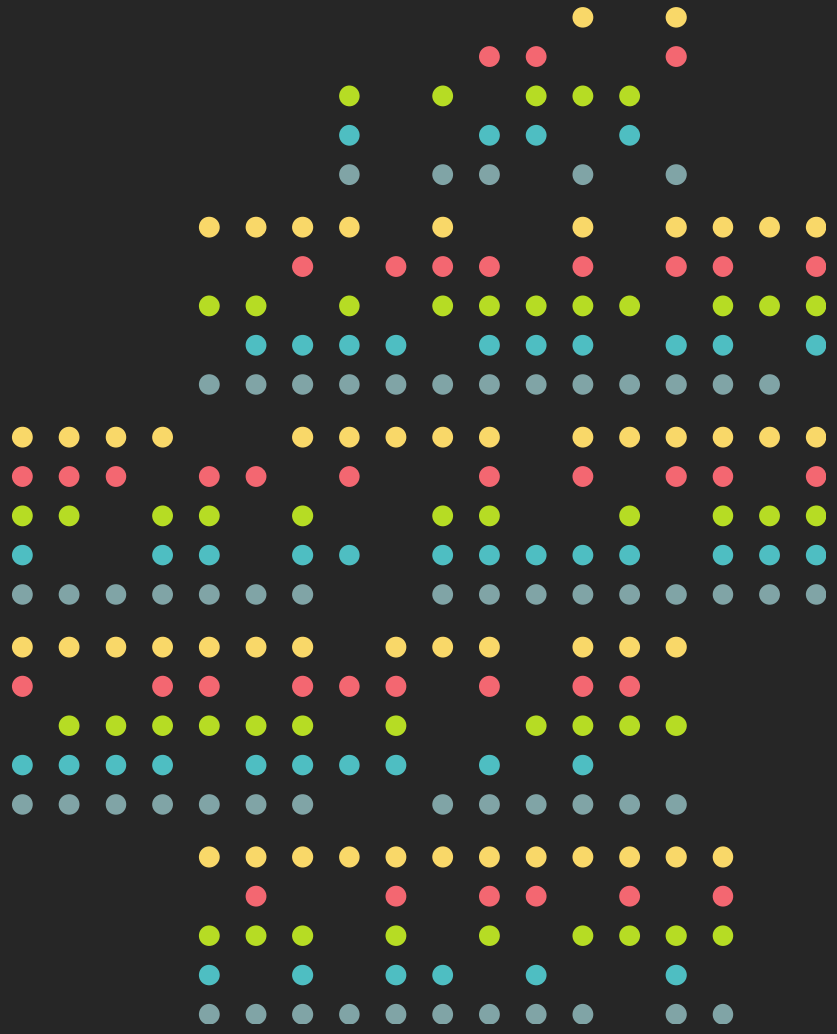

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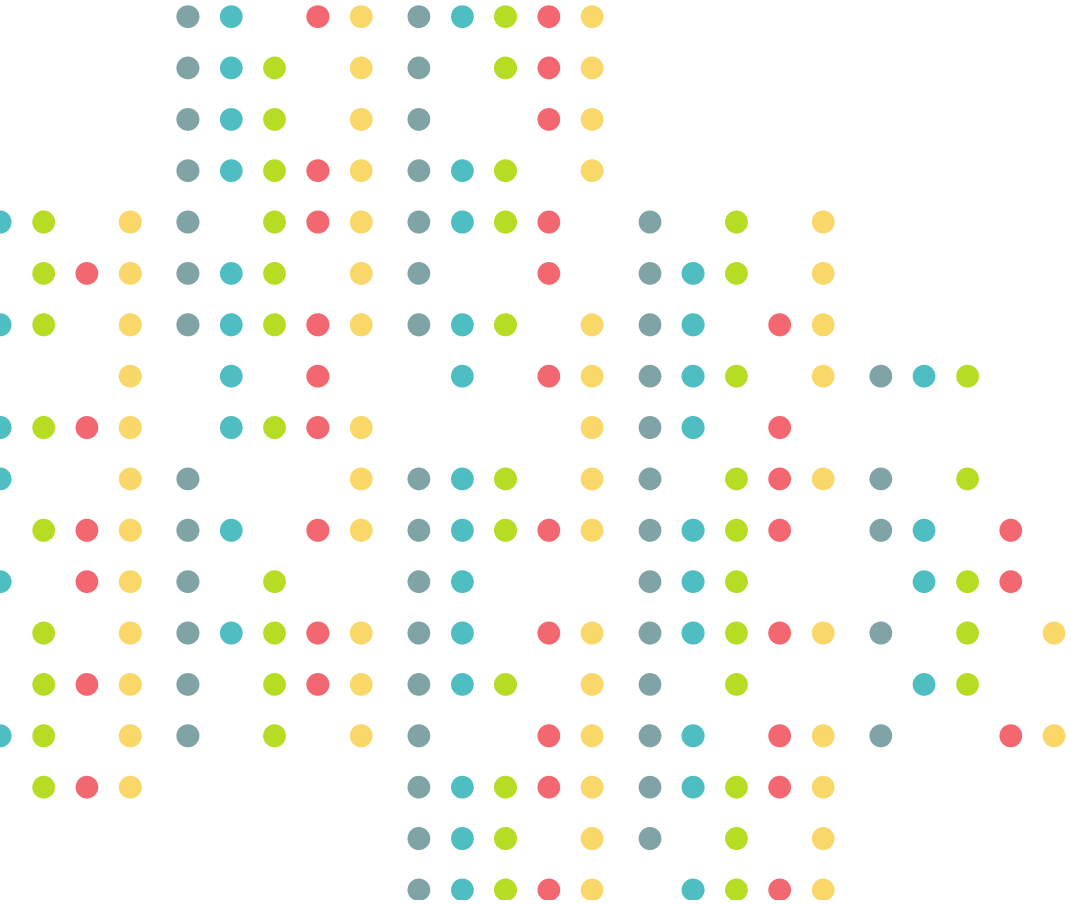
R&D Session #16

