



# Organization of regional wood biomass production centers and their contribution to the sustainable development of biomass energy projects

Association of Bulgarian Energy  
Agencies, Plovdiv



# Outline

1. Scope and problem definition
2. CES context
3. Organization of the Biomass Centers
4. Contribution of the BLC to the sustainable development
5. Good examples
6. Certification laboratory



# Problem definition

**Public buildings** - oil fuels, and electricity for heating

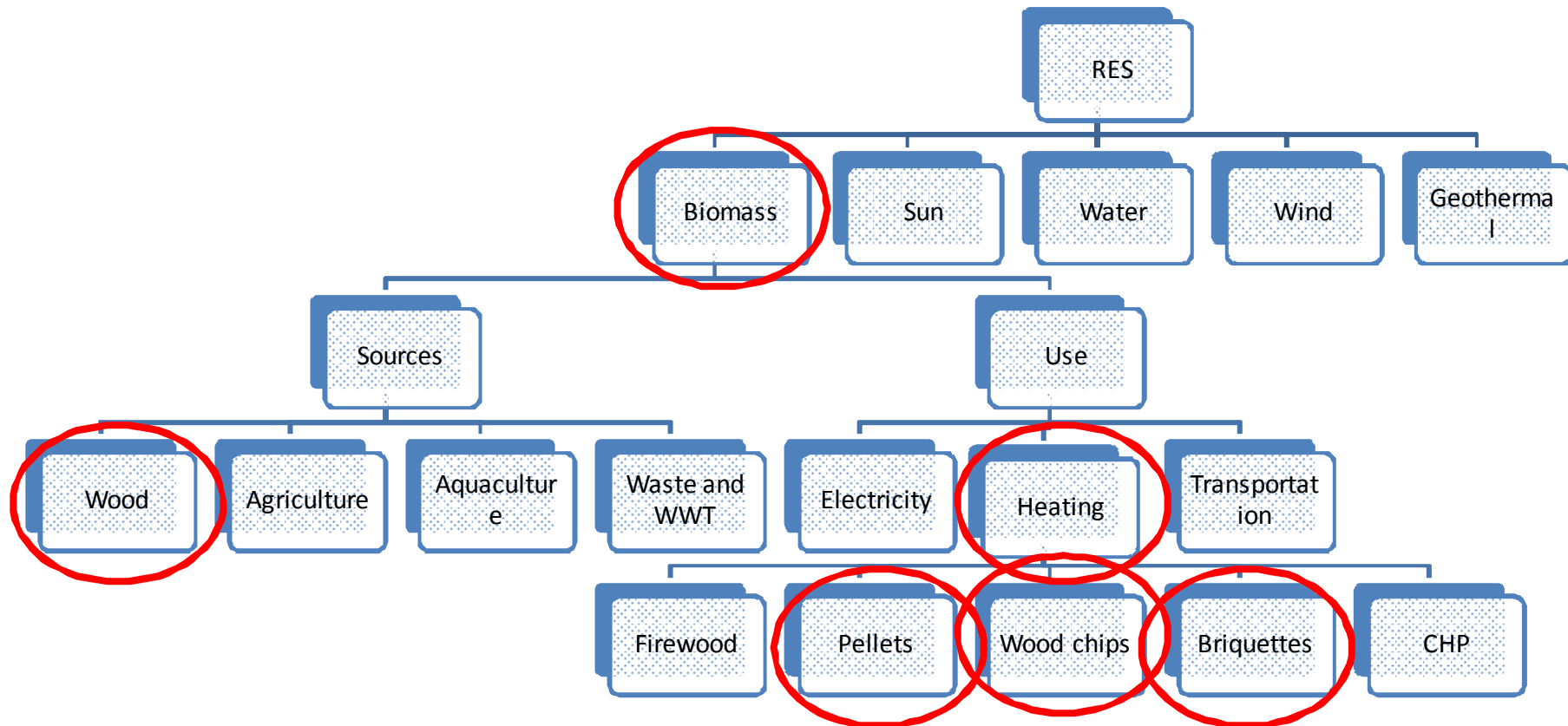
**Households and private buildings** - fossil fuels, primitive biomass, and electricity for heating

Aspects:

- Social
- Economic
- Ecological



# Scope





## The vicious circle

- In order to develop biofuels market in Bulgaria creation of biomass infrastructure should be priority in the municipalities.

Otherwise **the vicious circle “there are no biofuels therefore biomass heating can’t be introduced”** will remain the main barrier to municipalities to take actions.

