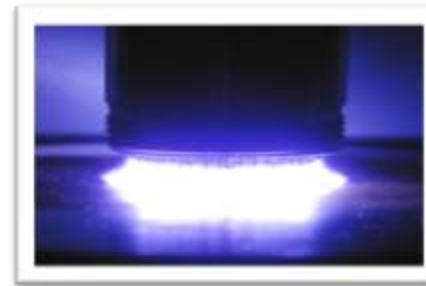
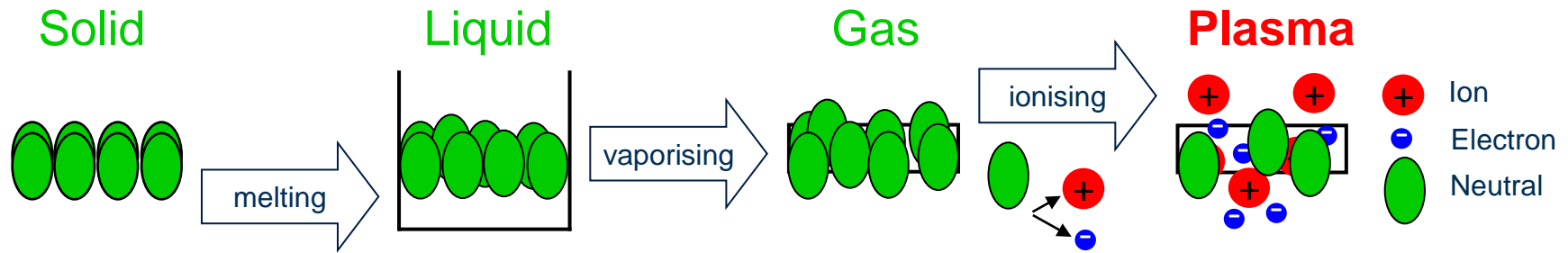


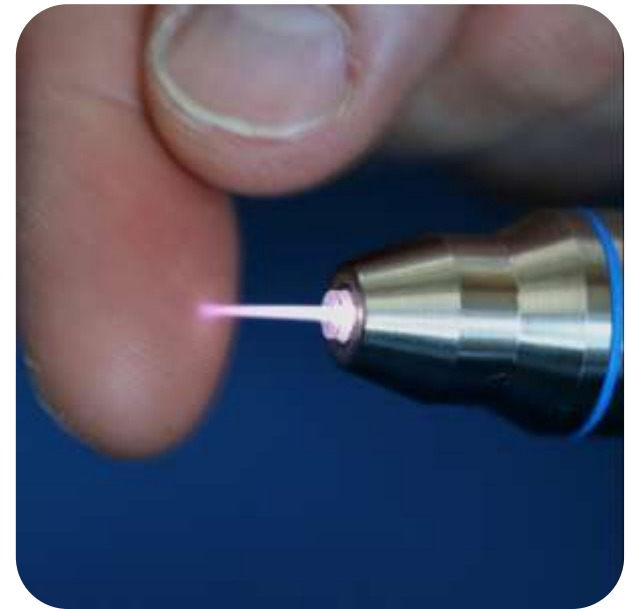
The network for plasma technologies in BSR



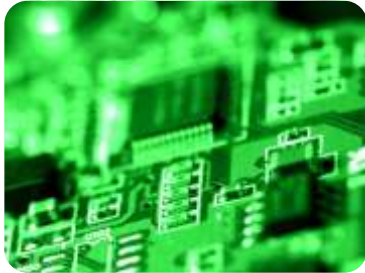
Plasma the 4th state of matter



- Surface modification, functionalisation
- Cleaning, disinfection up to sterilisation
- Generation of light and radiation
- Measurement, analysis
- Etching, welding, cutting
- Coating
- Switching