The Power of AI for Renewables

July 21st 2021

Welcome to the R&D Sessions powered by NEW



Sessions overview

- Session #1 – 18/06 – meet EDP NEW ✓
- Session #2 – 02/07 – Bring Smart Cities to Life ✓
- Session #3 – 16/07 – Robotics for Renewable Energies ✓
- Session #4 – 16/09 – Data and algorithms for energy ✓
- Session #5 – 30/09 – Flexibility and RES ✓
- Session #6 – 14/10 – New projects and new horizons ✓
- Session #7 – 28/10 – Buildings and energy performance ✓
- Session #8 – 11/11 – Customer centric Smart Grids ✓
- Session #9 – 25/11 – Hydrogen ✓
- Session #10 – 16/12 – Ocean Energy ✓
- Session #11 – 03/02 – Battery Energy Storage ✓
- Session #12 – 10/03 – A Blockchain Energy Business ✓
- Session #13 – 07/04 – Renewable Energy Communities ✓
- Session #14 – 05/05 – Local Energy and Flexibility Markets ✓
- Session #15 – 16/06 – Floating Offshore Wind ✓
- Session #16 – 21/07 – The power of AI for renewables

NEW

edp CTG

AGENDA

01 Introduction

02 AI

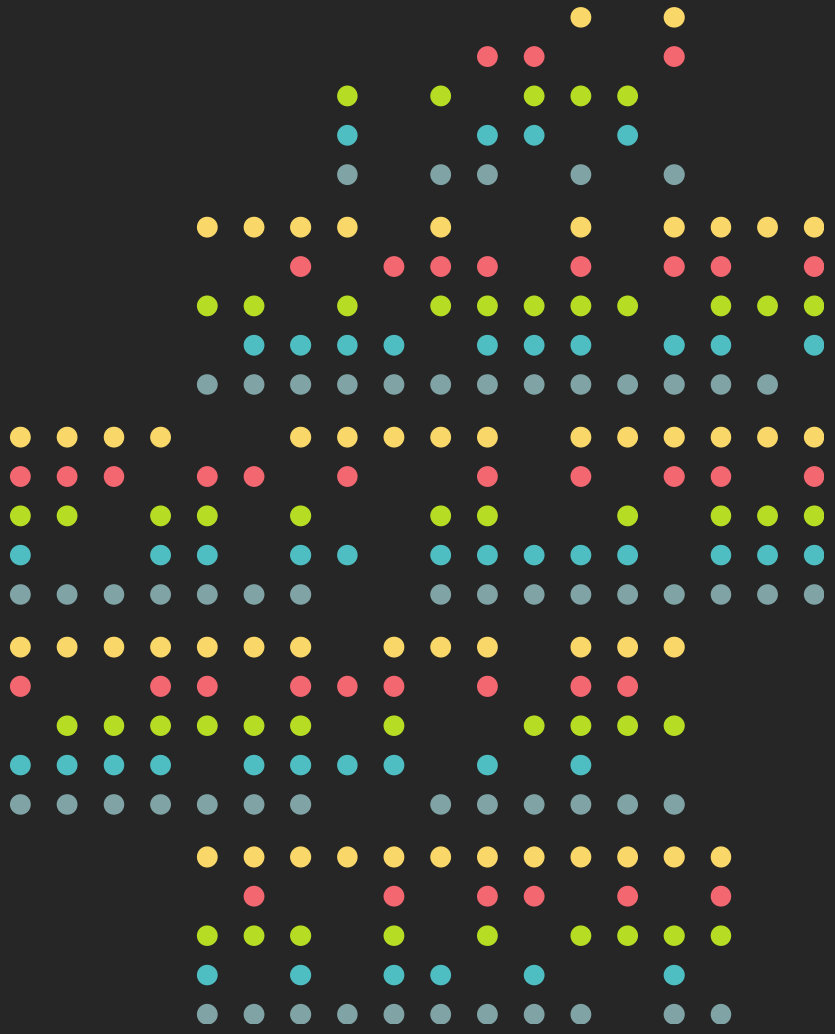
When? What? How? Why?

03 Project Smart4RES

Next-Generation Modelling and Forecasting of Variable Renewable Generation for Large-scale Integration in Energy Systems and Markets

