

# Simulation Output Summary

Integrated Energy Systems Optimiser (IESO) v24.03 · [www.github.com/greoux-research/ieso](https://www.github.com/greoux-research/ieso)

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## Demand

Demand for Electricity:

- Annual Demand in MWh: 50000000
- Hourly Profile: Figure 1
- Non-Service Penalty in \$ per MWh: 20000
- Supply Sources: Power Grid

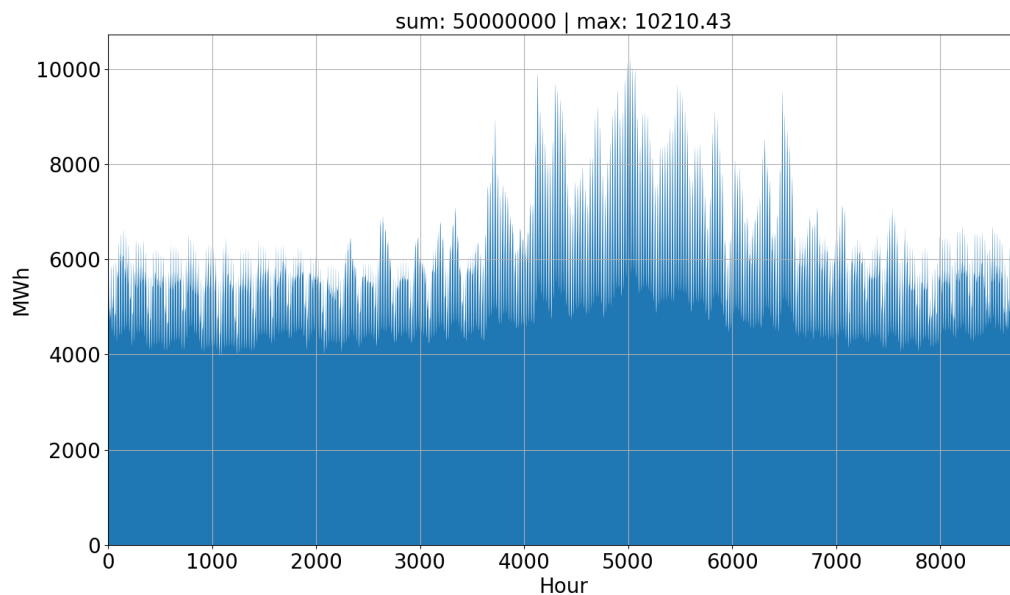


Figure 1: Demand for Electricity

Demand for Hydrogen:

- Annual Demand in Q(X): 35000000

- Hourly Profile: Uniform (3995 Q(X) each Hour)
- Non-Service Penalty in \$ per Q(X): 1000
- Supply Sources: Power-to-X Processes [ "p2x-h2" ]

## Generators

Generator "ocgt":

- Type: Electricity-Generating Power Plant
- Fixed Costs in \$ per MW per Year: 75182
- Variable Costs in \$ per MWh: 96.11
- Variable Emissions in \$ per MWh: 523
- [Capacity in MW: 6842.09](#)
- Electricity Generation: 9560229 MWh (Figure 2)
- Number of Successive Changes in Output: 3969

