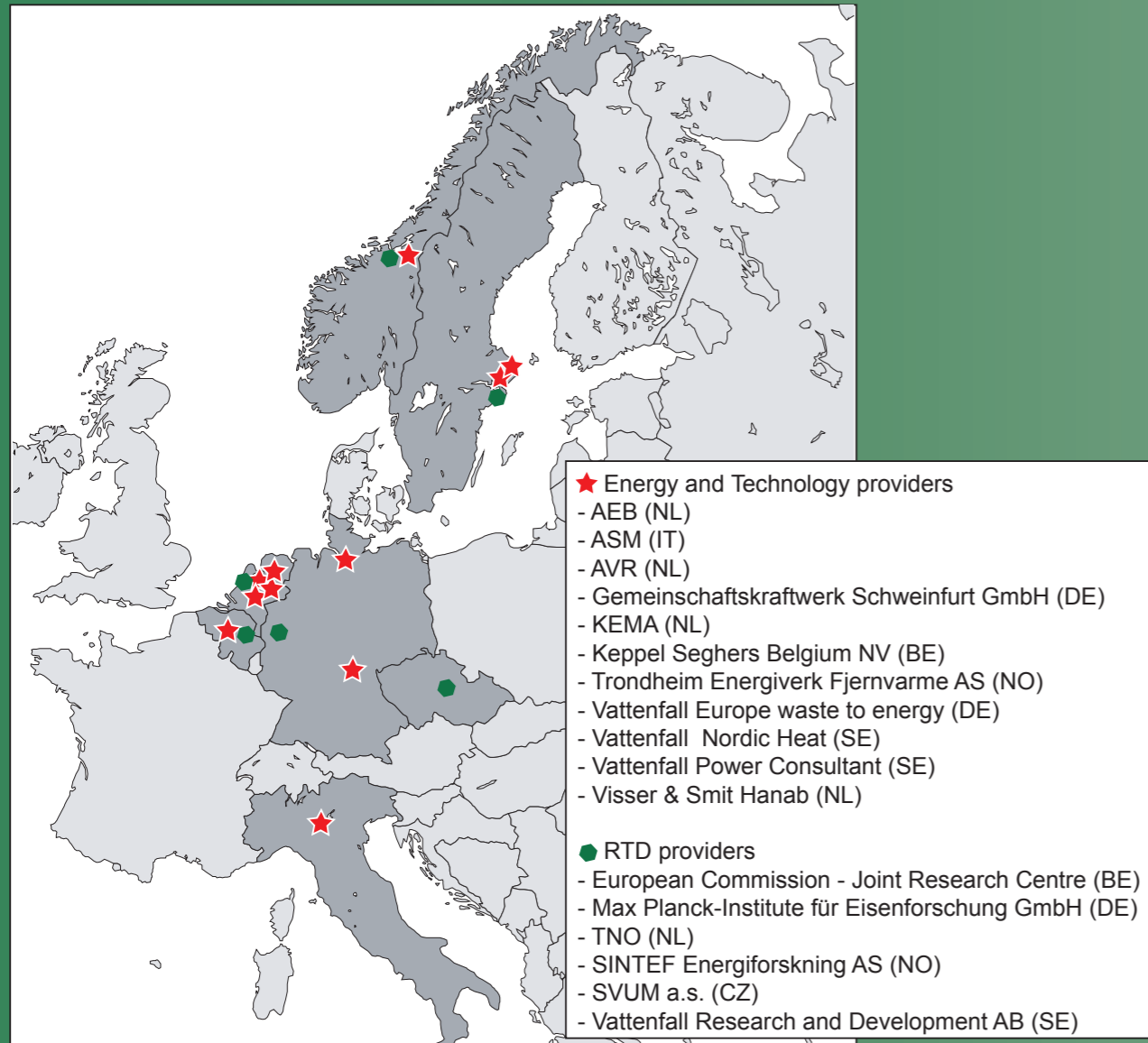


Partners

The NextGenBioWaste Consortium has been established by 17 legal entities from 7 European countries. The NextGenBioWaste consortium comprises 8 utility companies, 2 technology providers, 6 RTD providers, and 1 consultant/engineering company.



Project information

Co-funded by the European Commission under the Sixth Framework Programme

Starting date: 24 February 2006

Duration: 48 months

Budget: 29 million €

EU contribution: 11.5 million €

Integrated project; research and demonstration

Contract No: TREN/05/FP6EN/S07. 56773/019809

www.NextGenBioWaste.com

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Innovative demonstrations for the next generation
of biomass and waste combustion plants for
energy recovery and renewable electricity production

Greener energy supply in Europe



Project Objective

The objective of NextGenBioWaste is to demonstrate innovative ways of improving the energy conversion and the renewable electricity production using municipal solid waste materials and biomass for large-scale supply of renewable electricity and heating/cooling to end-users - at a more competitive cost and with improved environmental parameters.

