

Horizon2020 Information Days on Public-Private Partnerships

Brokerage event
21 October 2014

**THERMOELECTRIC GENERATORS FOR INDUSTRIAL
WASTE HEAT RECOVERY – CALL EE-18**

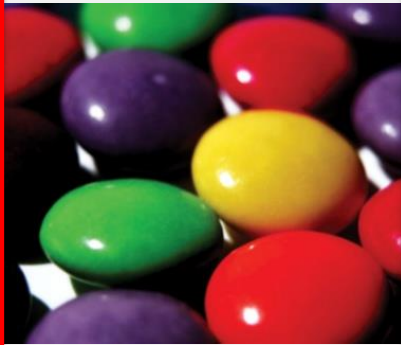
Dag Bjørnsen

dag.bjornsen@tel-tek.no

SPRE
Sustainable Process Industry through
Resource and Energy Efficiency

Efficient processes for a climate friendly future

Powder technology



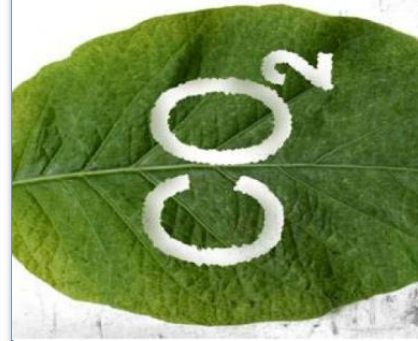
- Transport
- Storage
- Handling
- Separation
- Characterization

Energy



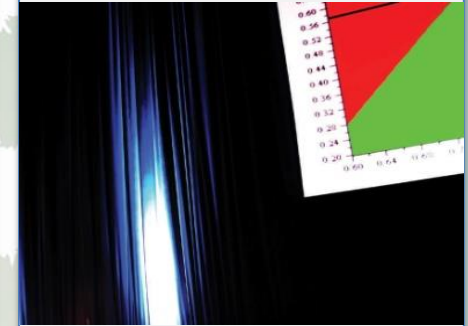
- CO₂ capture combined with bioenergy
- Biogas
- Combustion and environment
- Modeling and flow
- Energy efficient processes
- Calculation of cost-optimal energy utilization

CCS*



- Post-combustion capture technology
- CO₂ transport and infrastructure
- Degradation of amines
- Early phase cost estimation
- Solutions for energy-producing and energy-intensive industry
- CO₂-lab

Smart Manufacturing



- Multivariate
- analysis/diagnostics
- modeling
- simulation
- optimization
- Understanding/ hypothesis
- Verification
- Implementation

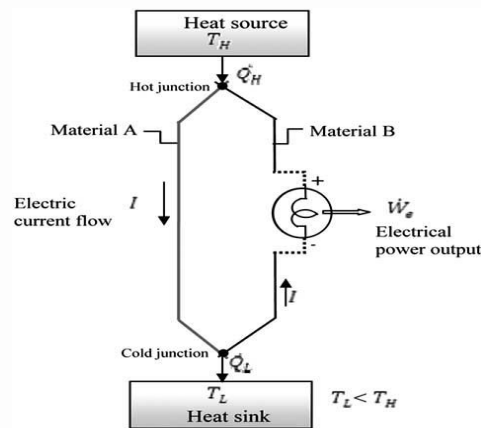
* Carbon capture and storage

PROJECT IDEA

Thermoelectric Generators for Industrial waste heat recovery

Today, a very large amount of heat is wasted in various industries (e.g., metallurgical, cement etc.). Conversion of this waste heat into electricity using thermoelectric generators can significantly enhance the energy efficiency of these industries.

Seebeck Effect: An electric current would flow continuously in a closed circuit made up of two dissimilar metals, if the junctions of the metals were maintained at two different temperatures - **Thomas Seebeck (in 1821)**



OBJECTIVES

Main project objectives (preliminary) proposed:

- Development and utilization of high power thermoelectric generator system integration to transform excess heat energy to electricity in the industry.
- Effective transformation of excess heat energy from production site to thermoelectric generators.
- Proposal for industrial scale implementation in different industrial environments (depending on project partners).

IMPACT

Large amount of waste heat is available in a number of industries:

- Metallurgical
- Cement
- Pulp&Paper
- Polymer

Some of the main advantages of using thermoelectric generators are:

- Environmentally friendly
- Extremely reliable (typically exceed 100,000 hours of steady-state operation) and silent in operation since they have no mechanical moving parts and require considerably less maintenance
- Simple compact and safe
- Capable of operating at elevated temperatures

Results from such projects will be applicable to large number of industries to provide solution for the conversion of waste heat into electricity. Results can also be implemented in automotive applications where a large amount of heat is wasted.

EXISTING PROJECT CONSORTIUM (Tentative)

Tel-Tek

- Project Leader/Manager
- Technical performance and cost assessment of commercially available single stage/cascaded modules
- Electrical and thermal integration methodology
- Development of full scale generator at Industrial plant
- Modelling of heat transfer
- Lab scale and industrial scale tests of single stage/cascaded modules and full scale generators

**Telemark University College,
Teknova,** Modelling of heat transfer

Eramet and Elkem,

- Access to waste heat source
- Technical support during electrical, mechanical and thermal integration
- Lab scale and industrial scale tests of single stage/cascaded modules and full scale generators

Alstom:

- Combining the concepts of heat exchangers/Thermoelectric generators

TEGma

- Advisor through their program on thermoelectric materials development

LOOKING FOR PARTNERS

We are looking for the partners who can provide:

- Industrial partners with access to waste heat in their plants
- Modules with advance materials and high efficiencies
- Technological competence on heat transfer mechanism from production site to thermoelectric generators for improved efficiency

CONTACT DETAILS

Tel-Tek

www.tel-tek.no

Dag Bjørnsen

dag.bjornsen@tel-tek.no



Call EE-18