04 Round Table

The future of renewable energy forecasting



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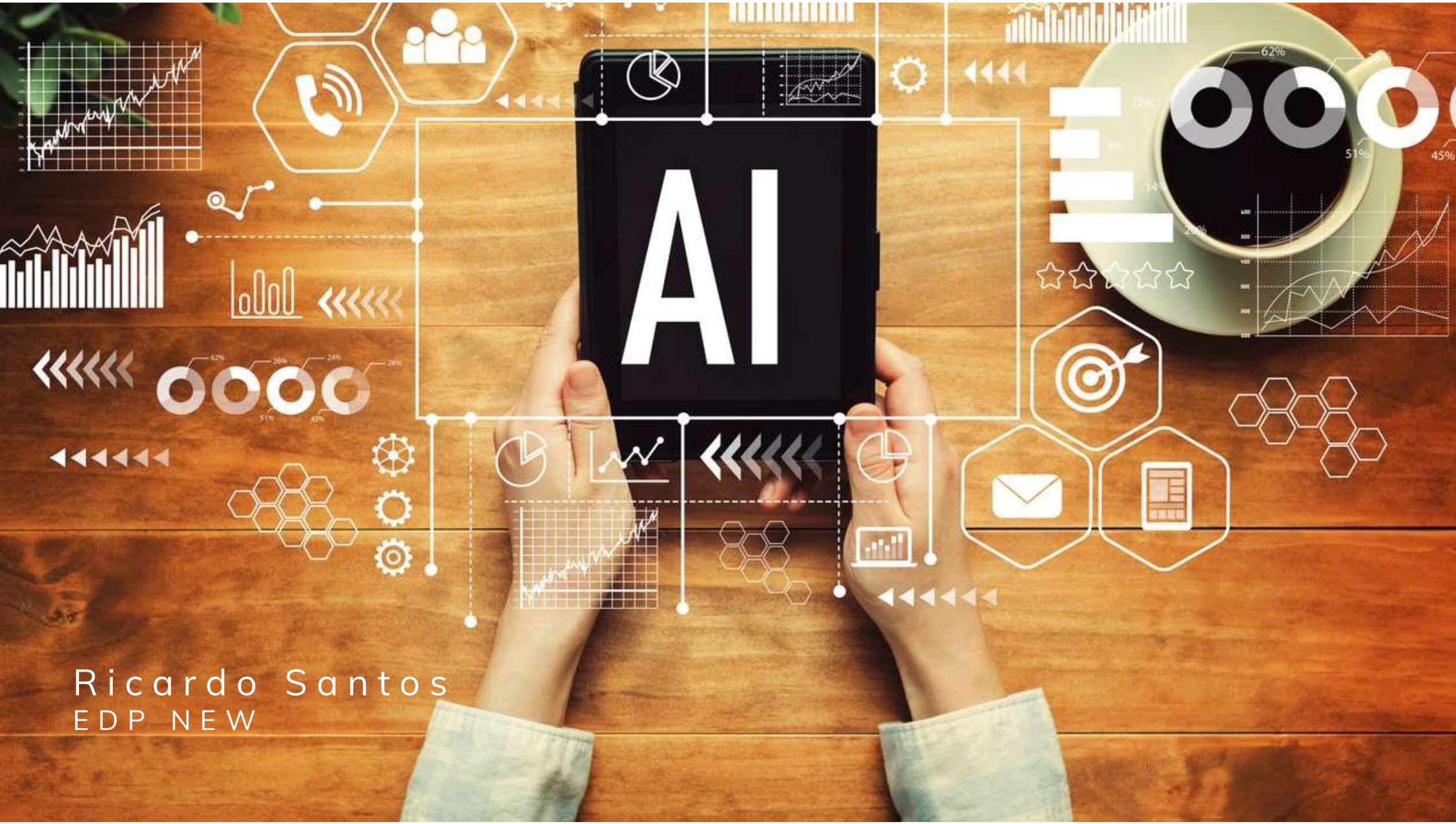
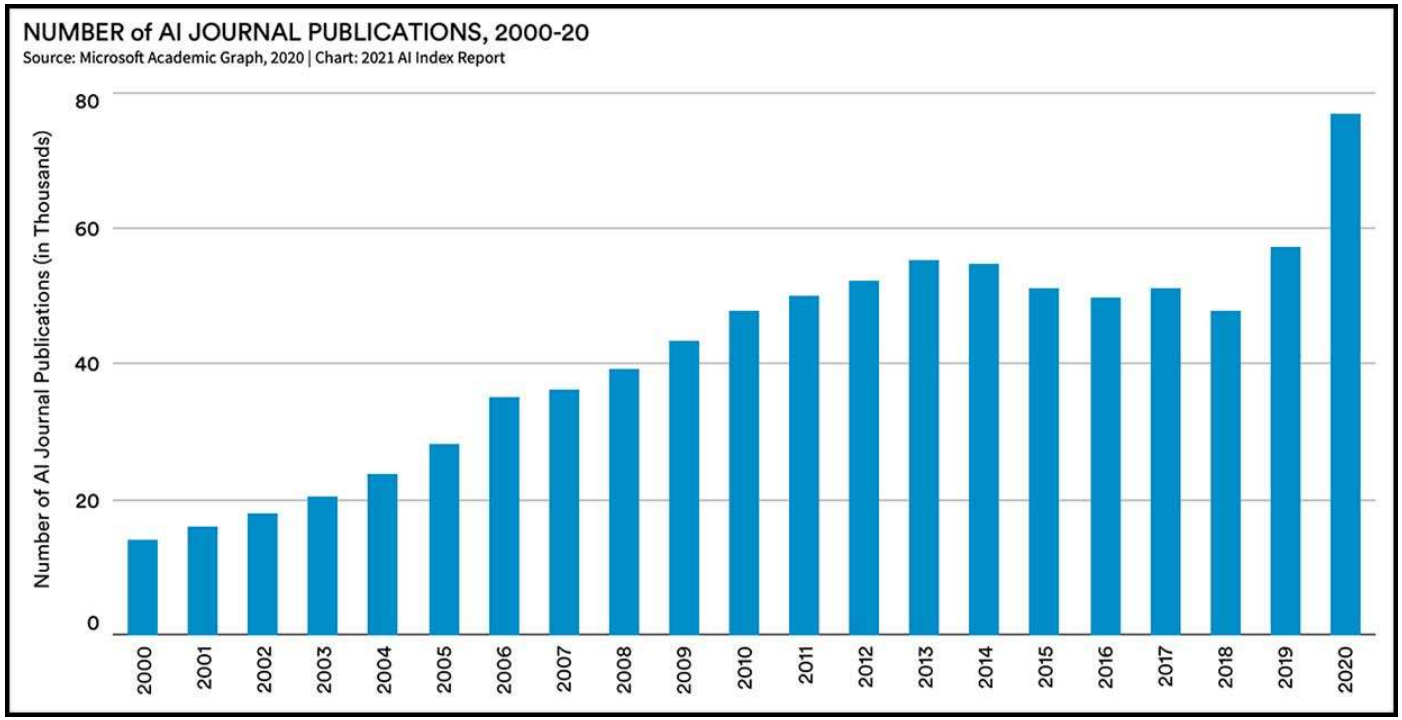