The project consists of integrated demonstration actions with a research component of approximately 20% as a support for planning, understanding and further improvement of the demonstrated technologies.

Targets:

1. Increase the electrical efficiency for waste to energy plants from 22 to 30% (gross generated)
2. Double the lifetime of heat exchange components at existing steam temperatures
3. Increase the electrical efficiency for biomass combustion plants from 33 to 35%, while making the systems more cost-effective by the use of more low-grade fuels
4. Lower the fuel cost at least 1 mill. €/year for a 100 MW_{th} biomass combustion plant while maintaining the two former targets
5. Enable technologies for upgrading of bottom ash, thus, enabling the utility companies to valorise from 70% of their bottom ashes for civil engineering purposes

SP 1 Innovative fuel preparation and mixing

SP-leader: Vattenfall Research and Development AB

There are many problems associated with waste and biomass combustion which increase the cost of the electricity or heat produced. Corrosion and fouling result in high maintenance costs, and in unplanned outages, which reduces the availability. The steam temperature is limited to reduce corrosion, but this limits the electrical efficiency. In order to make the next generation of combustion systems for biomass and waste more cost effective it will be necessary to be able to burn cheaper and potentially more problematic fuels more efficiently. The feedstock quality, preparation and mixing have a great influence not only on the corrosion and fouling tendencies, but also on the combustion process, and the qualities of the flue gas, fly ash and bottom ash.

Objectives

To demonstrate innovative fuel preparation and mixing in order to obtain fuels or fuel mixtures which:

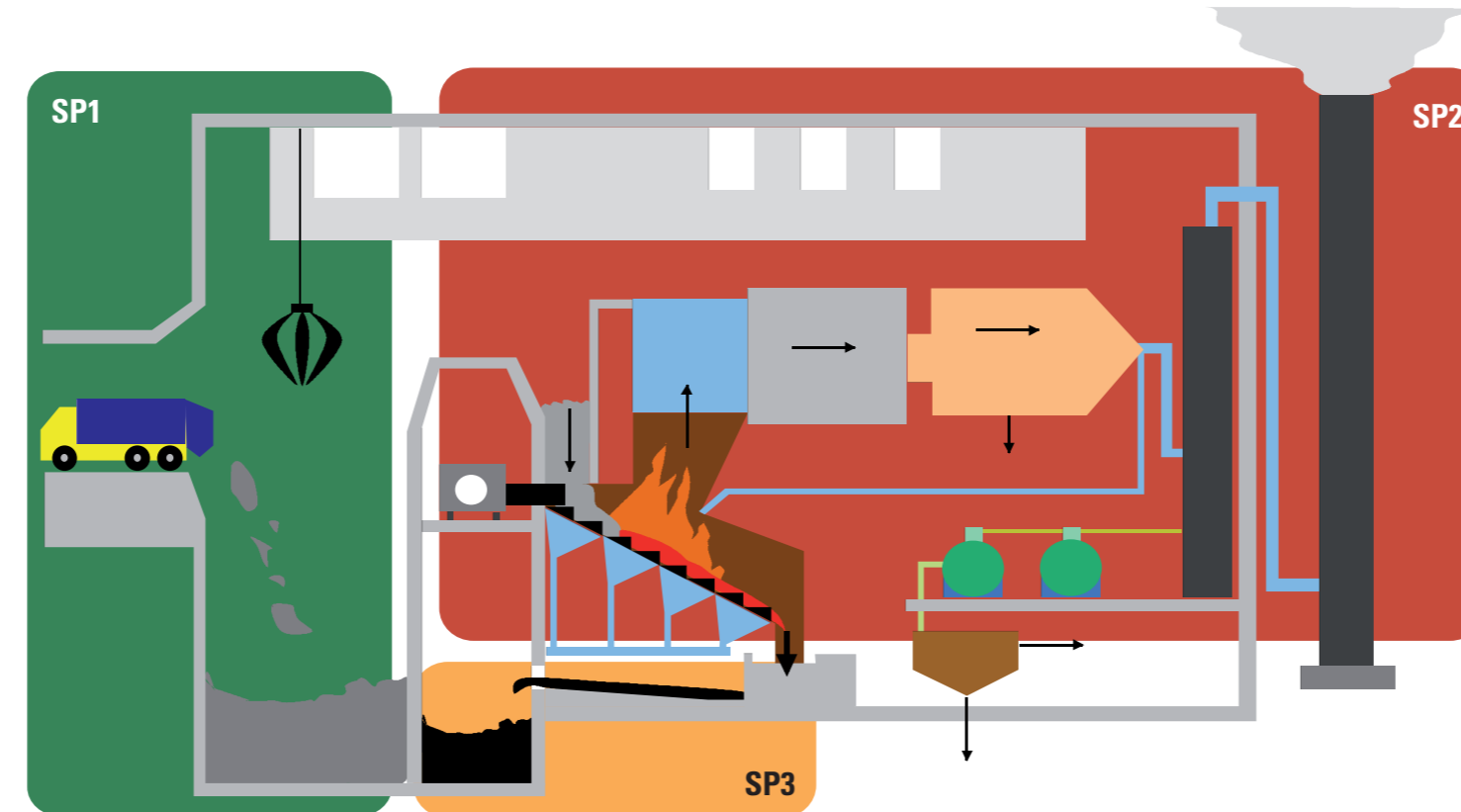
- reduce maintenance costs and/or increase efficiency
- reduce operational costs
- reduce the environmental impact