electro
technology



engine building



plastics industry



light sources



wood, paper,
printing industry



medical engineering
biotechnology



textile industry



Automotive
industry



environmental
technology



new materials
chemistry



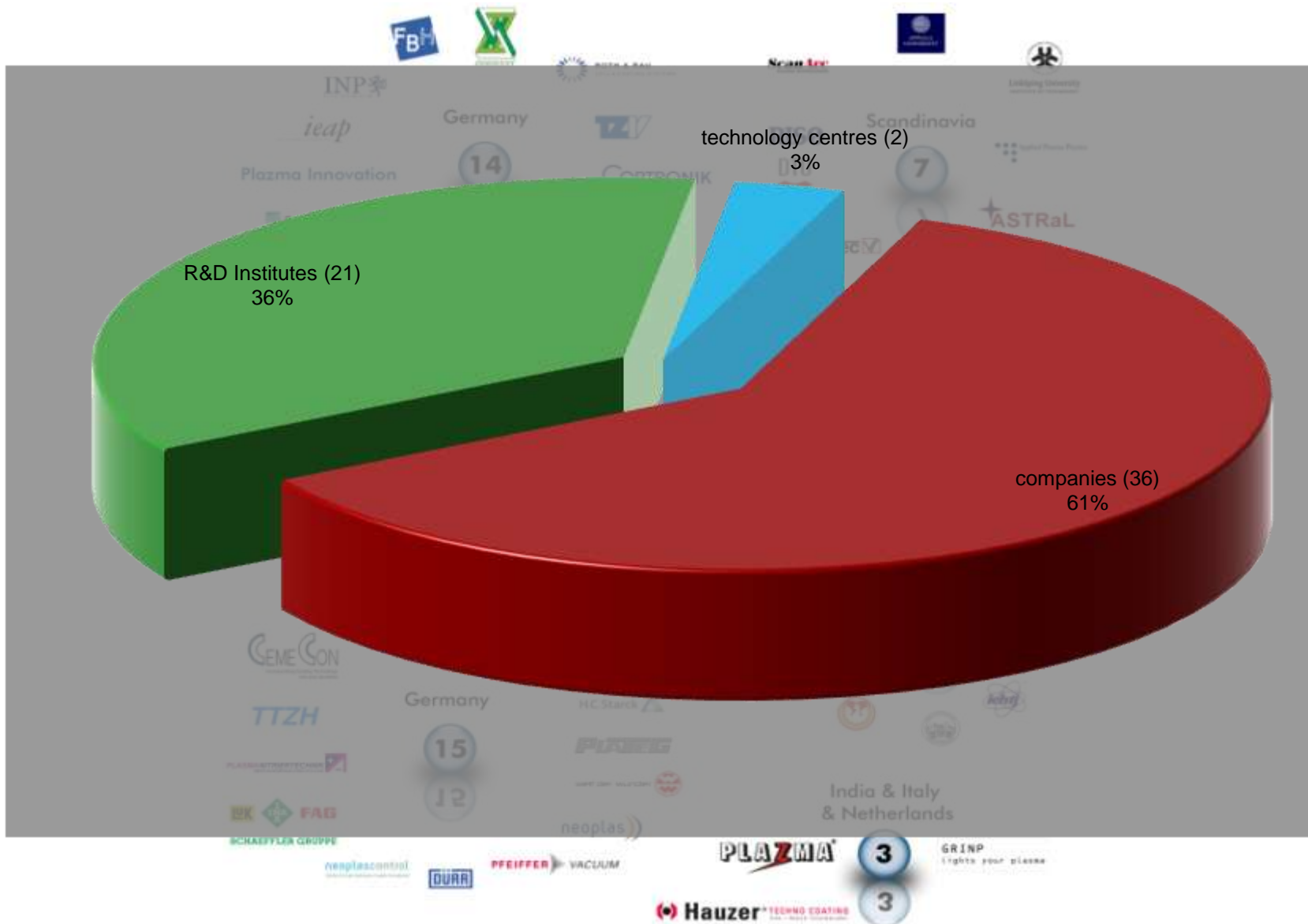
packaging
industry



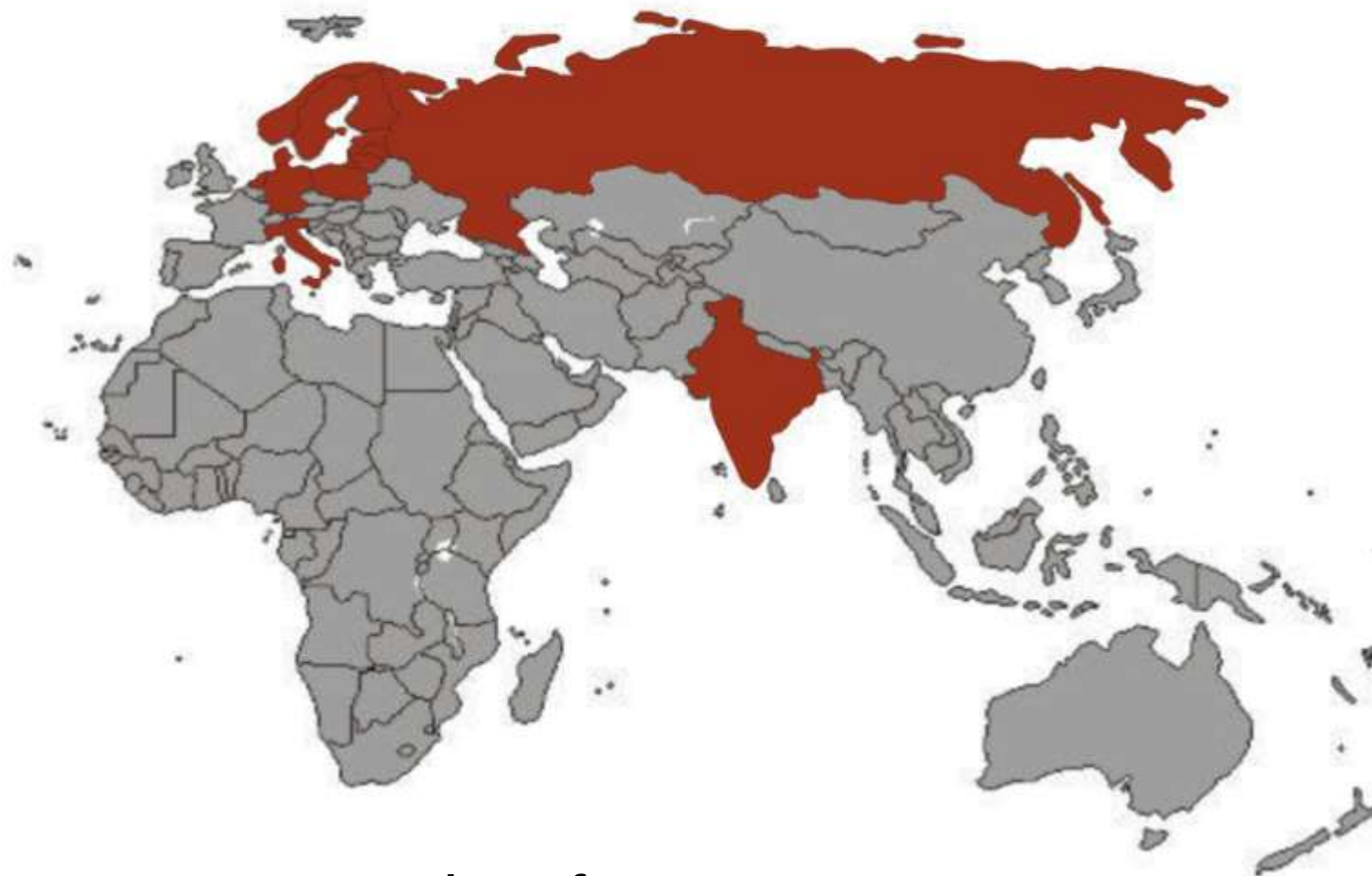
jewellery



Structure of BalticNet-PlasmaTec



BNPT member overview



59 members from 13 countries

Introduction of the PlasTEP project

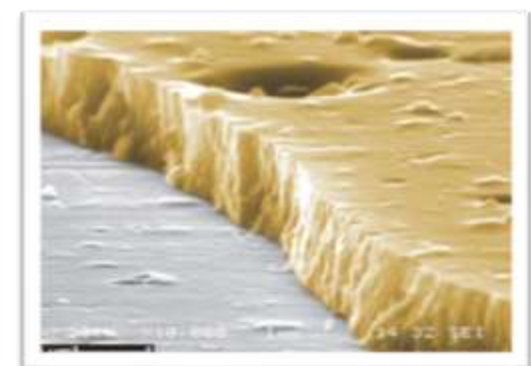
