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Project 4 – Energy Community

Course: INDUSTRIAL ENERGY MANAGEMENT [459MI]

A.Y. 2024/2025

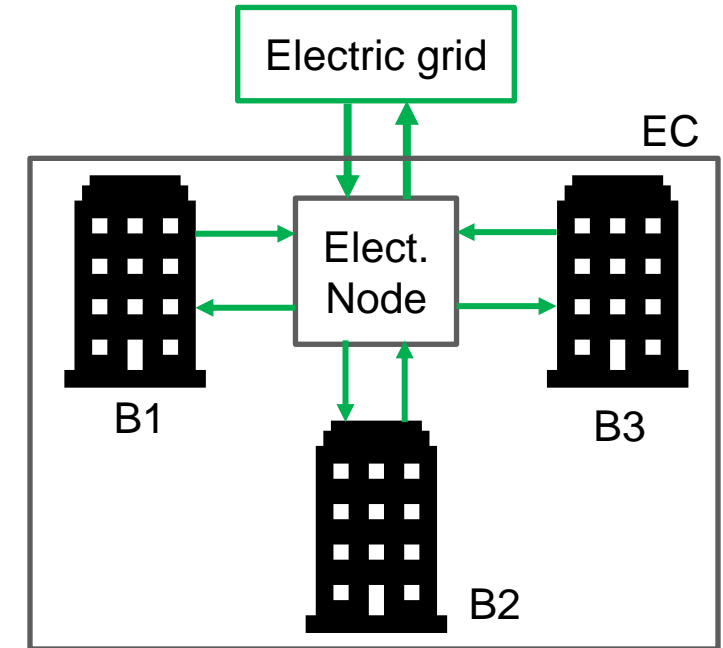
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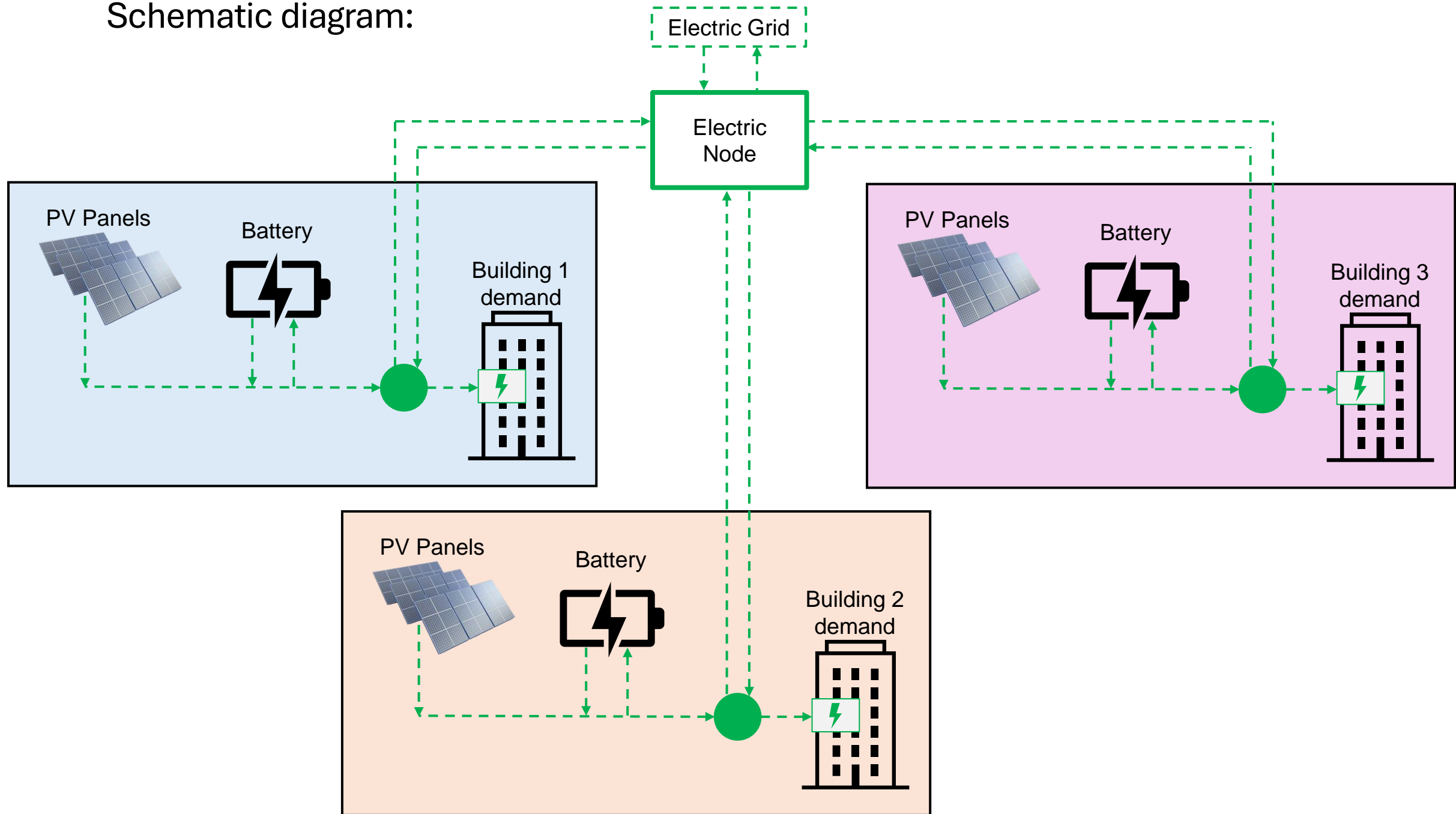
Dipartimento di Ingegneria e Architettura

