* **HYBRID OFF-GRID SYSTEM INPUTS-LOS ANGELES**

|  |  |  |
| --- | --- | --- |
| Parameters | Value | Ref. |
| Project life time | 25 | - |
| Nominal discount rate | 4.5% | [1] |
| Expected inflation rate | 2% | [2] |
| Tax rate (US national average) | 5.8% | [3] |
| Maximum loss of power supply probability | 1.1% | - |
| Minimum Renewable Energy Capacity | 75% | - |
| Installation cost (per kW) | 305.57 $ | [3] |
| Overhead cost (per kW) | 549.87 $ | [3] |
| Permitting and Inspection (per kW) | 205.95 $ | [3] |
| Electrical BoS (per kW) | 399.11$ | [3] |
| Structural BoS (per kW) | 89.90 $ | [3] |
| PV Capital cost per kW | 314.18 $ | [3] |
| Replacement Cost of PV modules per kW | 314.18 $ | [3] |
| PV O&M cost ($/year/kW) | 29.49 $ | [3] |
| PV life time | 25 | - |
| DG Capital cost per kW | 308.64 $ | [4] |
| Replacement Cost of DG modules per KW | 308.64 $ | [4] |
| DG life time | 24000 hours | [5] |
| Diesel fuel cost per liter | 1.39 $ | [6] |
| DG O&M+ running cost ($/op.h) | 0.064 $ | [5] |
| BT Capital cost per kW | 234.56 $ | [3] |
| Replacement Cost of BT per kWh | 234.56 $ | [3] |
| BT life time | 15 years (Li ion) | [7] |
| Inverter Capital cost per kW | 229.38 $ | [3] |
| Replacement Cost of Inverter modules Per kW | 229.38 $ | [3] |
| Inverter life time | 25 | - |
| Charger Capital cost | 149.99 $ | [8] |
| Charger Replacement Cost | 149.99 $ | [8] |
| PV tilt angle in Los Angles | 19 | [9] |

* **UTILITY RATES-GRID** [10]

Base Charges:

$2.30/month (tier 1)

$7.90/month (tier 2)

$22.70/month (tier 3)

*First tier rates:*

$0.19488/kWh (Jan - Mar)

$0.19375/kWh (Apr - May)

$0.19375/kWh (Jun)

$0.18179/kWh (Jul - Sep)

$0.19192/kWh (Oct - Dec)

*Second tier rates:*

$0.25347/kWh (Jan - Mar)

$0.25234/kWh (Apr - May)

$0.25234/kWh (Jun)

$0.24038/kWh (Jul - Sep)

$0.25051/kWh (Oct - Dec)

*Third tier rates:*

$0.25347/kWh (Jan - Mar)

$0.25234/kWh (Apr - May)

$0.33935/kWh (Jun)

$0.32739/kWh (Jul - Sep)

$0.25051/kWh (Oct - Dec)

* **RESULTS**
* ***Off-grid system***

System Size

Cpv (kW) = 7

Cwt (kW) = 0

Cbat (kWh) = 23

Cdg (kW) = 1

Cinverter (kW) = 1.9521

Result:

