Phydades/BIODAT – Building a Database for Biomass Fuels and Ashes Using CEN Standards and Training of its Users

presented by Jan Pels, coordinator

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- Background and partners of Phydades
- Why standards in biomass fuels are useful
- What we offer to the EU biomass community

Introduction

- PHYDADES = Phyllis Database, Dissemination, Education and Standardisation

- Europe Intelligent Energy (EIE) Action
  - sponsored for 50% by EACI and for 50% by partners
  - partners from Finland, Sweden, Estonia, Poland, Austria, Spain, Italy and Netherlands

SenterNovem
Agentschap voor duurzaamheid en innovatie

Phydades is a Catamaran

- Two floaters and a sail
  - DATABASE (leader ECN)
  - EDUCATION (leader VTT)
  - DISSEMINATION (leader ETA-Florence)
- Other partners
  - SLU (Swedish Universit of Agricultural Sciences)
  - IPiEO (Institute for fuels and Renewable Energy)
  - TUT (Tallinn University of Technology)
  - AICIA (Ass. Research and Industrial Coop. Andalusia)
  - OFI (Austrian Res. Inst. for Chemistry and Technology)
  - ENAS oy

Objective of PHYDADES

To assist in EU's goals for renewable energy

- Renewable Energy Directive: 20% renewable energy in 2020
- Biomass will be a substantial contribution
  to heat, power *and* transportation fuels
- 50-90% of biomass produced and traded **inside** the EU
- from rural areas, in particular
  - countries with large forests (e.g. Baltic Area)
  - countries with excess agricultural residues

These goals require standardisation of biomass fuel quality and standardisation of fuel analyses

Why standardisation?

- No biomass fuel standards
  - direct trade between producer and user
- With standards
  - more places to buy the same fuel
  - more customers to sell fuel to
  - traders emerge that disconnect the direct link of producers and users
  - rapid expansion of a trading network
  - larger (international) markets develop
  - **biomass fuels become commodity fuels**

This is what we need to fulfill the 20-20-20 goals, starting with wood pellets

PHYDADES brings education on standardisation to the bio-energy chain

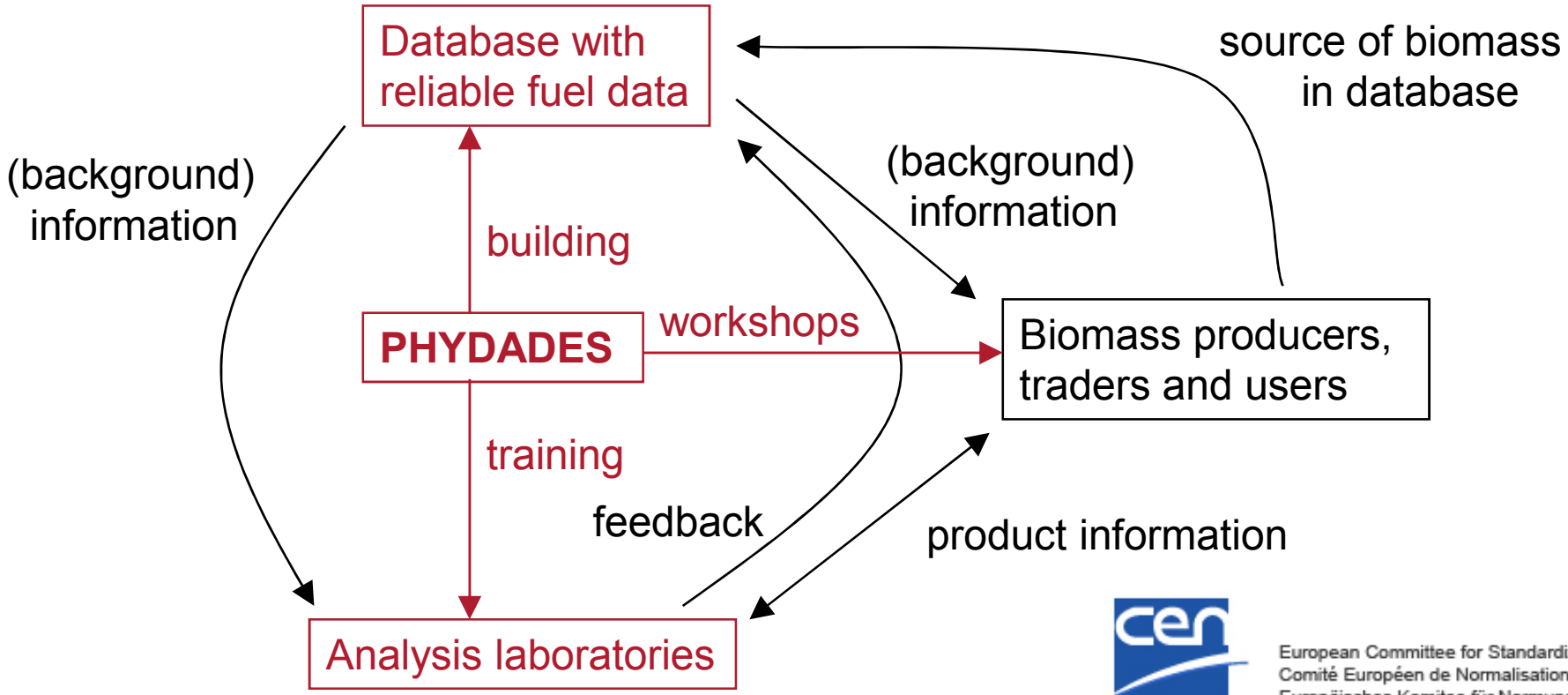
- biomass producers
- biomass traders
- biomass users
- boiler manufacturers
- cement companies using the ashes
- transportation companies
- port authorities
- legislators
- enforcing agencies

