Spring School on Next Generation Biomass Heat and Power Cogeneration

Are you interested in …

Thermal pretreatment technologies for biomass fuel upgrading?

Fluidized bed and pulverized fuel technologies for efficient, dedicated biomass combustion?

An introduction on measurement techniques for flue gas and combustion by-products?

Corrosion and fouling of biomass boilers and mitigation measures?

Environmental sustainability and socio-economic dimensions of biomass utilization?

Steady-state and dynamic modeling of biomass CHP plants?

Research activities and industrial outlook for biomass combustion facilities?

Application of biomass ashes?

Register for Biofficiency's Spring School and learn about:

Biomass properties · Torrefaction · Hydrothermal Carbonization · Steam Explosion · Fluidized Bed Combustion · Pulverized Fuel Combustion · Boiler corrosion and mitigation measures, furnace materials · Biomass ash utilization · Boiler and CHP plant modeling · Environmental and socio-economic impact of biomass utilization

Scope: An introduction to the state-of-the-art and research activities for efficient biomass combustion and biomass CHP plants

Dates: 2-5 April 2019

Location: Multimedia amphitheater, Central Library of National Technical University of Athens, 9, Heroon Polytechniou str., 15780, Athens-Greece

Suitable for: Students interested in biomass utilization, early career researchers and professionals

Registration: Free to attend. Snacks and refreshments will be provided during the spring school.

To register, please visit http://www.lsbtp.mech.ntua.gr/BiofSpringSchool/biof_sprschool_form

Application deadline: 15 February 2019

Spring School schedule

Tuesday 2nd April 2019		
09:00-09:15	**Arrival at the Spring School location**	
09:15-09:30	**Introduction to the Spring School**	NTUA
09:30-10:45	**Biomass: logistics and properties**	NTUA CERTH
10:45-11:30	**Torrefaction**	TNO
11:30-12:00	**Hydrothermal Carbonization**	TUM
12:00-13:00	Lunch	
13:00-13:30	**Efficient utilization of biomass for products and energy: Metsä Fibre activities**	Metsä Fibre
Wednesday 3rd April 2019		
09:00-10:00	**Fluidized Bed combustion**	Valmet VTT
10:00-11:00	**Pulverized Fuel combustion**	Ørsted TUM

11:00-12:00	**Fouling and deposit formation**	DTU
12:00-13:00	Lunch	
13:00-14:00	**Corrosion and material issues for biomass boilers**	Åbo Akademi
14:00-15:00	**Flue gas emission measurements according to EU standards**	NTUA
15:00-16:00	**Laboratory tour**	NTUA
Thursday 4th April 2019		
11:00-12:00	**Biomass ash utilization**	Laborelec
12:00-13:00	**Steady-state and dynamic modeling of biomass combustion units**	NTUA MHPSE
13:00-14:00	Lunch	
14:00-15:00	**State-of-the-art and leap forward for biomass CHP plants**	MHPSE

15:00-15:45	**Steam explosion for biomass pretreatment**	Valmet
16:00-17:00	**Environmental performance aspects and Life Cycle Analysis (LCA)**	NTUA CERTH
Friday 5th April 2019		
09:00-17:30	**Field trip: *Revithoussa* CHP plant (13 MW_{el}, 12.3 MW_{th})**	NTUA
17:30-18:00	**Spring school ending- Certificates of attendance**	NTUA

Spring school location and access information

NTUA is located about 2.5 km away from the Katechaki station (metro line 3). From there, you may access NTUA *via* bus line 242. For more information, please visit http://www.lsbtp.mech.ntua.gr/sites/default/files/Directions%20to%20NTUA.pdf.

For ticket prices in the city of Athens, please visit https://www.athenacard.gr/komistra.dev. For bus and metro line info please visit http://telematics.oasa.gr/en/#main and http://www.stasy.gr/.

Spring School language and presentations

All presentations and discussions will be carried out **in English**.

Travel and accommodation expenses

Travel/transportation (excluding field trip cost) and accommodation expenses are not covered by the spring school organization. All necessary arrangements are on the responsibility of attendees. A few hotel choices are listed below:

Zappion Hotel (2-star hotel)
Price range: 40-75 euros/night
https://www.zappionhotel.gr

Elizabeth Hotel (2-star hotel)
Price range: 55-70 euros/night
https://www.hotelelizabeth.gr/en

Athinais Hotel (3-star hotel)
Price range: 60-80 euros/night
https://www.athinaishotel.gr/

The Golden Age Hotel (4-star hotel)
Price range: 125-155 euros/night
https://hotelgoldenage.com/

President Hotel (4-star hotel)
Price range: 80-120 euros/night
https://president.gr/

Certificates of attendance

Certificates of attendance will be provided to all attendees upon Spring School ending.

