



# FarmCoilers

## Towards Integrated Wind Plant Control: Combining Power Plant and Farm Flow Control

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# FarmConnors



"We've researched wind farm control for more than a decade, and the promise is great. – Why can't you buy it?" (2018)

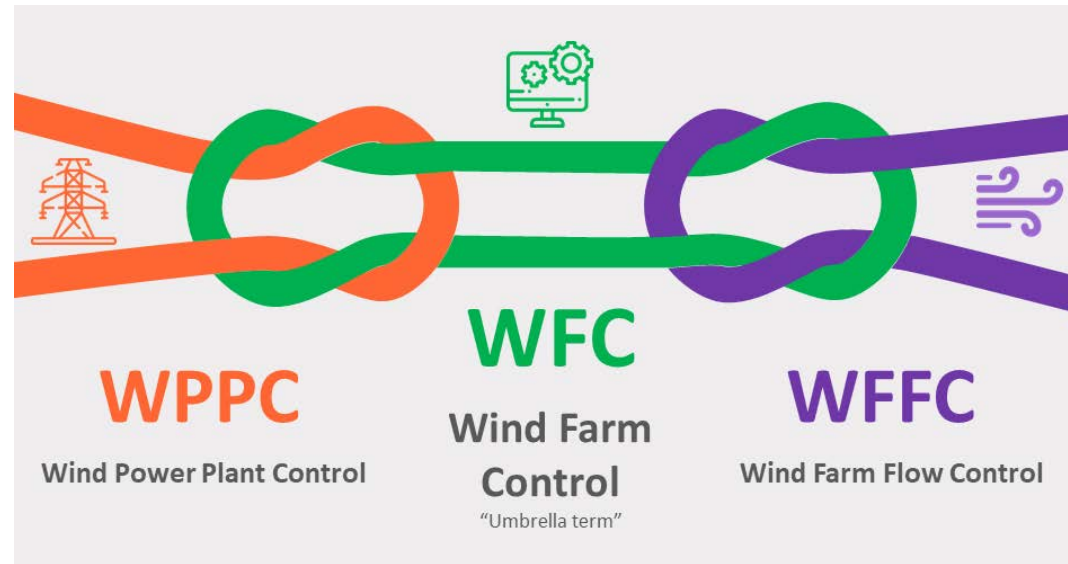
- EU H2020 Coordination Action
- Supports the implementation and industrialisation of **Wind Farm Flow Control**
- 2019 – 2022
- Partners: research institutes, industry and certification agencies

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# Wind farm control

= coordinated operation of wind turbines in a wind farm

- Wind farm as power plant
- Connection to power system, compliance to grid codes and provision of ancillary services



- Aerodynamic interactions between wind turbines
- Mitigation of wake effects, lifetime extension
- No standard control function (yet)

Figure from Eguinoa, I., et al. *Wind farm flow control oriented to electricity markets and grid integration: initial perspective analysis*, 2021. <https://doi.org/10.1002/ad2.80>

# Power system operation

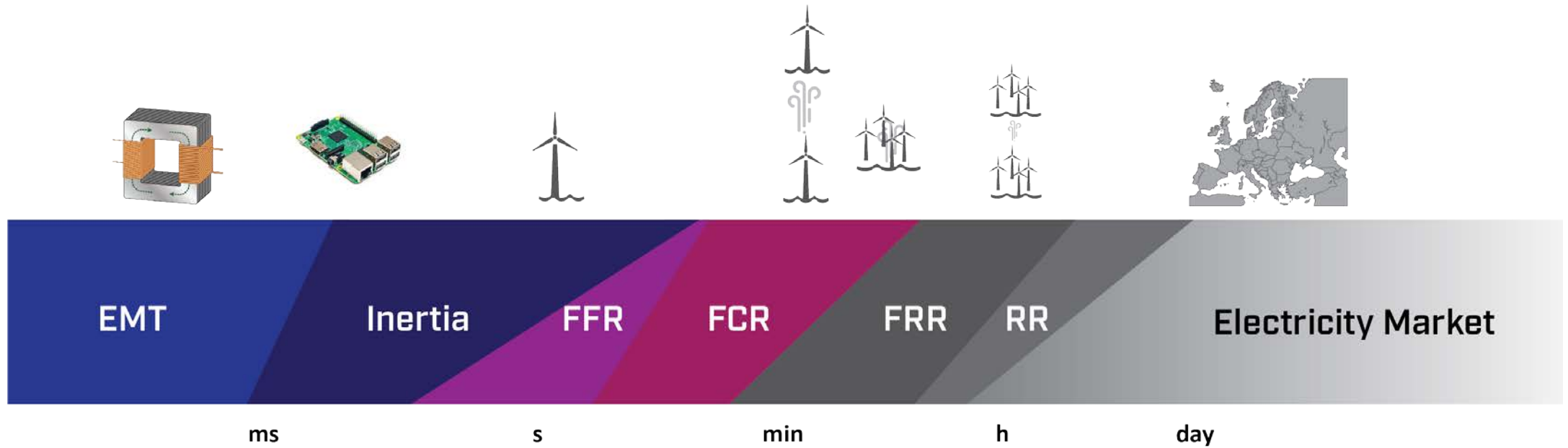


Figure from Kölle, K., et al. *Towards integrated wind farm control*, 2022 [unpublished].

