SEP 2.0 Pricing / EndDevice Proposal

- The ultimate goal is to be able to address real time pricing
  - Prices that change as a reflection of the market and can take on any value
- Consumers need to be able to set “preferences” between price and device function (e.g. Savings vs. Comfort)
- Support for negative pricing (pre-heat/pre-cool)
  - Useful for absorbing excess renewable energy from the grid

Slider and Table

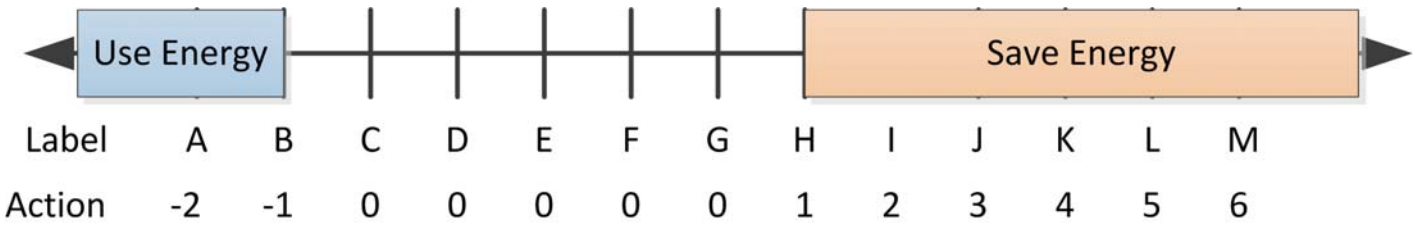
Label	A	B	C	D	E	F	G	H	I	J	K	L	M
Action	-2	-1	0	0	0	0	0	1	2	3	4	5	6

Price Threshold	Label	Action	
		Save Energy	Use Energy
	A	0	-2
-0.100	B	0	-1
0.000	C	0	0
0.100	D	0	0
0.200	E	0	0
0.300	F	0	0
0.400	G	0	0
0.500	H	1	0
0.600	I	2	0
0.700	J	3	0
0.800	K	4	0
0.900	L	5	0
1.000	M	6	0

- User-configurable sliders (or other GUI tools) determine value of “action” variables
- “Action” variable suggests both an action threshold and magnitude to end devices
- Utility or device manufacturers provide defaults.
- These values are stored by end-device, so settings can be adjusted by the consumer on a per-device basis.
- A device polls or subscribes to this list; each device can make a decision on what actions to take once it has its settings.
- Higher values of magnitude could mean more aggressive load shedding by a device.

*Price threshold and “Label” are *not necessarily* linked to TOU tiers, in order to support RTP.

Example 1



Price Threshold	Label	Action	
		Save Energy	Use Energy
	A	0	-2
-0.100	B	0	-1
0.000	C	0	0
0.100	D	0	0
0.200	E	0	0
0.300	F	0	0
0.400	G	0	0
0.500	H	1	0
0.600	I	2	0
0.700	J	3	0
0.800	K	4	0
0.900	L	5	0
1.000	M	6	0

- User wants to save some money only during critical peak pricing times

Example 2

Label	A	B	C	D	E	F	G	H	I	J	K	L	M
Action	-4	-3	-2	-1	0	0	0	0	0	0	1	2	3

Price Threshold	Label	Action	
		Save Energy	Use Energy
	A	0	-4
-0.100	B	0	-3
0.000	C	0	-2
0.100	D	0	-1
0.200	E	0	0
0.300	F	0	0
0.400	G	0	0
0.500	H	0	0
0.600	I	0	0
0.700	J	0	0
0.800	K	1	0
0.900	L	2	0
1.000	M	3	0

- User prefers comfort to savings
- Higher setting for “use energy” allows user to pre-heat or pre-cool the house, etc. at low price.

Example 3

Price Threshold	Label	Action	
		Save Energy	Use Energy
	A	0	-2
-0.100	B	0	-1
0.000	C	0	0
0.100	D	0	0
0.200	E	1	0
0.300	F	2	0
0.400	G	3	0
0.500	H	4	0
0.600	I	5	0
0.700	J	6	0
0.800	K	7	0
0.900	L	8	0
1.000	M	9	0

- User wants to save as much as possible

Calculating “Action” Value

Label	A	B	C	D	E	F	G	H	I	J	K	L	M
S	1	2	3	4	5	6	7	8	9	10	11	12	13
Action	-2	-1	0	0	0	0	0	1	2	3	4	5	6

Price Threshold	Label	Action	
		Save Energy	Use Energy
	A	0	-2
-0.100	B	0	-1
0.000	C	0	0
0.100	D	0	0
0.200	E	0	0
0.300	F	0	0
0.400	G	0	0
0.500	H	1	0
0.600	I	2	0
0.700	J	3	0
0.800	K	4	0
0.900	L	5	0
1.000	M	6	0

- S = position on line
- Action within the “Save Energy” range = (S – Y) + 1
- Action within the “Use Energy” range = (S – X) – 1
- Otherwise Action = 0; Y > X, thresholds cannot cross
- Sliders are an implementation detail and not the only option; menus and other methods could calculate these same values.
- Values in Price Threshold are “floor” values
  - Example: Level H includes prices from $0.50 up to the next price of $0.60
  - A declaration that price ranges are represented as a floor or ceiling value will also be required.

SEP 2.0 Proposed Changes Summary

- **Pricing**
  - A Boolean flag setting that determines if pricing is discrete or if its RTP.
  - Suggest that this flag be set in RateComponent.

- **EndDevice**
- When RTP is in effect, EndDevice has the ability to hold a range of prices that is global to all clients; otherwise the enumerated price tiers and discrete prices will be used to complete the proposed global table.
- For each individual instance of EndDevice, the price tier index that represents both the upper and lower threshold is put into the model.
- A normative statement is added to the EndDevice section of the SEP 2.0 Specification that states that the upper threshold shall be greater than the lower threshold.
- A normative statement is added to the EndDevice section that states that if a range of prices is communicated, then this set of prices uses either a floor or ceiling. Only one is defined and normative. A floor is preferred.
- The EndDevice server creates a magnitude table or passes the required information (e.g., total number of price ranges, lower threshold, upper threshold), onto clients so each client can calculate their own magnitudes