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Energy Data Management: Where Are We Headed?

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Panel/Roundtable Discussion



- Answer these questions (and perhaps more)
 - for *energy data management*:
- What was already done and what is still missing?
- What are the scientific challenges?
- What are the technical challenges?
- What are the challenges that necessitate an interdisciplinary approach?

My Own Opinions



- *What was already done and what is still missing?*
- What was done
 - Forecasting methods
 - Flexibility modeling, aggregation, disaggregation, etc.
 - Initial system architectures
 - Initial standards of data models and exchange protocols
- Missing
 - A broad range of *open benchmark datasets* that can be used to develop robust and effective methods for various energy data management tasks, e.g., datasets that provide detailed measurements of device usage and energy consumption at a fine-grained level for a larger number of households.

My Own Opinions



- *What are the scientific challenges?*
- Development of robust and effective *methods and techniques for prediction of energy production and consumption down to the device level*
- Development of *methods capable of extracting and predicting flexibilities in energy usage;*
- Development of *scalable techniques for aggregating, scheduling, and disaggregating micro-level flexibilities, e.g., in individual device consumptions, to large-scale macro-level units suitable for balancing energy supply and demand at the higher levels*



My Own Opinions



- *What are the technical challenges?*
- Develop community-wide, agreed-upon common *definitions of data and information concepts, e.g., standardized ontologies* specifying common concepts.
- Standardization of *communication protocols, e.g., for communicating available flexibilities.*

My Own Opinions



- *What are the challenges that necessitate an interdisciplinary approach?*
- Perhaps the hardest to meet, include interplay between:
 - *Computer scientists* developing scalable techniques for energy data management
 - *Human-computer interaction designers* exploring how and at which level of detail to interact with a smart grid system, e.g., in the home
 - *Economists* developing new business and energy taxation schemes that can ensure the (financial) interest of all the many involved parties (consumer, producers, distributors, traders, balance responsible parties, etc.) while still generating a tax revenue at the same level as current schemes.
 - *Companies* that give feedback on the practical feasibility
 - An example of these disciplines interacting to develop viable solutions for the truly smart grid is found in the Danish Totalflex project www.totalflex.dk



And Now, Let's Discuss!



- *What was already done and what is still missing?*
- *What are the scientific challenges?*
- *What are the technical challenges?*
- *What are the challenges that necessitate an interdisciplinary approach?*