- The organization of regional wood biomass production centers **establishment.**



# The main activities of the Biomass Centres

- Transportation, crushing and storage of harvested wood
- Drying of woody biomass
- Production of pellets
- Production of briquettes
- Logistics and storage
- Public relations and information





## The main steps

- Feasibility study
- Preliminary contract for supply of raw material
- Construction activities
- Supply and installation of equipment
- Setting up and sampling technology
- Appointment and training of staff
- Supply of raw material for production



## Contribution of the BLC to the sustainable development

- Substitution of oil fuels, fossil fuels, primitive biomass, and electricity for heating with advanced biofuels
- Establishment of adequate conditions for the efficient use of available biomass
- Reduction of greenhouse gas emissions
- Introduction of superior economic alternatives and innovative technologies for heating
- Job creation





# Barriers and Changes Needed

## Barriers

- Supply of raw material
- Cost of pellet stoves
- Quality assurance
- Focus on large RES projects
- Lack of information

## Changes Needed

- Long-term contracts
- Financial incentives
- Certification laboratory
- Consider small-scale, decentralized projects
- Central information collection



# Good examples



International Seminar, Pamporovo Resort, 16.04.2013



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International Seminar, Pamporovo Resort, 16.04.2013





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## II. ESTABLISHING A CERTIFIED LABORATORY FOR TESTING OF SOLID BIOMASS QUALITY

*International Seminar  
UP-TO-DATE BIOMASS GASIFICATION TECHNOLOGIES  
AND THEIR IMPLEMENTATION  
Pamporovo Resort  
15-17.04.2013*



## Main activities of the laboratory for testing and certification of solid biofuels:

- Testing and certification of solid biofuels according to international standards
- Research on the biomass problems
- Assessment of biomass resources
- Training and education
- Provides research, training and technical assistance for:
  - Bulgarian companies producing solid biofuels from wood or agricultural waste biomass
  - manufacturers of biomass boilers
  - national institutions (Ministry of Environment and Water of Bulgaria, Ministry of Economy, Energy and Tourism, Executive Forest Agency)
  - European institutions (EC, other institutions)
  - owners of forest and lands





## Normative properties for pellets (EN 14961-1)

Parameter	Standard	Equipment
Traded form, origin, dimensions, additives (w-% of pressing mass)	EN 14961-2	
Moisture content, M (w-% as received)	EN 14774-1 EN 14774-2	Drying oven Reference method Drying oven Simplified method
Ash content, A (w-% of dry basis)	EN 14775	High temperature laboratory furnace
Mechanical durability, DU (w-% of pellets after testing)	EN 15210-1	Pellet tester
Amount of fines, F (w-%, < 3,15 mm)	EN 15149	Sieve machine
Net calorific value, Q	EN 14918	Calorimetric bomb
Bulk density, BU	EN 15103	Measuring containers



## Normative/informative parameters for pellets (EN 14961-1)

Parameter	Standard	Equipment
Sulphur*, S (w-% of dry basis)	EN 15289	Analyzer for S, C
Nitrogen*, N (w-% of dry basis)	EN 15104	CHN-analyzer
Chlorine*, Cl (w-% of dry basis)	EN 15289	Ion Chromatography

\*Normative only for chemically treated biomass (1.2.2, 1.3.2, 2.2.2, 3.2.2)  
and Informative for all fuels that are not chemically treated

## Informative parameters for pellets (EN 14961-1)

Parameter	Standard	Equipment
Ash melting behaviour	CEN/TS 15370	CAF Digital & illumination for biofuels & solid recovered fuel testing



## Normative properties for briquettes (EN 14961-1)

Parameter	Standard	Equipment
Traded form, origin, dimensions, additives (w-% of pressing mass)	EN 14961-3	
Moisture content, M (w-% as received)	EN 14774-1 EN 14774-2	Drying oven Reference method Drying oven Simplified method
Ash content, A (w-% of dry basis)	EN 14775	High temperature laboratory furnace
Particle density, DE	EN 15150	Pycnometer
Net calorific value (Q)	EN 14918	Calorimetric bomb



## Normative/informative parameters for brquettes (EN 14961-1)

Parameter	Standard	Equipment
Mechanical durability*, DU (w-% of pellets after testing)	EN 15210-1	Pellet tester
Sulphur**, S (w-% of dry basis)	EN 15289	Analyzer for S, C
Nitrogen**, N (w-% of dry basis)	EN 15104	CHN-analyzer
Chlorine**, Cl (w-% of dry basis)	EN 15289	Ion Chromatography

\*Informative only if traded in bulk

\*\*Normative only for chemically treated biomass (1.2.2, 1.3.2, 2.2.2, 3.2.2)

and Informative for all fuels that are not chemically treated

## Informative parameters for brquettes (EN 14961-1)

Parameter	Standard	Equipment
Ash melting behaviour	CEN/TS 15370	CAF Digital & illumination for biofuels & solid recovered fuel testing



### Normative properties for wood chips (EN 14961-1)

Parameter	Standard	Equipment
Traded form, origin, dimensions	EN 14961-3	
Moisture content, M (w-% as received)	EN 14774-1 EN 14774-2	Drying oven Reference method Drying oven Simplified method
Ash content, A (w-% of dry basis)	EN 14775	High temperature laboratory furnace