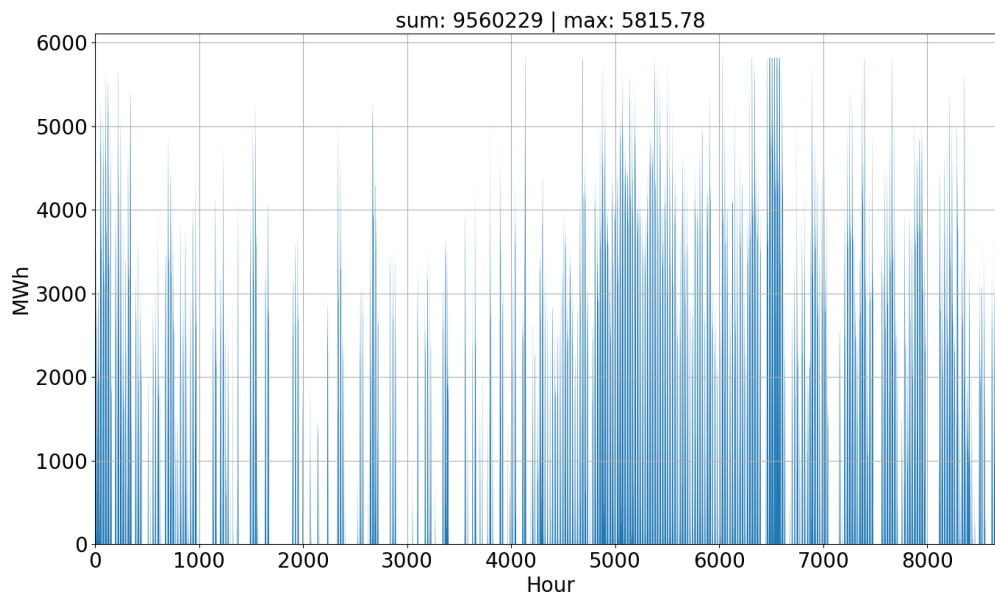


Figure 2: Electricity Generation by "ocgt"

Generator "solr":

- Type: Electricity-Generating Power Plant
- Fixed Costs in \$ per MW per Year: 70046
- Variable Costs in \$ per MWh: 3e-06
- Variable Emissions in \$ per MWh: 0
- [Capacity in MW: 11559.33](#)

- Electricity Generation: 23565296 MWh (Figure 3)
- Curtailment: 127 Hours; 148196.62 MWh or 0.63 % of the Tech.'s Annual Gen. Volume

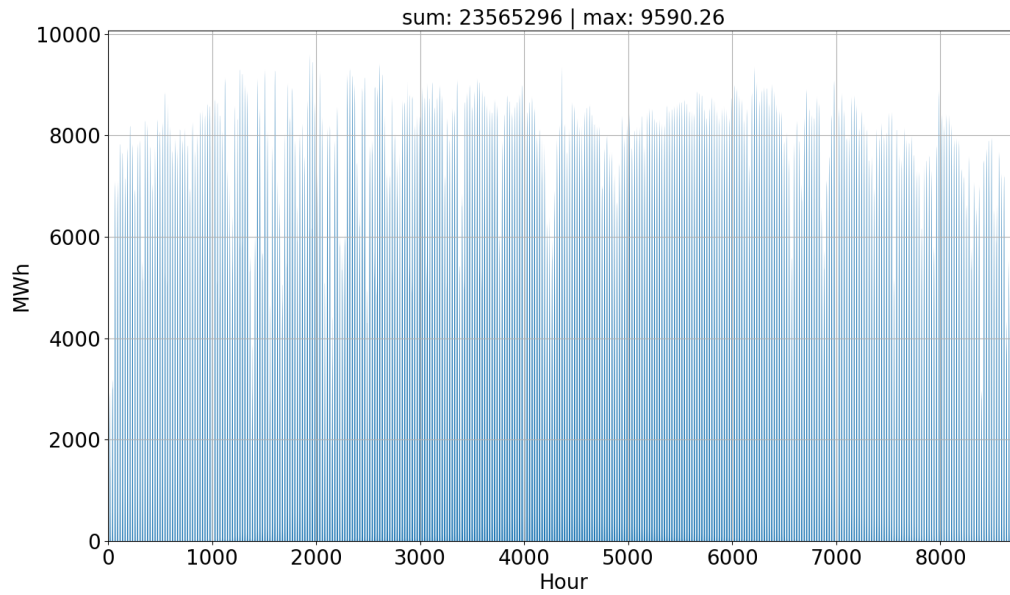


Figure 3: Electricity Generation by "solr"

Generator "wind":

- Type: Electricity-Generating Power Plant
- Fixed Costs in \$ per MW per Year: 133553
- Variable Costs in \$ per MWh: 6e-06
- Variable Emissions in \$ per MWh: 0
- [Capacity in MW: 9440.03](#)
- Electricity Generation: 19228061 MWh (Figure 4)
- Curtailment: 2580 Hours; 6222440.44 MWh or 32.36 % of the Tech.'s Annual Gen. Volume

