

New technologies in Energy Trading:
Artificial Intelligence (AI) and how it can change the world...
6, 7 June 2018, Courtyard Marriott Hotel Madrid



Agenda

- What is Artificial Intelligence (AI)
- How AI dominates the media
- How AI influences the financial markets (FinTech)
- About Yuso
- How Yuso employs AI on a daily basis
- Outlook: Future roles for AI in the energy business
- Questions





What is Artificial Intelligence?

- AI is *intelligence demonstrated by machines*, in contrast to natural intelligence (NI) in Humans or other Animals (Wikipedia)
- AI research in *Computer Science* studies intelligent agents perceiving the environment so to maximize performance goals
- AI is *not a new field* but it's performance was boosted by important developments in Neural Sciences and increased Computer Performance since its inauguration in 1956
- *Perception, Learning, Reasoning, and Planning* are the most important characteristics of generalized AI machines



How AI dominates the media:

... as with many other issues in the public domain, everyone seems to have an opinion on a broad and complex phenomenon such as AI ...



Elon Musk (Tesla, SpaceX, ..):

“Artificial Intelligence is a fundamental risk to the existence of human civilization...”, and...

“Artificial Intelligence can cause World War 3...”



Mark Zuckerberg (Facebook Inc.):

“I think you can build things and the world gets better. But with AI especially, I am really optimistic...”, and... “AI will improve our lives...”

How AI influences Financial Markets (FinTech):

... AI has been around in the broader Financial Markets for quite some time. Many agents use “technical indicators” as guidelines...

- AI is different from *Automation*: The latter involves reducing Human Action essentially by programming machines to perform repetitive tasks according to a clear and pre-defined set of rules
- AI has been in use in *FinTech* for high-frequency trading since the late 1980s. More recently, personalized applications of AI in financial advice and fraud detection (Data Mining), investment decisions and Blockchain have emerged
- Today, trading is less about ever higher frequencies but rather about increased *intelligence* using *Artificial Neural Networks*

About Yuso:

- Active since mid-2012 as direct marketer of RES (mainly solar PV) in Flanders (North of Belgium), currently at ca. 135 MWp size
- Managing directors are Bart Pycke and Michel Verschuere, bundling 35+ years of experience in the industry
- Developed in-house systems and software to efficiently manage and administer a portfolio of injection and supply contracts
- Active as operator of energy storage systems large and small in Flanders and The Netherlands
- *Active Automation and Artificial Intelligence* are key principles upon which the activities of Yuso are based, leveraging on availability of cloud computing and open source software



About Yuso: Welcome to our new website!




A NEW VIEW ON ENERGY MANAGEMENT

Solutions for green, decentralized energy

Yuso enables the exchange of renewable energy between different parties. We offer a platform (My Yuso Portal) for managing decentralized energy.

Stop going for the high and non-transparent prices of the powerful players on the energy market: Yuso believes in an open market where "peer to peer" energy is delivered and used. Together we ensure the integration of renewable energy in the existing markets.

Yuso facilitates the new way of exchanging energy and ensures that all parties can follow the energy market and its prices in a transparent manner.

[MORE ABOUT YUSO](#)



www.yuso.be

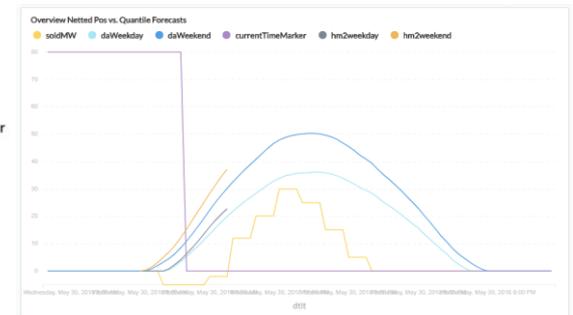
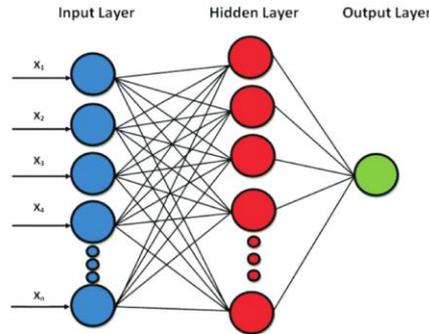
How Yuso employs AI on a daily basis:

- Managing renewable infeed requires detailed understanding of the intimate relation between *RES availability* and *System Balance*
- Managing RES such as wind and solar as intermittent, inflexible energy sources involves a deep understanding of *meteorology*
- The extent and recurrence of available system and meteorological data is so enormous that effective use requires both automation and Artificial Intelligence, *it is just too much info for humans...* 😞
- Yuso developed efficient business practices leveraging upon AWS *Cloud Computing-* and *Cloud Storage Services* as well as *Open Source Software* for analysis, deal execution and data visualization
- AI algorithms mainly automate the known principles developed (IA)



How Yuso employs AI on a daily basis:

Forecasting Procurement
 Dew
 Precipitation Load **LOW** UK Learning
 Position Navier Global Saturation Availability
 Day-Ahead Balancing Re-run Border
 Azimut Organisation Chaos **Net Script**
 Market Speed Office Temperature Cross
 Irradiance Regression
 Calibration **Solar System** Nonlinear
GFS **Price Imbalance** Thunderstorr
 Met International direction Data Plant
 Volume Point Deep Artificial Clouds
 Regulation Meteorological Eumetsat
 Cloudcover **Infeed** Pressure Historical
Wind CAPE Intelligence
 Renewable



Time	Area	Cost	Cup	Price	State	RTDy	RAH	CRSH	RDY	CRDY	RDVA	RAV	AVVA	ADY	CAAR	ADY	CAAR	ADY	CAAR
18:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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19:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Input data cloud

Neural Network

Output action & visualisation

Outlook: Future roles for AI in the energy business

- *RES infeed will only increase* in importance in the future, driven by its ever lower cost compared to classical generation technologies
- Its intermittent output characteristics requires improved methods to match supply and demand for RES on the *Existing Markets*
- RES infeed is not completely random but the *Learning Curve* towards prediction is steep, involving *massive amounts of data*
- Mapping the raw data cloud into useful output or automated market actions requires a *computerized decision making process*
- Today, it is already impossible for human operators alone to successfully and cost-effectively manage *RES portfolios 24/7*
- Artificial intelligence will likely become key to the energy transition!



Questions





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