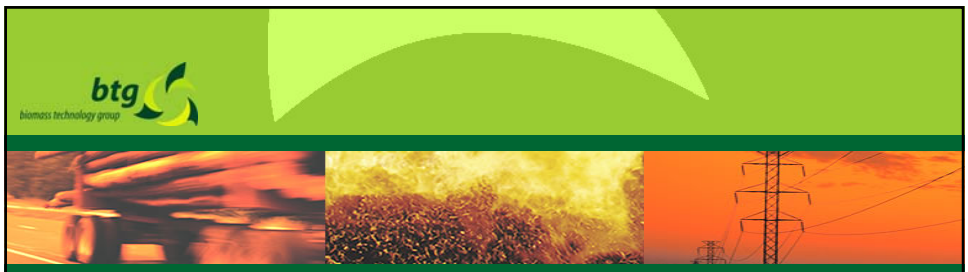

Bioliquids-CHP
Power generation from Biomass

Introduction to the project and symposium

John Vos, Bioliquids-CHP Symposium,
8 November 2011, Brussels, Belgium

Content

- > Project background, context and objectives
- > Project consortium and team members
- > General overview of project activities
- > Targeted impacts
- > Symposium programme set-up

slide 2

Project background and philosophy

- CHP is an efficient way of using energy sources
- EC target for CHP: 18% of 2020 EU27 energy supply (up from 10%)
- In Russia, many CHP units are used in particular in remote areas.
- Implementation of small-scale, direct biomass CHP systems (100-1000 kW_e) has been limited for different reasons including high investment and running costs, poor reliability, low acceptance by end-user.
- At the root of these reasons: contaminants in biomass, non-uniform appearance of biomass, low energy density, complicated operation, difficulty to operate on varying load
- Using biomass-derived liquids instead of direct biomass can break down main barriers hindering a wider use of biomass in small-scale CHP systems

slide 3

Project objectives

> Strategic objective:
  - Strategic research cooperation between EU and Russia, focusing on the development of technology and equipment for energy generation from biomass

> Technical objective:
  - To adapt engines/turbines to enable operation on a variety of biomass-based liquid fuels, including pyrolysis liquids

Liquid biofuels considered: fast pyrolysis oil, biodiesel, vegetable oil, blends and emulsions.

slide 4

Specific objectives

- To modify or upgrade bioliquids to enable their use in engines and turbines;
- To find a technical and economic optimum between fuel upgrading and engine/turbine modification;
- To develop methods/techniques to control exhaust emissions;
- To evaluate the complete chain (sustainability, economics, technology, environment, market opportunities) for application in EU and Russia

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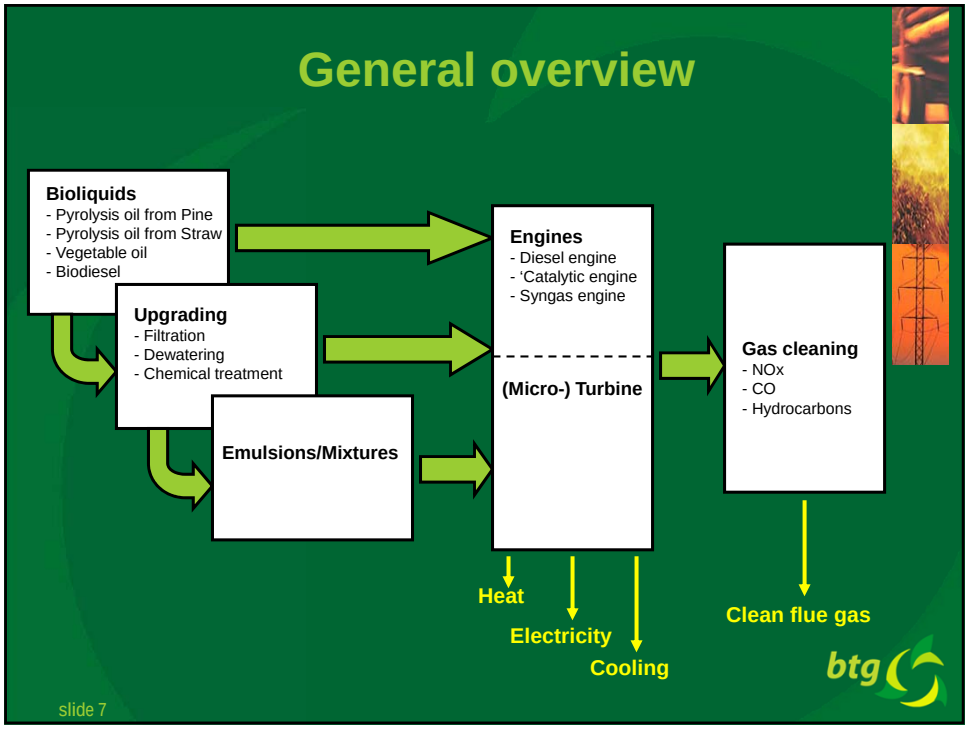
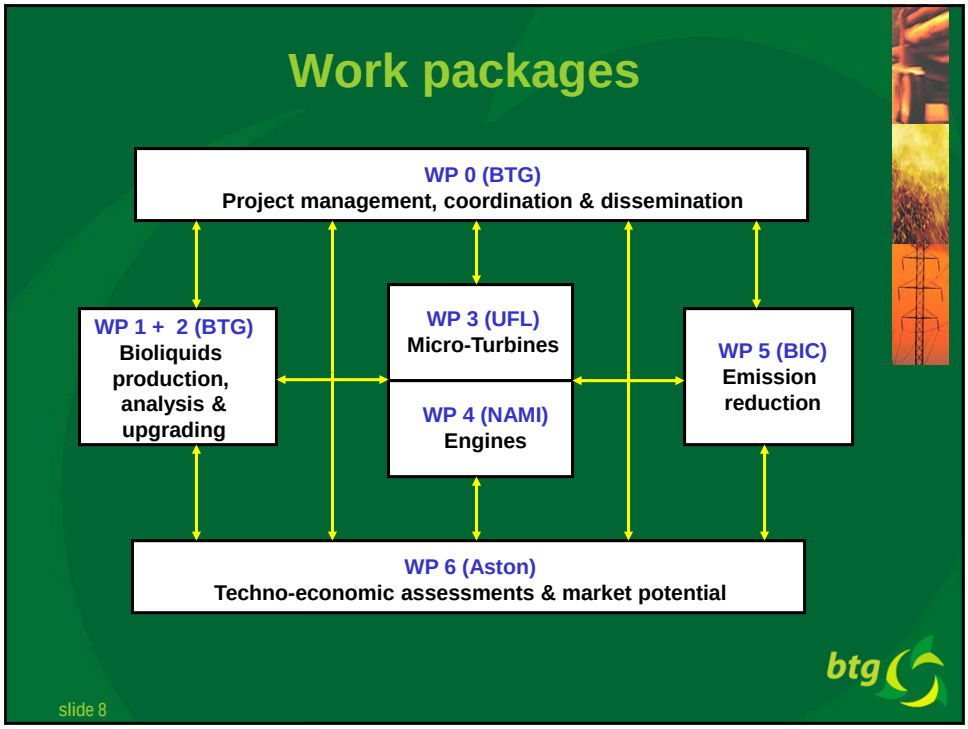
Project consortium

