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MANUFACTURING

MonIEflex

Steering industrial manufacturers' power consumption in function of fluctuating green energy supplies

The threat of global warming, rapid depletion of natural resources such as oil, coal and gas, and recent issues with nuclear power plants have significantly raised political and societal interest in the use of green, renewable energy sources.

Yet, green energy comes with an unpredictable and intermittent output. Therefore, the need increases for software that is capable of steering power demand of commercial and industrial consumers quickly and automatically – to match supply of intermittent green energy, yet without disrupting their operations.

"To deal with imbalances between energy production and energy consumption, grid operators have traditionally been looking at approaches that create flexibility on the supply side," says Matthias Strobbe (iMinds - Ghent University). "Concretely, fast-reacting power plants (typically running on natural gas) are activated during periods of peak consumption. But that's a highly expensive and polluting method."

"Putting the Industry 4.0 and smart grid concepts center stage, the MonIEflex project took a completely different approach," adds Thomas Zeebergh (Siemens). "We wanted to define, design and assess new software components that allow us to identify and free up 'flexible capacity' at large industrial power consumers – in a non-intrusive way."

THE OUTCOMES

1. An award-winning, non-intrusive 'flexible capacity' estimation engine

MonIEflex has resulted in a tool that forecasts flexible capacity at certain large industrial power consumers, enabling that flexible capacity to be freed up in a non-intrusive way. This non-intrusive approach was an important industry requirement. After all, plant managers strongly object to curtailing machines randomly – as this could lead to significant economic losses (both in terms of product quantity and quality).

"Instead, the forecasting technology developed during the MonIEflex project allows REstore to more accurately estimate available flexible power from complex processes. All while respecting boundary conditions set by individual industrial power consumers. Based on that, it is possible to better forecast how much flexible capacity is available and how that capacity can optimally be used," says Matthias Strobbe. "This is in line with REstore's unique data-driven approach to enable demand-response in electricity grids – with response times of a couple of seconds only."

"Thanks to MonIEflex, REstore has been able to improve its now- and forecasting of flexible power in complex industrial processes in real-time," confirms Jan-Willem Rombouts (REstore). "REstore's unique approach and capabilities have recently been recognized through several international awards – such as the Global Cleantech Cluster Association Award, and Frost & Sullivan's European Demand Response Leadership Award."

2. A proof-of-concept that covers the whole value chain – from collecting sensor info, to data aggregation, decision-making and business case modelling

The proof-of-concept in which MonIEflex has resulted, covers the whole value chain to making MonIEflex' industrial flexible capacity approach work.

The MonIEflex demonstrator encompasses the real-time collection of data logs from sensors, power meters, etc. over a scalable communications network. What's more, by applying machine learning techniques to the collected sensor data, the company's boundary conditions can be inferred automatically. And it includes the interconnection with a remote aggregation platform as a basis to take intelligent decisions.

Last but not least, the economics related to making the concept of industrial flexible capacity work have been thoroughly studied and analyzed, and have revealed drivers for positive business cases.

3. A new service that has already been commercialized in Belgium and the UK

As mentioned, MonIEflex resulted in a number of machine-learning techniques to estimate the potential of flexible capacity in an industrial setting; techniques that accelerated the commercialization of new services by consortium partner REstore in Belgium and the UK.

"In the UK, if industrial power consumers contribute to the three biggest energy consumption peaks during winter, they are penalized for that," says Jan-Willem Rombouts. "As a result, companies try to anticipate those peaks, and regularly shut down their machines in order to avoid being fined. In turn, this results in unwanted opportunity costs - as production is lost."

"But leveraging the MonIEflex research, REstore has been able to build a solution that can accurately predict whether a demand peak is upcoming, up to half an hour in advance. With our technology, manufacturers don't have to curtail their machine parks in vain – saving them lots of money."

"And we built a similar service that helps Belgian grid operators predict in a timely fashion if strategic reserves should be activated – to avoid that energy shortages should occur."

NEXT STEPS

As described, consortium partner REstore has already found a number of ways to valorize the MonIEflex research findings – thus accelerating its growth.

Siemens has especially been able to further develop local competences, positioning its team in Flanders as a key hub for the international implementation of this type of projects.

AGENTSCHAP INNOVEREN & ONDERNEMEN | Vlaanderen is ondernemen

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FACTS

NAME	MonIEflex
OBJECTIVE	Steering industrial manufacturers' power consumption in function of fluctuating green energy supplies
TECHNOLOGIES USED	Smart grid, Industry 4.0
TYPE	ICON project
DURATION	01/01/2014 – 31/12/2015
PROJECT LEAD	Thomas Zeebergh, Siemens
RESEARCH LEAD	Matthias Strobbe iMinds - IBCN - UGent
BUDGET	2,296,000 euro
PROJECT PARTNERS	Crop's, REstore, Siemens
IMEC RESEARCH GROUPS	Distrinet - KU Leuven IBCN - UGent SMIT - VUB

WHAT IS AN

IMEC.ICON PROJECT?

The imec.icon research program equals demand-driven, cooperative research. The driving force behind imec.icon projects are multidisciplinary teams of imec researchers, industry partners and / or social-profit organizations. Together, they lay the foundation of digital solutions which find their way into the product portfolios of the participating partners.

MonIEflex project partners:

CROP'S THE natural choice | REstore | SIEMENS

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