NPC = 33674.5877 $

LCOE = 0.23153 $/kWh

Operation Cost = 716.258 $

Initial Cost = 20403.686 $

RE = 91.065 %

Total operation and maintenance cost = 4047.8469 $

PV Power = 13053.2685 kWh

WT Power = 0 kWh

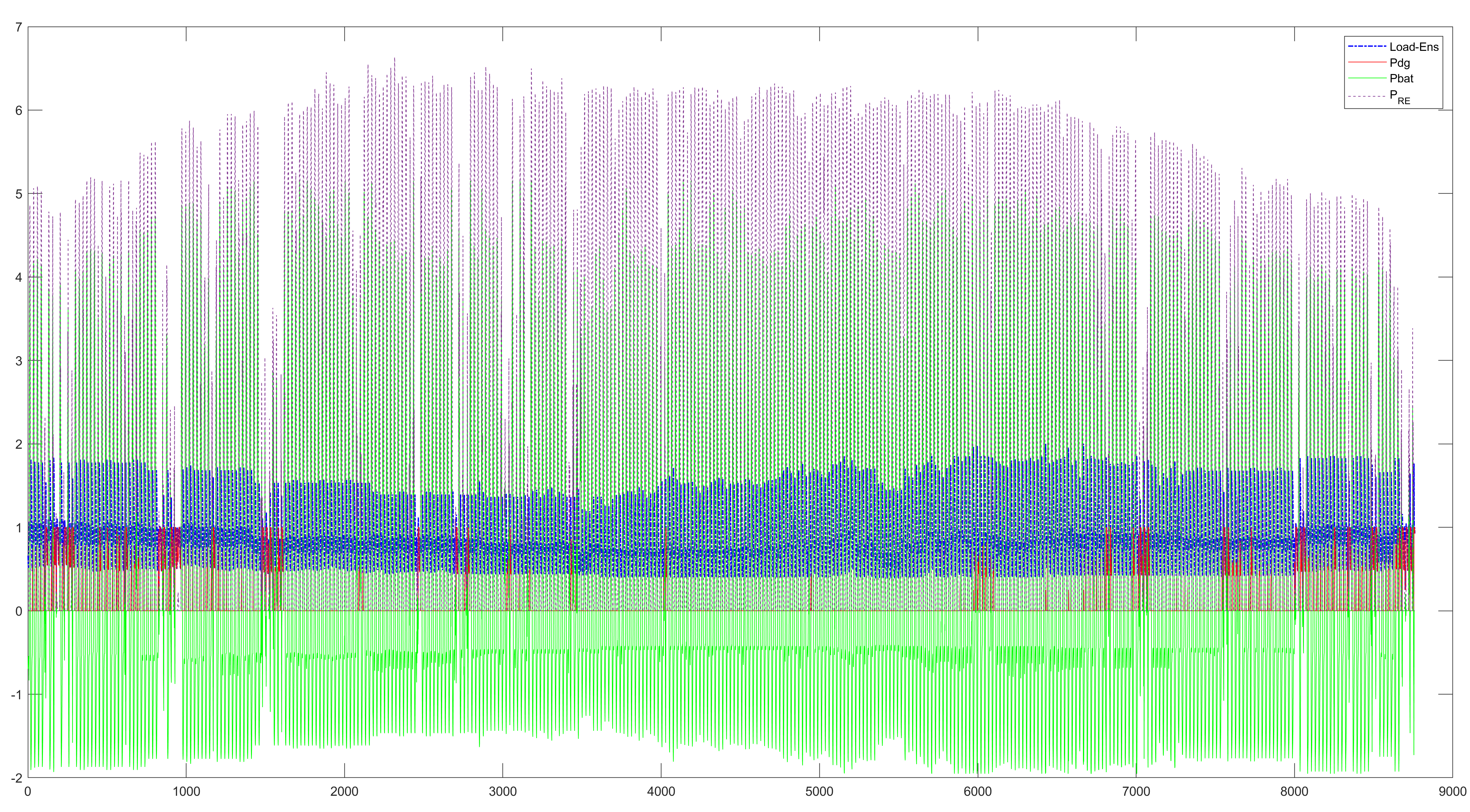
