ emission according to LCA
 - Natural gas = 251 kgCO₂/MW_{hp}
 - Coal = 396 kgCO₂/MW_{hp}
 - Wood pellets = 55 kgCO₂/MW_{hp}

$$\# GC = \left(1 - \frac{55}{251} * \frac{55\%}{34\%} = 0,65\% \right) * MWh_{el}$$

Evolution of legislation in Flanders from 1/6/7

- The acceptance of each additional supplier requests the results of the certification procedure of Laborelec: certification documents must be issued before first use
- From 1st of June on primary energy for transport is subtracted at 55% from the net green power instead of 100%
- For new projects, green certificates are only granted for wood that is not used by classical wood industry (woodboard, paper) in Flanders but cultivated wood is always accepted
- After heavy discussions:
 - a power level limitation at 20 MWeI has not been set up
 - energy from biomass used for drying is not subtracted from net green power
 - energy from CO₂-neutral fuels (bio-diesel) is subtracted at reduced level

Evolution of legislation in Wallonia

- Cogeneration brings additional green certificates: up to doubled
- Certification documents must be issued before first use
- Independent report on regional forest management is requested
- No limitation on firing wood but for cultivated wood specific CO₂ factor is expected to be higher
- Data will be handled by supplier with real CO₂ factor
- Still discussions ongoing about:
 - a power level limitation at 20 MWeI for biomass
 - subtraction of energy from biomass used for drying

Laborelec Sustainability Certification

Procedure : designed by Laborelec & 

1) S1: Supplier Declaration

- concerns origin of raw material, technical specs and energy use
- signed by supplier
- checked on site by inspection company

2) S2: International Transport Declaration

- number of days of sea and distance
- energy use of sea/river vessels

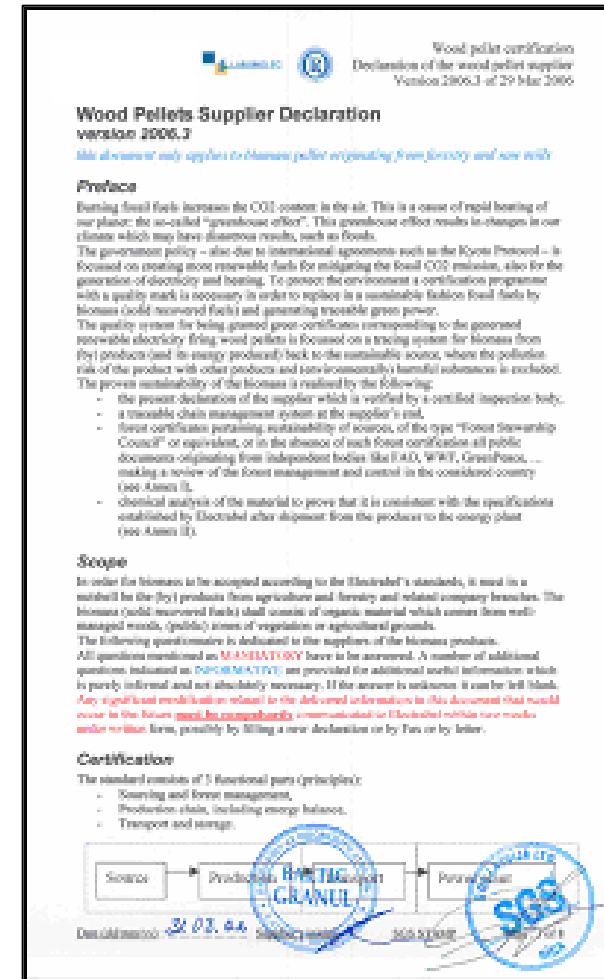
3) S3: Overview of energy balance

4) Inspectorate prepares an audit report:

Verified by 

S4:

- list of critical points to check
- suggested methodologies for evaluation of internal energy use



S1: Traceability and origin of raw material

□ Origin of raw material:

- **country, region of origin**
 - **forests or agriculture**
 - **intermediate industry**
- legislation & policy