### Normative/informative parameters for wood chips (EN 14961-1)

Parameter	Standard	Equipment
Nitrogen*, N (w-% of dry basis)	EN 15104	CHN-analyzer
Chlorine*, Cl (w-% of dry basis)	EN 15289	Ion Chromatography

\*Normative only for chemically treated biomass (1.2.2, 1.3.2, 2.2.2, 3.2.2) and Informative for all fuels that are not chemically treated

### Informative parameters for wood chips (EN 14961-1)

Parameter	Standard	Equipment
Ash melting behaviour	CENTS 15370	CAF Digital & illumination for biofuels & solid recovered fuel testing
Net calorific value (Q)	EN 14918	Calorimetric bomb
Bulk density (BU)	EN 15103	Measuring containers



### Normative properties for hog fuel (EN 14961-1)

Parameter	Standard	Equipment
Traded form, origin, dimensions	EN 14961-3	
Moisture content, M (w-% as received)	EN 14774-1 EN 14774-2	Drying oven Reference method Drying oven Simplified method
Ash content, A (w-% of dry basis)	EN 14775	High temperature laboratory furnace
Net calorific value (Q)	EN 14918	Calorimetric bomb

### Normative/informative parameters for hog fuel (EN 14961-1)

Parameter	Standard	Equipment
Nitrogen*, N (w-% of dry basis)	EN 15104	CHN-analyzer
Chlorine*, Cl (w-% of dry basis)	EN 15289	Ion Chromatography

\*Normative only for chemically treated biomass (1.2.2, 1.3.2, 2.2.2, 3.2.2) and Informative for all fuels that are not chemically treated

### Informative parameters for hog fuel(EN 14961-1)

Parameter	Standard	Equipment
Ash melting behaviour	CEN/TS 15370	CAF Digital & illumination for biofuels & solid recovered fuel testing
Bulk density (BU)	EN 15103	Measuring containers






## Content of a product declaration – EN 15234 – 1

- supplier (body or enterprise) including contact information
- traded form (according to the EN 14961-1 e.g. wood chips)
- origin and source (according to the EN 14961-1 table 1)
- country/countries (locations) of origin
- specification of properties (according to the relevant part of EN 14961)
  - normative properties
  - informative properties
- chemically treated material (yes/no)
- signature, date



## Example of product declaration - pellets packages

 <b>Wood pellets</b>	<b>Producer</b>	EAA Biofuels P.O. Box 1603, FI-40101 Jyväskylä Tel. +358 20722 2550
	<b>Origin:</b>	1.2.1.2 Coniferous wood without bark
	<b>Traded Form:</b>	Pellets - Class A1
	<b>Country of origin</b>	Jyväskylä, Finland
	<b>Normative (EN 14961-2)</b>	
	<b>Dimensions</b> Diameter (D), length (L)	D08 (D= 8±1 mm, and 3,15 < L < 40 (99%) Maximum 45 mm
	<b>Moisture</b> (w-% as received)	M10 (< 10 %)
	<b>Ash</b> (w-% of dry basis)	A0.7 < 0,7%
	<b>Mechanical durability</b> (w-% of pellets after testing)	DU97.5 < 97,5%
	<b>Amount of fines</b> (w-%, < 3.15 mm)	F1.0 < 1%
	<b>Net calorific value, Q</b>	Q > 4,7 kWh/kg
<b>Additives</b> (w-% of pressing mass)	Starch < 1 w-%	
<b>Bulk density</b> as received (kg/m <sup>3</sup> )	DB600 > 600 kg/m <sup>3</sup>	
<b>Chemical composition</b> (w-% dry basis)	N0,3, S0,05, Cl0,02	
<b>Minor elements</b> (mg/kg dry basis)	As 1, Cd 0,5, Cr 10, Cu10, Pb10, Hg 0.05, Ni 10, Zn 100	



## Laboratory equipment financed by the project

- Inductively coupled plasma-optical emission spectrometer
- Ion-Chromatography device
- CHNS-Analyzer
- Moisture Analyzer (for thermo-gravimetric method)
- Laboratory dry oven
- Laboratory furnace
- Pellet and briquette tester of mechanical durability
- Sieve machine (with sieves)
- Different laboratory scales



## Future actions

- Laboratory accreditation
- Promote the laboratory as research center
- Applying for funding of:
  1. Oxygen bomb calorimeters to determining the calorific values
  2. CAF Digital Biomass furnace for determination of ash melting behavior
  3. Laboratory lab scale
  4. Laboratory fume cupboard for sample preparation
  5. Ultrapure water system
  6. Ultrasonic atomizer for ICP-OES device
  7. Hydride system for ICP-OES device
  8. Automatic sampler for ICP-OES device and for IC device
  9. Microwave oven for sample preparation



# Thanks for your attention

Energy Agency of Plovdiv  
139 Ruski Blv.  
4000 Plovdiv  
Tel/Fax: +359 32 62 57 54  
[elka.piskova@eap-save.dir.bg](mailto:elka.piskova@eap-save.dir.bg)