- BTG Biomass Technology Group BV (NL)
- EnConTech BV (NL)
- University of Florence, CREAR (Italy)
- Boreskov Institute of Catalysis, Siberian Branch of Russian Academy of Sciences (Russia)
- Federal State Unitary Enterprise 'Central Scientific Research Automobile and Automotive Engines Institute' - FSUE 'NAMI' (Russia)
- Aston University (United Kingdom)
- The Likhachev Plant (AMO ZIL) (Russia)

slide 6


General overview
Bioliquids
- Pyrolysis oil from Pine
- Pyrolysis oil from Straw
- Vegetable oil
- Biodiesel
Upgrading
- Filtration
- Dewatering
- Chemical treatment
Emulsions/Mixtures
Engines
- Diesel engine
- 'Catalytic engine
- Syngas engine
(Micro-) Turbine
Gas cleaning
- NOx
- CO
- Hydrocarbons
Heat
Electricity
Cooling
Clean flue gas
btg
slide 7


Work packages
WP 0 (BTG)
Project management, coordination & dissemination
WP 1 + 2 (BTG)
Bioliquids production, analysis & upgrading
WP 3 (UFL)
Micro-Turbines
WP 4 (NAMI)
Engines
WP 5 (BIC)
Emission reduction
WP 6 (Aston)
Techno-economic assessments & market potential
btg
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Joint activities

- **Emission Catalysts:** catalysts for upgrading PO and for NO_x reduction, developed by BIC, were tested by NAMI
- **Pyrolysis Oil Blends:** a method for blending of PO and biodiesel with bio-alcohols, developed by Aston, was evaluated by BTG and Florence
- **Round Robin** to establish and compare the basic fuel properties of vegetable oil, biodiesel and PO
- **Training Materials** targeted at Masters students
- **Promotion and Dissemination:** production and distribution of promotional materials in English & Russian

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Targeted impacts

- Increase in electricity production from biomass by reducing bioliquids production prices and by improving bioliquids quality.
- Reduction of costs of electricity production from biomass.
- Optimisation of the engine-bioliquid fuel combination
- Adaptation of existing technologies (bioliquid production, engines and CHP-units) with a view to optimise the engine-fuel combination
- Improvement of the environment, the quality of life, health and safety.

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Bioliquids-CHP
Power generation from Biomass

Symposium on using bioliquids in engines and turbines in CHP applications

Tuesday 8 November 2011
Tuscany Regional Office, Rond Point Schuman 14, 1040 Brussels

4 sessions with presentations from consortium partners and external speakers on:

- Session 1: Programmatic setting of the project
- Session 1: Liquid biofuel preparation, characterisation and upgrading
- Session 2 & 3: Engine and turbine modification (and development) for use with liquid biofuels
- Session 4: Exhaust emissions control
- Session 4: Assessment of economics and markets

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Acknowledgement

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SEVENTH FRAMEWORK PROGRAMME

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