DG Power = 701.381 kWh

LPSP = 1.0139 %

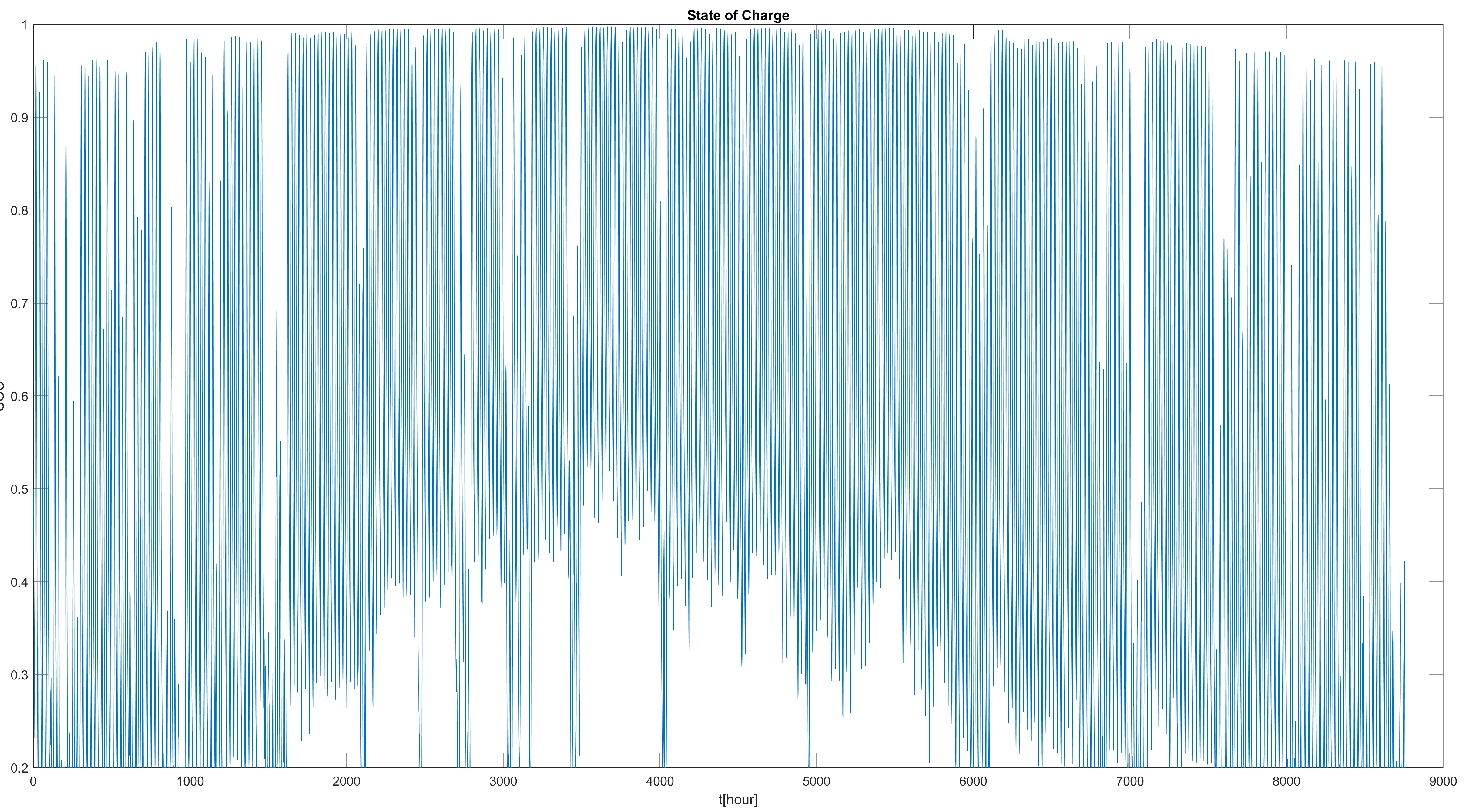
Excess Electricity = 3225.3793 kWh

Total Money paid by the user= 33674.5877 $

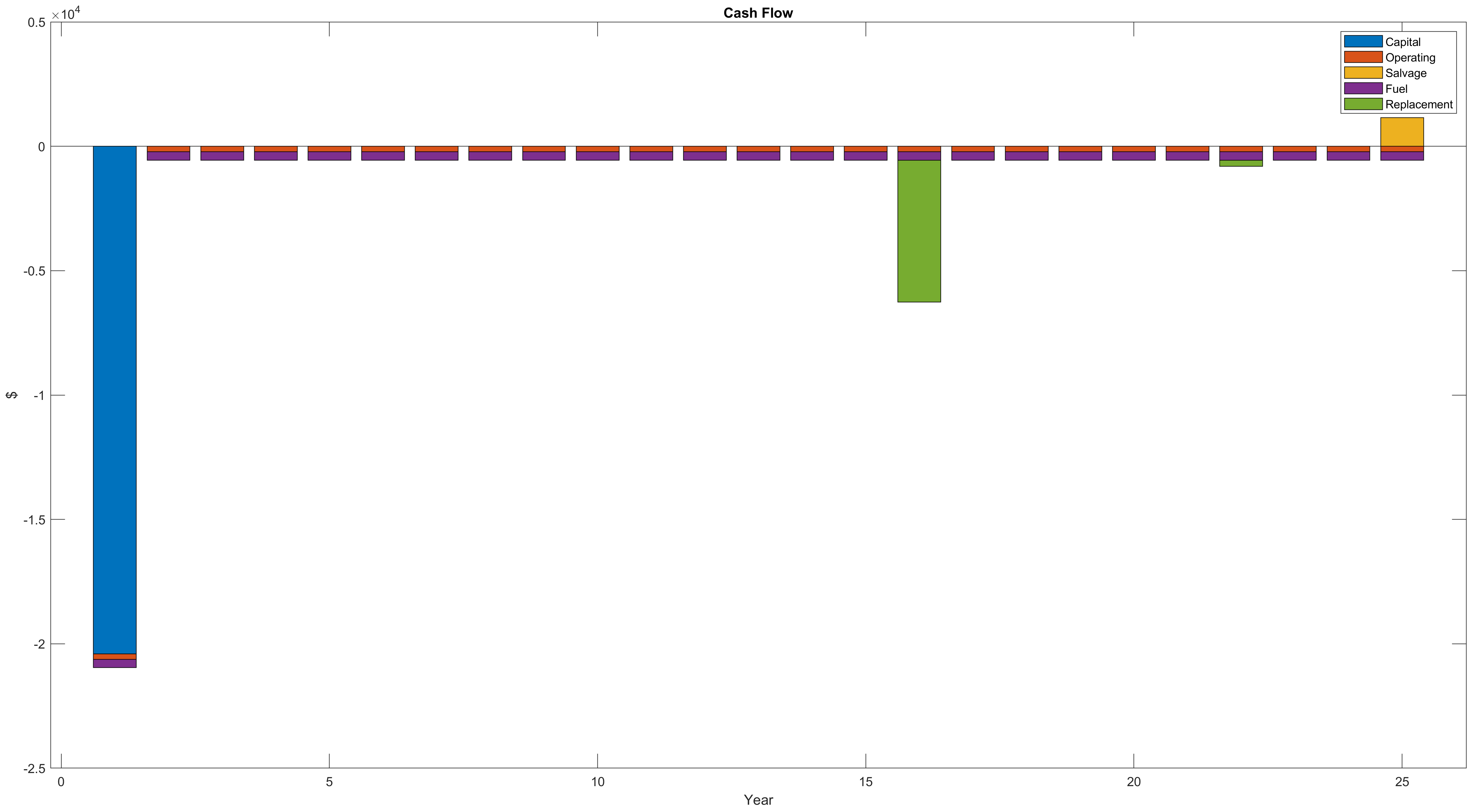
Total fuel consumed by DG = 229.493 (kg/year)



