

Green in Affordable Housing Design

Financing and Funding

Costs Review

Tax Credits

Mortgage Assistance

Utility Rebates

Payback Analysis

Green in Affordable Housing Design

Financing and Funding

Low First Costs

- Small home size
- Integrated design approach

Low Operating Costs

- Energy Efficiency
- Water Efficiency
- Maintenance + Durability

Low Indirect Costs

- Occupant Health
- Indoor + Outdoor Environmental Quality
- Security
- Beauty

Financing and Funding

Tax Credits

- Solar Hot Water Heating
 - Federal: up to \$2,000
 - State: 25% cost of device up to \$1,000
- Graywater Systems (AZ House Bill 2323)
 - State: 25% cost of system up to \$1,000

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Mortgage Assistance

- Energy Efficient Mortgages
 - Allows Homeowners to finance 100% of approved, cost-effective energy efficiency strategies:
 - New Construction: up to 5% total value of home
 - Renovations + Upgrades: up to 15% total value of home
 - Allows Homeowners to qualify for a larger mortgage
- Smart Commute Initiative + Location Efficient Mortgage
 - Allows Homeowners to qualify for a larger mortgage depending on home location in proximity to workplace

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Utility Rebates for Solar Power

- APS – Solar Partners Incentive Program
- SRP – EarthWise Solar Energy
- Sulphur Springs Valley EC – SunWatts Incentive Program
- TEP – SunShare PV Buydown
- Trico Electric Cooperative – SunWatts Incentive Program
- UES – SunShare PV Buydown

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Payback Analysis

- First Costs
 - Rebates or Incentives (deduct)
 - Operational Costs (energy use, water use...utility bills)
 - Maintenance Costs (repair + parts' replacements)
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- Calculate Standard / Typical Operational + Maintenance Costs (*annual*)
 - Compare with Efficient Technology Operational + Maintenance Costs (*annual*)
 - Calculate Difference = **Annual Cost Savings**
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- Calculate First Costs with Rebates
 - Divide Total First Costs by Annual Cost Savings = **Total Years for Payback**

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Payback Analysis

- Implement Strategies that Payback within **7 years**
- Consider Strategies that Payback within **7 – 10 years**

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Payback Analysis - Photovoltaics



1,200sf House

	1.5kW System ₂	3kW System ₃
Initial cost ₁	\$13,000	\$22,500
Federal tax credit	(\$2,000)	(\$2,000)
State tax credit	(\$1,000)	(\$1,000)
TEP cash rebate ₄	(\$2,000)	(\$4,000)
City of Tucson permit credit	(\$1,000)	(\$1,000)
Total cost	\$7,000	\$14,500

System	Average Monthly Savings ₁	Annual Savings	Payback Period ₂	Annual ROI ₃
1.5 kW System	\$20	\$240	29.2	3.4%
3 kW System	\$40	\$513	28.3	3.5%

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Payback Analysis - Photovoltaics

- First Costs = **\$13,000**
- Rebates or Incentives (deduct) = **\$7,000**
- Operational Costs (energy use) = **\$540 / year (\$45/mo)**
- Maintenance Costs (repair + parts' replacements) = **\$0 / year**
- Typical Operational Costs (standard systems) = **\$780 / year (\$65/mo)**
- Typical Maintenance Costs (standard systems) = **\$50 / year**
- Operational + Maintenance Cost Savings = **\$830 - \$540 = \$290 / year**
- Total First Costs (PV System) = **\$13,000 - \$7,000 = \$6,000**
- Total Years for Payback = **\$6,000 / \$290 = 20.7 Years**



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Payback Analysis – Solar Hot Water

	Active systems			Passive systems		
Initial cost ₁	\$2,950	\$3,700	\$5,000	\$2,150	\$2,318	\$5,000
Conventional heater ₂ OR				\$400	\$400	
Tankless heater ₃				\$650	\$650	
Average total cost	\$2,950	\$3,700	\$5,000	\$2,675	\$2,843	\$5,000
Federal tax credit	(\$885)	(\$1,110)	(\$1,500)	(\$645)	(\$695)	(\$1,500)
State tax credit	(\$738)	(\$925)	(\$1,000)	(\$669)	(\$711)	(\$1,000)
Scenario 1 total cost ₄	\$1,328	\$1,665	\$2,500	\$1,361	\$1,437	\$2,500
TEP cash rebate	(\$1,475)	(\$1,475)	(\$1,475)			
City of Tucson permit credit	(\$1,000)	(\$1,000)	(\$1,000)	(\$1,000)	(\$1,000)	(\$1,000)
Scenario 2 total cost ₅	\$0	\$0	\$25	\$361	\$437	\$1,500

System	Annual operating cost	Annual savings ₂	Payback period ₃
Electric (existing)	\$434	N/A	N/A
Scenario 1			
Active	\$178	\$256	9.8
Passive	\$249	\$185	13.5
Scenario 2			
Active	\$178	\$256	0.1
Passive	\$249	\$185	8.1

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Payback Analysis – Solar Hot Water

- First Costs = **\$5,000**
- Rebates or Incentives (deduct) = **\$2,500**
- Operational Costs (energy use) = **\$178 / year (\$15/mo)**
- Maintenance Costs (repair + parts' replacements) = **\$0 / year**
- Typical Operational Costs (standard systems) = **\$434 / year (\$36/mo)**
- Typical Maintenance Costs (standard systems) = **\$20 / year**
- Operational + Maintenance Cost Savings = **\$454 - \$178 = \$276 / year**
- Total First Costs (PV System) = **\$5,000 - \$2,500 = \$2,500**
- Total Years for Payback = **\$2,500 / \$276 = 9.0 Years**

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Payback Exercise

- **New Efficient HVAC package unit = \$1,600**
- **Energy Use with New Efficient unit = \$40 / month**
- **Existing Energy Use = \$100 / month**

- **What is the *Payback period* for implementing this New Unit?**
- **Should you implement this strategy?**

THANK YOU!!!

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