Solar Investment Decision – Reference Sheet

Date: April 2025

# Energy Consumption Estimates

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| --- | --- | --- |
| Scenario | Description | Estimated Daily Consumption |
| Conservative | Based on past 12-month average, minor efficiency upgrades | ~17.7 kWh/day |
| Progressive | Adds new appliances + EV charging (~13 kWh extra) | ~31.6 kWh/day |

# Electricity Rate Assumption

• Blended average of current and projected utility rates  
• Assumed Rate: $0.195 per kWh

# Solar Output Estimates

|  |  |  |
| --- | --- | --- |
| Condition | Assumed Value | Notes |
| Average Day | 22.65 kWh/day | Weather-adjusted average |
| Perfect Sunny | 29.45 kWh/day | Max output using 6.3 kW × 5.5 PSH × 85% |

# Maintenance Cost Scenarios (30-Year Horizon)

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| --- | --- | --- | --- |
| Scenario | Annual Cost | 30-Year Total | Assumptions |
| Low Maintenance | $75 | $2,250 | DIY upkeep, minimal service |
| High Maintenance | $250 | $7,500 | Pro cleaning & periodic inspection |

Probabilities: Low – 70%, High – 30%

# Degradation Cost Scenarios (30-Year Horizon)

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| --- | --- | --- | --- |
| Scenario | Rate | 30-Year Cost | Notes |
| Low Degradation | 0.25%/year | $1,284.02 | Tier-1 panels; minor output loss |
| High Degradation | 0.80%/year | $3,935.16 | Conservative upper bound |

Probabilities: Low – 80%, High – 20%

# Payment Options

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| --- | --- | --- | --- |
| Payment Type | Total System Cost | Net Price (After ITC) | 30-Year Total Cost |
| Upfront | $20,660 | $14,462 | $40,385 |
| Finance | $20,660 | $21,747 (loan) | $47,041 (w/o paydown) |

# Utility Cost Projections

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| --- | --- | --- |
| Scenario | 30-Year Grid Cost | Notes |
| Grid-Only | $64,933 | 3% annual increase assumed |
| With Solar (partial) | $12,750 | Grid used only for surplus needs |

# VPP & Net Metering Rates

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| --- | --- | --- |
| Model | Rate ($/kWh) | Notes |
| Net Metering | $0.195 | Retail credit for exported kWh |
| VPP (Low to High) | $0.05 – $0.25 | Time-based compensation (TOU/Wholesale) |

Daily Surplus Energy: ~11.75 kWh  
Estimated Daily Credit: $2.29/day → ~$838/year

# Final Probability Summary (Used in Tree Model)

|  |  |  |  |
| --- | --- | --- | --- |
| Factor | High Case | Low Case | Probability (High) |
| Weather (Sunny/Cloudy) | 0.575 | 0.425 | 57.5% |
| Consumption | 31.6 | 17.7 | 54.3% |
| Degradation | High/Low | - | 20% (High) |
| Maintenance | High/Low | - | 30% (High) |
| Utility Rate ↑ | - | - | 75% |