Project 4 – Energy Community - Overview Description

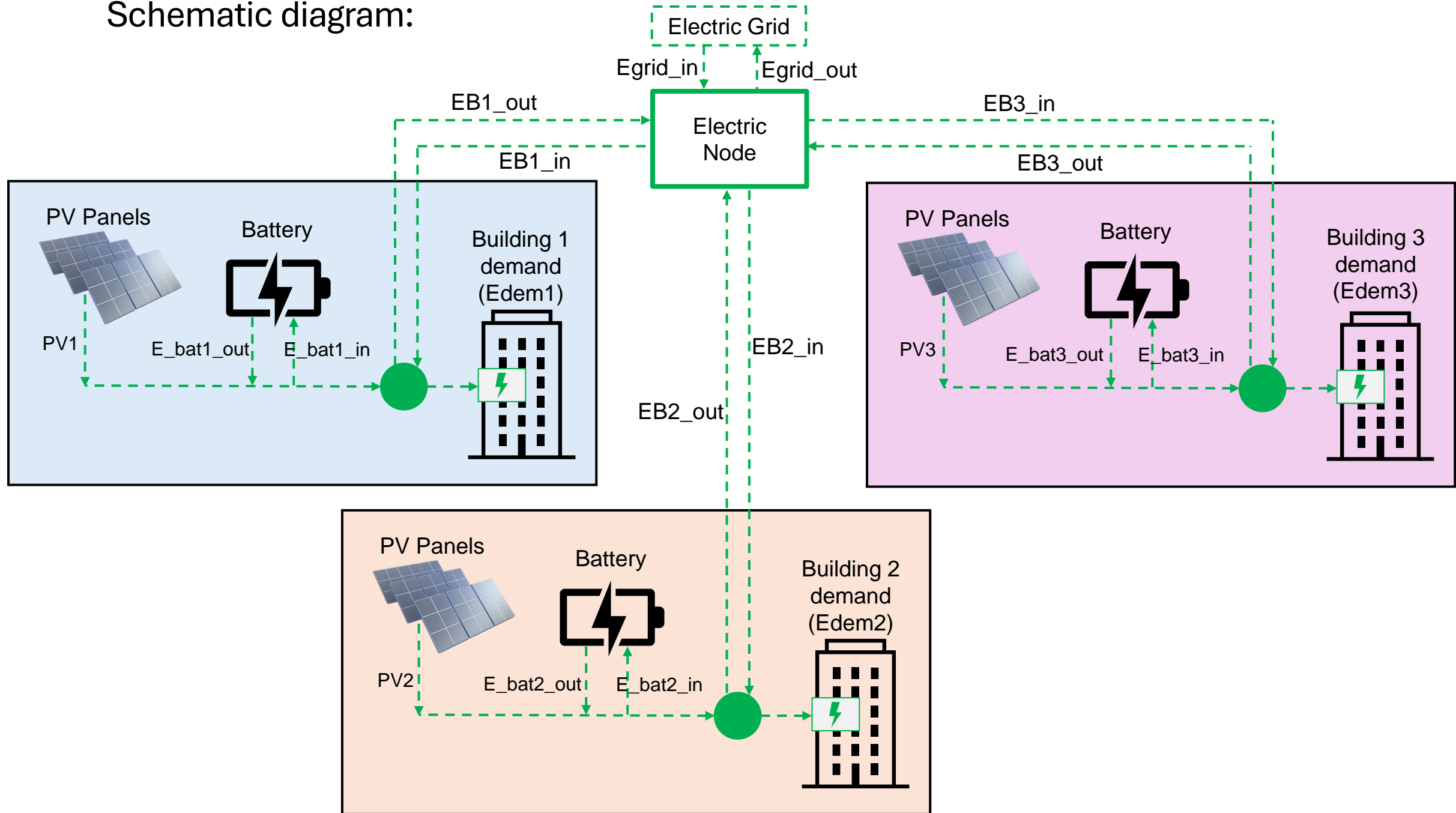
- Energy community composed by 3 buildings.
- Only the electricity demands are considered.
- The buildings are not connected directly to the grid.
- For a single building, the electricity demand can be covered by: PV, battery, and electric node.
- Electric node's role: management of the electricity flow among the buildings and between the EC and the electric grid.
- A given building can send electricity to another one, in the case of PV electricity production surplus.