AI
Ricardo Santos
EDP NEW

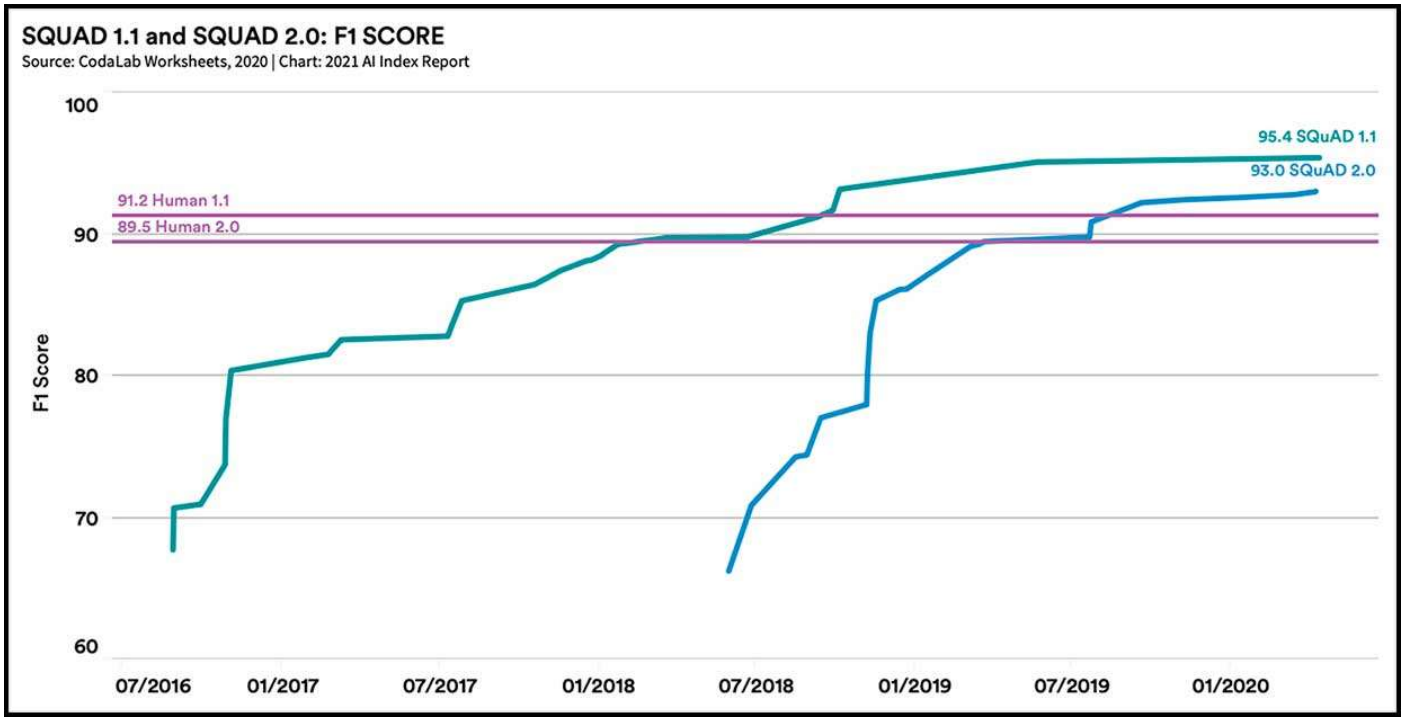
WHEN?

AI Summer


NUMBER of AI JOURNAL PUBLICATIONS, 2000-20
Source: Microsoft Academic Graph, 2020 | Chart: 2021 AI Index Report
Number of AI Journal Publications (in Thousands)
80
60
40
20
0
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020

WHAT?