Deposits on a superheater formed by the combustion of waste wood.
Photo: By courtesy of Vattenfall AB



NextGenBioWaste will contribute to EU's ambitious targets:

- Reduction in CO₂ emissions
- Security of energy supply
- Increasing the share of renewable energy sources from 6 to 12% by 2010
- Increasing the share of green electricity from 14 to 21% of gross electricity consumption by 2010
- Enhancing the competitiveness of European industry
- New standards



NextGenBioWaste deals with waste and biomass feedstocks and covers the supply chain from fuel preparation, via conversion to ash treatment and use.

SP 2 Conversion technology

SP-leader: TNO

In order to improve the efficiency and the environmental compliance of waste-and-biomass-to-energy plants a good knowledge of the key operational parameters is essential. The operational parameters in turn depend on the quality and the composition of the input fuel and thus the combustion process. Further the control system used for the process must be reliable. For the case where the plant operator has reliable and real time information on the behaviour of the process, the process parameters can be adjusted and optimized as required during the process. When the effects of the key operational parameters on the plant performance are well understood by direct measurements and modelling, it is possible to further develop new concepts in combustion, boiler design and process control.



Visual control of combustion.

In this project novel designs of reconstructions of existing boilers will be demonstrated; in addition to novel concepts to boiler systems of completely new generation High Efficiency Waste-to-Energy plants. All these demonstrations are aimed at getting a much better energy recovery (efficiency improvement, CO₂ emission reduction), increase of throughput, increase of reliability and cost efficiency. The present task addresses this issue.

Objectives

- Improving process stability and thus efficiency by improving control concept
- Gathering data with new advanced sensors for model validation and understanding of fouling and corrosion
- Improving electrical efficiency and energy recovery by novel designs and reducing O₂- level

SP 3 Residue handling and use

SP-leader: KEMA

After suitable upgrading ashes from solid waste incineration plants are for a large part fit for utilization. Practices in some of the European countries confirm the technical possibilities to utilize the bottom ashes as an embankment material in road construction. In other European countries utilization is negligible. Helping to increase the share of bottom ash utilization is one of the targets of the project.

Objectives

This subproject concentrates on the following aspects:

- Assessing ash management practices
- Marketing approaches and restraints for MSWI bottom ashes with the purpose to increase market penetration
- Develop and demonstrate innovative ash management practices which will upgrade the ashes to regular construction materials, thereby reducing the quantity of ashes that has to be landfilled



Utilization of MSWI bottom ashes as a road embankment material Photo: Vereniging Afvalbedrijven, NL

Ashes from incineration Photo: KEMA, NL

SP 4 Dissemination

SP-leader: SINTEF Energiforskning AS

Objectives

The dissemination of results and experience from NextGenBioWaste aims to promote innovative approaches to the use of improvements to energy recovery and renewable electricity production using waste and other commonly available biomass feedstocks, and also to encourage the sharing of policies and knowledge among the participating partners.

The dissemination activities will promote project results and approaches, and encourage duplication in other countries, thereby contributing to EU objectives of CO₂ reduction and security of energy supply, and to the target of increasing the share of renewable energy sources from 6 to 12% as well as increasing the share of green electricity from 14 to 21% of gross electricity consumption by 2010.