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What is Demand Response (DR)?

- DR is the change in electricity usage by end-use customers in response to changes in the price of electricity over time [1].

Why is DR important?

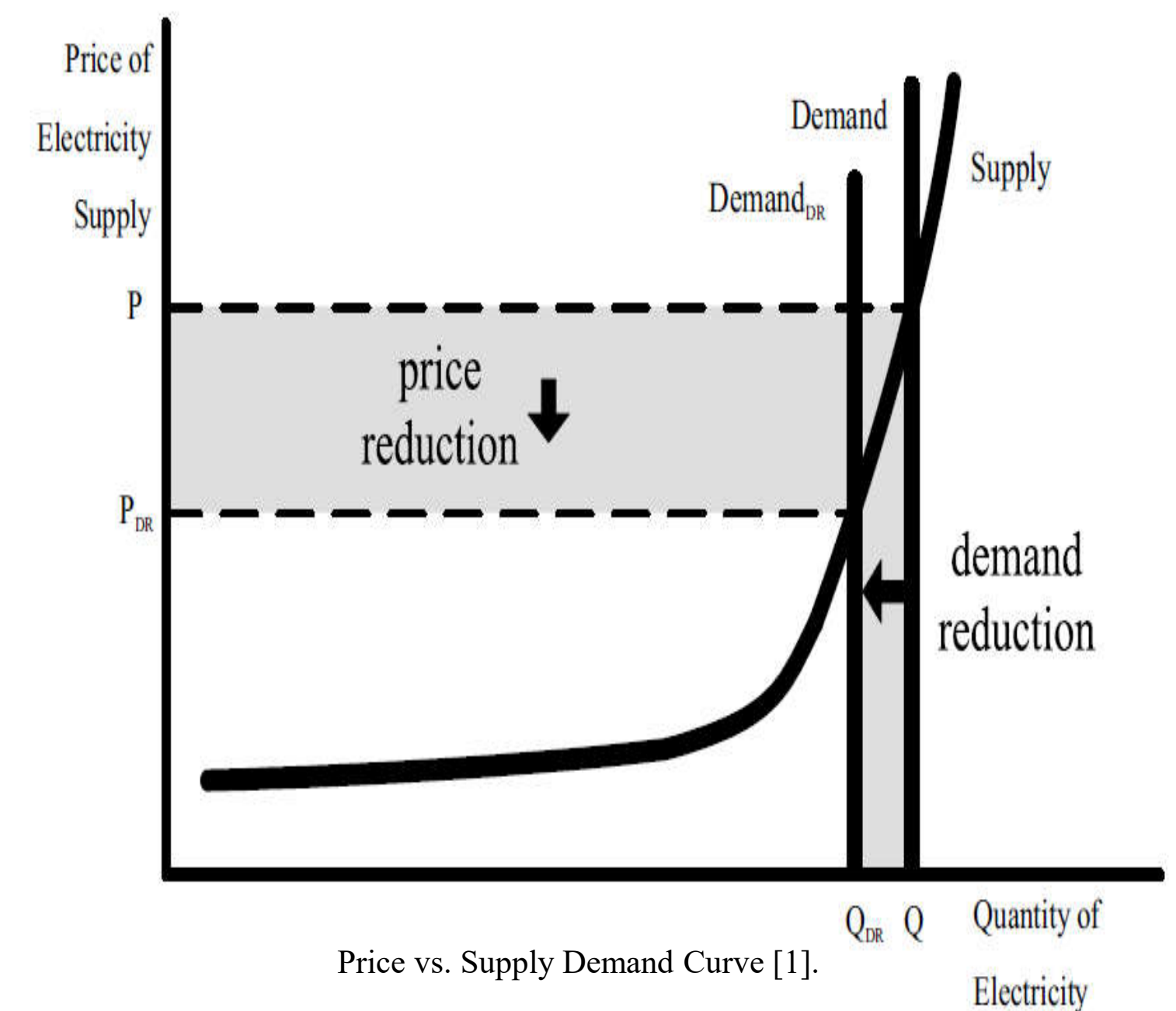
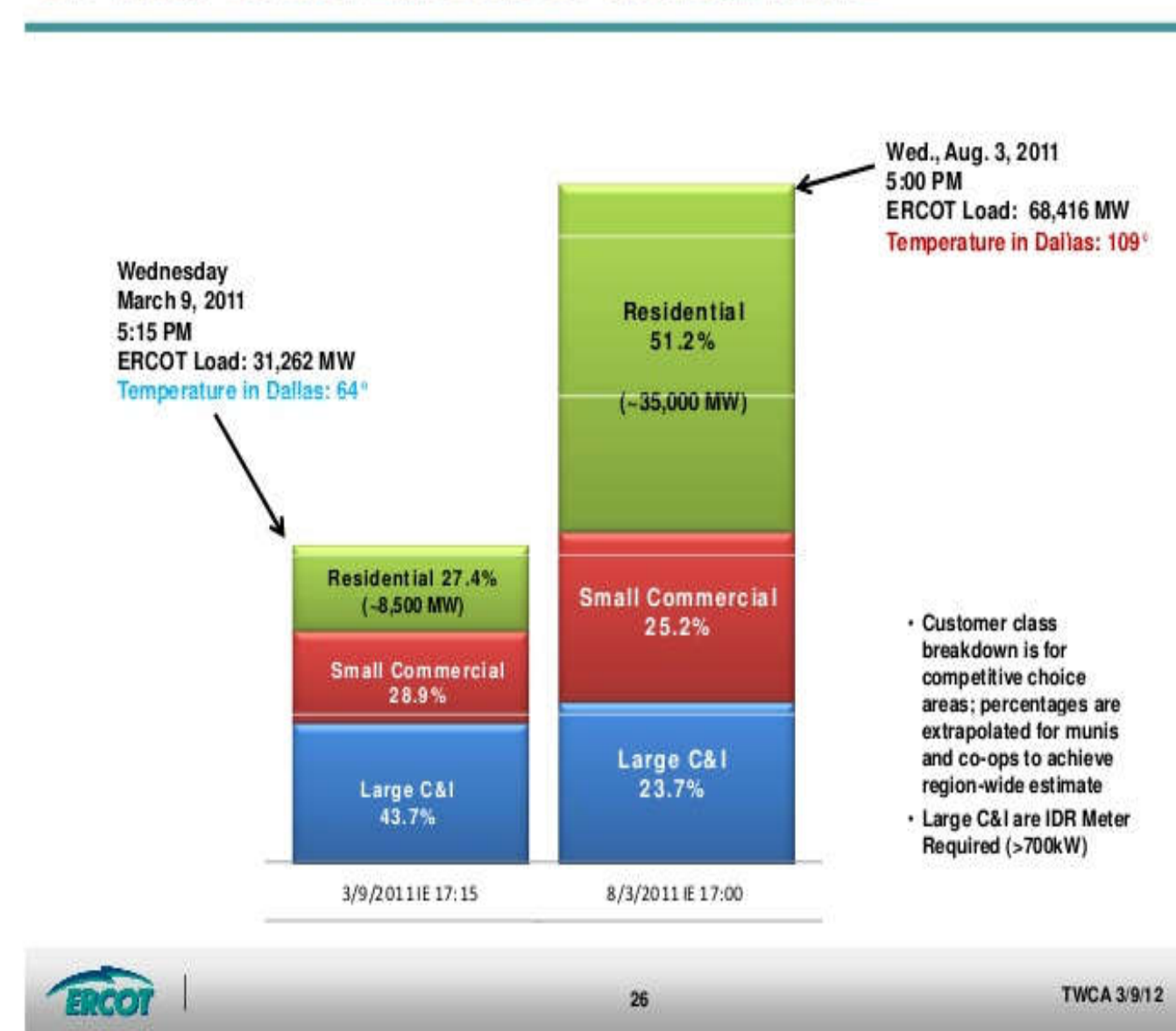
- Saves money
- Reduces energy consumption
- Improves reliability of the Grid
- Prevents rolling blackouts

Why Residential?