□ Status of raw material:

- **primary product**
 - **secondary product (saw dust, fatty acids)**
 - **biomass-waste (coffee ground, sewage sludge)**
- influences permit
- determines starting point for energy balance

In the case of woody biomass:

- Residues originating from saw mills
 - saw dust
 - shavings
 - others, specify
- Sanitary cuttings of forests
 - hard wood
 - soft wood
- Treated wood (with traces of paint, varnish, preservatives, MDF, woodboards, etc.)
- Timber wood
- Woody short rotation coppices¹
- Others, specify

Average percentage of bark in mass:%

In the case of non woody agricultural resources:

- Energy crops (plants grown only for energy purposes)
 - Cereals primary products (wheat, maize, etc.)
 - Cereals by-products (like wheatbran)
 - Other (non-cereal) agricultural residues (cassava, olive cake, rice husk, coffee husk, grape powder, etc.)
 - Vegetal oils
 - refined
 - crude
 - by-product (like fatty acids)
 - Dry Distillated Grain & Solubs (secondary products bio-ethanol production)
 - Others, specify
-

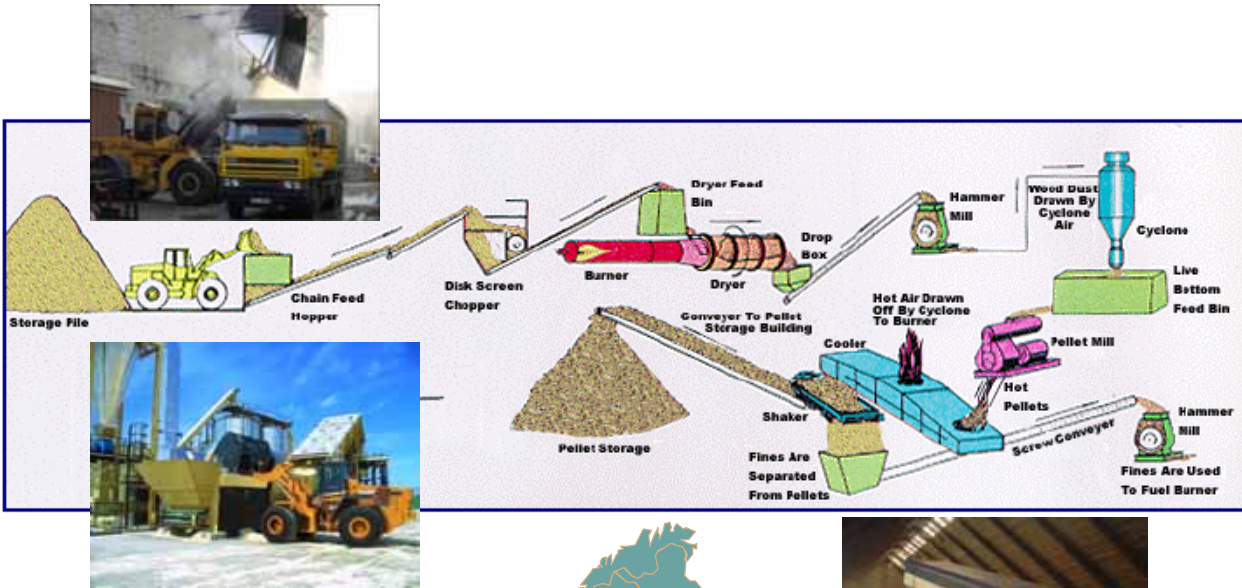
S1: Energy use for production

<p>MANDATORY: ELECTRICITY Give the best estimation and origin of the total electricity consumption of the production plant per metric ton of delivered biomass</p> <p>E = kWh/ton⁽¹⁾</p>	<p><input type="checkbox"/> from network</p> <p><input type="checkbox"/> cogeneration plant</p> <p><input type="checkbox"/> wind farm</p> <p><input type="checkbox"/> other (specify)</p> <p>.....</p>	<p>..... %</p> <p>..... %</p> <p>..... %</p> <p>..... %</p> <p>..... %</p>
