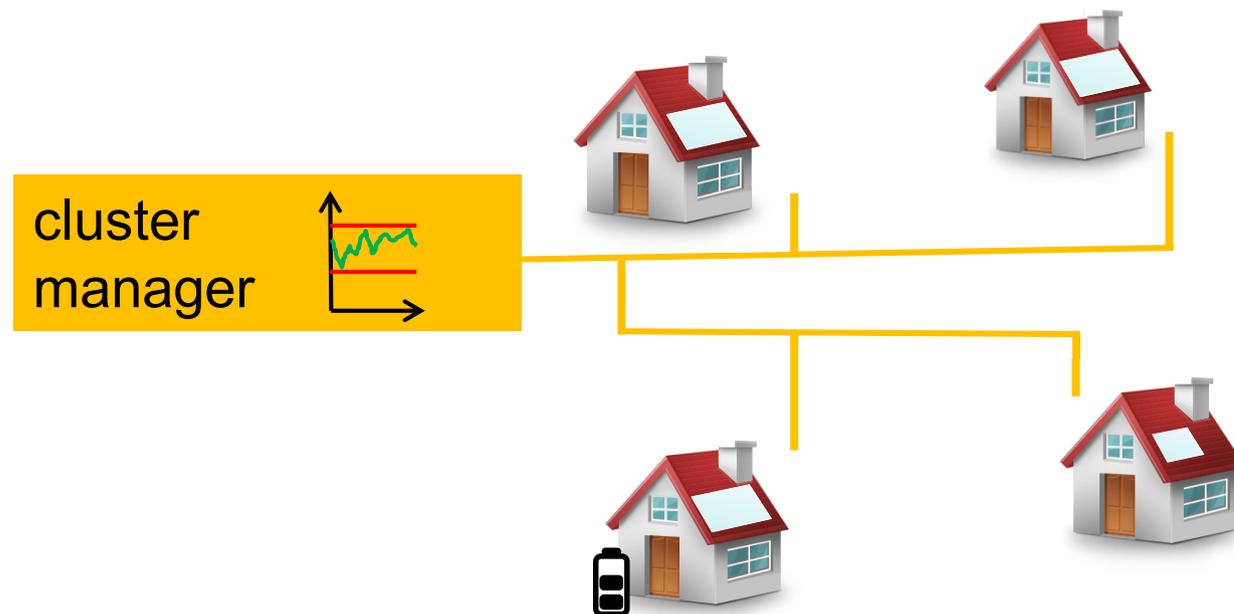


Flexibility of building clusters

IEA EBC Annex 82

Energy Flexible Buildings Towards Resilient Low Carbon Energy Systems



IEA EBC Annex 82

Energy Flexible Buildings Towards Resilient Low Carbon Energy Systems

Background

- «net-zero» goal: need of large scale of renewable energy sources
- flexibility in buildings
- follow up IEA EBC Annex 67 «Energy flexible Buildings»
extensive knowledge on how to obtain and control energy flexibility in buildings
 - flexible consumer: heat pump, chiller, DHW boiler, ...
 - storage possibilities: thermal mass, water storage, batteries, ...
 - penalty signals: costs, self-consumption, peak shaving, CO_{2eq}, load profile, ...
 - controls: on/off, MPC, forecast, ...
 - KPI: flexibility factors, amount, time periode, ...

IEA EBC Annex 82

Energy Flexible Buildings Towards Resilient Low Carbon Energy Systems

Research areas

- scaling from single buildings to clusters of buildings
- energy flexibility and resilience in single and multi-carrier energy systems (electricity, district heating, district cooling and gas)
- acceptance / engagement / barriers of stakeholders
- development of business models
- recommendations to policy makers and government

