

APPENDIX A

This the Appendix A for the conference paper “The energy management strategies of residential integrated energy system considering integrated demand response”, IEEE IAS I&CPS ASIA 2021.

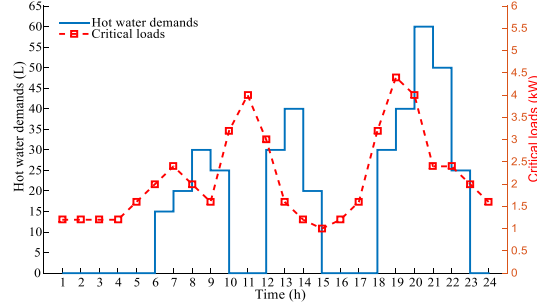


Fig. A1 Hourly critical electric loads and hot water demands

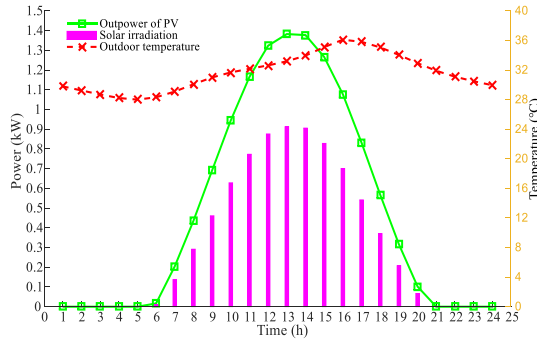


Fig. A2 Hourly outpower of PV, solar irradiation and temperature

TABLE A-I PARAMETERS OF WATER HEATER

Parameter	VALUE	Parameter	VALUE
T^{cw}	15 °C	T_{set}^{ws}	70 °C
T_{min}^{ws}	66 °C	T_{max}^{ws}	74 °C
ρ_w	1000 kg/m ³	V	100 L
$C_w(kWh/kg^{\circ}C)$			1.1667×10^{-3}

TABLE A-II PARAMETERS OF ENERGY STORAGES

Parameters	Battery	Thermal storage
e_c^x	0.95	0.92
e_d^x	0.96	0.95
$E_{min}^x(kWh)$	0.75	1
$E_{max}^x(kWh)$	4.75	9
$E_0^x(kWh)$	1.5	3
$P_{max,c}^x(kW)$	1.25	3.5
$P_{max,d}^x(kW)$	1.75	4
O_x	0.01	0.02

TABLE A-III PARAMETERS OF SHIFTABLE APPLIANCES

Responsive loads	Rate power (kW)	Operation hours	Operation intervals
Washer	0.6	2	10~18h
Dish washer	0.8	2	19~24h
Pool pump	1.2	3	1~14h

TABLE A-IV PARAMETERS OF ELECTRIC VEHICLE

Parameter	VALUE	Parameter	VALUE
t_{arr}^{EV}	18:00	SOC_{min}	0.15
t_{dep}^{EV}	8:00	SOC_{max}	1
$P_{max,c}^{EV}$	3.6 kW	SOC_d	1
W_{EV}	24 kWh	O_{EV}	0.01

TABLE A-V PARAMETERS FOR RESIDENTIAL ENERGY SYSTEM

Parameter	VALUE	Parameter	VALUE
$R(^{\circ}C/kW)$	2.5	$P_{min}^{mt}/H_{min}^{mt}$	0(kW)
$T_{min}^{in}(^{\circ}C)$	22	$H_{max}^{mt}(kW)$	7.5
$T_{set}^{in}(^{\circ}C)$	24	$C_{min}^{ac}/C_{min}^{ac}$	0(kW)
$T_{max}^{in}(^{\circ}C)$	26	$C_{max}^{ec}(kW)$	5
$C_{air}(kW/^{\circ}C)$	0.525	$C_{max}^{ac}(kW)$	3.6
COP_{ec}	2.5	$P_{max}^{buy}(kW)$	10
COP_{ac}	1.2	$P_{max}^{sell}(kW)$	6
η_{mt}^e	0.3	N_k/η_{in}	6/0.97
η_{mt}^h	0.45	$\gamma_e/\gamma_g(kW/kWh)$	0.968/0.22
$P_{max}^{mt}(kW)$	5	$\kappa(\$/kg)$	0.0032

TABLE A-VI ENERGY PRICES

Load periods	π_t^{buy}	π_t^{sell}	π_g
Peak (11-14,18-20h)	0.19	0.222	0.048
Flat (8-10,15-17, 21-22h)	0.14	0.140	0.048
Valley (1-7, 23-24h)	0.076	0.044	0.048