MEDOW

MULTI-TERMINAL DC GRID FOR OFFSHORE WIND

Newsletter
September 2016
Issue 7

Welcome

Welcome!

The MEDOW (Multi-Terminal DC Grid for Offshore Wind) project is investigating DC (direct current) grids for transmitting offshore wind power.

MEDOW researchers are working on the technology that we hope will form the basis of a future European 'supergrid'.

The newsletter is issued 3-4 times per year and aims to communicate not only news from MEDOW but also news of interest to the wider research community and the public.

Cath Roderick and Karolina Rucinska, MEDOW Project Officers

Find us on Facebook

MEDOW is funded by the Seventh Framework Programme of the European Union under grant agreement no. 317221

International recognition for MEDOW project

MEDOW has been showcased in an international UK innovation report.

A new report by Universities UK International, with support from UK's Department of Business Innovation and Skills details the breadth of UK universities' international activities which foster innovation and university-business interaction.

The report was launched in Shanghai by Jo Johnson MP, UK Minister of State for Universities and Science, as he visited China for events highlighting the strength of UK-China education, science and innovation relation-ships.

Universities UK International

INTERNATIONAL INNOVATION BY UK UNIVERSITIES

Report praises MEDOW for its impact especially, inking industries across borders, providing opportunities for fu-ture collaborations and contributing to an international framework for the development of a pan-EU power grid (Universities UK report, 2016:32)

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Recent Events

It was a busy summer for MEDOW team.

From training and workshops, through international conferences to HDVC Colloquium.

Here are the highlights.

University of the 3rd Age, Monmouth, UK, May 2016

Marc Cheah, Tibin Joseph and Gen Li (pictured below) presented the rationale for and challenges of DC grids for transmission of offshore wind power, but also talked about the wider context of renewable energy and plans for international power interconnection.



Tour de force in China, May and June 2016

Gen Li presented a paper IEEE International Power Electronics and Motion Control Conferences (IPEMC) ECCE Asia 2016 in Hefei. He then presented a poster at IET ACDC 2016 in Beijing, while Abel Ferreira presented a paper at the same conference. Gen then presented his IPEMC paper to students and staff at China Agricultural University and presented an overview of offshore wind and DC grids in Europe to staff of State Grid Chang Chun Power Supply Company. Gen presented the overview again at Northeast Dianli University, and MEDOW Scientist-in-Charge Dr Jun Liang presented the project at Beijing Information Science & Technology University and North China Electric Power University.

Abel Fereira, Dr Jun Liang and Gen Li

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Recent Events

Open Day, Cardiff, UK, 08 July 2016

Cardiff University hosted a MEDOW Project Open Day and Energy Exhibition. This was our final public outreach event and aims to give the general public the opportunity to find out about the project's aims and achievements.

The event was open to all and formed part of the University's Summer of Innovation programme. As well as displaying MEDOW's work, the exhibition featured other energy and environment related doctoral level research, including that of the SUSPLACE (Sustainable Place Shaping) Marie Curie European Training Network.

Visit to National Grid Control Centre, UK, July 2016

MEDOW students and Dr Jun Liang had a great opportunity to visit the control centre for the entire UK. MEDOW team heard about latest operability challenges, but also shared their knowledge and project results to National Grid team. Well done to Robert Renner, Gen Li, Mohammad Meraj Alam and Tibin Joseph for disseminating their work!

7th HDVC colloquium, Porto, September 2016

During three days of this annual gathering many of MEDOW researchers presented their work as well as took part in the Supervisory meeting. It goes without saying that MEDOW researchers have done very well. Congratulations to Ataollah Mokhberdoran, Abel Ferreira, Jorge Gonçalves, Kevin Schönleber, Mohammad Meraj Alam, Marc Cheah and Muhammad Raza on delivering great presentations!

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MEDOW goes to IEEE PES General Meeting, Boston 2016

MEDOW researchers, namely Jayachandra and Marc along with Dr Jun Liang went to IEEE PES meeting in Boston, USA. To find out about this great event read Marc's review.

"Last July, I attended IEEE PES General Meeting in Boston, USA. This is the most important conference in the Power and Energy Society and represents a great opportunity to meet people from industry or other international universities that are on the same research area.

My paper was selected as one of the Best Conference Papers submitted and he has the chance to disseminate his work as presentation and poster.

The day before the official start of the conference I attended a tutorial on *Planning an Integration of Flexible HVDC into Today's Grid*, where a number of aspects about the current state of art of HVDC where discussed. During the week many activities, such as panel sessions, paper presentations or poster forums, were scheduled in parallel and it was a bit challenging to choose the most interesting ones.

I also joined two of the technical tours organized during the conference. One visit was to a 1 MW photovoltaic farm owned by National Grid, where some of the experts explain the main characteristics of this facility and perform real-time demonstrations to show the advantages of using VSCs to control the solar panels (see figure 1).

Figure1.

Assistants during the technical visit to 1MW photovoltaic farm .

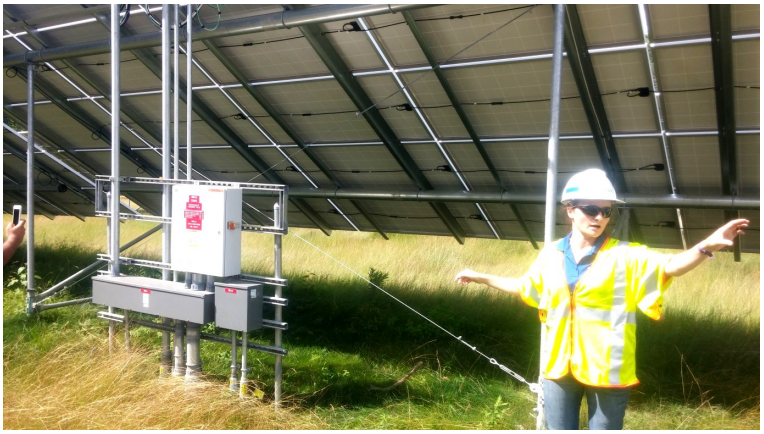

Figure 2: National Grid employee explaining the solar panel's distribution in the site.