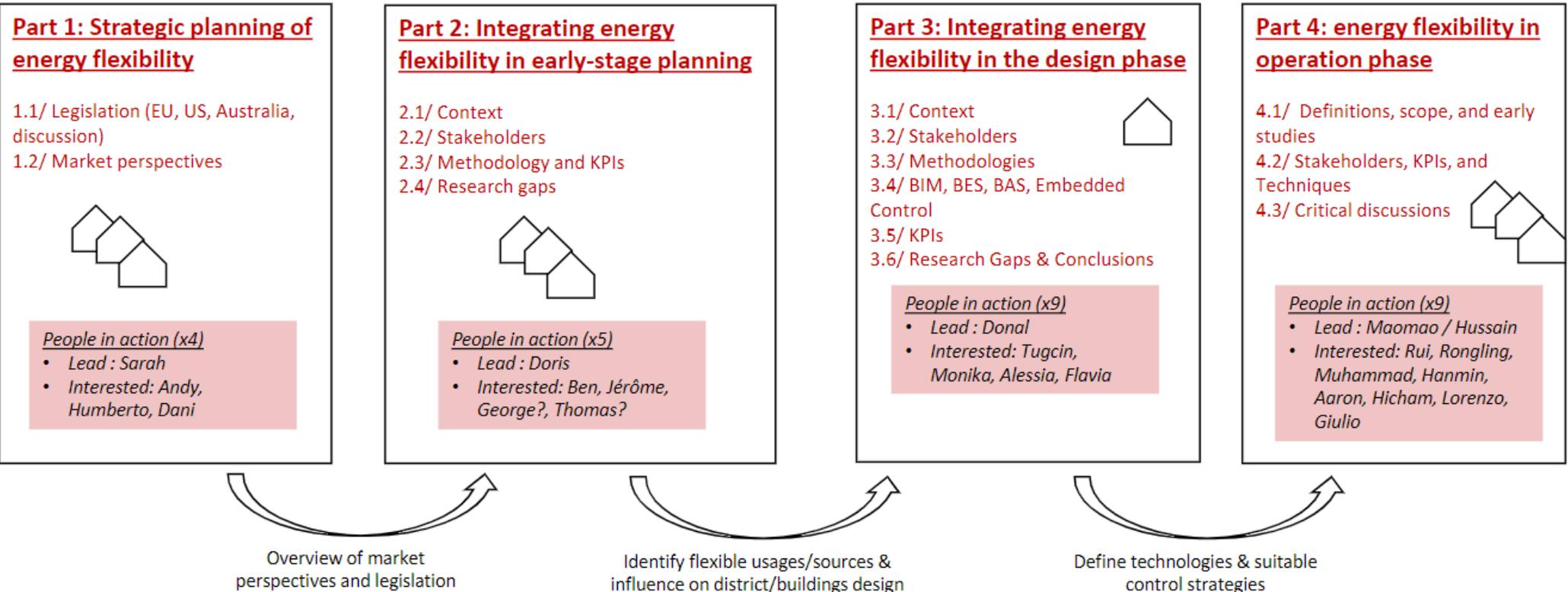
Sturcture and activities IEA EBC Annex 82

SUBTASK A Scaling from single buildings to clusters of buildings	SUBTASK B Flexibility and resilience in multi-carrier energy systems	SUBTASK C Stakeholder acceptance and engagement	Subtask D Development of appropriate implementation (business) models
Activity A.1. Methodology for characterisation of energy flexibility from clusters of buildings FHNW	Activity B.1. Characterization methodology for flexibility and resilience in multi-carrier systems	Activity C.1. Analysis of stakeholder's behaviour, acceptance and engagement	Activity D.1: Business cases from the perspective of the consumer and the solution provider side
Activity A.2. Forecasting energy flexibility from clusters of buildings	Activity B.2. Control of existing multi-carrier energy systems to improve flexibility	Activity C.2. Development of strategies to engage stakeholders	Activity D.2: Value Preposition and Benefits of Flexible Systems
Activity A.3 Controlling energy flexibility from clusters of buildings FHNW	Activity B.3. Simulation and Design of future multicarrier energy systems for increased flexibility and resilience	Activity C.3. Recommendations to policy makers	Activity D.3: Least Cost Approach for Flexible Systems
			Activity D.4: Recommendations to policy makers
DISSEMIANTION & DELIVERABLES			

Literatur review STA 1.1

Energy flexible districts: a review of methodologies & tools from planning to operation

FHNW



STA 3 Controlling energy flexibility of building clusters

FHNW

A3.1 - Definition/acquisition of aggregator's and DR penalty signals to activate flexibility sources

Should we keep this activity?

Lead: Monika Hall, George Dawes
Participants: George Dawes, Tugcin Kirant, Rui Lopes, Monika Hall, Philip White

Topics:
Possible activities:

A3.2 - Development of cluster level control strategies considering energy flexibility forecasting and imposed penalty signals

Lead: Lorenzo Nespoli (?)
Participants: Maomao Hu, Alessia Arteconi, Jérôme Le Dréau, Lorenzo Nespoli, Tugcin Kirant, Giulio Tonellato

Topics: Single energy carrier.
Centralized control? Decentralized control? Distributed control?

Possible activities: coordination with STB? Participants from both Subtasks?

