SOUTHERN CALIFORNIA EDISON®
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CalPlug Workshop Series #9

IOT OPPORTUNITIES AND CHALLENGES AND INTELLIGENT ENERGY EFFICIENCY

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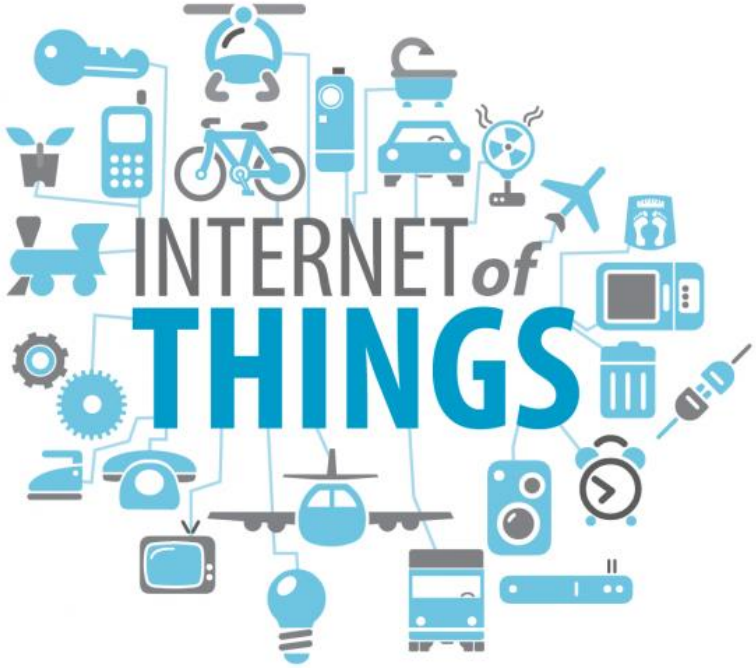
May 12, 2016

“Family Room Lamp”

Internet of Things (IoT)

- The latest "buzz" word
  - IoT is expanding
    - Windows 10 for IoT
    - Lighting and Controls
    - Even the Cloud has IoT



- Many promises, but at what cost?
  - Benefits
    - Automation
    - Connectivity
    - Information
    - Convenience
  - Challenges
    - Replacing simple on/off switches with connected controls
    - Standby Power
    - Network Infrastructure
    - Grid Impacts

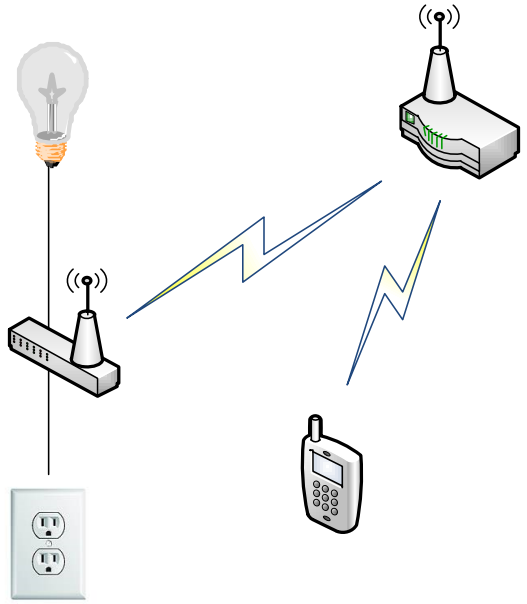
For example…

Before IoT Plug Load Controller

On = 10W
Off = 0W

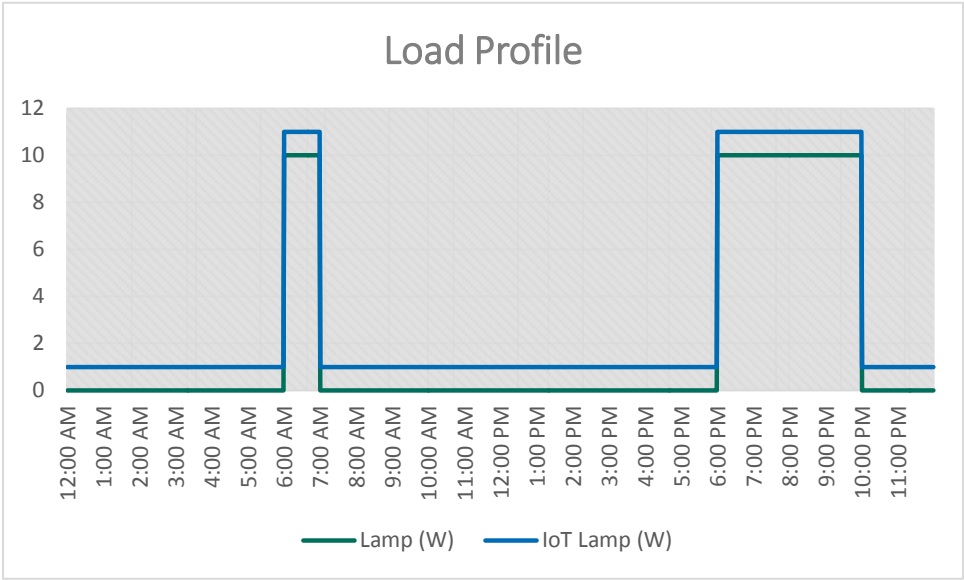
After IoT Plug Load Controller

On = 10W
Off = 1W + 10W



Hypothetically…

- The Regular LED Lamp uses 0.050 kWh per day
- The IoT LED Lamp uses 0.074 kWh per day
- Assume that this happens every day of the year.
  - Regular LED Lamp uses 18.25 kWh per year
  - IoT LED Lamp uses 27.01 kWh per year
  - That's 8.76 kWh a year per plug load control device



- Now if there are at least 4 of these devices per home and about 12.8 Million homes in California.
  - The result is about in an annual energy increase 448 GWh
- This hypothetical example assumes you started with a 10W LED Lamp
- Instead start with a 13W CFL Lamp
  - Just switching to a 10W LED Lamp results in 23% Savings
  - But switching to a 11W IoT LED Lamp results in just a 15% Savings

Other devices to consider

- Within the household:
  - What other devices are there?
  - What is the standby load?
  - What about the hub? How much does that use? 10W?
    - One hub could connect to multiple devices

- Beyond the household:
  - The hub connects to the cloud…what impact will this have on the need for data centers?

Data, Data and more Data

- The promise of IoT enabled devices
  - Connectivity gives us more control
  - Allows us to make smarter decisions
  - Has the potential to make us more efficient energy consumers
    - I can now connect to my washer to start the wash cycle after 6pm provided I loaded my laundry earlier in the day
    - I can now lock and unlock my front door remotely
    - I can remotely control my thermostat
    - I can track my energy use throughout my house
- To do all this requires Data
  - Data is very valuable
  - Having historical data can help predict future energy use
  - The data can change behavior
- Behavior
  - Having more data can improve decision making
  - We can prioritize tasks and change our habits

The needs of the many…

- We need to understand what devices are being used, when they are used and how they are being used.
- What are usage profiles for Mobile devices (aka – Chargers)?
  - What know profiles for Appliances and to some extent home entertainment equipment
  - What about my 10W tablet charger(s)?
    - Do you charge every day?
    - Do you charge while using it?
    - How many do you charge?
- We need to ask ourselves whether we are using the connectivity in the best way.
  - Is speaking to a device to turn something off really faster than flipping a physical switch?
  - Is knowing how much energy you used in the past really of interest to change someone's habits?
  - What's the right amount of Data?
  - How difficult is it to connect your devices? Do they all speak the same language? Is it easy to setup?

Thank you!

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