Strategic objectives of BNPT

- Technology and market oriented cooperation between:
 - R&D facilities & universities
 - Companies
 - other important people from the field of plasma technology
- Develop a „Plasma technology“ cluster in the Baltic Sea Region
- Organisation of international cooperation with other dynamic regions in the world



Workgroups in BalticNet-PlasmaTec

- Plasma & Marketing
- Plasma & Education
 - Plasma & Russia
- Plasma & Vacuum
- Plasma & Bio
 - Plasma & Food
- Plasma & Environment



Dissemination and fostering of plasma based environmental technological innovation

Introduction of the PlasTEP/PlasTEP+ project

Alexander Schwock, Technology Centre Vorpommern

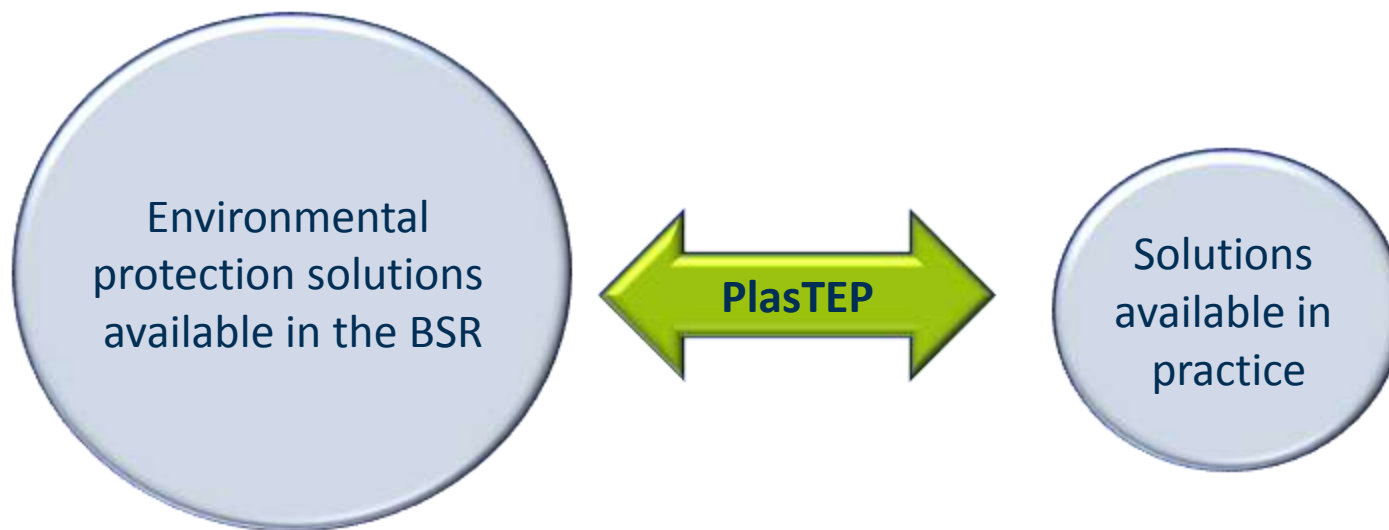


PlasTEP

plasma for environment protection

Background information

PlasTEP in the context....



There is a gap between research results and their implementations. Reasons for this are insufficient perceptions of potentials, particularly of decision makers from industry and public.