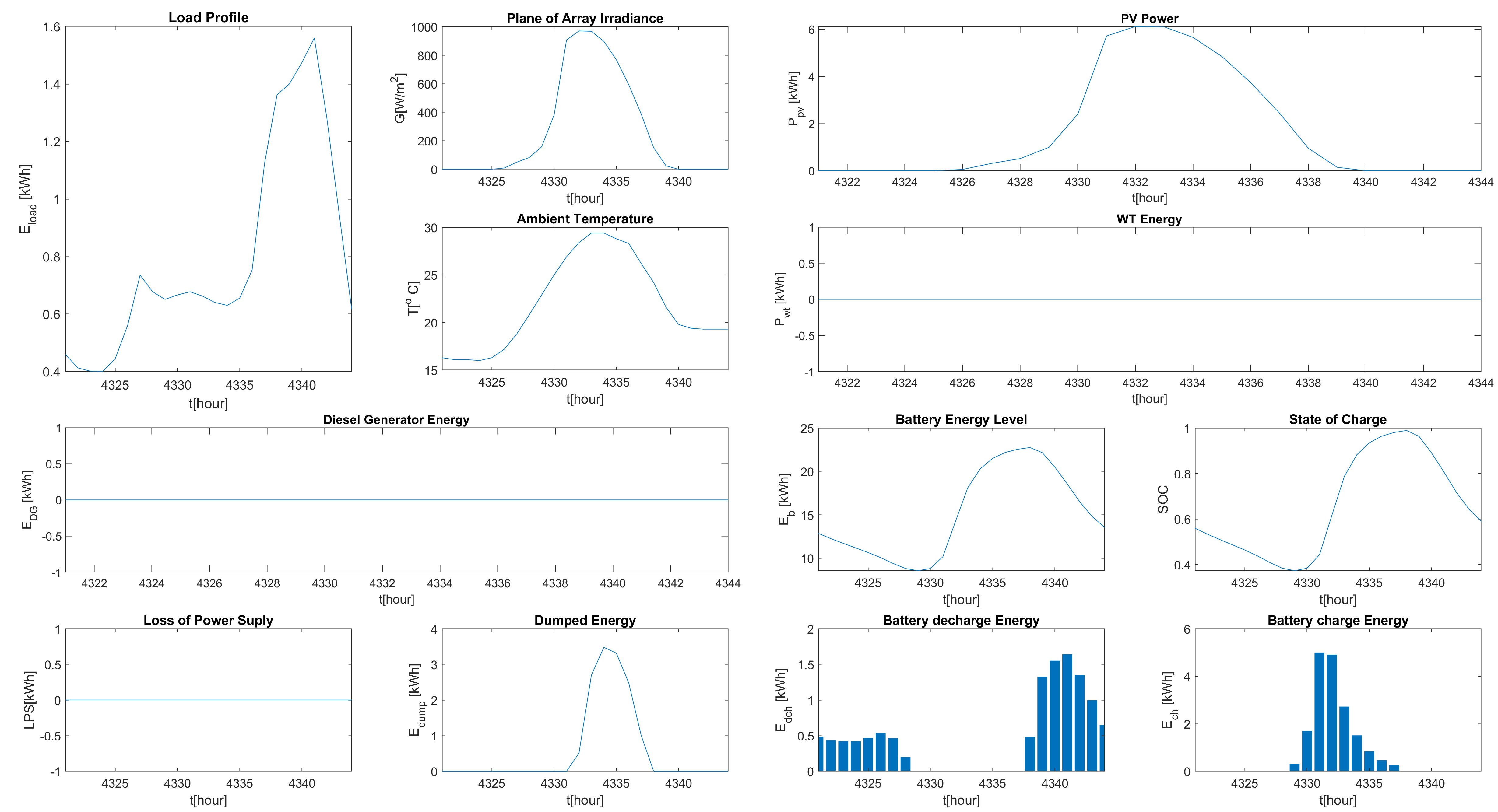
**Fig.1.**Energy distribution in the hybrid system throughout the year



