

Note 1: The red line in Table I represents that minimum 5% and maximum 10% of all households may use the Heater appliance in the Morning Washing activity in between 7:00 to 8:00; minimum 0% and maximum 3% of all households may use the Heater appliance to achieve the Morning Washing activity outside the time period from 7:00 to 8:00.

TABLE I
DEFINED HOUSEHOLD BEHAVIOR BY GENERATING THE DATASET USED IN THE PAPER

	Appliances	Activities	Expected time period of activity	Appliance's working percentage range	Unexpected time period of activity	Appliance's working percentage range
1	Heater	Morning Washing	[7:00, 8:00]	[5%, 10%]	[23:00, 7:00]	[0%, 3%]
		Night Washing	[22:00, 23:00]	[60%, 85%]	[9:00, 12:00]	[0%, 2%]
		Morning Cooking for Breakfast	[8:00, 9:00]	[20%, 60%]	[13:00, 18:00]	[0%, 5%]
		Come Back to Cook for Lunch	[12:00, 13:00]	[20%, 60%]	[19:30, 22:00]	[0%, 5%]
		Come Back to Cook for Dinner	[18:00, 19:30]	[20%, 60%]		
2	Compact Fluorescent / Lamp	Get Up; Go to Work	[7:00, 9:00]	[60%, 80%]	[23:00, 7:00]	[0%, 2%]
		Come Back; Go to Bed	[18:00, 23:00]	[90%, 100%]	[9:00, 18:00]	[0%, 1%]
3	Bulb	Get Up; Go to Work	[7:00, 9:00]	[60%, 80%]	[23:00, 7:00]	[0%, 2%]
		Come Back; Go to Bed	[18:00, 23:00]	[90%, 100%]	[9:00, 18:00]	[0%, 1%]
4	Hairdryer	After Morning Washing	[7:15, 8:00]	[5%, 10%]	[23:00, 7:15]	[0%, 3%]
		After Night Washing	[22:15, 23:00]	[60%, 85%]	[8:00, 22:15]	[0%, 2%]
5	Laptop	Entertainment	[19:30, 22:00]	[80%, 100%]	[22:00, 19:30]	[0%, 10%]
6	Microwave	Cooking for Breakfast	[8:00, 9:00]	[20%, 60%]	[19:30, 8:00]	[0%, 5%]
		Cooking for Lunch	[12:00, 13:00]	[20%, 60%]	[9:00, 12:00]	[0%, 5%]
		Cooking for Dinner	[18:00, 19:30]	[20%, 60%]	[13:00, 18:00]	[0%, 5%]
7	Air Conditioner	Come Back; Go to Bed	[18:00, 23:00]	[80%, 100%]	[9:00, 12:00]	[0%, 5%]
		Go to Bed	[23:00, 7:00]	[70%, 90%]	[13:00, 18:00]	[0%, 5%]
		Get Up; Go to Work	[7:00, 9:00]	[10%, 20%]		
		Morning Cooking for Breakfast	[12:00, 13:00]	[60%, 80%]		
8	Fan	Come Back; Go to Bed	[18:00, 23:00]	[80%, 100%]	[9:00, 12:00]	[0%, 5%]
		Go to Bed	[23:00, 7:00]	[70%, 90%]	[13:00, 18:00]	[0%, 5%]
		Get Up; Go to Work	[7:00, 9:00]	[10%, 20%]		
		Morning Cooking for Breakfast	[12:00, 13:00]	[60%, 80%]		
9	Washing Machine	Clean Room	[20:00, 21:00]	[70%, 100%]	[21:00, 20:00]	[0%, 10%]
10	Vacuum	Clean Room	[20:00, 21:00]	[70%, 100%]	[21:00, 20:00]	[0%, 10%]
11	Fridge	All Day	[7:00, 7:00]	[100%]	NULL	/

Note 2: A few key activities and its execution time periods are shown in Table II. The blue line represents that the activity of Morning Cooking for Breakfast may happen in between 8:00 to 9:00.

TABLE II
DEFINED KEY ACTIVITIES AND ITS TIME PERIODS THAT MAY HAPPEN

Get Up	[7:00]
Turn on the Light	[7:00, 9:00]
Morning Washing	[7:00, 8:00]
Using Hair Dryer	[7:15, 8:00]
Morning Cooking for Breakfast	[8:00, 9:00]
Go to Work	[9:00, 12:00]
Come Back to Cook for Lunch	[12:00, 13:00]
Go to Work	[13:00, 18:00]
Come Back to Cook for Dinner	[18:00, 19:30]
Turn on the Light	[18:00, 23:00]
Entertainment	[19:30, 22:00]
Clean Room	[20:00, 21:00]
Night Washing	[22:00, 23:00]
Using Hair Dryer	[22:15, 23:00]
Go to Sleep	[23:00, 7:00]