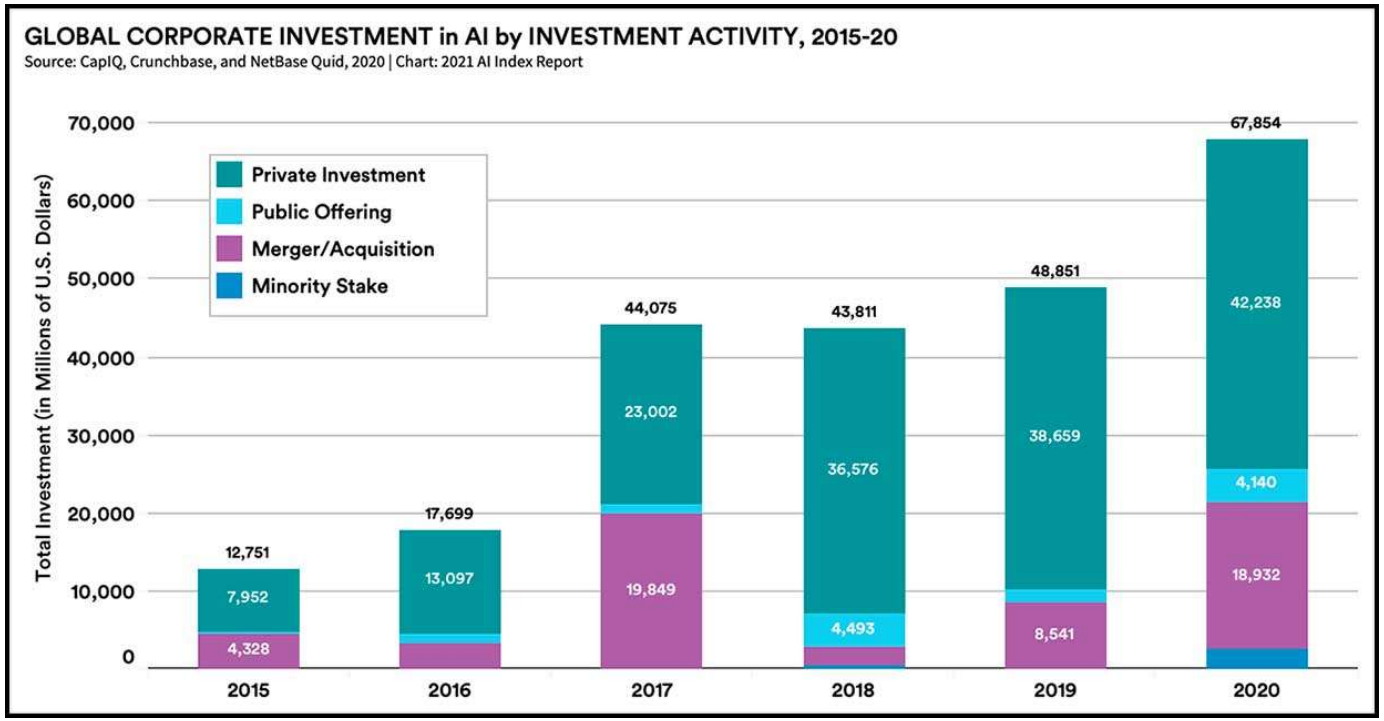
NLP[1] Hyper Growth



[1]NLP: Natural Language Processing

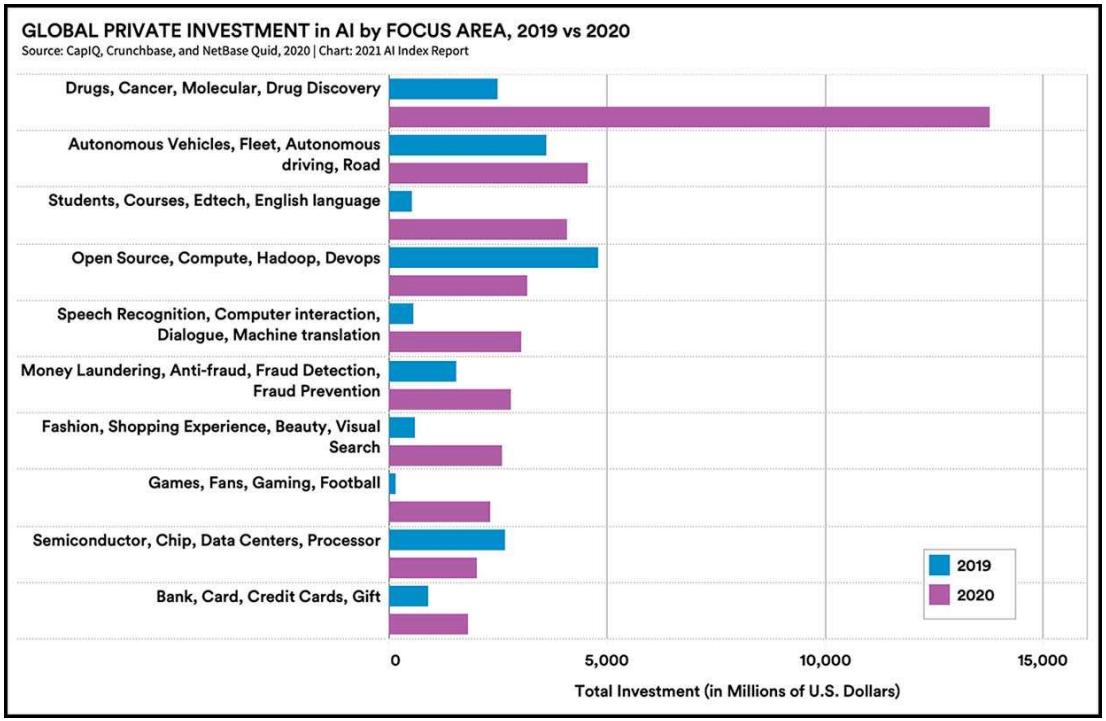
HOW?

Investment Boost



WHY?

COVID Effect



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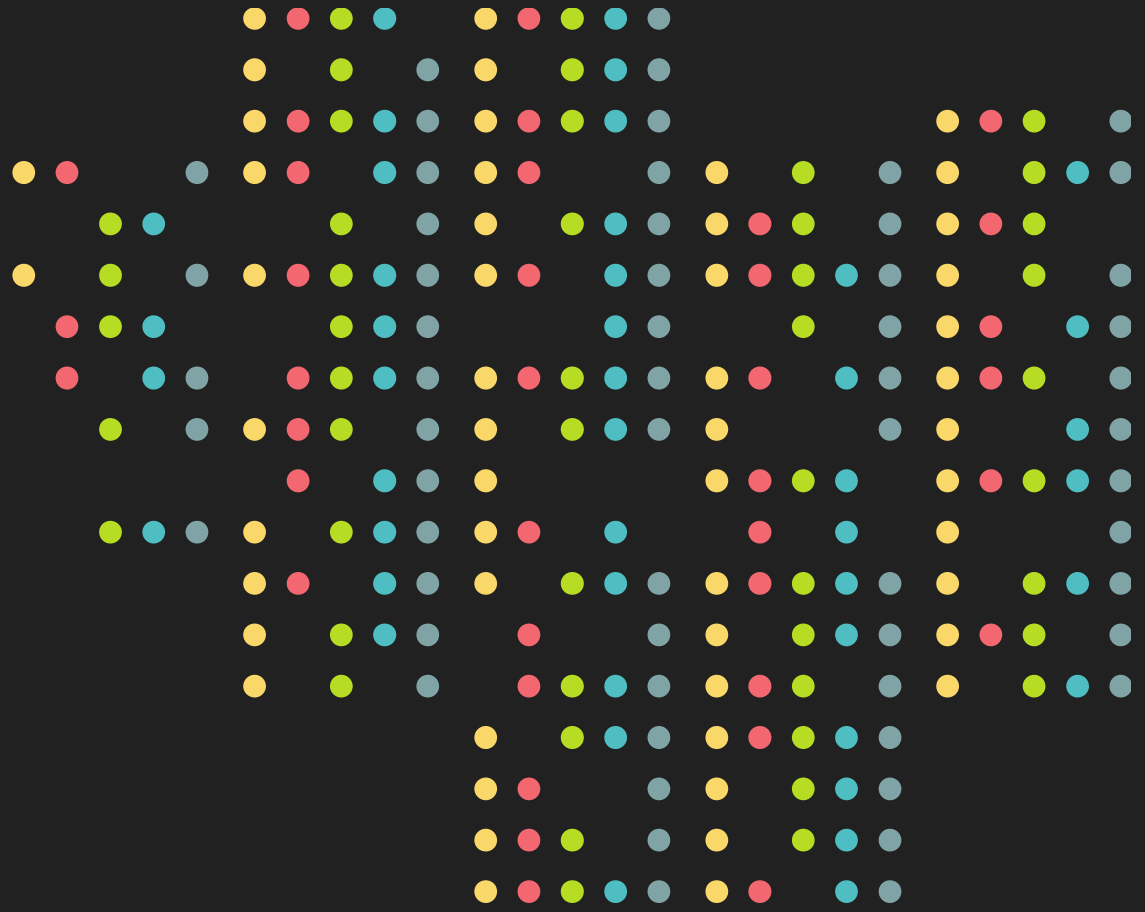
Smart4RES