Do you have more questions?

Send your e-mails at dimgrim@mail.ntua.gr (Mr. Dimitrios Grimekis) and dmskouloudi@mail.ntua.gr (Ms. Despina Magiri – Skouloudi).

About the Biofficiency project:

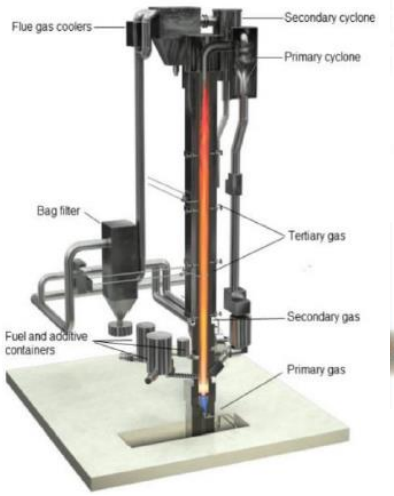
In order to meet the strict emission targets and energy efficiency goals in Europe, an increase in medium- to large-scale biomass utilization for combined heat and power (CHP) applications is expected. The *Biofficiency* project aims to enhance the prospects for technology penetration by addressing several challenges associated with efficient biomass combustion, especially through handling ash-related issues. Fluidized-bed and pulverized-fuel combustion are of major interest in the project, with particular attention on understanding fly ash formation, deposit formation and corrosion, improving current biomass pre-treatment technologies and contributing to the field of biomass ash utilization. The ultimate goal is to enable energy recovery from low-grade, cheap biomass fuels in highly efficient CHP plants with live steam temperatures up to 600 ^{o}C, thus increasing resource efficiency. At the same time, a great effort is placed on evaluating and minimizing risks related to economic, socio-economic and environmental barriers. The program has established a strong collaboration between industrial and academic partners from different EU countries (Germany, Denmark, Finland, Greece, The Netherlands and Belgium) to increase the impact of the research output.

A holistic approach is ensured by combining modeling and experimental work. A few examples can be listed such as:

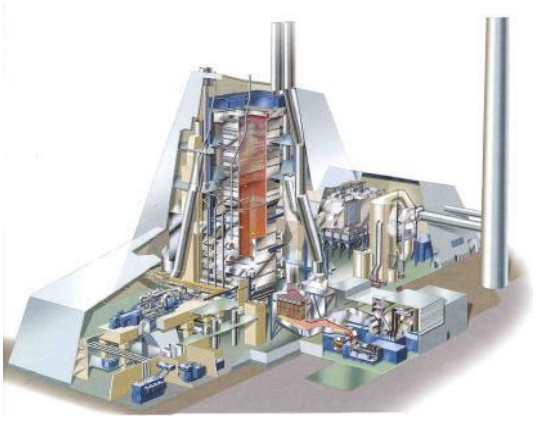
- Bench-scale facilities: pulverized biomass combustion (DTU, TNO), torrefaction (TNO) and hydrothermal carbonization (TUM), ash analysis and classification (Laborelec).
- Pilot-scale facilities: pulverized fuel combustion (TUM), fluidized-bed combustion (VTT), steam explosion (Valmet).
- Full-scale or pre-industrial scale facilities: pulverized fuel combustion at Avedore AVV2 and Studstrup SSV3 (Ørsted) and fluidized-bed combustion (Valmet).
- Modeling and simulation work through commercial and in-house software for biomass boilers (MHPSE), CHP plant concepts (NTUA, MHPSE) and life cycle analysis (NTUA).

Biofficiency website:
https://www.biofficiency.eu/

TNO's Torrefaction Pilot-scale test rig



VTT's 50 kW Pilot-scale CFB combustion test rig



Ørsted*'s Avedore AVV2 Large-scale CHP plant*

Project partners

Technische Universität München (**TUM**) - *Coordinator*
Germany
https://www.tum.de/

Ørsted
Denmark
https://orsted.com/en

Technical University of Denmark (DTU)
Denmark
https://www.dtu.dk/

Technical Research Centre of Finland (VTT)
Finland
https://www.vttresearch.com/

Valmet Technologies
Finland
https://www.valmet.com/

Åbo Akademi University
Finland
https://www.abo.fi/en/

National Technical University of Athens
Greece
https://www.ntua.gr/en/

ECN/TNO
The Netherlands
https://www.tno.nl/en/focus-areas/ecn-part-of-tno/

Mitsubishi Hitachi Power Systems Europe
Germany
https://www.emea.mhps.com/en/

Engie Laborelec
Belgium
https://www.laborelec.be/ENG/

Metsä Fibre
Finland
https://www.metsafibre.com/en/Pages/default.aspx

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