<p>MANDATORY: FOSSIL PRIMARY ENERGY Best estimation of fossil primary energy consumption of the production plant per metric ton of delivered biomass (for drying, cooling, ...).</p> <p>TOTAL FOSSIL :PF=.....kWh/ton</p>	<p><input type="checkbox"/> natural gas firing</p> <p><input type="checkbox"/> industrial gas firing</p> <p><input type="checkbox"/> diesel oil firing</p> <p><input type="checkbox"/> propane firing</p> <p><input type="checkbox"/> <u>waste heat fossil boiler</u> <input type="checkbox"/></p> <p>.....</p>	<p>....., _ kWh/ton⁽²⁾</p> <p>....., _ kWh/ton⁽²⁾</p> <p>....., _ kWh/ton⁽²⁾</p> <p>....., _ kWh/ton⁽²⁾</p> <p>....., _ kWh/ton⁽²⁾</p> <p>....., _ kWh/ton⁽²⁾</p>
<p>MANDATORY: NON FOSSIL PRIMARY ENERGY Best estimation of non fossil primary energy consumption of the production plant per metric ton of delivered biomass (for drying, cooling, ...).</p> <p>TOTAL NON FOSSIL :PB=.....kWh/ton⁽²⁾</p>	<p><input type="checkbox"/> biomass <u>pellets</u> firing</p> <p><input type="checkbox"/> biomass <u>residues</u> firing</p> <p><input type="checkbox"/> <u>waste heat biomass boiler</u></p> <p><input type="checkbox"/> other (specify)</p> <p>.....</p>	<p>....., _ kWh/ton⁽²⁾</p> <p>....., _ kWh/ton⁽²⁾</p> <p>....., _ kWh/ton⁽²⁾</p> <p>....., _ kWh/ton⁽²⁾</p>

⁽¹⁾estimation can be made according to yearly consumption of the plant in kWh divided by the plant capacity in tons of delivered biomass per year.

⁽²⁾estimation can be made according to yearly consumed mass of fuel, multiplied by specific average low heating value and divided by the plant capacity in tons of biomass per year.

S3: Energy use of biomass supply



Transport of raw material:



- Avg. distance
- Max. distance

Pelleting:

- Electricity/ton pellets

Drying:

- Fossil/ton pellets
- Biomass/ton pellets

Transport of pellets:

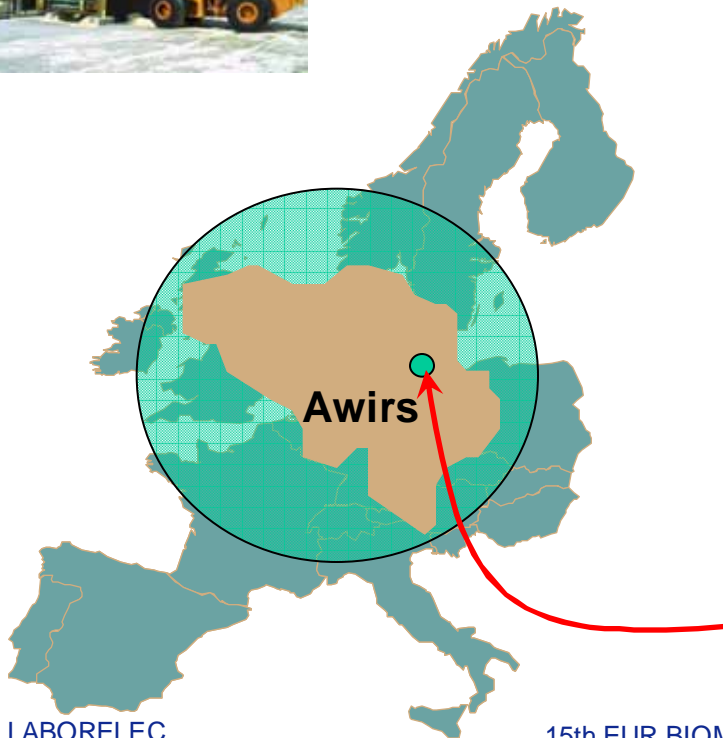
- Distance to harbour
- Truck or train

Sea/River transport:

- Capacity in tons
- Distance in miles
- Number of days of sea
- Consumption/sea day

Flatboat from ARAG:

- Avg. diesel use



Awirs

What is sustainable bio-energy?