Introduction

Maria Inês Marques
EDP NEW



Project Smart4RES

Next-Generation Modelling and Forecasting of Variable Renewable Generation for Large-scale Integration in Energy Systems and Markets

6 countries

12 partners

End-users

Research

Meteorologists

Funds: H2020 programme

Budget: 4 Mio€

Duration: 3.5 years

11/2019 – 4/2023

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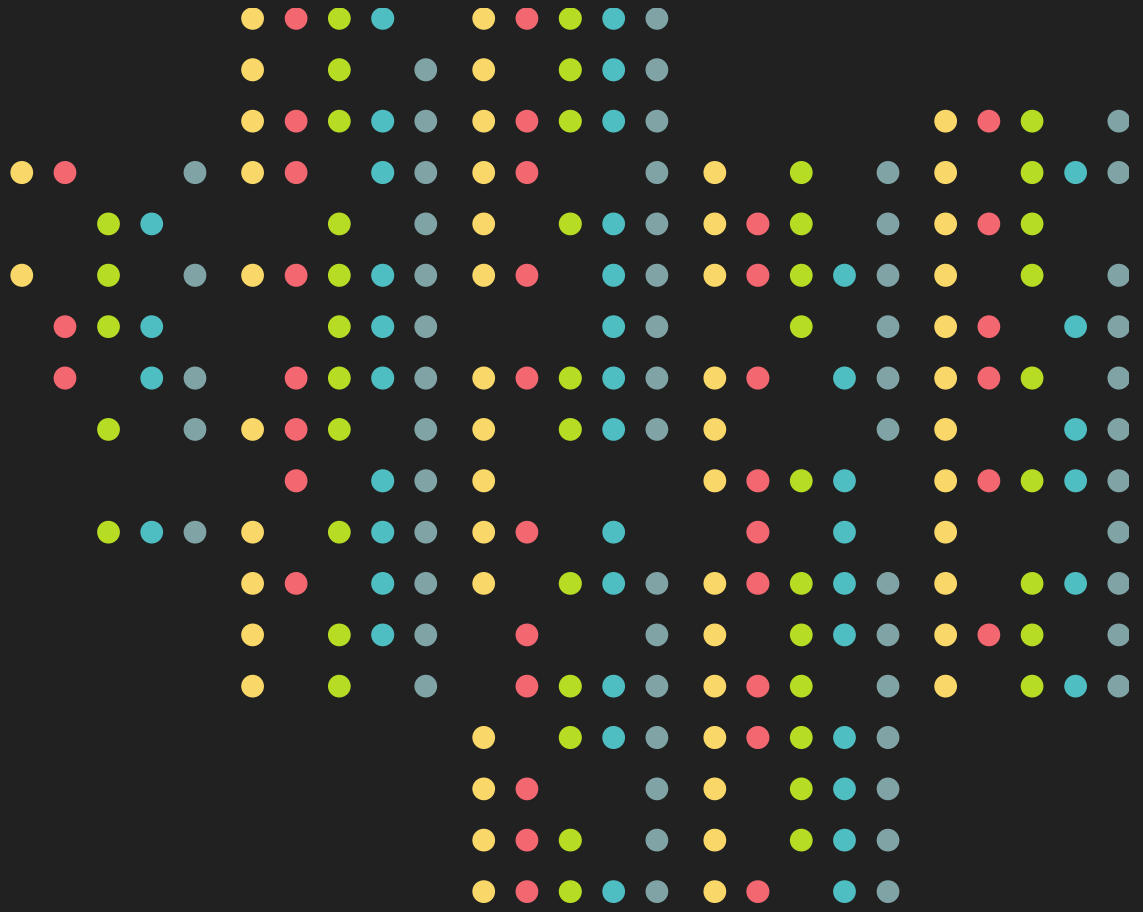
Smart4RES