# Towards integrated wind farm control

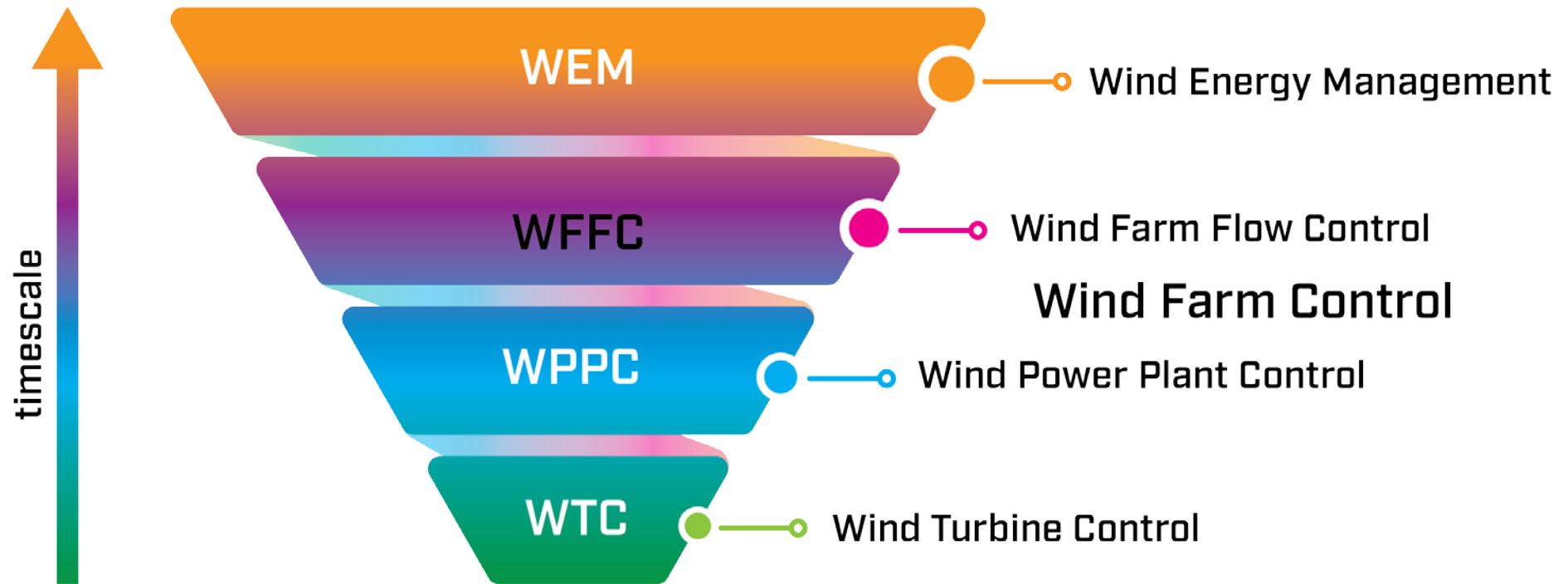


Figure from Kölle, K., et al. *Towards integrated wind farm control*, 2022 [unpublished].

# Extract from survey about the integration of WFC

Most participants from industry and researchers agree:

- Industry is interested in using WFFC.
  - More evidence is needed to prove increased performance with WFFC.
  - Standardised validation practices are needed.
- WFFC and WPPC should be coordinated.
- Activation of WFFC should depend on environmental conditions.
- Wind turbines should provide an interface for WFC.

# Some challenges of integrated WFC

- ❑ Multidisciplinarity
  - Taxonomy
- ❑ Control objectives
  - Power-point dispatch balancing different objectives
  - Uncertain quantification of revenue, both in control horizon and long term
- ❑ Overall system dynamics
  - Complex interactions
  - Different timescales
  - Fidelity of models for control design
- ❑ Integration with wind turbine control system
  - Proprietary rights
  - Warranty → Certification



# Outlook

Your input?



- Comment and share your experiences
- Answer the survey for [industry](#) and [researchers](#)



FarmConnors paper on challenges



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Let's solve the challenges together!



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