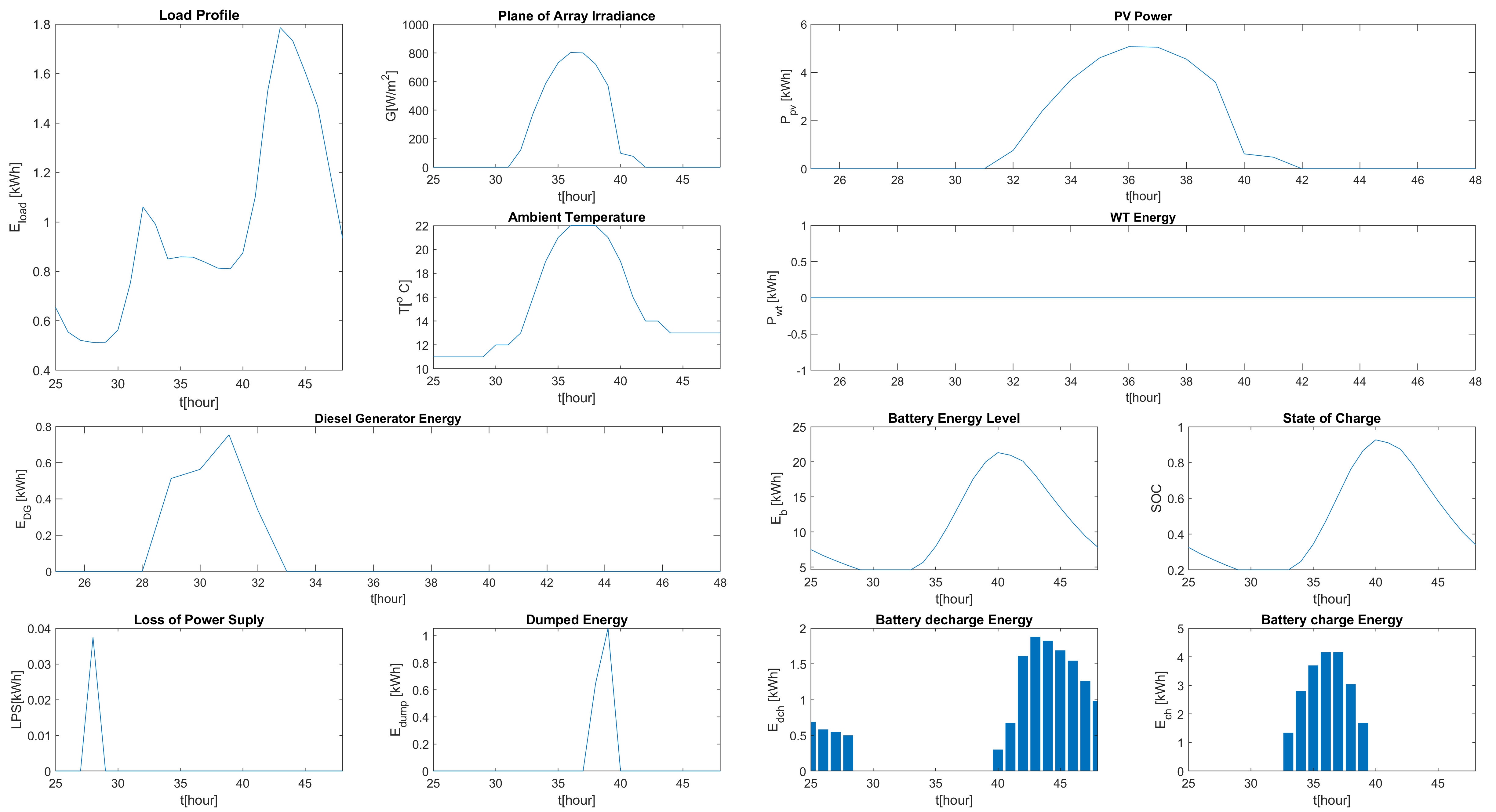
**Fig.2.**Sate of charge of battery throughout the year