The other visit was to Doble Headquarters, an engineering company that provides testing and monitoring services oriented to asset management (see Figure 3). During the tour many technical demonstrations were carried out by some employees to show the expertise of Doble.

Figure 3:

Entrance of Doble Headquarters.

I recommend to attend the next editions of this conference".

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Conferences

Apart from Boston, Beijng and Hafei, MEDOW researchers travelled to Florence and Genoa to share the results.

In June 2016, Abel Ferreira (pictured), Ataollah Mokhberdoran and Muhammad Raza went to 16th IEEE International Conference on Environment and Electrical Engineering which was hosted in Florence, Italy.

In June 2016, Jayachandra Naidu presented his project at the 19th Power System Computation Conference Genoa, Italy, 2016.

In August 2016, Robert Renner and Alejandro Bayo Salas attended Cigre Sessions in Paris. 21st -25th August 2016.

Farewell!

Robert Renner is the first MEDOW early career researcher to complete his contract

Robert's MEDOW project focused on the behaviour of combined AC and DC grids with a high participation of renewable energy, the technical limitations of integrating large amounts of wind power into the grid and the benefits of controllable devices such as HVDC.

His work has been presented and published widely. Here are some examples:

Renner R., Van Hertem D. 2016. Potential of using DC voltage restoration reserve for HVDC grids. *Electric Power Systems Rese*

Van Hertem, D., Renner, R. H., & Rimez, J. (2016). Power sys tem operations with HVDC grids. HVDC Grids: For Offshore and Supergrid of the Future, 213.

Nentwig C., Renner R., Van Hertem D., Haubrock J. 2016. Application of DC Choppers in HVDC Grids. IEEE EneryCon 2016, Leuven, 4-8 April 2016.

Renner R., Beerten J., Van Hertem D. 2015. Optimal dc reference voltage in HVDC Grids. In *Proc. IET ACDC 2015. International Conference on AC and DC Power Transmission, Birmingham, UK, 10-12 February 2015.* , pp. 1-6

We wish you all the best on your academic career path

Results

The most recent publications

Journal articles

Rodrigo Teixeira Pinto; Monica Aragues-Penalba; Oriol Gomis-Bellmunt ; Andreas Sumper (UPC) (2016)
Optimal Operation of DC Networks to Support Power System Outage Management. *IEEE Transactions on Smart Grid* (Volume: PP, Issue: 99)

Robert Renner and Dirk Van Hertem (2016) Potential of using DC voltage restoration reserve for HVDC grids. *Electric Power Systems Research,* 134, 167-175.

Take a look at the full list on our dissemination webpages at www.medow.engineering.cf.ac.uk

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Communication

So in which other ways does MEDOW communicate its work?

As a Marie Curie project, MEDOW has communication high on its agenda. We aim to communicate with as wide a variety of people as possible so as to share our work, to increase its impact and to let European taxpayers know how their money is being spent! We are keen to find news ways of sharing our project news, so do get in touch with us if you can help!

Public outreach

We have already taken part in a number of activities with people outside the research community including participating in a renewable energy and science project days at a school in Cardiff and hosting a group of Spanish and Swedish school students at a workshop on 'HVDC Towards the Future' in Barcelona.

MEDOW in One Minute

Take a look at out bite-size explanation of MEDOW and life as a Marie Curie researcher on Youtube.

Facebook

https://www.facebook.com/medowproject

LinkedIn

Group: 'MEDOW'

In the press

Articles on MEDOW have targeted a wide range of audiences in renewable energy news-site reNews , Spanish site Smart Grids Info, in the national newspaper of Wales and on OffshoreWind.biz

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MEDOW Consortium

MEDOW partners:

- Cardiff University (Co-ordinator)
- Universitat Politècnica de Catalunya
- Control Intel.ligent de l'energia
- Alstom Renovables España
- Universidade do Porto
- EFACEC
- Katholieke Universiteit Leuven
- Elia System Operator
- Danmarks Tekniske Universitet
- China Electric Power Research Institute
- National Grid (Associated Partner)

Members and roles

MEDOW is co-ordinated by Cardiff University and has four other university partners, five private sector partners and one associate partner.

Collectively, staff from the partners organisations have the wide-ranging experience and expertise to provide the appointed researchers with broad-ranging training in DC grid technologies.

All partners will host at least one researcher, and associate partner National Grid will provide training and steering to the consortium.

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Useful Information

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A DC grid based on multi-terminal voltage-source converter is a newly emerging technology, which is particularly suitable for the connection of offshore wind farms. Multi-terminal DC grids will be the key technology for the European offshore 'supergrid'.

The project's anticipated achievements will greatly contribute to integrating offshore wind power into the onshore AC grids of European countries and to the European 'supergrid'.

Read more about supergrid at friendsofthesupergrid.eu

MEDOW offers a development path to researchers across Europe in the area of DC grids, in addition to fostering greater ties between industry and academia in this key development area.

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www.medow.engineering.cf.ac.uk

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