

CyDER

**Cyber Physical Co-simulation Platform for
Distributed Energy Resources (DER) in Smart Grids**

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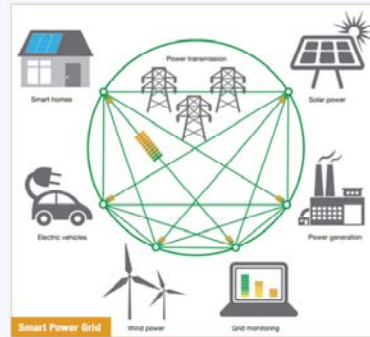


Change to add ipcgrid and Berkeley + project description (team and funds)

Problem Statement

Increasing complexity, Impact on larger system, DERs intermittency
→Lack of visibility for utilities

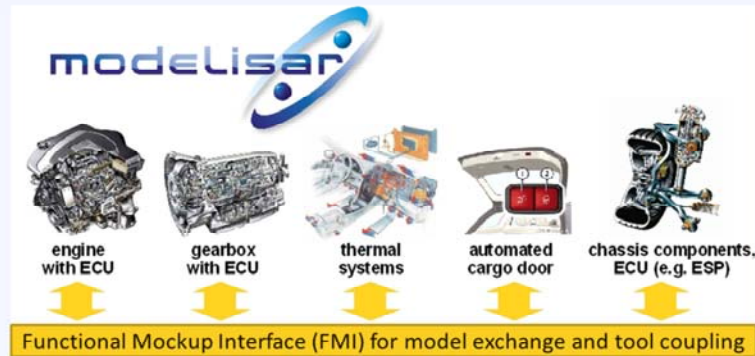
- There are specialized tools to simulate individual aspects of the grid (CymDIST, EnergyPlus, Control modeling)
- A co-simulation platform is necessary to simulate the grid as a whole



Split this slide to represent intro cyder paper

Problem Statement

Developed "FMI" to encapsulate and link models and simulators
Initially a 28 million € European project with 29 partners.
Standardizes API and encapsulation of models and simulators.
First version published in 2010. Second version published in 2014.
Initially supported by 35 tools, now supported by more than 100 tools.



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Developed to encapsulate and link models and simulators

Initially a 28 million € ITEA2 project with 29 partners.

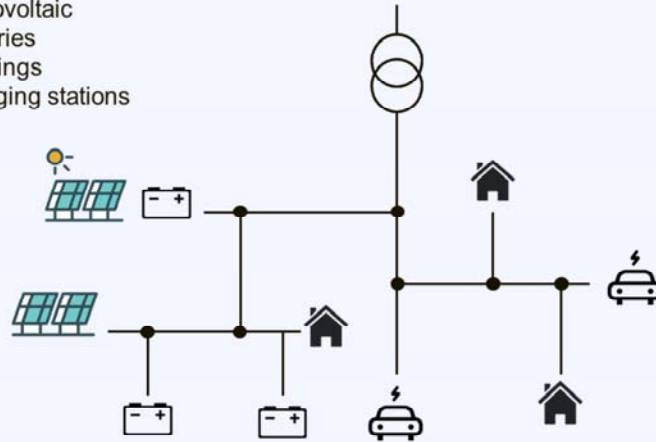
Standardizes API and encapsulation of models and simulators.

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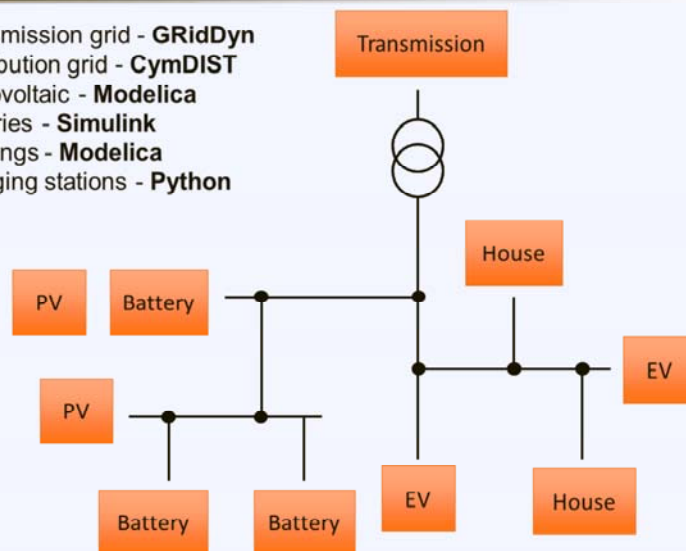
CyDER Concept

- Transmission grid
- Distribution grid
- Photovoltaic
- Batteries
- Buildings
- Charging stations



CyDER Concept

- Transmission grid - **GRidDyn**
- Distribution grid - **CymDIST**
- Photovoltaic - **Modelica**
- Batteries - **Simulink**
- Buildings - **Modelica**
- Charging stations - **Python**



Project objectives

- **Prototype** a cyber-physical **co-simulation platform** to analyze high penetration of DERs
 - Highly modular
 - Scalable
 - Transparent
 - Interoperable with commercial planning tools
- **Utilities** continue to use existing tools, while expanding the simulation capabilities with modules from vendors, and research groups.
- **Industry and research groups** develop tools and new control strategies that can be shared and tested by the community.