Phydades focus

What has PHYDADES to offer?

- ***free*** **workshops** for biomass producers, traders, buyers, analysis labs, etc.
- ***free*** **training** for laboratory technicians
- ***free*** **public biomass database** for all of us

Information Exchange and PHYDADES



cen
European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

New Database BIODAT

- Follow-up of ECN's popular database PHYLLIS
- Input from ECN, VTT, OFI and other partners
- Classification using CEN/TS 14961
- Only reliable data, including
  - analysis method used
  - laboratory that did the analysis
  - source of the biomass fuel
- Free for **all users** in the World
  - producers, traders, users, labs, scientists, legislators, etc.

BIODAT
Biomass Database

BIODAT future

- Phyllis will stay on-line: http://www.phyllis.nl
- BIODAT on-line in 2008: http://www.biodat.eu
- During project, partners collect reliable information
  - starting with solid biomass fuels (pellets/chips)
  - extending to waste-derived fuels
  - extending to ashes from biomass
- After the project ends
  - extending to liquid and gaseous biomass fuels
  - funding needed to keep updating information

BIODAT
Biomass Database

Workshops organised by PHYDADES

- Locations close to production centers
  - Estonia, Poland, Romania, Spain
  - hosted by PHYDADES partners TUT, EC-BREC, AICIA
- Target groups are biomass producers and traders and labs that want to offer fuel analysis commercially
- Free admission
- Local language when possible (Poland, Spain)
- Local hosts are familiar with local customs
- Speakers are local people, PHYDADES partners or experts from other EU networks

Contents of One-day Workshop

• Welcome (by local host)	5-10 min.
• Welcome (by PHYDADES coordinator)	5 min
• Introduction to standards	20-30 min
• Sampling	30-45 min
• Physical properties	about 30 min
• Chemical properties	about 30 min
• **Presentation by local biomass producer/user**	20-40 min
• BIODAT/Phyllis Database	20-30 min
• *optional: Biomass in co-firing*	*20-30 min*

Successful first Workshop in Estonia

- 50 participants from Estonia, Latvia, Finland, Sweden
- 25 of them were from industry
- positive feedback from participants
  - relevant information
  - useful for their business
- Improvements for other workshops
  - English language was okay, but inhibited free discussion
  - local speakers are of key importance

Local speaker knows the business

- ***Kuido Kuntro, Kalvi Mõis Ltd***
- *Danish-Estonian company*
- *Producing "FLEX HEAT" clean white wood pellets in Estonia*
- *Selling in Denmark and Germany*
- *Standardized physical characterization done by themselves using simple equipment (€ 30,000)*
- *Standardized chemical analysis in Denmark or Tallinn Technical University (new equipment: € 1,000,000)*

DANISH TECHNOLOGICAL INSTITUTE **Quality control of wood pellets** (Ver. 6 2006.10.17)	**Analysis of wood pellets according to CEN/TC 335 modified. (Translation of Danish report ELAB 1016 – 31)**		**Project No.:** 1323571
	Company:	FLEX HEAT A/S	**Date of Analysis:** 2007.11.07
	Contact person:	John Hansen	
	Address:	Bisholdt Møllevej 5	**Report No.:** ELAB 1016-31
	Postcode and town:	8700 Horsens	

