COST WIRE and CITIES WORKSHOP, Weather Intelligence for Renewable Urban Areas

DATES: 2nd – 3rd June 2014

VENUE: Niels Bohr Auditorium, Technical University of Denmark (DTU), Risoe Campus, ROSKILDE, DENMARK

Meteorological modelling for urban area management, planning distributed power plants, renewable energy forecasting, and energy efficiency

Key words: Urban areas, Smart cities, smart grids

ABSTRACT OF MAX ONE PAGE should be submitted to Anna Maria Sempreviva, anse@dtu.dk

The deadline for submission is 10 MAY 2014

Extended abstracts delivered during the workshop, will be published on the Action's website.

RATIONALE

A meeting is proposed to gather WIRE scientists working in "urban area" projects to discuss the progress of the urban area meteorology aiming at the well-functioning of a town with the main emphasis on the energy system.

Being hosted at DTU in Denmark, the Workshop is Co-Sponsored by the Smart Cities project CITIES **- Centre for IT-intelligent Energy Systems in Cities,** coordinated by DTU.

CITIES is a new national Danish project funded by the Danish Science Foundation (budget approx. 10 mill Euros). The scientific objective of CITIES is to develop methodologies and ICT solutions for planning and operation of fully integrated urban energy systems.

The purpose of the meeting is to identify and reach a consensus on critical issues to be addressed in the meteorological modelling of renewable distributed power sources in towns.

The interest is based on the following:

- The Urban meteorology is a field that has been developed mostly for investigating environmental issues i.e. air quality; there are models/methodologies already developed to be adapted/applied to the energy sector.
- The "urban energy" field is relatively new but there are several Smart Cities projects started in Europe that focus on renewable energy forecast research. Therefore, current state of research needs to be surveyed.
- Development of models/methodologies needs: measurements of meteorological variables for data assimilation and for validation; data concerning energy production from existing power units and consumption.
- The town system has different components: City, Urban area, Semi-urban area and rural each with its characteristics to be taken into account, adding to the modelling complexity.

The following research areas are identified:

- Define methodologies for providing meteorological Key Perfomance Indicators useful for a well-functioning urban management based on e.g. wind speed and direction, temperature, horizontal temperature difference DT , Relative Humidity, aerosols content for solar radiation, precipitation etc.)
- Tools for strategic planning of urban area energy networks: addressing the strategic directional development of the urban area with renewable plants (solar, wind, hydro, a.o.) integrated in the town structure while at the same time considering energy efficiency, demand side management and evolution of other energy infrastructures (gas network, heating…)
- Algorithms for forecasting distributed power plants production aimed at the integration of renewable production in the urban area energy system and storage capacity strategies. At present, photovoltaic roof mounted solutions are preferred for densely populated areas; a question is whether the urban wind energy is coming of age.

Preliminary list of topics

- ❖ Measuring and modelling for defining Key Performance Indicators (KPIs) for an effective Urban Control Center (UCC)
- ❖ Best practice of intensive and monitoring campaigns in urban areas from surface and ground-based and space-born remote sensing (wind, solar, temperature, aerosol content, precipitation etc.).
- ❖ Meteorology and Climatology for the strategic planning of urban areas energy infrastructures development including planning storage capacity
- ❖ Weather and climate forecasting at different space and time scales for the management of renewable energy production and storage devices at urban areas
- ❖ Meteorology and climatology modelling for energy efficiency control systems and load forecast

Abstracts of contributions are invited, but not restricted, to the following issues applied to the above topics:

- Measurements of meteorological and air quality parameters
- Big data
- CFD modelling for urban wind energy development
- Forecast model/methodologies of power production at different spatial and time scales
- Use of ground- based and space-borne forecast for solar radiation
- On-going urban areas projects