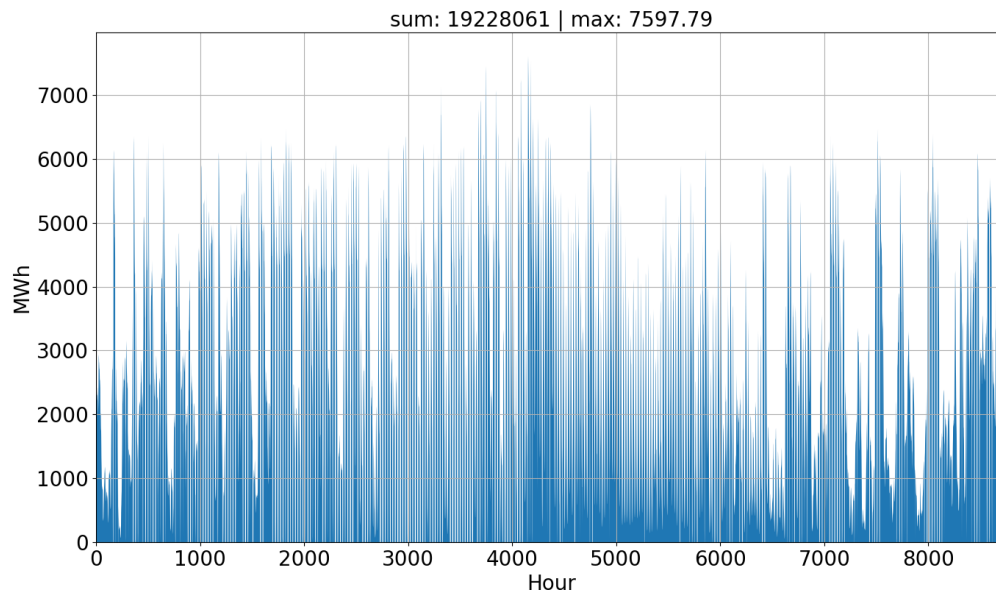


Figure 4: Electricity Generation by "wind"

## Flexibility Means

Flexibility Mean "bstr":

- Type: Electricity Storage System
- Fixed Costs in \$ per MWh per Year: 27248
- Hours of Storage at Maximum Discharge: 4
- Round Trip Efficiency: 0.85
- [Capacity in MWh: 13426.5](#)
- Electricity Charged (-) and Discharged (+): Figure 5
- Electricity Stored: Figure 6

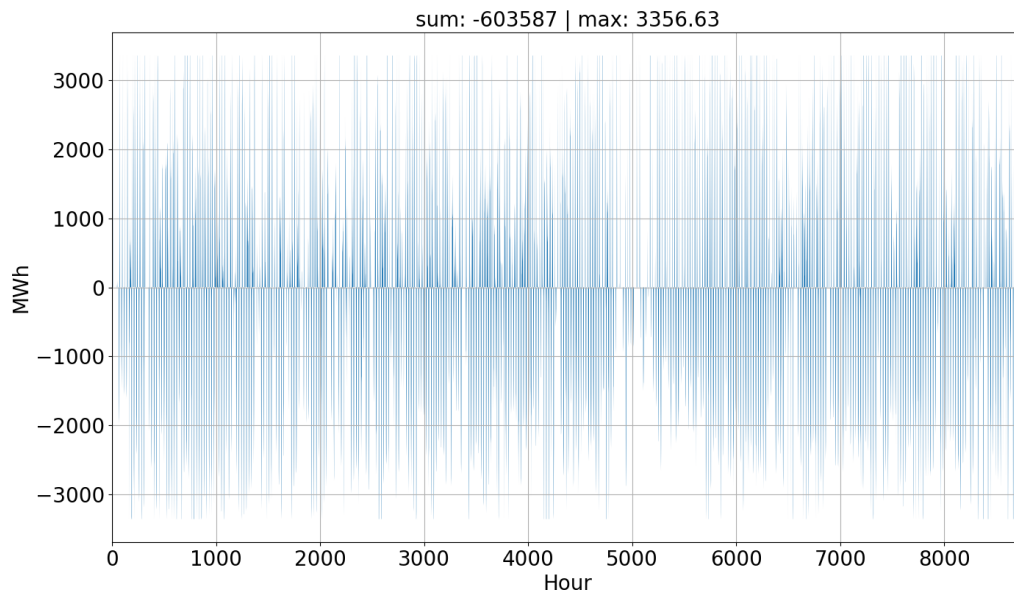


Figure 5: Electricity Charged (-) and Discharged (+) by "bstr"