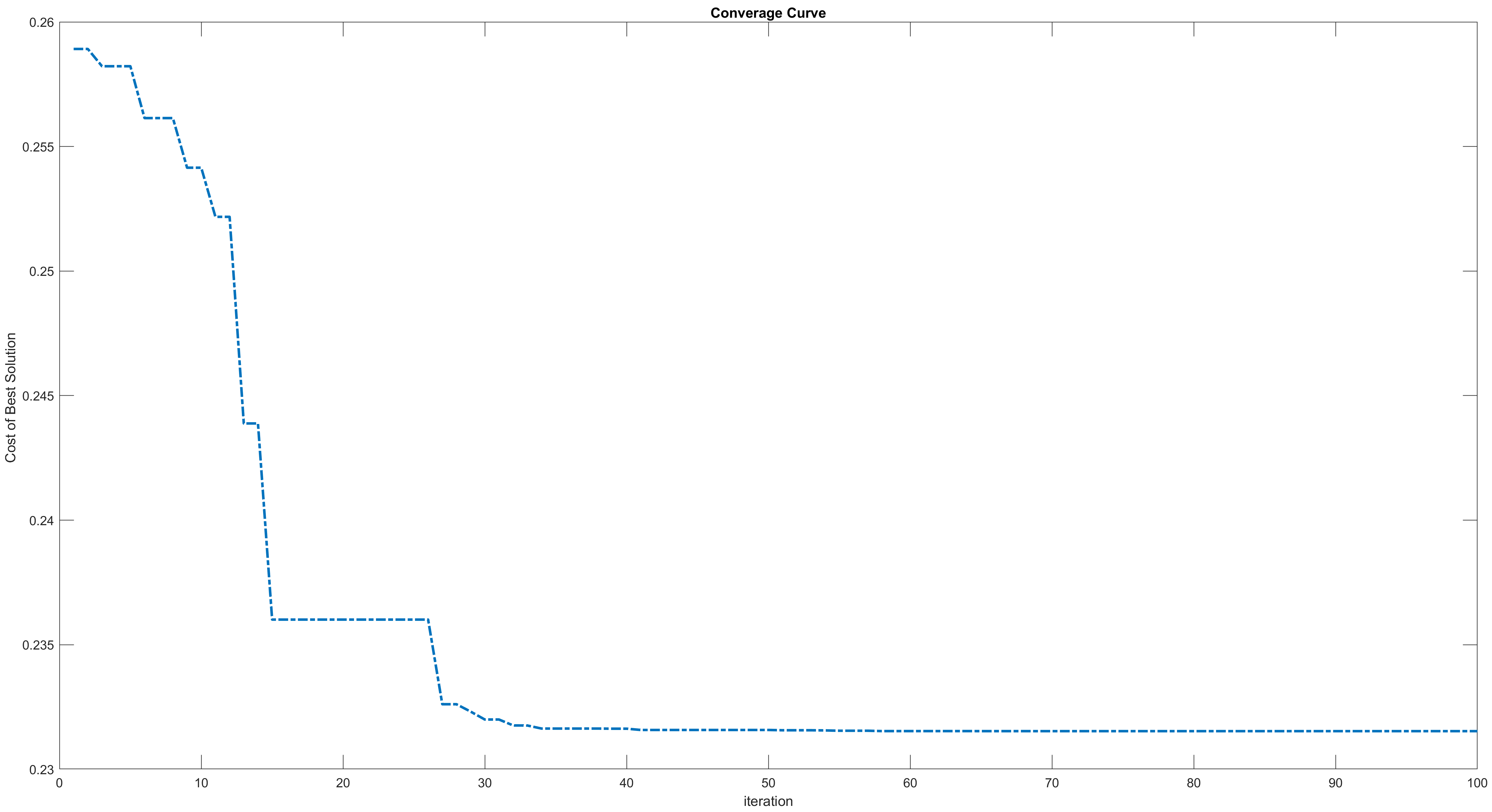
**Fig.3.**Cash flow of project



**Fig.4.**Results for 181th day of year



**Fig.5.