



The Value of Distributed Photovoltaics to Austin Energy and the City of Austin

Electric Utility Commission
Resource Management Commission

June 26, 2006

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Original Objectives

- Quantify the comprehensive value of distributed PV to AE in 2006
- Document evaluation methodologies to assist AE in performing the analysis as conditions change and applying it to other technologies

Additional Objective

- Quantify the comprehensive value of distributed PV to AE in 2006
- Document evaluation methodologies to assist AE in performing the analysis as conditions change and applying it to other technologies
- **Produce a consensus/compromise-based estimate of the value of distributed PV to AE in 2006**



Results Depend on ...

- Evaluation framework
- Values to quantify
- Methodologies
- Assumptions & Data



SOCIETAL					
Total	Resource Cost	(TRC)	Industry	Government	
Participant	(PAC)				
Rate Impact Measure (RIM)					
Participant	All Ratepayers	Utility	Industry	State/Local Gov.	Federal Gov.

Investment					
Equipment	-		+		
Installation	-		+		
Sales Tax	-			+	
O&M Cost	-		+		
Financing	-		+		
Electric Utility Bill	+	-			
Incentives					
Incentive Payments	+	-			
Program Administration		-		+	+
Tax Effects					
Tax Credits	+			-	-
Depreciation	+			-	-
Loan Interest Write-Off	+			-	-
O&M Costs	+			-	-
Utility Bill Savings	-			+	+
Tax on Tax Credits	-				+
Utility Cost Savings					
Energy		+			
Capacity		+			
T&D System		+			
Losses		+			
Technology Synergies		+	+		
Environmental					
Emissions		+			
Water		+			
Health		+			
RECs/Green Tags	+		+		
Job Creation			-	+	+
Reliability					
Blackout Prevention		+	+	+	+
Emergency Utility Dispatch	+		+		
Catastrophe Recovery		+		+	+
Backup Power	+			+	+
Risk Factors					
Manage Load Uncertainty			+		
Wholesale Price Hedge			+	+	+
Retail Price Hedge	+			+	+
Retail Price Cap		+	-	+	+
National Energy Security		+		+	+



Benefits to be Included

- Energy production w/ natural gas price hedge
- Generation capacity
- T&D capacity deferrals
- Reduced transformer and line losses
- Environment

