Skoltech
Skolkovo Institute of Science and Technology

CENTER FOR ENERGY SYSTEMS

02.12.2016
Moscow, Nobel Street,
Building 3, 3rd floor,
room 303

RESEARCH AND PRACTICAL WORKSHOP ON:

«R&D activities of Skoltech Center of Energy Systems and launching of Smart Grids laboratory»

Skoltech Center for Energy Systems has started operation in 2014 and the aim of this workshop is to show the results of our research and officially open the Smart Grids laboratory. The Center has four main directions of research: smart grids, interacting energy infrastructures, markets and regulation and thermal devices. This workshop will concentrate on the first two areas. A more detailed description of the Center, its staff and research can be found at:

crei.skoltech.ru/energysystems

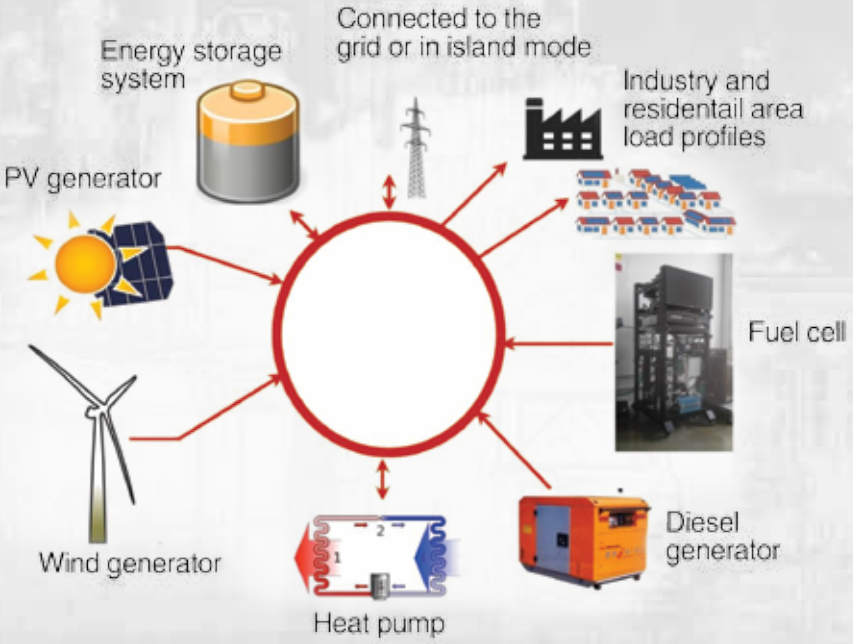
The unique feature of the Center is its interdisciplinarity character whereby engineers work closely with mathematicians and physicists to make sure that mathematical breakthroughs and insights have practical meaning and can be applied by the industry in not too distant future. We work closely together with our foreign partners: Massachuesetts Institute of Technology (MIT, USA), California Insititute of Technology (Caltech, USA), Newcastle University (UK), and Russian partners: Moscow Power Engineering Institute (MPEI), V.A Trapeznikov Institute of Control Sciences of Russian Academy of Science, Melentyev Institute of Energy Systems of SB RAS (ESI).

- ***The morning*** *will be devoted to presentations outlining our main research achievements. They will cover methods for on-line security assessment, power system stability analysis, transmission expansion planning, optimal frequency control in future power systems, demand-side management, voltage control in distribution networks, and incentive mechanisms for integration of distributed generation into power system.*

- ***The afternoon*** *will be devoted to opening of the Smart Grids laboratory during which there will time to discuss collaboration activities.*

The Smart Grids Lab offers the opportunity to test any device in a real microgrid. The installed facility includes: two simulated renewable generators which can be attached to real PV panels and to a wind turbine, a diesel generator, an energy

storage system, active and reactive loads and several transmission lines. By using these renewable energy generators, we can test different kind of scenarios, so it is possible to size and to test a microgrid for several weather conditions just by setting the solar and wind generator profiles. The diesel generator works as a back-up systems as in grids for remote areas. The energy storage system is an important key of a microgrid that includes renewable energy generators. The Smart Grids Lab offers the possibility to simulate different kind of energy storage systems based on batteries or supercapacitors. Finally, the loads can simulate industry and residential area profiles, and the transmission lines allow us to test a distributed system.



PROGRAM

09.00 – 09.20	**REGISTRATION**
09.20 – 09.30	**Workshop opening** *Ponomarev A.K., Vice President for Strategy and Industry* *Bialek J., Director of Skoltech Center for Energy Systems*
09.30 – 09.45	**A unified framework for frequency control and congestion management** *Janusz Bialek, Director of Skoltech Center for Energy Systems*
09.45 – 10.00	**Scalable heuristics for planning, placement and sizing of flexible AC transmission system devices** *Vladimir Frolov, Skoltech*
10.00 – 10.45	**Robust stability with load model uncertainty.** **N-2 contingencies selection.** **Data-Driven Diagnostics of Mechanism and Source of Sustained Oscillations** *Konstantin Turitsyn, MIT*
10.45 – 11.00	**Increasing transmission grid operation flexibility using controllable devices** *Priyanko Guha Thakurta, Janusz Bialek, Skoltech*
11.00 – 11.15	***T*ransversality Enforced Newton Raphson Algorithm for Fast Calculation of Maximum Loadability** *Konstantin Turytsyn, Mazhar Ali, MIT/Skoltech*
11.15 – 11.30	**Combined cooling, heat and power systems: from optimal scheduling and design to technology development.** *Aldo Bischi, Skoltech*
11.30 – 11.45	**Development of the complex of measures to improve the adaptability of overhead transmission lines and electric traction networks to the icing on their elements.** *Dmitry Titov, Skoltech*

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11.45 – 12.00	**Modelling of Asian Supergrid at Skoltech** *Janusz Bialek, Ksenia Letova, Andrey Churkin, Skoltech*
12.00 – 12.30	**Presenting results of joint research: Skoltech – ICS RAS:** **Development of the automated systems of Power Systems Stabilizers optimal optimal tuning for generator with an installed capacity of more than 40 MW (for JSC «System Operator - UES»);** **Development of the automated monitoring systems for stability margins in the main electric networks (for the PJSC «Rossetti»)** *Mikhail Goubko, Igor Yadikyn, ICS RAS*
12.00 – 12.30	**Presenting results of joint research: Skoltech – MPEI:** **Modernization of the power mode control in distribution grids basing on Smart Grid concept;** **Stimulation of autonomous distributed generation integration into the Unified Energy System** *Artem Vanin, Oleg Bakhmisov, MPEI*
13.00 – 13.30	**DISCUSSION** **1. Possible applications of research to solve practical problems of Russian and international energy companies and organizations** **2. Proposals for the improvement of the research to solve practical problems of Russian and international energy companies and organizations**
13.30 – 14.00	**LUNCH**
14.00 – 15.00	**LAUNCHING OF THE SMART GRIDS LABORATORY**
14.00 – 14.10	**Laboratory opening** *Kuleshov A.P., President of Skolkovo Institute of Science and Technology*
14.10 – 15.00	**Presentation of laboratory** *Federico Ibañez, Mikhail Afonin, Skoltech*

NOTE

REGISTRATION AND ADMINISTRATIVE SUPPORT:
Victoria Godunova V.Godunova@skoltech.ru,
Tel.: + 7 495 280 14 81 (ext. 3502)

The workshop will be held mainly in Russian and for English presentations simultaneous translation will be provided

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