- During periods of high demand, residential consumers can account for up to 50% of the total load on a utility company.

Demand Response Background

OFF-PEAK VS. ON-PEAK LOAD BY CUSTOMER TYPE



A/C Devices and Settings Questions

Questions to give insight on how much energy a participant regularly consumes.

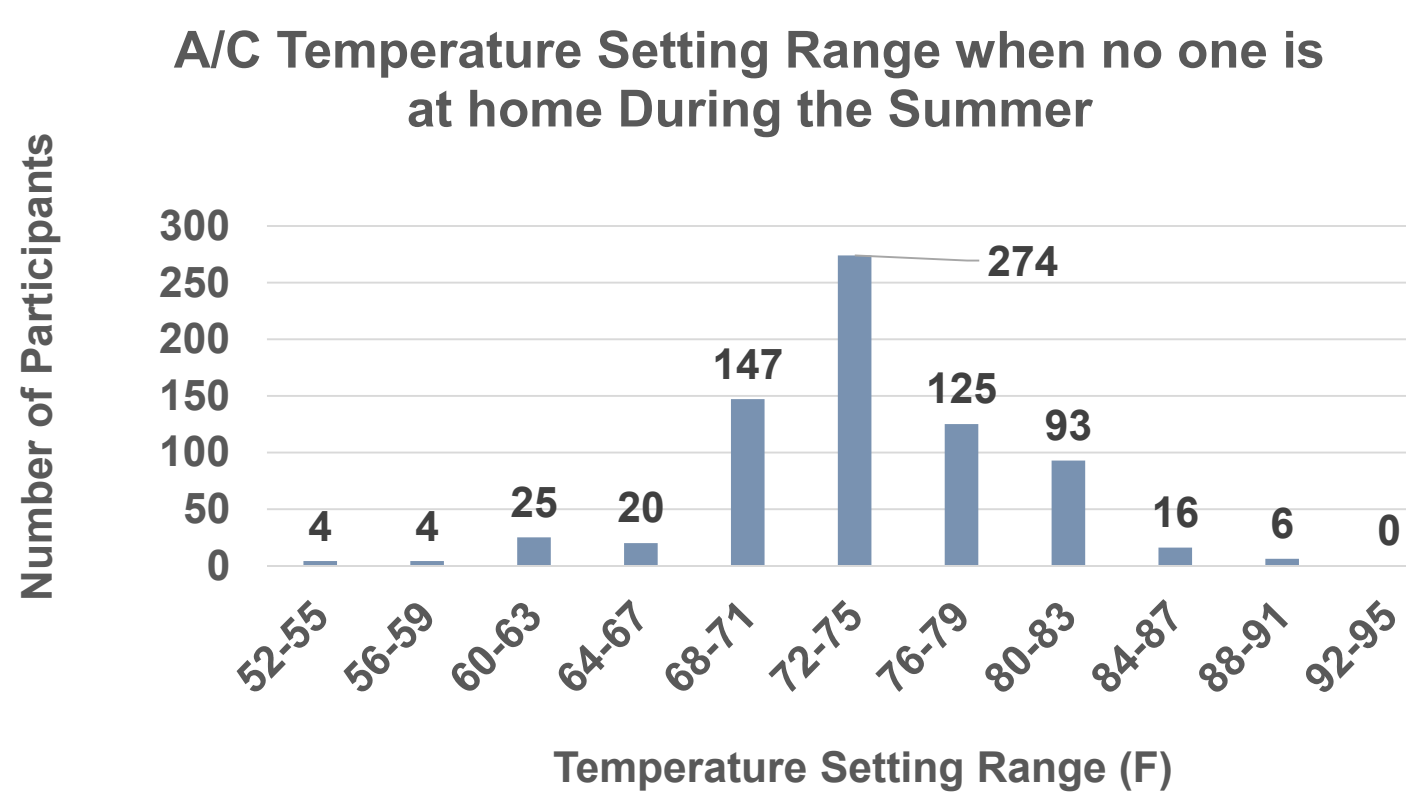
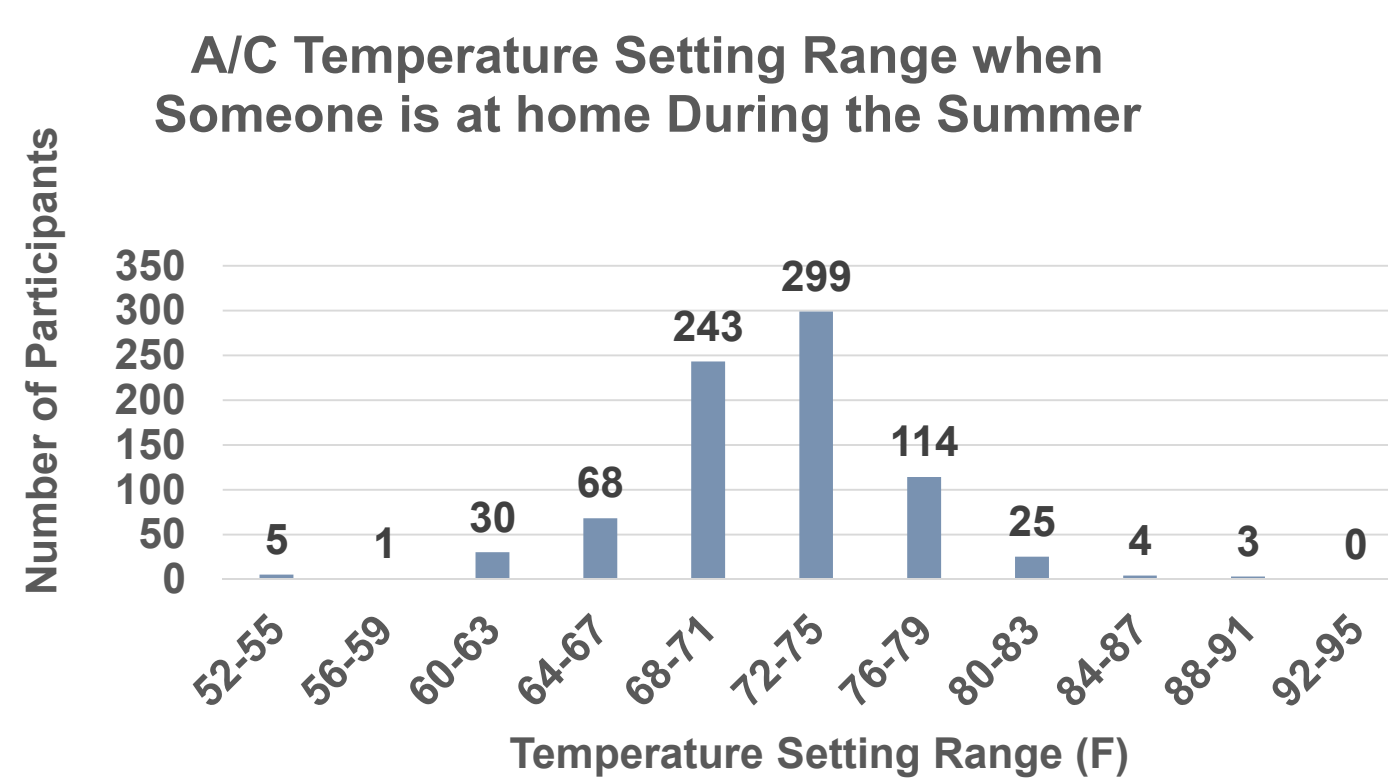
AVG Monthly Bill:
 Summer: \$158.25
 Winter: \$160.16