**Results for 2th day of year



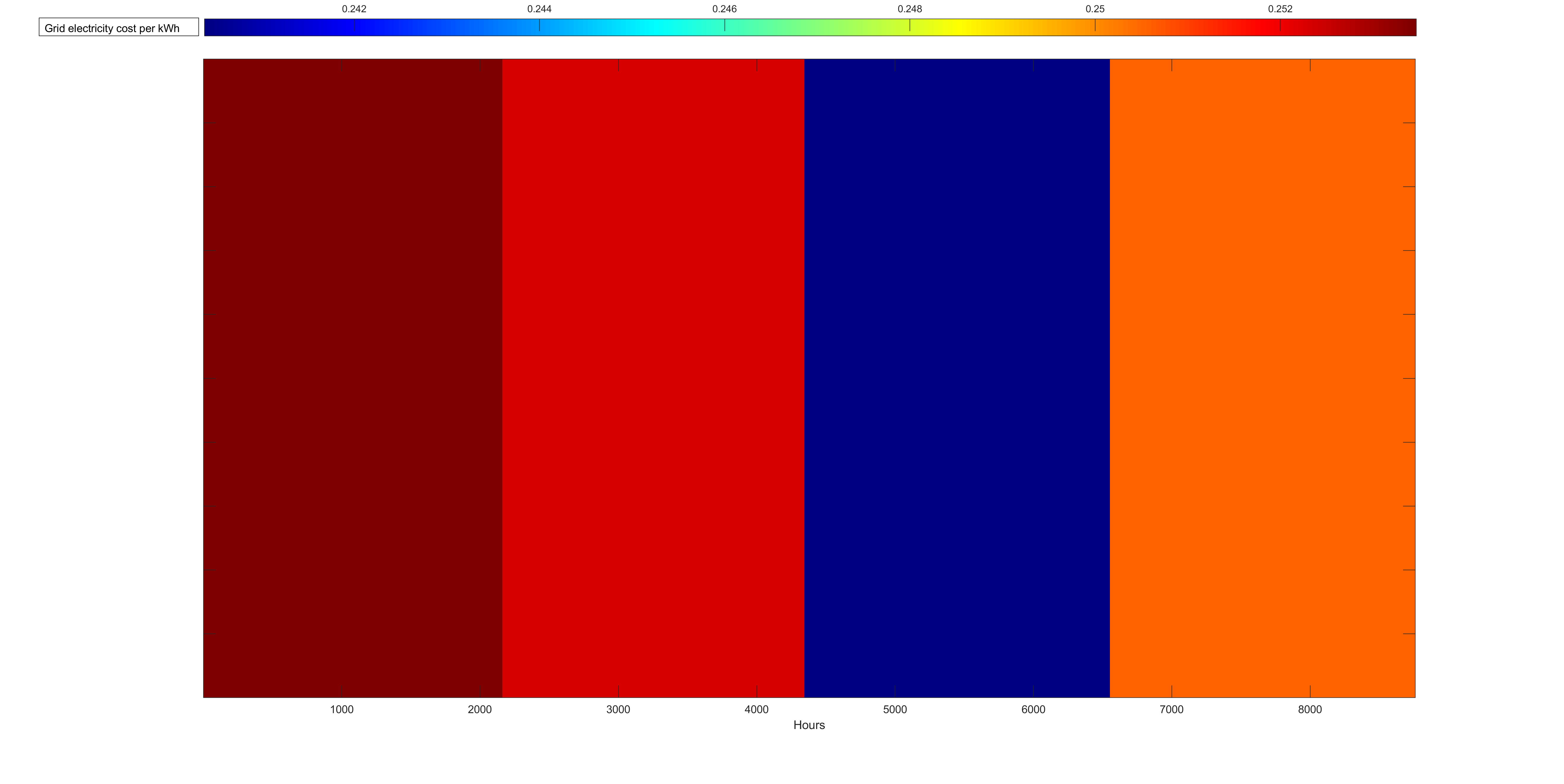
**Fig.6.**Convergance curve for optimization

