# Demand Response (DR) Enabling Technology Project

CBE
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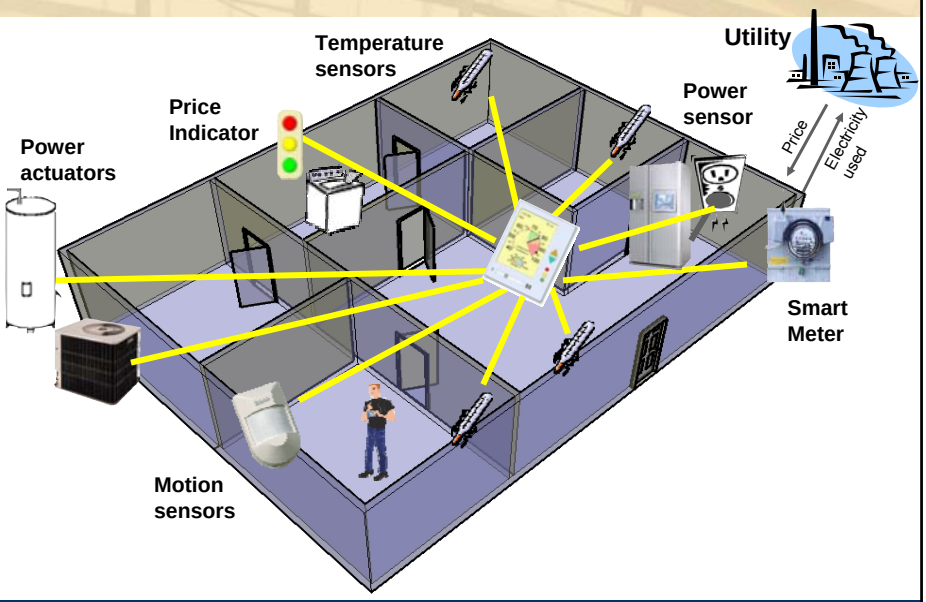
## DR residential energy management

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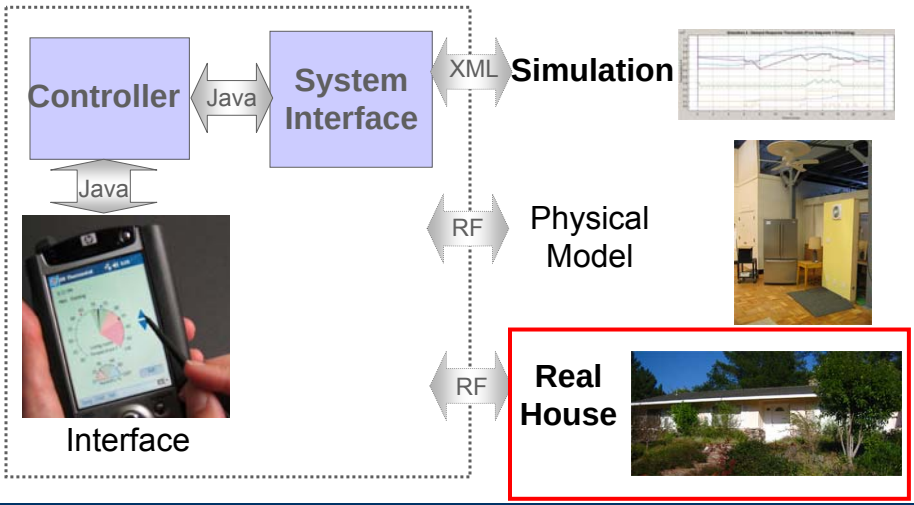
## Control structure

**Control of simulated, model, or real houses**

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## Developments: test house 2005

- **HVAC Control**
- **Indoor Monitoring**
  - Air / globe temperature
  - Relative Humidity
  - Occupancy
- **Electricity metering**
- **Outdoor monitoring**
  - Solar radiation
  - Temperature / humidity
  - Wind speed / direction

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## On-site weather station

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## Indoor environment & occupancy

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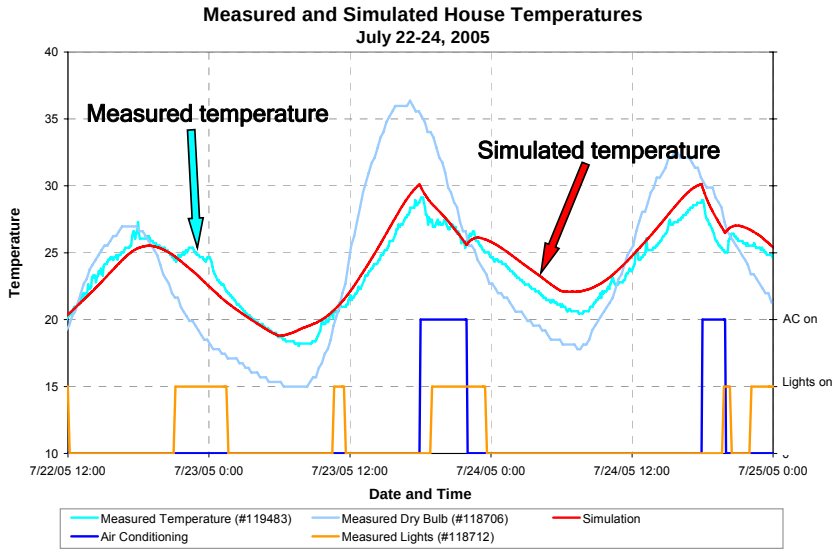
## Findings: simulation results

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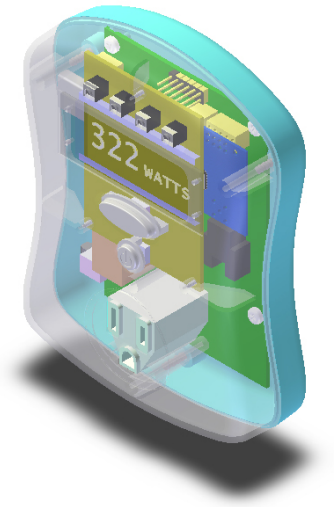
## Electricity: demand-response AC receptacle

- **In-line outlet device for lamps and appliances**
- **Measure AC current, power, energy**
- **Power relay for appliance on/off**
- **TRIAC for lamp/appliance dimming**

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## Next Steps

- **Use data for development of the learning algorithms**
- **Determine which parameters are important and/or correlated**
- **Additional sensors for finer resolution**
  - Example: Whole-house electricity use
    → measure at each line of circuit breaker
    → appliance-level monitoring
- **Simulate dynamic pricing in house**

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## Questions?

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