

Improving Energy Efficiency of Wireless Communication Circuitry in Miscellaneous Electric Loads

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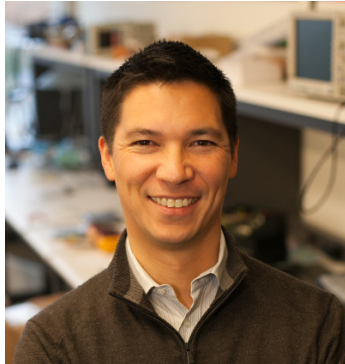
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Team

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MELs Power State
Management

Network and
Integration

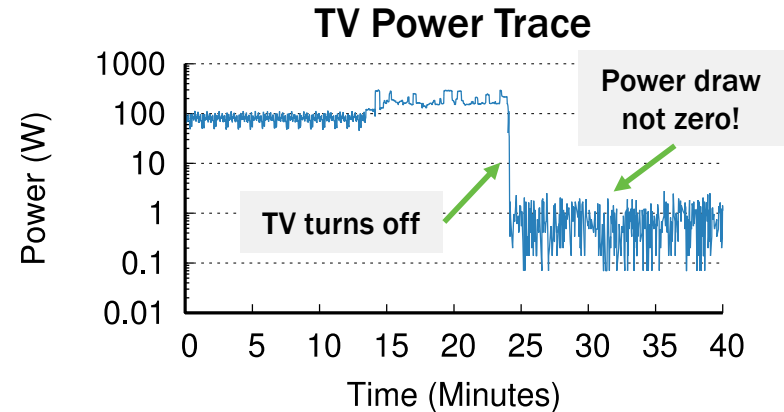
Custom Integrated
Circuits

Cross-hierarchical team to
address MELs connectivity
and efficiency

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The Problem (The Need/Challenge)

Many miscellaneous electric loads (MELs) consume phantom power when off simply to enable connectivity or to remain in standby mode. This small, yet continuous, power draw (typically 1-3 Watts) adds up, costing upwards of \$30/year/home.



Ideally, when a MEL is switched off it would consume zero power.

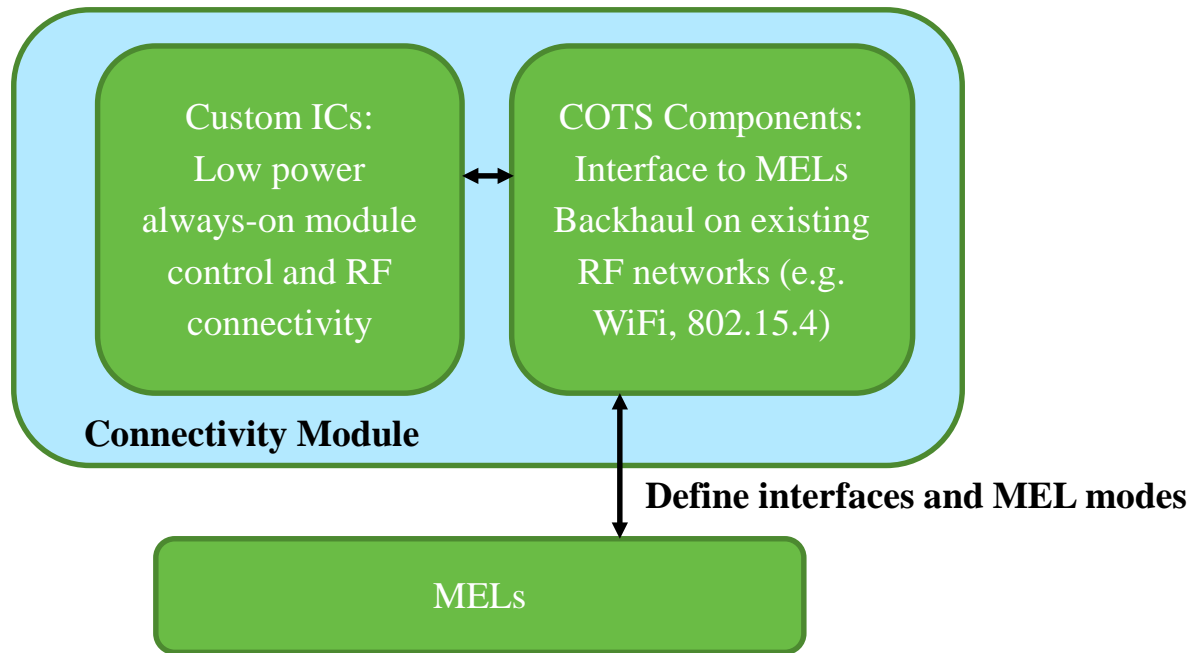
At a national scale MELs are...

- 30% of electricity in residential buildings
- 36% of electricity in commercial buildings

We propose leveraging advances in ultra-low-power wireless radios and smart control methods to cut phantom power consumption of MELs by 60-90%.

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The Solution



- Custom radio frequency (RF) wakeup receiver (WRX) ICs for WiFi and 802.15.4
- Custom ICs for MELs interfacing and continuous control
- Custom printed circuit board (PCB) for integration into Connectivity Module
- Wake on Wireless (WoW) capability
- MELs WoW and control optimization

Advantage, Differentiation, and Impact

- **Custom Ultra-low Power ICs:**
 - Reduce wakeup receiver power from 80mW to $< 1\text{mW}$
 - Reduce controller active power from $\sim 1\text{mW}$ to $< 50\ \mu\text{W}$
- **Connectivity Module:**
 - Reduce WoW latency from 3 sec to $< 30\ \text{ms}$
 - Flexible power state control
- **Phantom Energy**
 - Reduction by 60-90%
 - Show in 20+ appliances

Thank You

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