PlasTEP

plasma for environment protection

General Objectives

PlasTEP has the following aims:

- Dissemination and fostering of plasma technologies for environment protection in BSR
- Build up a network with partners from industry, science and policy
- Offer new possibilities for environment neutral production
- Combining the existing knowledge about plasma technologies in the BSR
- Bring the idea of investing in plasma technology and therewith in future research into the minds of industrial decision makers and politicians and show people: there are new ways!

PlasTEP+ has the following aims:

- acquire investments in plasma-based air and water cleaning technologies by using the developed PlasTEP devices
- continuation of the transnational use of the investments



PlasTEP

plasma for environment protection

Project Partners

- | | | |
|----|--|----------------|
| 01 | Technology Centre of Western Pomerania (TZV) | Germany |
| 02 | Leibniz Institute for Plasma Science and Technology (INP) | Germany |
| 03 | VDI Mecklenburg Western Pomerania (VDI) | Germany |
| 04 | Risø National Laboratory for Sustainable Energy, TU of Denmark (Risø) | Denmark |
| 05 | Uppsala University, The Ångström Laboratory (UUA) | Sweden |
| 06 | Lappeenranta University of Technology, ASTRA (LUT) | Finland |
| 07 | Riga Technical University (RTU) | Latvia |
| 08 | Lithuanian Energy Institute (LEI) | Lithuania |
| 09 | Kaunas University of Technology (KUT) | Lithuania |
| 10 | Vilnius Gediminas Technical University (VGTU) | Lithuania |
| 11 | Institute of Nuclear Chemistry and Technology (INCT) | Poland |
| 12 | The Szwedalski Institute of Fluid Flow Machinery (IMP) | Poland |
| 13 | West Pomeranian University of Technology (SUT) | Poland |
| 14 | University of Tartu (UT) | Estonia |
| 15 | Association of Polish Electrical Engineers, Szczecin Branch (SEP) | Poland |



PlasTEP

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PlasTEP topics

Topic 1: Plasma based technologies sustainability analysis and integration in to the educational process

Topic 2: Plasma based cleaning of exhaust gases of combustion (NO_x / SO_x)

Topic 3: Removal of organic/hazardous compounds and aerosols (VOC)

Topic 4: Plasma technologies for water cleaning

PlasTEP+ topic 1: field test using investments

PlasTEP+ topic 2: workshops / seminars / fairs





PlasTEP

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Key facts

Partnership:	Technology centres and research organisations from Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland and Sweden
Number of partners:	15 / 7
Lead partner:	Technology Centre Vorpommern, Germany
Total budget:	3.820.000 € / 313.265 €
Duration:	17.09.2009 – 16.12.2012 / 01.12.2012 - 28.02.2014



PlasTEP

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Dissemination activities

Presentation for politicians

- 6 events: Open Days 2011 (Brussels), Baltic Sea States Subregional Co-operation Conference, Baltic Development Forum, Presentation at the voivodeship Western Pomerania ect.

Presentation to broad public

- Open events: presentation at night of sciences, week of sciences, night of commerce, science festival

Presentation to industry

- Several events: participation at international fairs like Hannover fair, Poleko, Achema, Plasma Surface Engineering
- 9 industrial workshops in Rostock, Riga, Kaunas, St Petersburg, Helsinki, Tallinn, Roskilde, Berlin

Materials / Documents

Guideline for standardised test methods

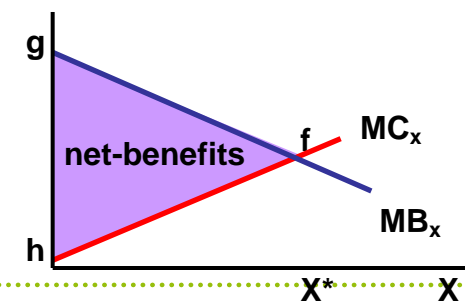
Aim: Realise comparability of the partner's results and possibility to compare different plasma technologies. (model gas mixtures, the measuring conditions (pressure, temperature, mass flow) and measuring methods)

Analysis of main pollution sources

Aim: The analysis of main pollution source of NO_x/SO_x, VOC/odour and waste water in BSR is the basis for cost-benefit analysis and should define main targets for plasma treatment.