□ The principles for management of raw material are similar for *Forest Stewardship Council*-forest certificates or *RoundTable Sustainable Palm Oil*

- Respect of legislation
- Respect of rights of local people
- Respect of rights of workers
- Responsible management of the forests
- Respect of right and responsibility for soil use
- Controlled impact on environment (water, air, soil)
- Management plan
- Evaluation
- Protection of primary forests with high value
- Afforestation



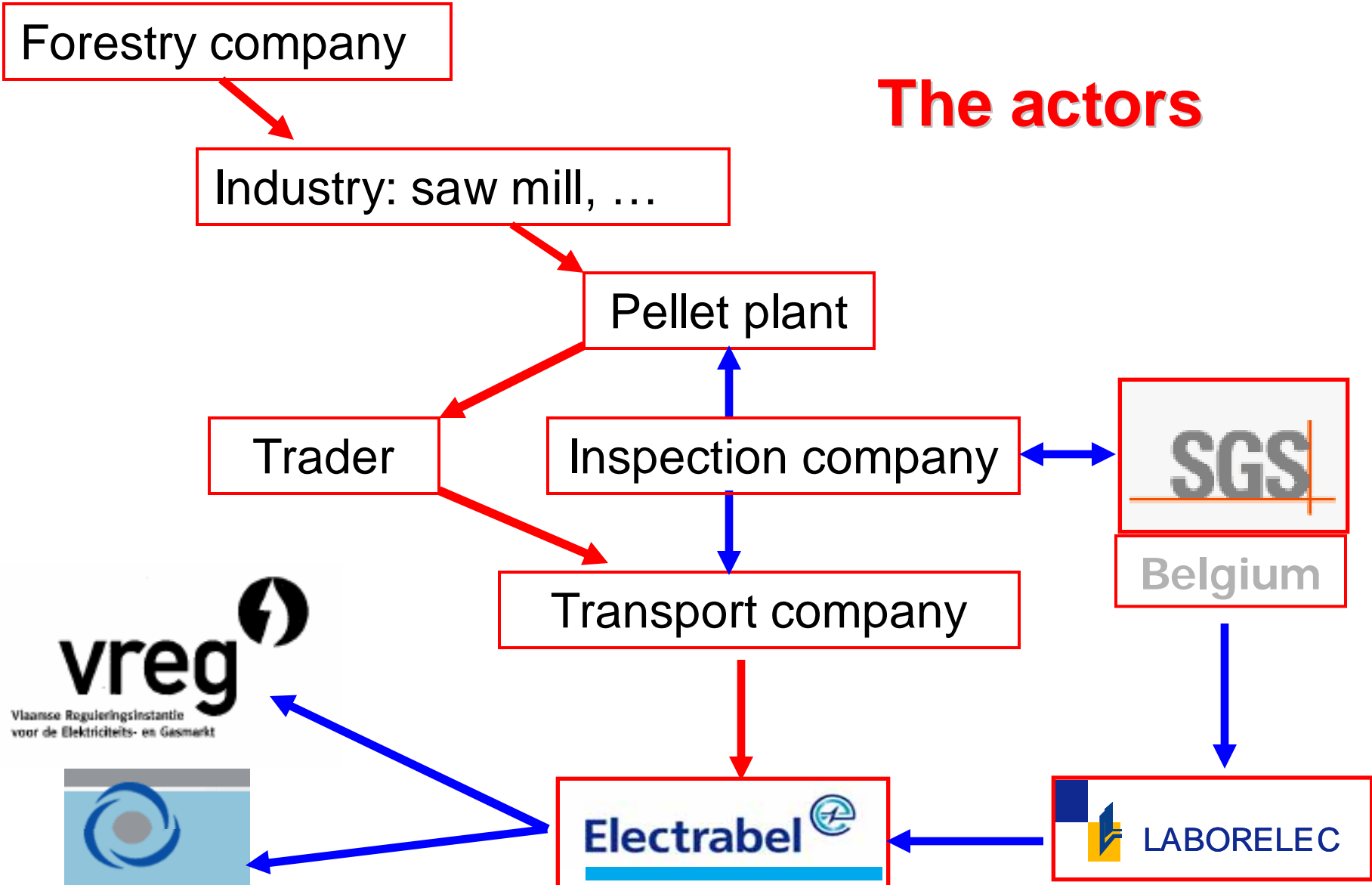
□ But how can this be guaranteed at an acceptable cost ?