* ***Only Grid connection***

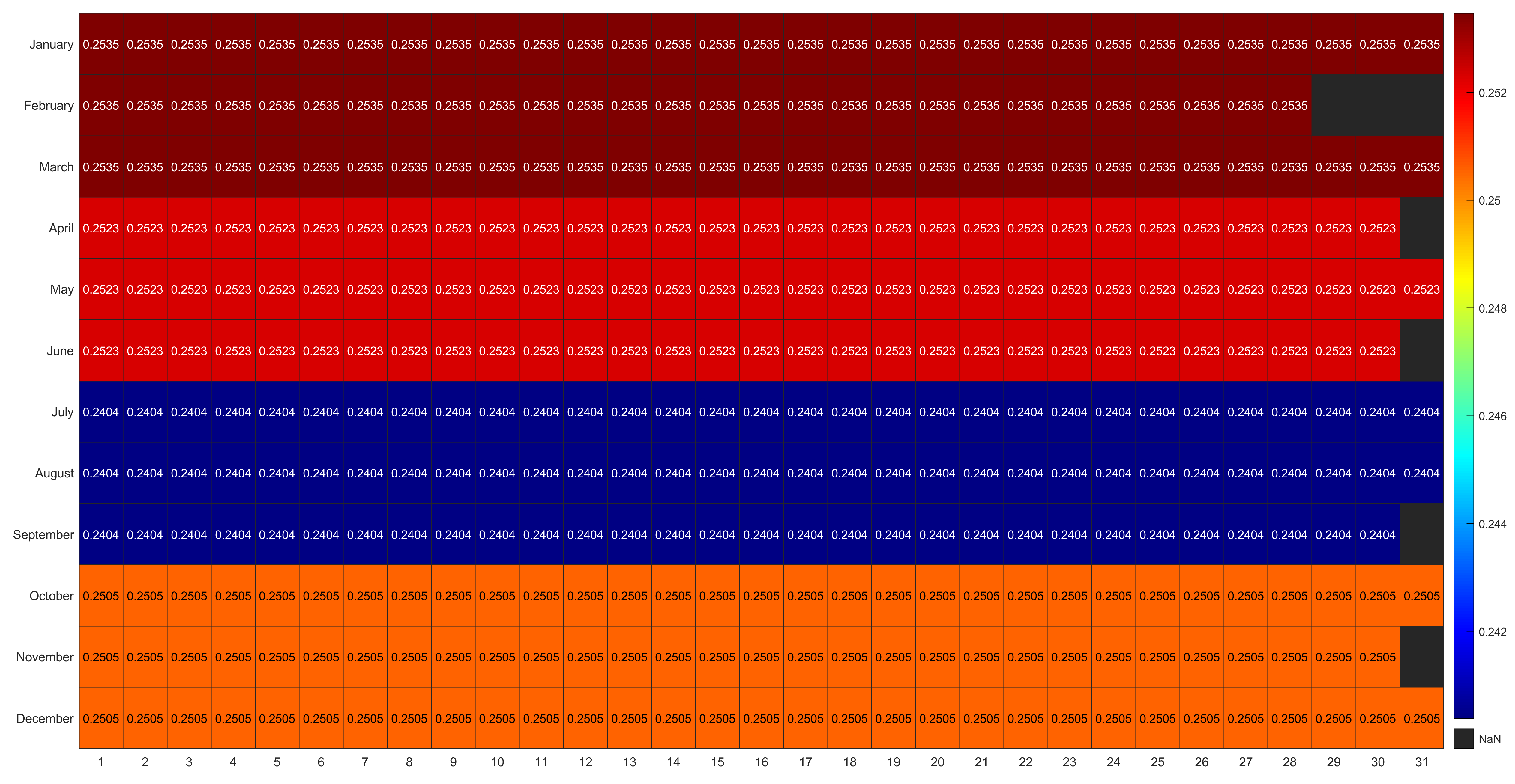
NPC = 38332.3709 $

LCOE = 0.26088 $/kWh

Operation Cost = 2068.8772 $



**Fig.7.**Color map of electricity prices throughout the year



**Fig.8.**Color table of electricity prices throughout the year

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