1. Basis of Analysis		
Identification: Flex Heat, produced 01.09 - 30.09.2007		
Date of receipt: 2007.10.20		Number of samples: 1 piece
Packaging material: Plastic		Weight of sample: 8 kg
2. Classification based on supplier declaration		
Declaration		**Classification according to CEN/TC 335**
Raw material:	Pure sawdust	1.2.1.1 Wood without bark
Traded form:	Wood pellets	Wood pellets without additives
3. Classification based on analysis		
Analysis figures		**Classification according to CEN/TC 335**
Diameter/length:	8 ± 0.5 mm / <= 5 × diameter	D08
Water content:	6.1 % (weight% as received)	M10
Ash content:	0.49 % (dry basis)	A0.7
Mechanical stability:	98.27 %	Measured with Ø 3.15 mm sieve
Additives:	0%	The fuel is without additives
Efficient calorific value:	17.9 MJ/kg 4.97 kWh/kg 4.28 kcal/kg	Calculated on the basis of ash and water content
Density:	678.2 kg/m^3	
Dust in received sample:	0.63 %	
Slag test, category:	1 (no slag forming)	Danish Technological Institute's method
Sulphur content:	Not analyzed	Sulphur is normative only for chemically treaded biomass and if sulphur containing additives have been used.
Nitrogen:	Not analyzed	Nitrogen is normative only for chemically treated biomass.

Date: 7/11-07 Signature: Torl Nørgaard

Contact: Torben Nørgaard Jensen (TNJ), tel.: 72 20 13 11, e-mail: torben.norgaard.jensen@teknologisk.dk

FLEX HEAT®
woodpellets - natural fuel

Quality cerficate on premium quality pellets

24 April 2008
Tallinn; Estonia

What have the CEN/TC 335 standards given us?

- Traceability
- Testing procedures
- Easier to trade and communicate
- Reliable quality control in production
- and confidence that customer requirements are fulfilled

On-the-job training

- Objective: to learn standardized analysis methods
- Key laboratory staff of commercial and industrial laboratories (*not managers!*)
- From New Member States and Southern Europe
- How: two-four week training
  - preparation at home
  - visit of 1-2 weeks in PHYDADES partner labs
  - reporting afterwards
- End result: trained personnel and written protocols in local languages

On-the-job training

- Participating partners:
  - ENAS and VTT (Finland)
  - SLU (Sweden)
  - OFI (Austria)
  - AICIA (Spain)
- Training is free
- Travel and cost for residence → individual basis
- Current status: recruiting first trainees
- Training possible until end 2009

Summary

- BIODAT Database on-line in 2008
- Workshops
  - Warsaw, Poland: 21 October 2008 (in Polish
  - Romania; 20 November 2008 (in English)
  - Spain; 21 November 2008 (in Spanish)
  - programmes, registration, local arrangements on-line
- Lab training for technicians
  - targeted at Eastern and Southern Europe
  - contact information, application forms, etc.

BIODAT
Biomass Database

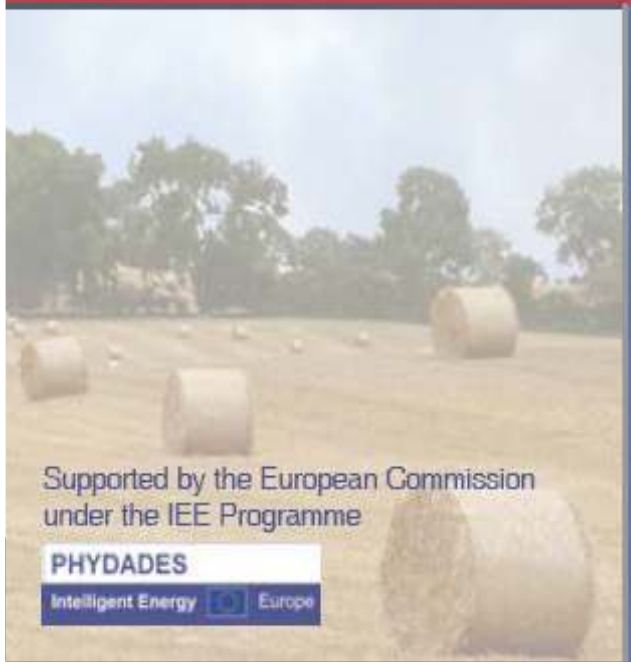
http://www.phydades.info

www.phydades.info

based on existing Phyllis database (www.phyllis.nl)
to create a new European "BIODAT" database (www.biodat.eu)

On-job training
in laboratories

4 international
workshops



Supported by the European Commission
under the IEE Programme

PHYDADES
Intelligent Energy Europe

Provide education
for EU countries about
standardised analysis
methods for solid biofuels