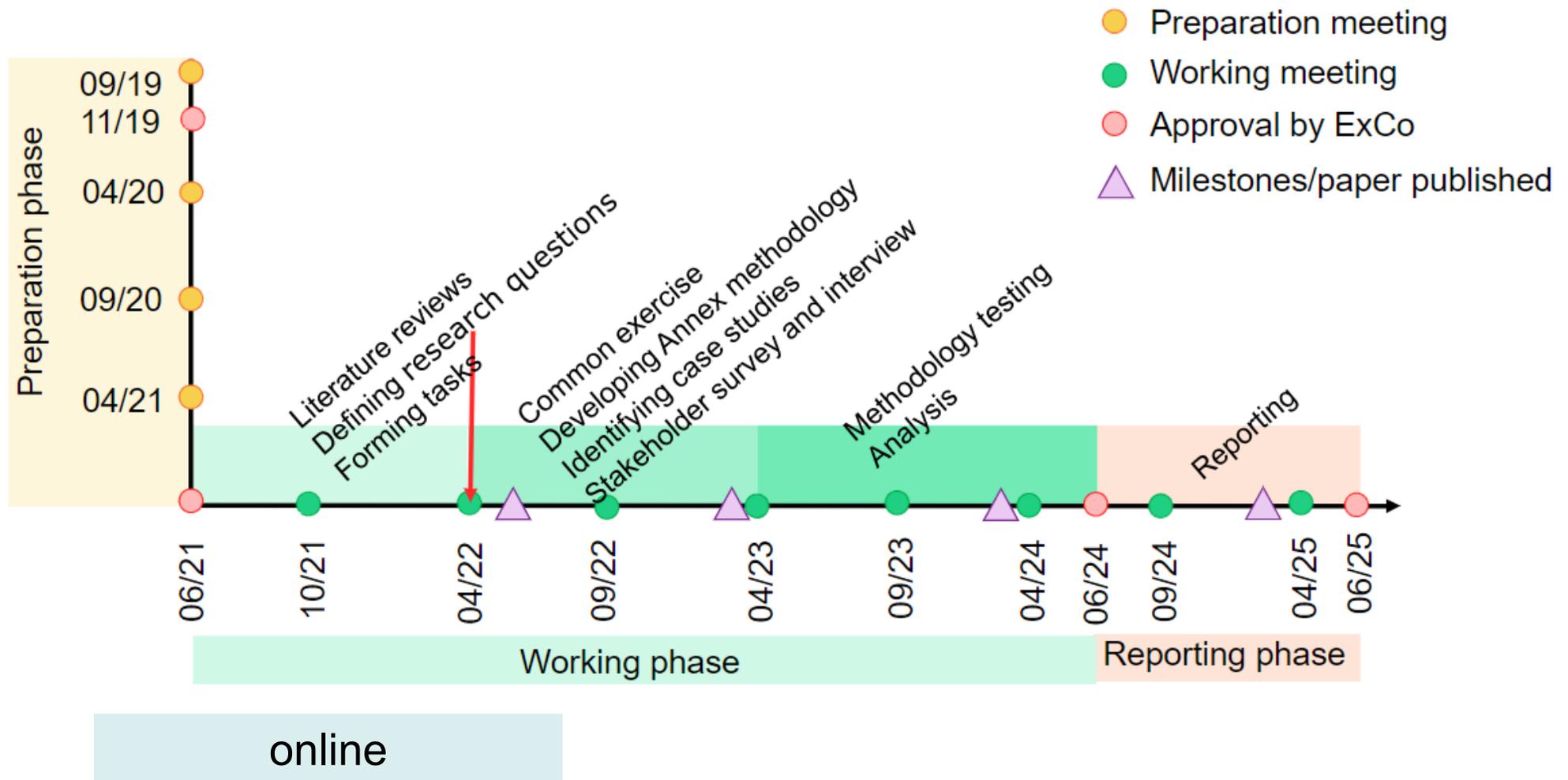
A3.3 - Assessment of control strategies based on simulations and field studies (including the influence of penalty signals on the exploited flexibility)

Lead: ?
Participants: Maomao Hu, Alessia Arteconi, Ben Polly, Lorenzo Nespoli, Tugcin Kirant, Hanmin Cai, Giulio Tonellato

Topics: Assessment of control strategies. Types of Penalty Signals? Field studies data?

Possible activities: coordination with STB? Participants from both Subtasks?

IEA EBC Annex 82 – time table



IEA EBC Annex 82

- duration: 2021 – 2025
- work has started
- work groups for literature reviews and paper preparations
- common exercise
- review of activities from STA and STB to merge workgroups
- webinars: Mai STA+B, Sep STD, Nov/Dec STC, Feb/Mar 23
- next Annex 82 meeting: October, Zürich, EMPA
- 193 participants on the mailing list
- 22 countries (CH: EMPA, Green Digital Finance Alliance, FHNW, SUPSI)

- <https://annex82.iea-ebc.org/>

National project «FlexiCluster - Flexibility of building clusters»

- lack of easy-to-use tools to evaluate building cluster in regard of flexibility

Goal

to develop the basics of an easy-to-use tool on available building clusters' data

- flexible consumer
- storage possibilities
- penalty signals
- flexibility potential

National project «FlexiCluster - Flexibility of building clusters»

- detailed (co-)simulation of buildings & grid
- cluster design variations: heat pumps, PV, battery, head demand, ...
- load management with different penalty signals
- excel sheet for easy designing of flexibility in building cluster
- participation in STA

