

LOW-BIN

Efficient Low Temperature Geothermal Binary Power

LOW-BIN Work Packages Description

LOW BIN Meeting in Athens

15-16 March 2007

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LOW-BIN Objectives (1)

- Development of water cooled **Rankine** cycles prototypes for **power generation** using temperatures **down to 65°C** (90°C – state of the art)
- Development of water cooled **Rankine** cycles for **heat and power cogeneration** with overall efficiency **99%** using **geothermal resources of 120-150°C** cooled by **water of 60/80°C** used for **district heating**

LOW-BIN Objectives (2)

- Techno-economical and market evaluation** of the developed prototypes
- Manufacturing** of successful prototypes
- Demo site construction**
- Monitoring and technology validation**
- Dissemination** activities

Work Packages (WPs)

- WP1: Project Coordination
- WP2: Technology Development
- WP3: Manufacturing of prototypes
- WP4: Development of demonstration sites
- WP5: Monitoring and technology validation
- WP6: Innovation Related Activities

WP1: Project Coordination

WP1 leader: CRES

Time and financial management of the project objectives

Work Packages (WPs)

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- WP1: Project Coordination
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 - WP6: Innovation Related Activities

WP2: Technology Development

WP2 leader: TURBODEN

- Power generation** plant using **65-90°C** geothermal resources
- Cogeneration heat and power** plant using **120-150°C** geothermal resources cooled by water of **60/80°C** used for district heating

WP2: work description (1)

Theoretical Design

- Study of **Ranking cycles for low temperatures** geothermal power production – *TURBODEN – CRES, GFZ, UOR, POLIMI*
- Study of **other heat cycles for low temperatures** geothermal power production – *GFZ - UOR, POLIMI*
- **Modelling of Rankine cycles - TURBODEN – CRES, GFZ, UOR**
- Evaluation of **working fluids - TURBODEN – CRES, GFZ, UOR, ESTSetubal, POLIMI**

WP2: work description (2)

Theoretical Design

- Reengineering **materials** (temperatures 65-90⁰C) to **reduce costs** - *TURBODEN – POLIMI*
- Reengineering **pipng** to **reduce heat losses** - *TURBODEN*
- Reengineering **insulation** to **reduce heat losses** - *TURBODEN*

WP2: work description (3)

Theoretical Design

- ❑ Technology assessment of **pumps**/energy efficiency - *TURBODEN – POLIMI*
- ❑ Technology assessment of **heat exchangers**/low temperatures operation - *TURBODEN – ESTSetubal, POLIMI*
- ❑ Technology assessment of **turbines** → improve conversion efficiency - *TURBODEN – POLIMI*
- ❑ Technology assessment of unit **automation & control** → improve overall efficiency - *TURBODEN*

WP2: work description (4)

Theoretical Design

- Thermo-dynamic parameters specification - *TURBODEN*
- Theoretical design of prototypes - *TURBODEN*

WP2: work description (5)

Laboratory **experimentation** to **verify** the **results** of theoretical design - *TURBODEN – GFZ - POLIMI*

Work Packages (WPs)

- WP1: Project Coordination
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WP3: Manufacturing of Prototypes

WP3 leader: TURBODEN

- Techno-economical and market evaluation** of the prototypes under development
- Manufacturing** of the successful prototypes

WP3: work description

- **Techno-economical evaluation & feasibility study** of the prototypes under development/large scale production, marketing - *TURBODEN – POLIMI*
- **Pre-prototype development** - *TURBODEN – CRES, GFZ, GEOTEAM, UOR, ESTSetubal, POLIMI*
- **Technology intermediate evaluation report** → successful prototypes - *TURBODEN – CRES*
- **Manufacturing** of 2 prototypes (150-200kWe) - *TURBODEN*
- **Laboratory measurements** of prototype energy performance - *TURBODEN – CRES, GFZ, ESTSetubal, POLIMI*

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WP4: Development of Demonstration Sites

WP4 leader: CRES

Construction of **demo sites in Austria and Romania**, installation of prototypes and commissioning

WP4: work description (1)

- **Austrian demo site - power production**
 - **site preparation** (civil, mechanical, electrical works)
– *GEOTEAM, CRES*
 - **transport** of the demo unit - *TURBODEN – GEOTEAM*
 - prototype unit **installation** - *GEOTEAM, CRES, TURBODEN*

- **Romanian demo site - power production and district heating**
 - **site preparation** (civil, mechanical, electrical works)
– *UOR, CRES*
 - **transport** of the demo unit - *TURBODEN – UOR*
 - prototype unit **installation** - *UOR, CRES, TURBODEN*

- **Commissioning** of both demo units – *GEOTEAM, UOR, TURBODEN – CRES, POLIMI*

WP4: work description (2)

- ❑ Preparation and testing of the **software** for plants **control & monitoring** - *TURBODEN*
- ❑ **Specifications** for measuring and monitoring equipment - *GFZ, GEOTEAM*
- ❑ **Installation** of measuring and monitoring equipment - *GFZ, GEOTEAM, UOR*

Work Packages (WPs)

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WP5: Monitoring and Technology Validation

WP5 leader: CRES

Demo plants **operation, monitoring and technology validation**

WP5: work description

- Demo plant **operation for 6 months** – *GEOTEAM, UOR, CRES, TURBODEN*
- **Maintenance** - *TURBODEN*
- **Monitoring** and **elaborating** geothermal energy input parameters, cooling fluid parameters, power generation, overall efficiency - *CRES, GFZ, GEOTEAM, UOR, ESTSetubal, POLIMI*
- **Technology validation** report – *CRES, ESTSetubal*

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WP6: Innovation Related Activities

WP6 leader: CRES

All necessary **activities for dissemination** of the innovative technologies presented by LOW-BIN project

WP6: work description

- Creation of LOW-BIN **internet site** - *TURBODEN*
- **Intellectual Property Protection** - *CRES TURBODEN, GEOTEAM*
- LOW-BIN **brochure** - *CRES*
- Final **plan for using and disseminating knowledge** - *CRES, BRGM, ISOR*
- **Market study** – *CRES, TURBODEN, POLIMI, BRGM, ISOR*
- **Technical & scientific publications** – *all partners*

thank you for your attention