Abstract and bio Torben Bach Pedersen, professor Aalborg University; Co-founder of FlexShape

FlexOffers: Towards an Open Standard for Energy Flexibility

The growth of distributed renewable energy sources and smart IoT devices offer new possibilities for the use of energy flexibility, the ability to shift energy use in time, amount, type and storage. This opens a new era of bottom-up cellular energy systems. In order to harness the full potential of flexibility, flexibility has to be modeled and represented in a standardized way that can be efficiently managed, manipulated, and traded on markets.

This keynote provides a comprehensive overview of the award-winning FlexOffer technology, which offers a general, powerful and effective way of modeling and managing energy demand and supply flexibilities from a wide range of flexible resources and their aggregates. Basic concepts and the different phases of the FlexOffer life-cycle are defined, followed by advanced FlexOffer types and constraints as well as algorithms for FlexOffer generation, aggregation, disaggregation, and pricing that can significantly reduce energy management and trading complexities and increase overall efficiency. A general system architecture for trading FlexOffers in existing and emerging markets is presented.

Experimental results show that FlexOffers can capture all common energy loads, (dis)aggregate millions of loads in seconds, scale to long time horizons, and be traded on common markets with high utility. FlexOffers are used in a number of commercial products and is currently being developed as an open standard for flexibility.
Finally, the talk will briefly mention some of my other research topics at the intersection of data analytics technology and digital energy.

Bio Torben Bach Pedersen

Torben Bach Pedersen is a professor of computer science at Aalborg University, Denmark and co-founder of FlexShape, focusing on Big Data Analytics with applications in Digital Energy. He has published more than 330 peer-reviewed papers which received more than 8400 citations on Google Scholar, yielding an h-index of 51. He serves on the PCs of the top conferences in (big) data management (SIGMOD, PVLDB, ICDE, CIKM, and EDBT) and digital energy (ACM e-Energy). He is an ACM Distinguished Scientist, an IEEE Computer Society Distinguished Contributor, and a Member of the Danish Academy of Technical Sciences. He received the Best Paper Award at ACM e-Energy and an Honorary Doctorate from TU Dresden for his work on managing energy flexibility using FlexOffers, which are used in more than 20 EU and national research projects with thousands of prosumers, and a number of commercial products. He is a co-founder of FlexCommunity.eu, the European forum for energy flexibility.