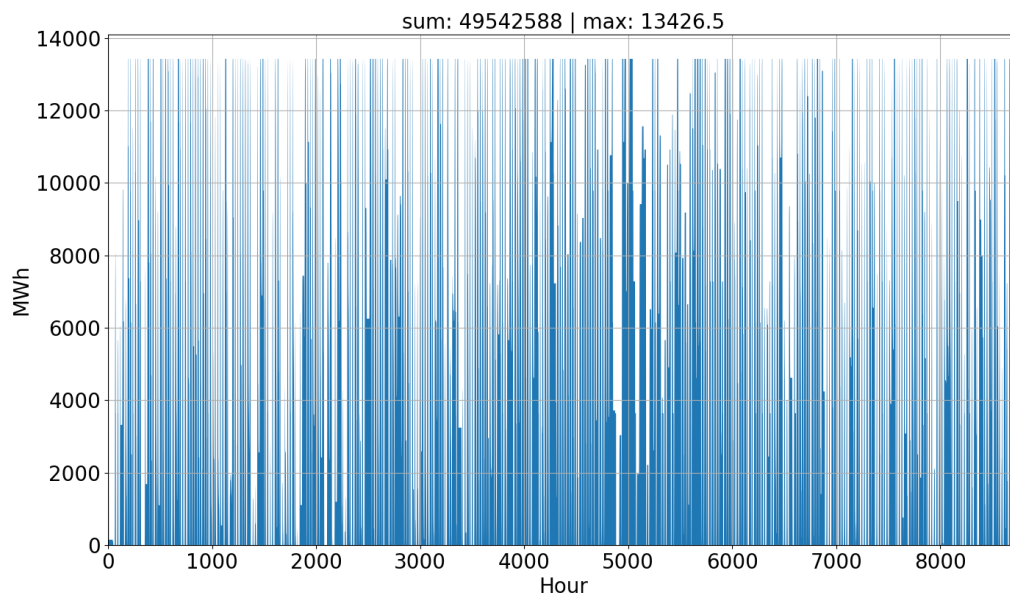


Figure 6: Electricity Stored by "bstr"

## Power-to-X Processes

Power-to-X Process "p2x-h2":

- Consumes Electricity (Grid-Supplied 0.05 MWh per Q(X))
- Fixed Production Costs in \$ per Q(X) per Hour per Year: 2486
- Variable Production Costs (Excluding Energy) in \$ per Q(X): 0
- Production Capacity in Q(X) per Hour: 13731.48
- Production Profile: Figure 7
- Fixed Storage Costs in \$ per Q(X) per Year: 49.2
- Storage Capacity: 174740.46 Q(X) or 15 Hours of Production at Max. Capacity
- Storage Profile: Figure 8
- Supply Profile: Figure 9

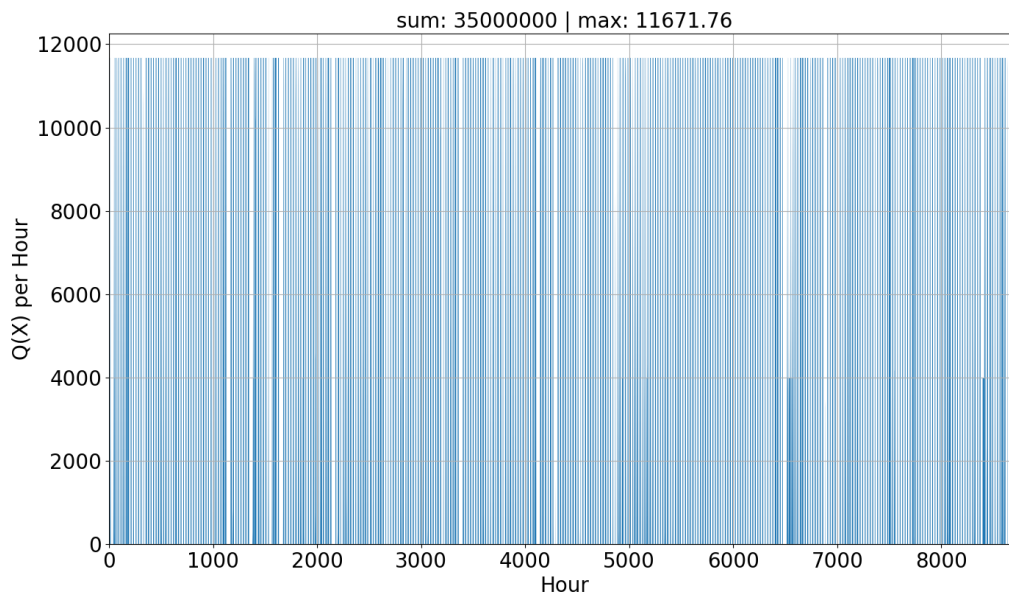


Figure 7: Production Profile - "p2x-h2"