AVG Monthly Bill TN:
 Summer: \$145.13
 Winter: \$166.71

AVG Monthly Bill TX:
 Summer: \$184.63
 Winter: \$148.95

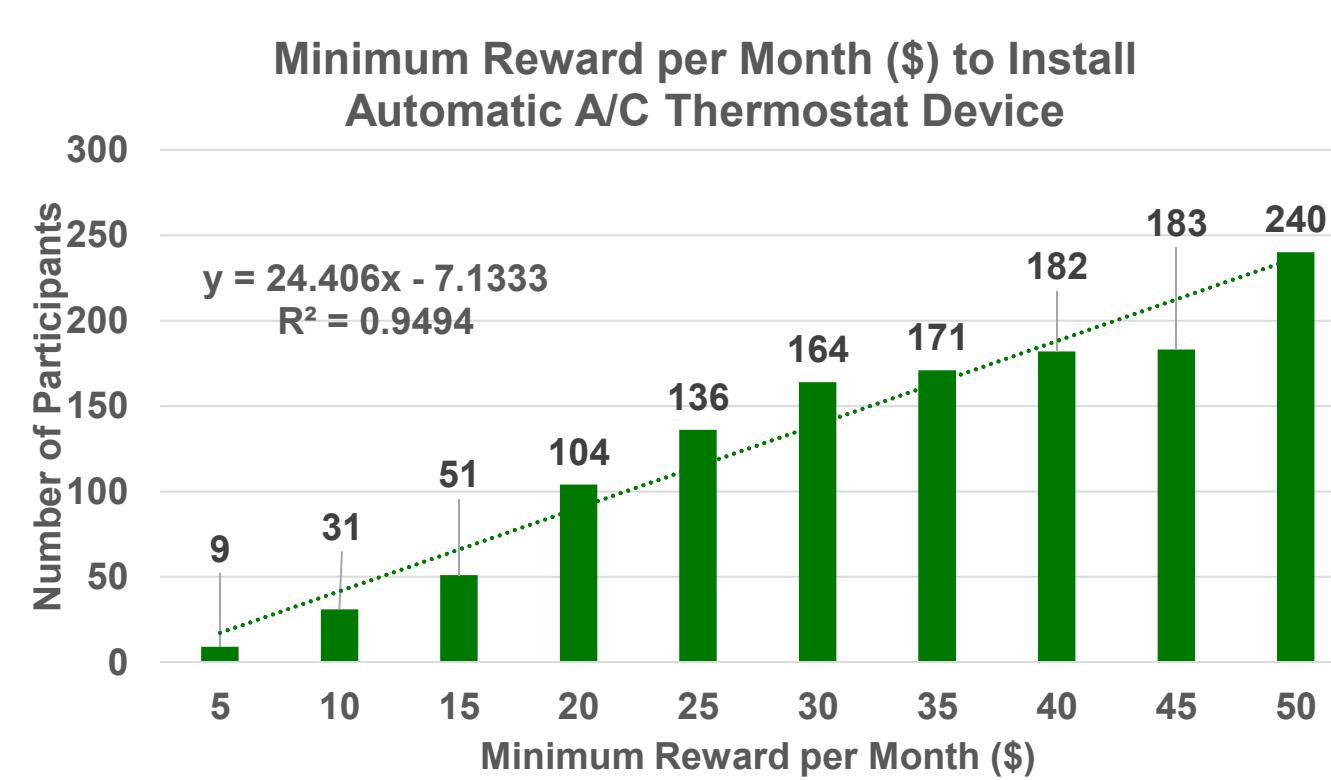
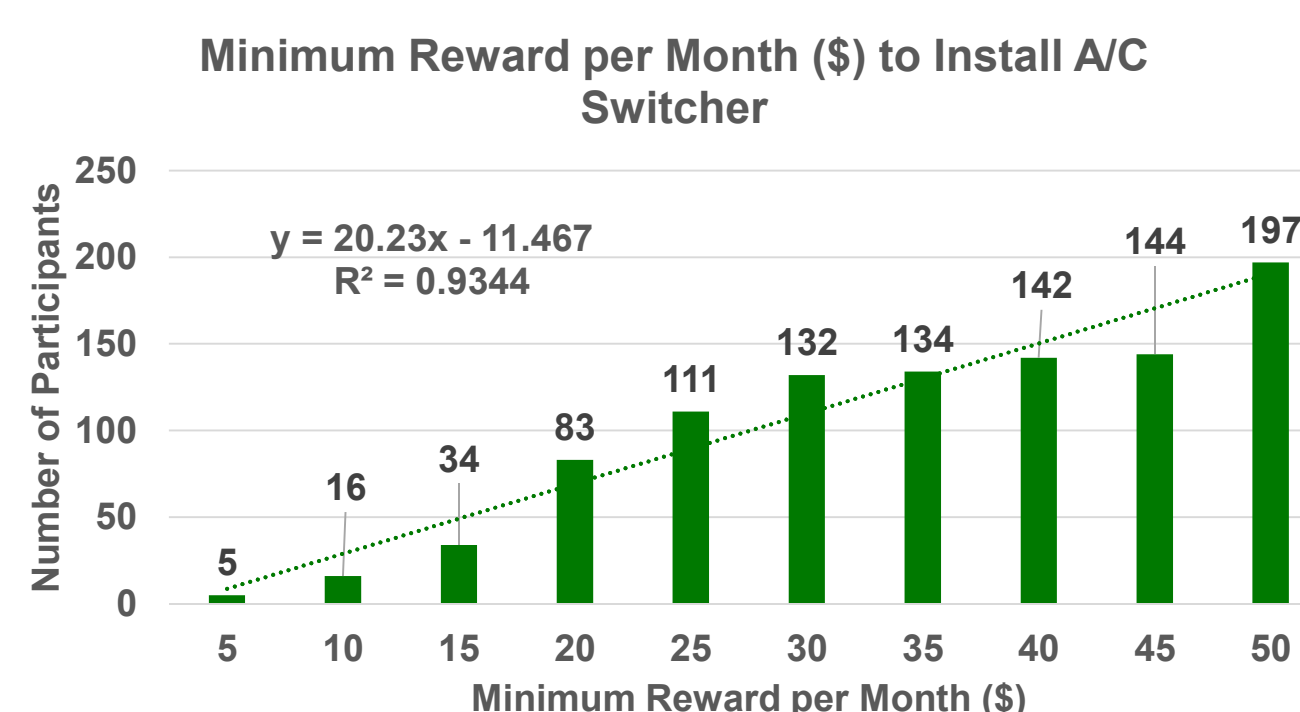
Other questions asked included:

- When participants were home
- What type of Heating/Cooling system participants primarily used.



DR Program Questions

Questions to indicate how likely participants are to join certain DR programs.



DR questions ask:

- Would you participate in a particular DR program?
- If not, what reward amount (\$) would influence you to?
- Would a particular incentive influence you to participate?

Programs offered:

- Switchers A/C and Heating
- Automatic Thermostat adjustment (+/- 3°)
- Manual Decrease in consumption via encouragement

Incentives offered:

- \$30 per summer/winter
- Up to \$15/month
- Option to override settings

Conclusions and Future Work

Two major factors seem to play a part in program acceptance

- Weather/Climate
- Degree of Control

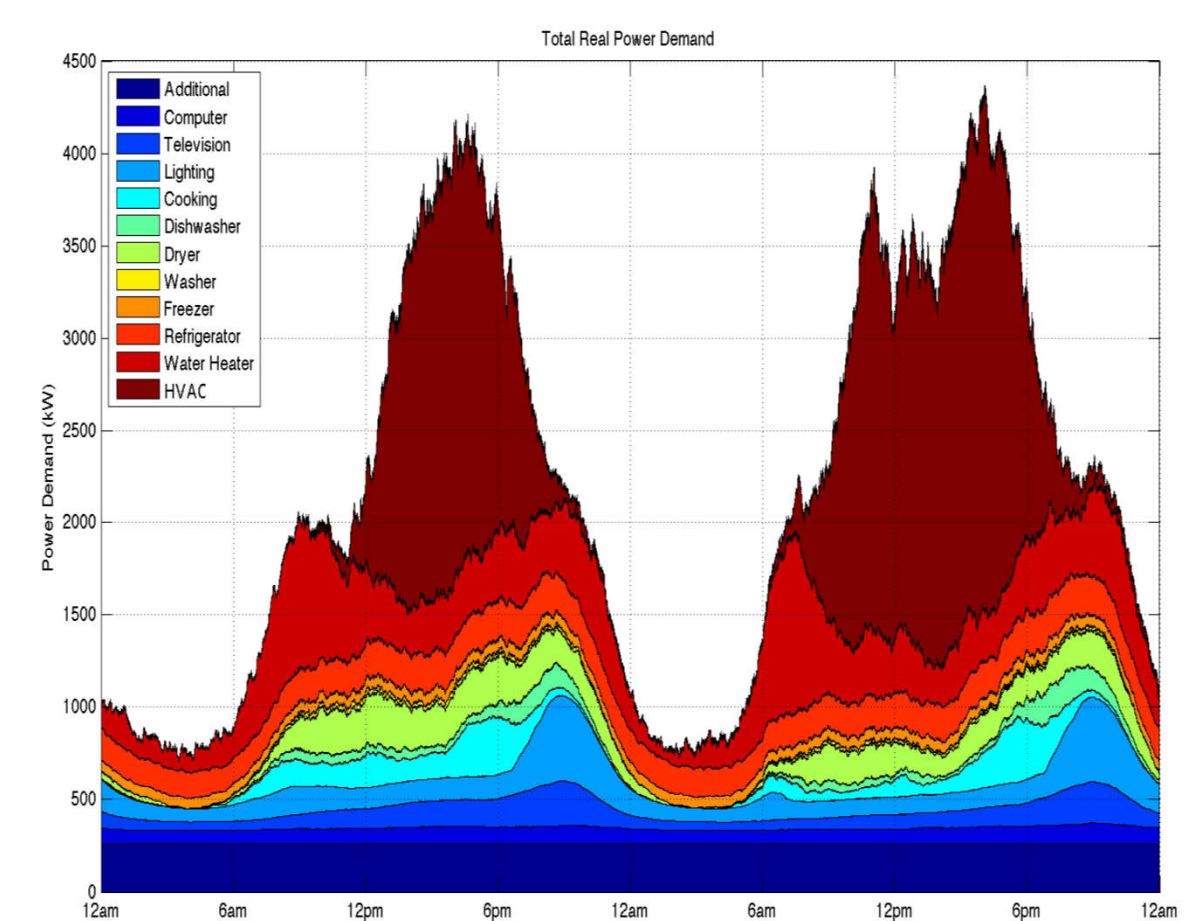
Generally, willingness to participate in DR programs was high (approximately 50% affirmative responses). This solidifies the idea that the potential benefit of DR programs in the residential sector is great.

Improve upon this survey.

- Eliminate weather as a factor
- Shorten the survey
- Add new DR programs that are relevant to utilities
- Redesign answers to fit more probabilistic data

Develop a model

- A probabilistic model of participation in different DR programs based on incentives could provide valuable information to utilities hoping to implement new programs.



Probabilistic Model of Residential Load based on Occupant Behavior [3].