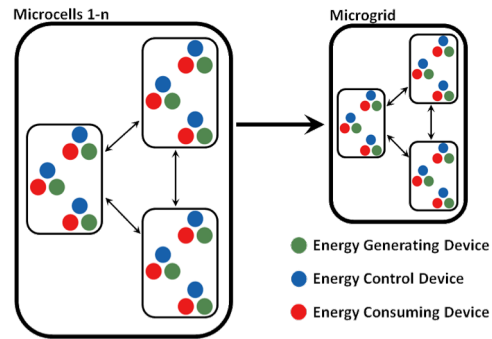


The Smart Energy Problem - Principles of The Lab

Smart energy refers to IT-based approaches to achieve energy efficiency, encompass distributed energy generations, and manage growing volatility of power supply.

In essence, smart energy addresses the local problems of momentary shortage and surplus over time.

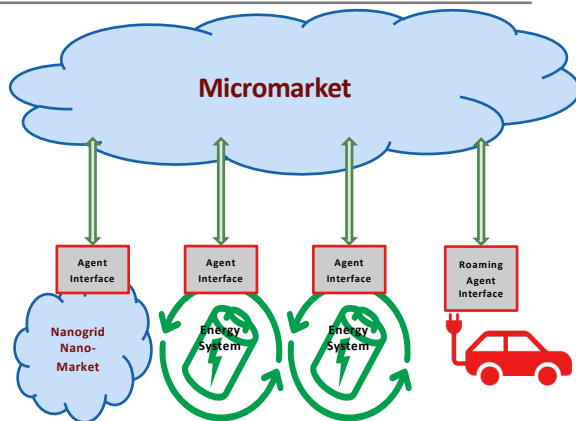
The Lab believes these problems can best be solved locally to meet local needs and desires.



Understanding Microgrids as the Essential Architecture of Smart Energy
https://www.researchgate.net/publication/267927596_Understanding_Microgrids_as_the_Essential_Architecture_of_Smart_Energy

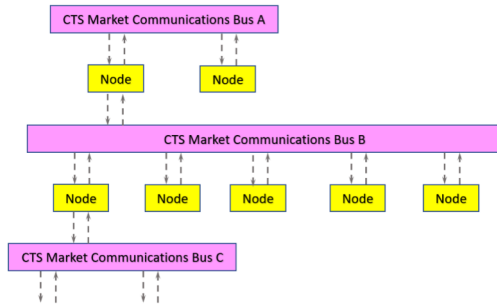
Promise of Transactive Energy is un-filled

- Rapid integration
- Diverse power tech
- Enable rapid innovation
- Preserve privacy
- Honor local and personal autonomy



The Energy Mashup Lab CTS System

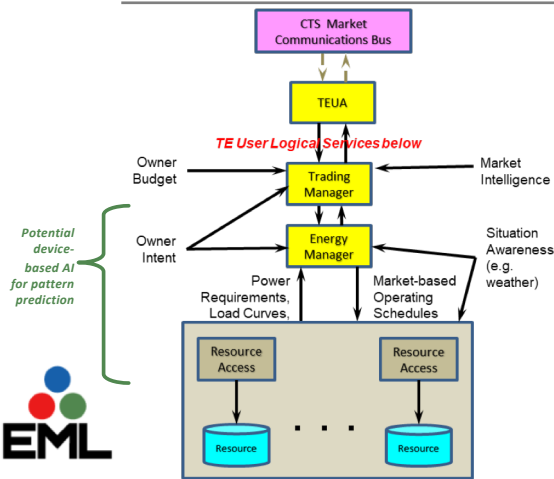
<https://github.com/EnergyMashupLab/eml-cts>



- FOSS Software for Transactive Energy
- Apache 2.0 License for ready uptake
- Fractal ready – no “special” participants
- Actor Model
- Separation of functions to enable interoperation even as technology and regulation evolve
- Open interfaces (CTS) for all interactions
- Independent or Grid-Connected

How will the TE User develop behind the TEU Agent?

The drawing is an abstract functional decomposition, and the components may be collapsed in any way that makes sense



- TEUA interacts with the market
- Trading Manager directs TEUA based on owner intent, market intelligence, budget, and algorithm
- Energy Manager interacts with specific systems (resources) through each Resource Access
- Resource Access translates operating schedules into energy requirements, accepts schedules
- Resource is a physical system, possibly pre-existing

No need to wait for permission or for ongoing research in market design