Cost-benefit-analysis → Cost model and investment preparation document

Case study by MAN B&W: base model for NO_x reduction of different types of engines used for marine transportation and small district power plants to produce hot water and electricity.





PlasTEP

plasma for environment protection

Main results of topic 1

Dissemination and education

- Handbook for plasma application for environment protection
- The results from all prepared reports, education materials was used to develop a specific wiki with the main terminology about plasma application for environment
- Set of lectures/presentations for plasma application for environment protection
- The main project results and information are downloadable from the project web page www.plastep.eu and from the project partners pages





PlasTEP

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Main results of topic 2

Conclusions

- Optimization of NO_x/SO_x reduction was carried out in different configurations including ozone injection, direct plasma treatment, catalytic materials and electron beam irradiation.
- Results have been disseminated during workshops with industrial partners, symposiums, summer schools, printed reports, guidelines, handbooks and scientific publications;
- Investments were finalized successfully and have been used transnational tests with participation of project partners



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Aims of topic 3

Plasma technologies for the removal of hydrocarbons, aerosols and other hazardous compounds in exhaust gases

- Raising the interest of potential industrial stakeholders supported by the development of modular mobile evaluation models for demonstration
- Creation of a compendium on existing and future plasma technology applications
- Applied studies on near-industrial, small and medium scale installations and novel plasma assisted catalytic processes on small scale



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Topic 4

Tasks

- INP and IMP – development of plasma reactors:
 - INP – dielectric barrier discharge reactor
 - IMP – microwave discharge reactor
- ASTRaL – catalytic material to support pollutants destruction
- TUS – power supply system for the prototype as a whole



Power supply with solar panel



Microwave discharge plasma



Dielectric barrier discharge plasma



Prototype



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PlasTEP+ topic 1 – field test

Realised test

- Field test at polymer concrete factory (Poland) 16th of May 2013
- Field test at metal working plant (Estonia) 27 -31 May 2013
- Field test at oil shale company (Estonia) 03 – 07 June 2013
- Field test at pig farm (Germany) 26 July 2013





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PlasTEP+ topic 1 field tests

Tasks

- Planned field test
 - Field test at paint facility at paint facility
 - Field test at biomass power plant (Sweden)
 - Field test at biomass power plant (Denmark)
 - Field test at maritime supplier (Poland)



PlasTEP

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Preparation of PlasTEP Events 2013

final scheduling:

- International workshop for new electron beam technologies including new trends in water cleaning (MS3.2-1 - INCT)
 - 12. April 2013
- Workshop for exhaust gas cleaning in Poland (MS3.2-2.4 - WTUS)
 - 08. October 2013 during Poleko fair
- Application seminar in Denmark (MS3.2-2.5 - DTU)
 - 05.-06. November 2013
- Workshop for exhaust gas cleaning in Germany (MS3.2-3.1 - INP)
 - 04.12. 2013 in Berlin



PlasTEP

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Preparation of PlasTEP Events 2014

final scheduling:

- Application seminar “New trends in application of modern electron beam generation in air pollution” (MS3.2-2.6 - INCT)
 - 15-16 January 2014
- Workshop for exhaust gas cleaning in Sweden (MS3.2-2.7- UU)
 - February 2014



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PlasTEP+ topic 2 workshops / seminars / fairs

Tasks

- Planned field test
 - Field test at paint facility at paint facility
 - Field test at biomass power plant (Sweden)
 - Field test at biomass power plant (Denmark)
 - Field test at maritime supplier (Poland)



PlasTEP

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Materials / Documents

www.plastep.eu/english/downloads/reportssurveys/

www.plastep.eu/english/events/

or at our booth



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Thank you for your attention!

PlasTEP

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