Benefits Evaluated but Not Included

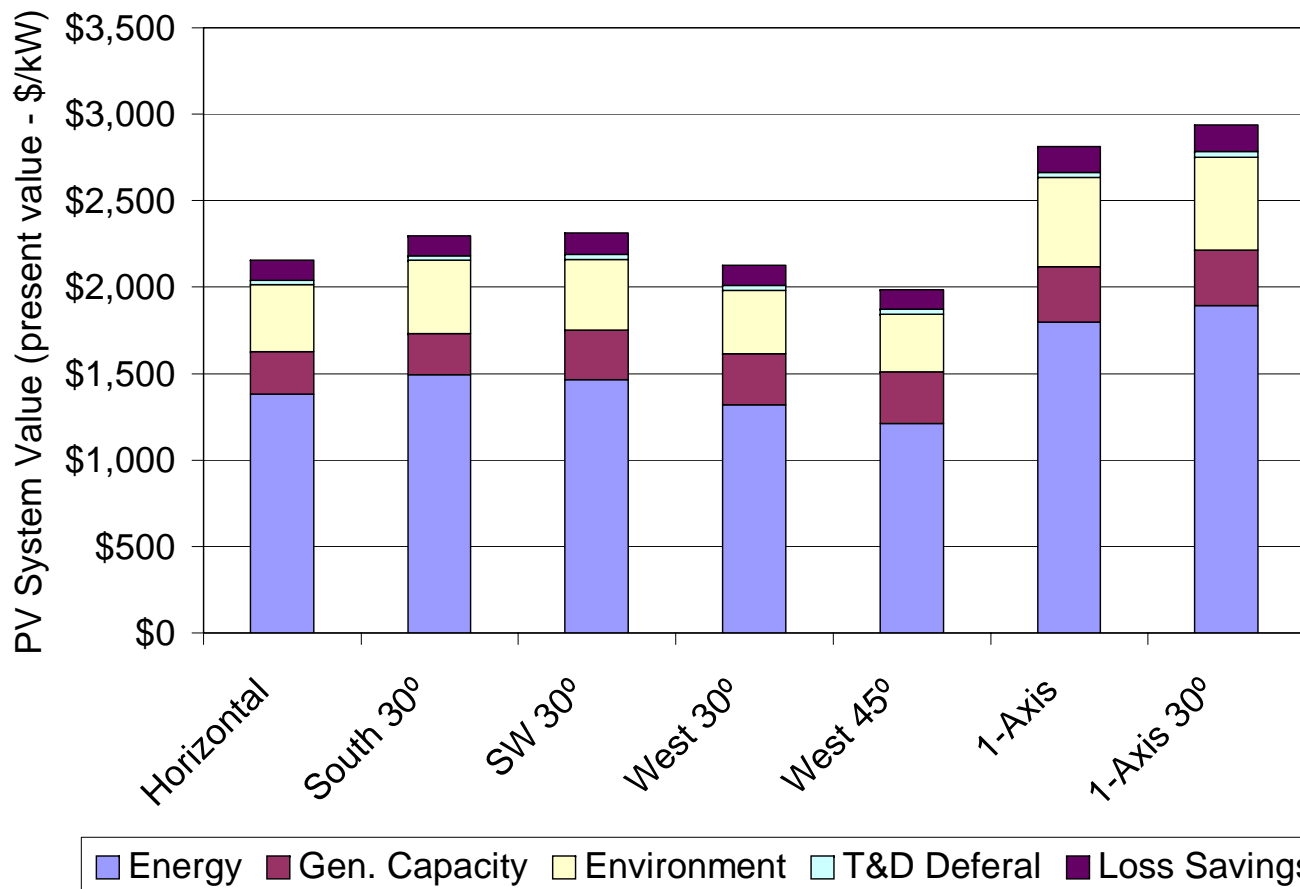
- Reactive power control
 - Benefit is insignificant
- Disaster recovery
 - Disaster recovery benefit is significant but requires coupling with storage; AE recommended that the benefit be removed
- Technology synergies (PV + load control)
 - Three capacity value methods were implemented; AE selected mid-range value

Benefits Explicitly Excluded

- **Blackout Prevention**
 - AE decided to exclude this benefit because battery storage is separate technology from solar
- **Emergency Utility Dispatch**
 - AE decided to exclude this benefit because battery storage is separate technology from solar
- **Manage Load Uncertainty**
 - Benefit applies to T&D deferral and AE personnel estimated that only a small portion of the distribution capacity expansion plans have the potential to be deferred, thus making this benefit insignificant
- **Retail Price Cap**
 - Benefit was large in other studies (e.g., NJ), but requires broader framework