Project Overview

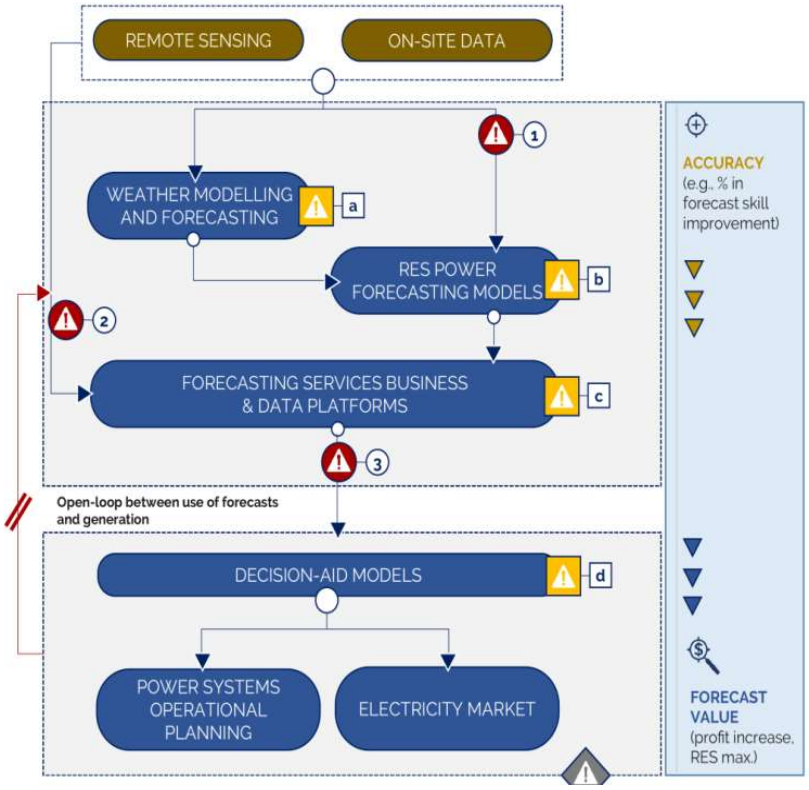
Ricardo Santos
EDP NEW



Smart4RES in a nutshell

Smart4RES vision

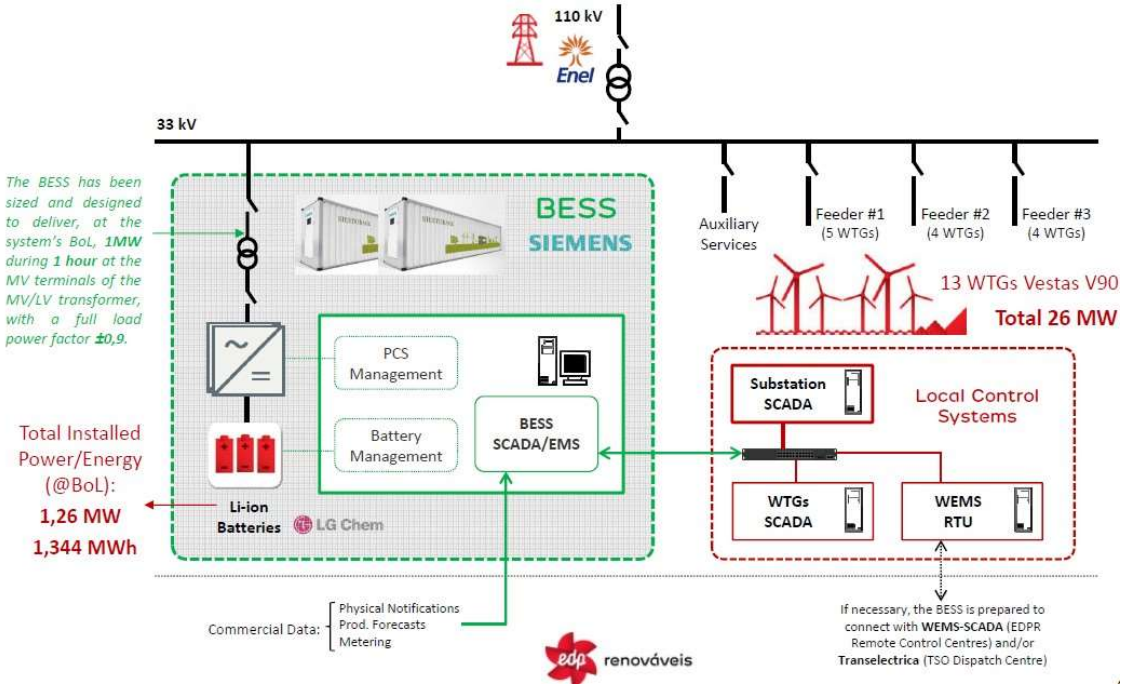
Science and industry closely co-operate to achieve outstanding improvements of RES forecasting by considering the whole model and value chain.




Romania

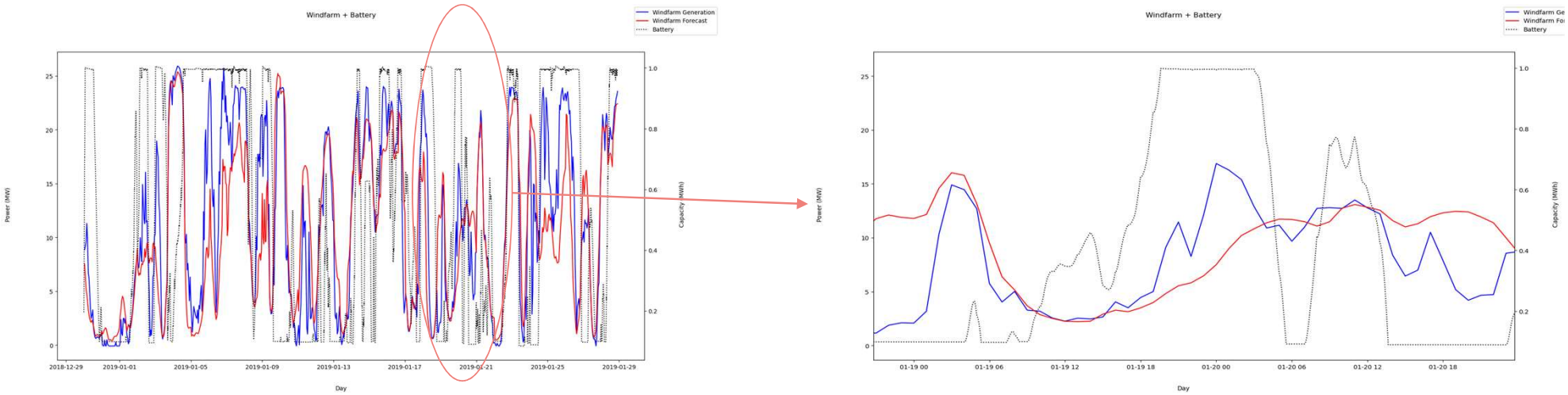

Cobadin

Cobadin Windpark



- System:
  - 2x 13 MW Vestas Wind Turbines
  - 1x 1.26 MW Li-ion Batteries
- Goal:
  - Study the battery capacity to compensate deviations from the WT generation bids to the market
  - **Minimize energy deviations** between the market bids and real-time generation.