Schematic diagram:

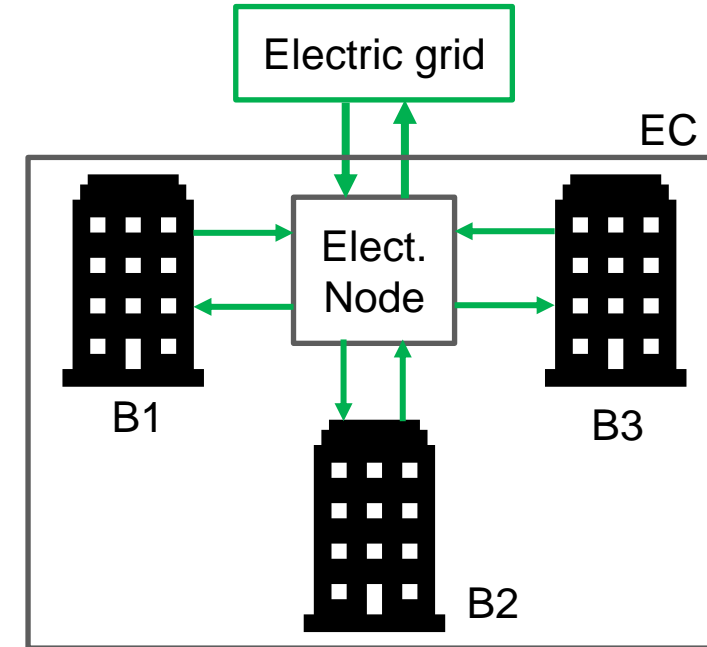


Schematic diagram:



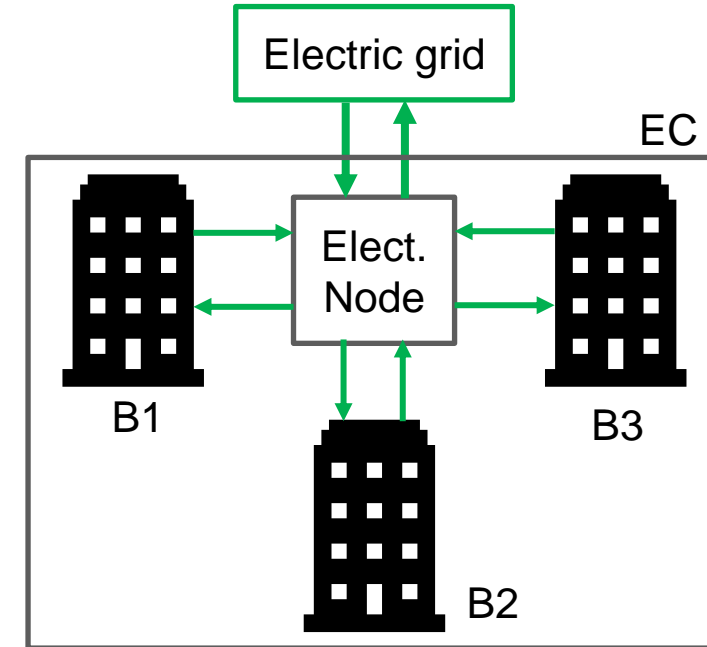
Project 4 – Energy Community - Objectives

- Understand the entire model (e.g. input data, defined variables, defined constraints, objective function, etc.).
- Analyse the electricity exchange among the buildings.
- Identify the hours when such exchanged happened. What were the buildings involved? What was the reason(s) for that exchange?
- Evaluate the electricity source profile (for a given hour):
 - self-consumption (from its own PV panels)
 - battery
 - another building
 - electric grid



Project 4 – Energy Community - Objectives

- What happens with the electricity exchange (building \leftrightarrow node \leftrightarrow building) and (node \leftrightarrow electric grid) if:
 - we increase the electricity purchase price?
 - we increase the electricity selling price?
 - we double the maximum allowed size for the PV panels?
 - we do not allow installation of PV panels?
- Let's consider a 3% loss in the electricity sent from a building to the node. What happens with the electricity flows?





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