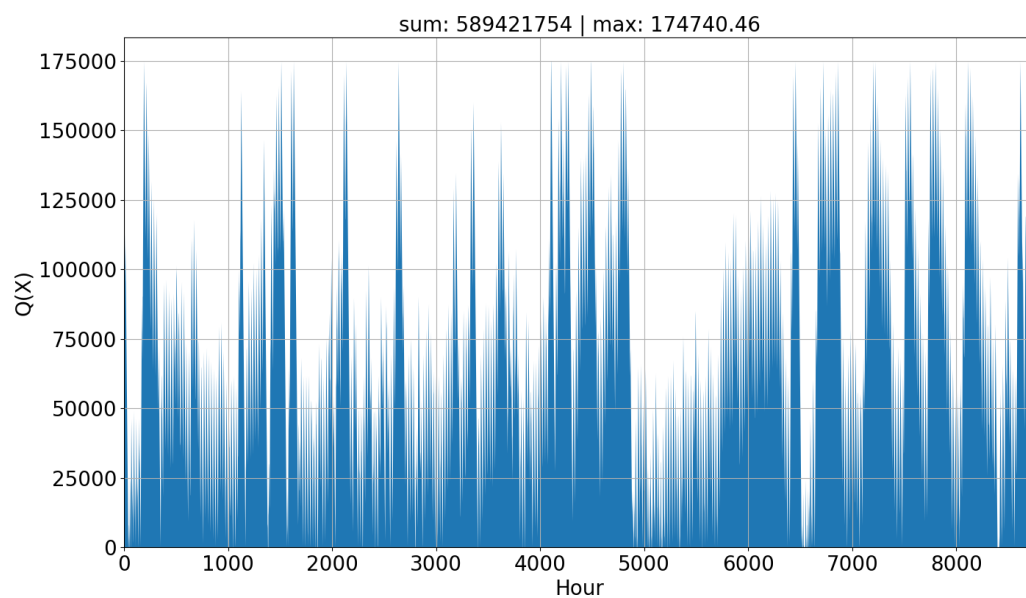


Figure 8: Storage Profile - "p2x-h2"

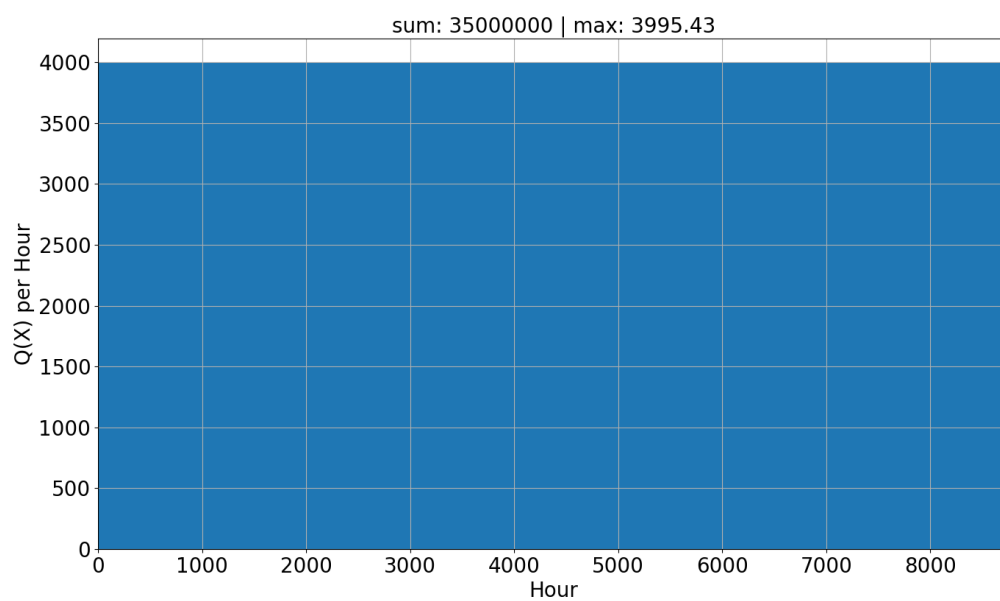


Figure 9: Supply Profile - "p2x-h2"

## Costs and Emissions

Generation Costs and Emissions on a per MWh Basis:

- Generation Costs in \$ per MWh: 66.92
- Generation Emissions in kg per MWh: 95.5

## Prices

Electricity:

- Average Price in \$ per MWh: 79.21
- Price Profile: Figure 10

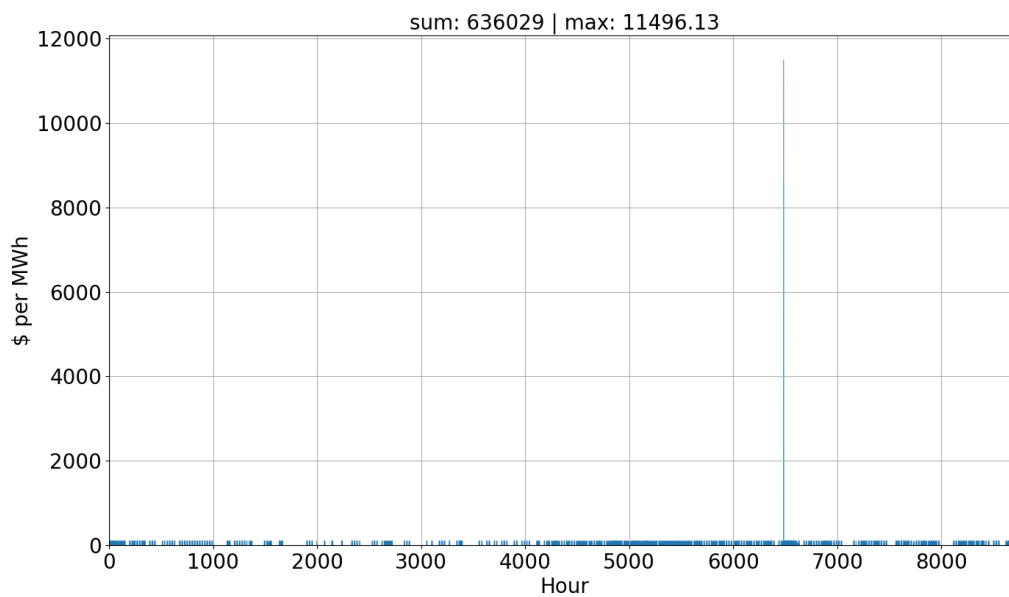


Figure 10: Electricity Price Profile

Hydrogen:

- Average Price in \$ per Q(X): 2.43
- Price Profile: Figure 11



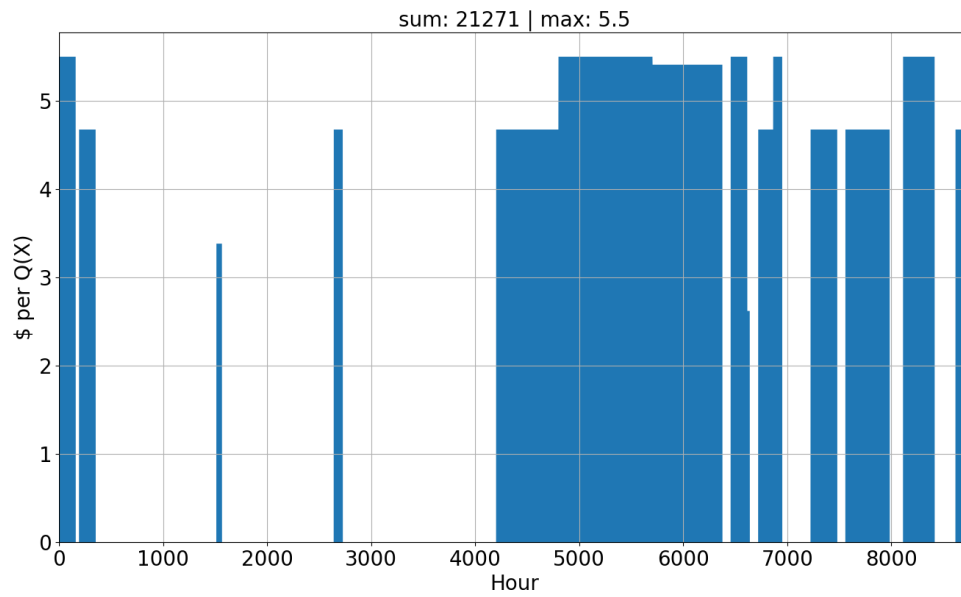


Figure 11: Hydrogen Price Profile

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