EDPR Algorithm



Main Remarks:

1. Generation > Forecast -> Battery Charging
2. Generation < Forecast -> Battery discharging
3. Several periods of stasis on minimum or maximum charge, since the battery capacity is small

Performance KPI

Compensation Ratio

Definition:

A measure of the amount of energy deviations, between generation and forecast, that the battery is able to compensate.

$$C = \frac{D_C}{D.B}$$

C = Compensation ratio,

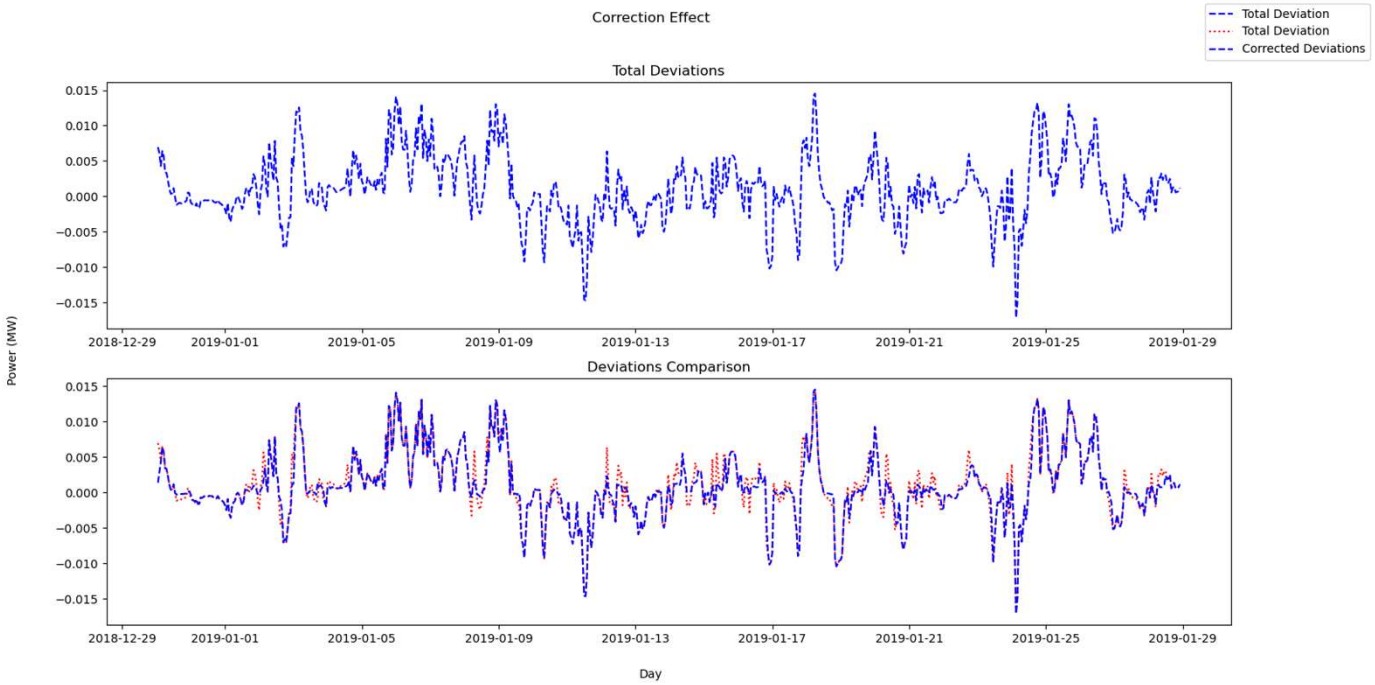
Dc = Deviation compensation

D = Total deviations

B = Battery capacity

Ratio over 1 month period:

$$C = 12.5\ \%$$



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Round Table

The future of renewable energy forecasting

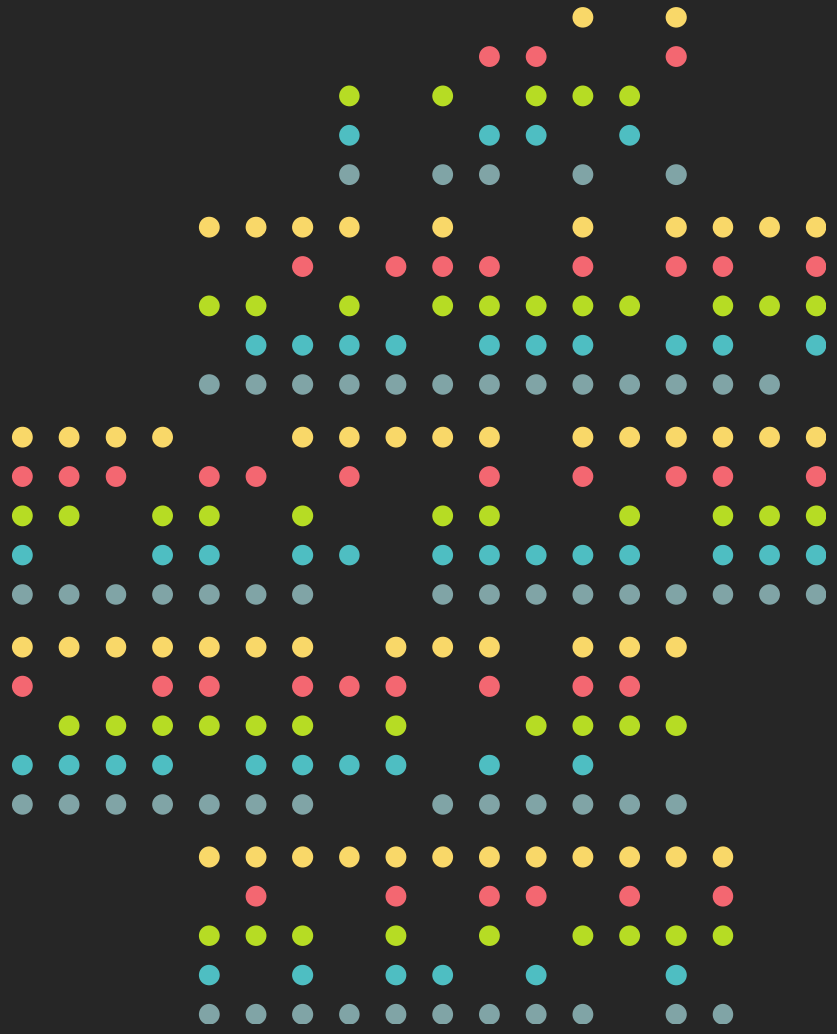
Simon Camal
ARMINES / MINES Paris

Laure Raynaud
Météo-France

Ana Garcia
EDP Renewables

NEW edp

QUESTIONS?



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Monica.fernandes@edp.com

Thank you!

July 21st 2021