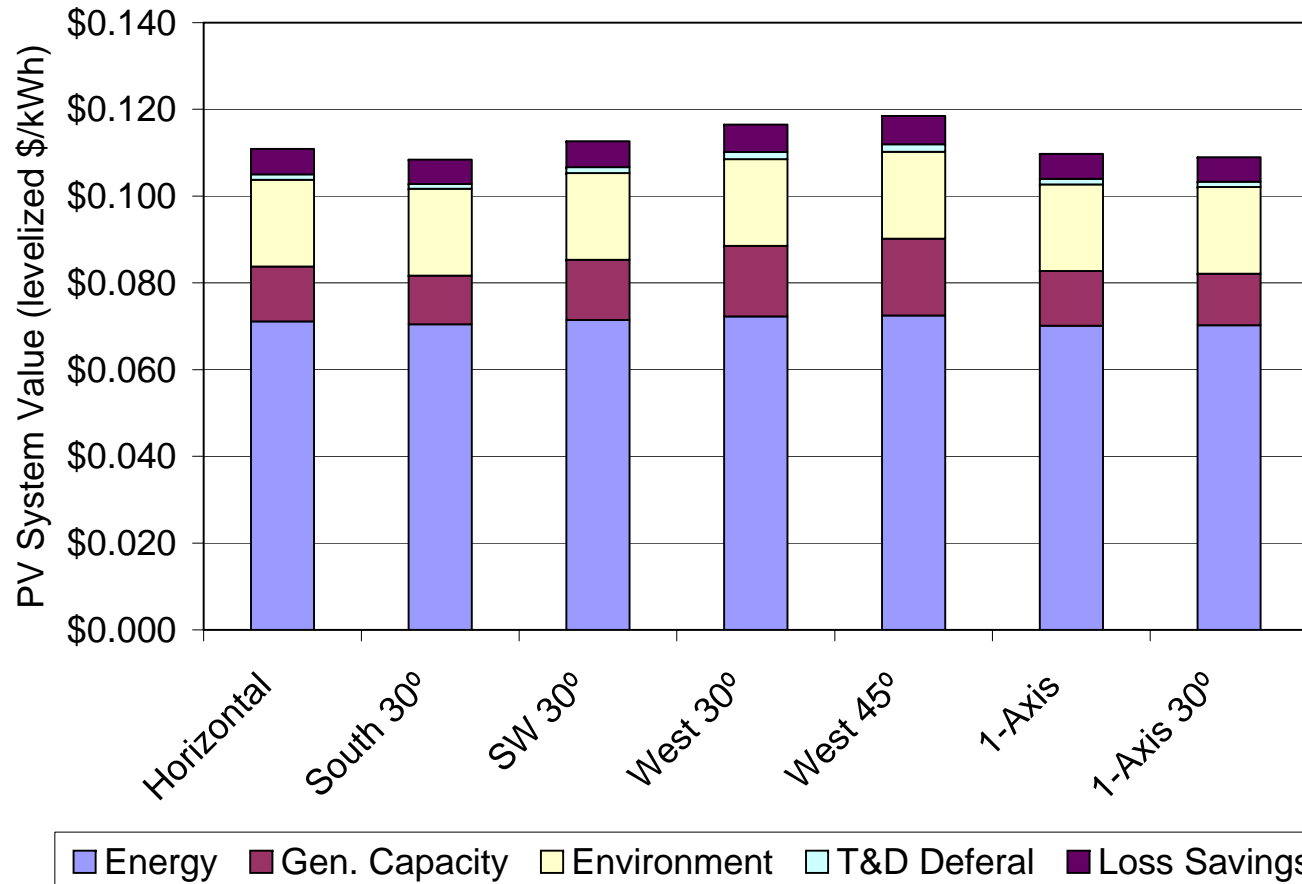


Absolute PV Value Depends on Configuration





Per Unit PV Value is 11¢ per kWh





Change Assumptions: PV Value = 21¢ per kWh

- Change the following assumptions:
 - Include disaster recovery benefit
 - Increase natural gas prices (years 6 to 30) by 30%
 - Capture PV & load control technology synergy
 - Escalate environment benefit 5% per year
- Value goes from 11¢ per kWh to 21¢ per kWh



Study Uses

- Assist in structuring an RFP
- Provide input into incentive design for customer-owned systems
- Evaluate other PV applications
- Assist in evaluating new business opportunities (e.g., a fixed-price electricity offering)

Methodology Advances

- Applied method to capture natural gas price hedge benefit
- Demonstrated importance (and applied) marginal loss savings calculations
- Developed preliminary method to quantify disaster recovery benefit
- Developed method to convert non-firm resource (PV) into firm resource using technology synergies (PV + load control)



Study Enhancements

- Further investigate disaster recovery benefit
- Improve long-term natural gas price forecast
- Use PV in conjunction with load control
- Further evaluate T&D deferral potential
- Expand framework to include other benefits