S4: Sustainability check

The inspector must not deliver a guarantee
but checks evidences of violations

SUSTAINABILITY PRINCIPLE	AUDITOR'S COMMENTS
Respect of legislation on forestry (afforestation and management plans)	<input type="checkbox"/> OK <input type="checkbox"/> SOME EVIDENCES OF VIOLATION
Respect of legislation, rights and responsibility for soil use	<input type="checkbox"/> OK <input type="checkbox"/> SOME EVIDENCES OF VIOLATION
Legislation, rights and responsibility for irrigation and water use	<input type="checkbox"/> OK <input type="checkbox"/> SOME EVIDENCES OF VIOLATION
Respect of rights of local inhabitants	<input type="checkbox"/> OK <input type="checkbox"/> SOME EVIDENCES OF VIOLATION
Respect of rights of workers (especially working children)	<input type="checkbox"/> OK <input type="checkbox"/> SOME EVIDENCES OF VIOLATION
Respect of legislation and responsible management of the waste streams	<input type="checkbox"/> OK <input type="checkbox"/> SOME EVIDENCES OF VIOLATION
Respect of environmental legislation (emissions in air, water and soils)	<input type="checkbox"/> OK <input type="checkbox"/> SOME EVIDENCES OF VIOLATION

The actors



✓ Technically **OK**
✓ Legally **OK**



Experience of evaluating energy balance

■ Evaluating energy use of pellet plant is not obvious and can vary according to reference used:

- Electricity : from installed power or from invoices ?
- Thermal energy for drying: varies with moisture content

■ Evaluating energy use for local transport is not obvious

- Trucks have different sizes, are modern or old, ...

■ Evaluating energy use by sea vessels is not obvious

- Vessels are modern or old, use different types of fuels, ...

■ Transport scheme can change in time as well as vehicles used

Experience of inspecting pellet plants

- **Now full inspection organised at once and revised yearly**

- **Avoids discrepancies between data in Supplier Declaration and Audit Report of inspectorate
→ data influence grant of GC in Flanders**
- **Avoids difficulties to get again access to pellet plants if commercial relationships had changed or bankruptcy**

- **The inspection is based upon the production unit, and thus not the trading or production company**

- **Necessity to add a Declaration of Transport company (Section 2)**

- **Section 3 was added to summarise energy balance**

- **Section 4 adds up a procedure to carry out the audit including check-list and methodologies**

CONCLUSIONS

- Certification scheme is applied by Electrabel for about 1 000 000 ton biomass imported to Belgium from more than 30 suppliers in the whole world
- Laborelec and SGS manage the certification process
- Cost < 50 €/ton of imported biomass
- Procedure is based upon LCA of supply chain and is continuously improved in collaboration with Belgian regional authorities
- Procedure is recognised in Flanders and Wallonia **even though legislation is different**
- Future: recognition in the Netherlands & Poland ?

Laborelec delivers services to Electrabel as well as third-parties

Five reasons for you to choose Laborelec :

- You have one-stop shopping for your energy needs
- You get access to more than 40 years of experience
- You get rapid service with reliable solutions
- You increase the profitability of your installations
- You benefit from independent and confidential advice



QUESTIONS ?

The technical Competence Center
in energy processes and energy use.
From R&D to operational assistance