Situation today

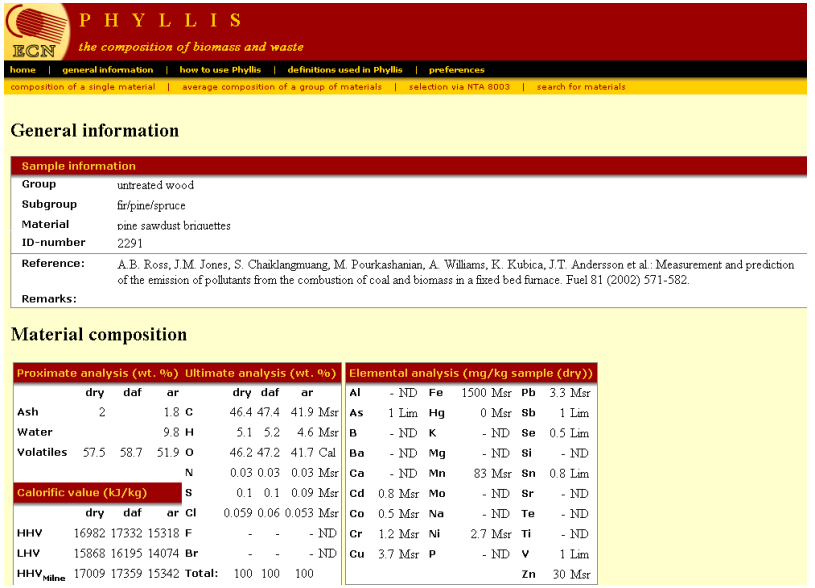
- Biomass fuel standards exist for
  - terminology: CEN/TS 14588
  - fuel classification: CEN/TS 14961
  - fuel sampling: CEN/TS 14778 (and more)
  - fuel quality guarantee: CEN/TS 15234
  - fuel analyses: CEN/TS 15289, CEN/TS 15290, etc.

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

- Common practice in Northern and Western Europe
- Being adopted in Southern Europe
- To be adopted in New Member States

Phyllis Database http://www.phyllis.nl

- ECN has a popular database
  - 10.000 hits in March 2008
  - 3400 fuel analyses download
  - information dates from 1990s
  - unreliable data and unrealistic values included
  - using statistics to get reliable information



PHYLLIS
ECN the composition of biomass and waste

home | general information | how to use Phyllis | definitions used in Phyllis | preferences
composition of a single material | average composition of a group of materials | selection via NTA 8003 | search for materials

General information

Sample information	
Group	untreated wood
Subgroup	fir/pine/spruce
Material	pine sawdust briquettes
ID-number	2291
Reference:	A.B. Ross, J.M. Jones, S. Chaiklangmuang, M. Pourkashanian, A. Williams, K. Kubica, J.T. Andersson et al.: Measurement and prediction of the emission of pollutants from the combustion of coal and biomass in a fixed bed furnace. Fuel 81 (2002) 571-582.
Remarks:	

Material composition

Proximate analysis (wt. %)	dry	daf	ar
Ash	2		1.8
Water			9.8
Volatiles	57.5	58.7	51.9

Calorific value (kJ/kg)	dry	daf	ar
HHV	16982	17332	15318
LHV	15868	16195	14074
HHV_{Milne}	17009	17359	15342

Ultimate analysis (wt. %)	dry	daf	ar
C	46.4	47.4	41.9 Msr
H	5.1	5.2	4.6 Msr
O	46.2	47.2	41.7 Cal
N	0.03	0.03	0.03 Msr
S	0.1	0.1	0.09 Msr
Cl	0.059	0.06	0.053 Msr
F	-	-	- ND
Br	-	-	- ND
Total:	100	100	100

Elemental analysis (mg/kg sample (dry))					
Al	- ND	Fe	1500 Msr	Pb	3.3 Msr
As	1 Lim	Hg	0 Msr	Sb	1 Lim
B	- ND	K	- ND	Se	0.5 Lim
Ba	- ND	Mg	- ND	Si	- ND
Ca	- ND	Mn	83 Msr	Sn	0.8 Lim
Cd	0.8 Msr	Mo	- ND	Sr	- ND
Co	0.5 Msr	Na	- ND	Te	- ND
Cr	1.2 Msr	Ni	2.7 Msr	Ti	- ND
Cu	3.7 Msr	P	- ND	V	1 Lim
				Zn	30 Msr

- Standards emerged → time for a new database

Who are the BIODAT users?

The same as the Phyllis users: everybody

- Biomass producers
- Biomass traders
- Biomass buyers
- Equipment manufacturers
- Analysis Laboratories
- Legislators
- Scientists, students and teachers
- Interested public

BIODAT
Biomass Database