Scientific Committee

Anna Maria Sempreviva CNR/DTU Coordinator, Local Organizing Committee
Gregor Giebel DTU, Local Organizing Committee
Sven-Erik Gryning, DTU, Local Organizing Committee
Ferhat Bingöl, Local Organizing Committee
Henrik Madsen, DTU,
Alain Heimo, Meteo Test, CH
Selahattin Incecik, İstanbul Technical University, ITU, TR
George Kariniotakis, Mines-ParisTech, FR
Andreas Kazantzidis, Patras University, GR
Alessandra Liberto, Telvent, NL
Emil Pelikan, Academy of Sciences of the Czech Republic, CZ
Dario Ronzio, Ricerca Sistemi Elettrici, RSE, Italy link to IRP EERA Smart Grids

Suggested Key invited speakers

1. Stefan Emeis, Karlsruhe Institute of Technology (KIT),GE, climate impact of land use destination change around urban areas CONFIRMED
2. Janet Barlow, Reading University, UK, Urban area experiments. TBC
3. Sue Grimmond, Reading University, UK, Mega-Cities Observations (London), TBC.
4. Ole Hertel , Aarhus Universtity (COST Action TD 1105 New Sensing Technologies for Air-Pollution Control and Environmental Sustainability – EuNetAir. TBC
5. George Kariniotakis, MINES ParisTech. FR, The NICE GRID/GRID4EU projects and Urban areas gaps. CONFIRMED
6. Andreas Kazantzidis, Patras University, GR, Estimating solar radiation via sky cameras. CONFIRMED
7. Henrik Madsen, Danish Technical University, DK The CITIES Project and short-term forecast of energy from renewable in urban areas. CONFIRMED
8. Martin Piringer, Central Institute for Meteorology and Geodynamics, AU. Boundary Layer in Urban Areas. CONFIRMED
9. Kurt Rohrig IWES, GE. Morgenstadt / City of the Future: City Insights. CONFIRMED
10. Dario Ronzio, Ricerca Sistema Elettrico, ERS, Italy. Integrated Research Programme Smart Grids IRP Smart Grids Solar radiation modeling in towns. CONFIRMED
11. Alessandra Liberto. Schneider Electric, NL. Views on urban area renewable energy solutions. CONFIRMED
12. Andreas Beckman, DTU Wind Energy . Online WAsP for small and medium size turbine. CONFIRMED
13. Selahattin Incecik, İstanbul Technical University, ITU, TR. Urban area project in Turkey. CONFIRMED
14. Lucien Wald, MINES ParisTech, Tools for solar radiation short-term forecast in urban areas. TBC.
15. Zoltan Bartalis (ESA), Earth observations capabilities for decision making and energy optimization in urban areas. TBC

WORKSHOP FORMAT:

Start: 2nd June at 13:00 - End: 3rd of June at 16:30

Afternoon 3rd of June 14-16:30: Brainstorming to discuss the current Technology Readiness Levels (TRLs) for the enabling and converging technologies and foresight of TRLs advancement in the frame of the HORIZON 2020.

DRATF OF THE PROGRAMME

Monday 2nd June

13:30 Registration

14:00 – 18:20

- Measuring and modelling Key Performance Indicators (KPIs) for an effective Urban Control Center (UCC)
- Best practice of intensive and monitoring campaigns in urban areas from surface and ground-based and space-born remote sensing. (Wind, solar, Temperature, aerosol content, precipitation etc.)

Tuesday 3rd June,

8:30 – 12:30

- Meteorology and Climatology for the strategic planning of urban areas development including planning storage capacity
- Weather and climate forecasting at different space and time scales for renewable energy production from distributed power plants and storage charge and discharge cycles
- Meteorology and climatology modelling for energy efficiency control systems and load forecast

13:30 – 16:00

Brainstorming to discuss the current Technology Readiness Levels (TRLs) of the enabling and converging technologies

As a result of the meeting we plan to obtain

- A list of R&D priorities (short-medium-long term) for the area.
- A list of identified topics critical for urban areas (i.e. measurements, UCC technology, remote sensing, weather forecasting, climate forecasting, application forecasting etc.)
- To assign a TRL to each topic reflecting the state of the art and foresight a TRL advancement in the next years.
- A committee for a short position paper on the workshop topics.