



Overview of PBI Design Issues

Thomas E. Hoff
Clean Power Research
www.clean-power.com

Performance Based Solar Incentives Workshop

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Overall Policy Goal

Achieve subsidy-free market in CA, with 3000 MW installed within 11 years, through the use of incentives that are designed to assure full expected energy performance from installed PV systems

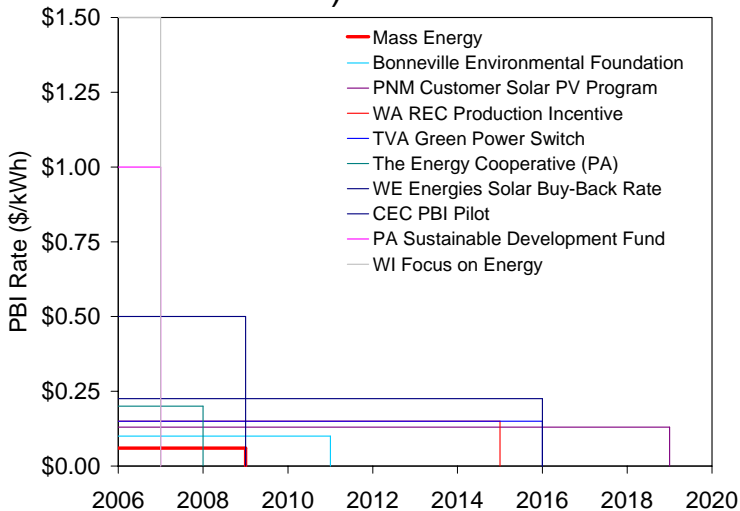
Objective

- Existing PBI programs
- Structures available to PV incentive programs
- Key concerns from various perspectives
- Possible next steps

Questions to Answer

- How to optimize performance based incentives
 - Performance based incentive (PBI)
 - What should the PBI rate and duration be?
 - Should structure be constant or variable? Etc.
 - Hybrid structure
 - What fraction should be PBI and what fraction upfront payment?
 - Other?

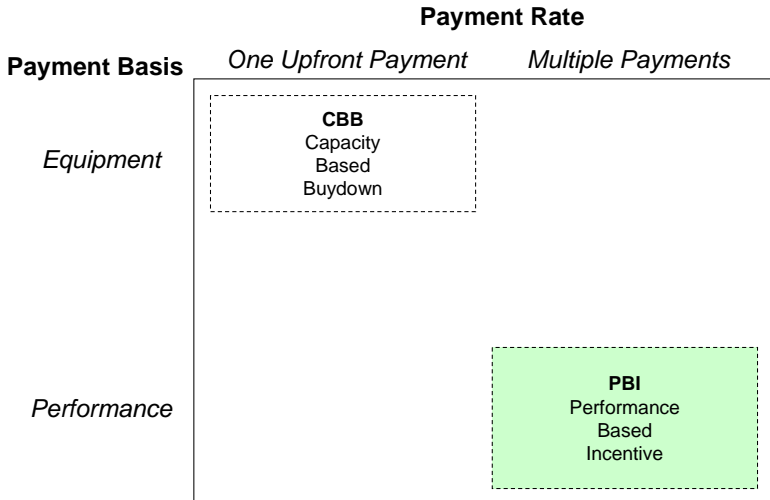
There is a Wide Variety of Existing PBI Programs (Both Rate & Duration)



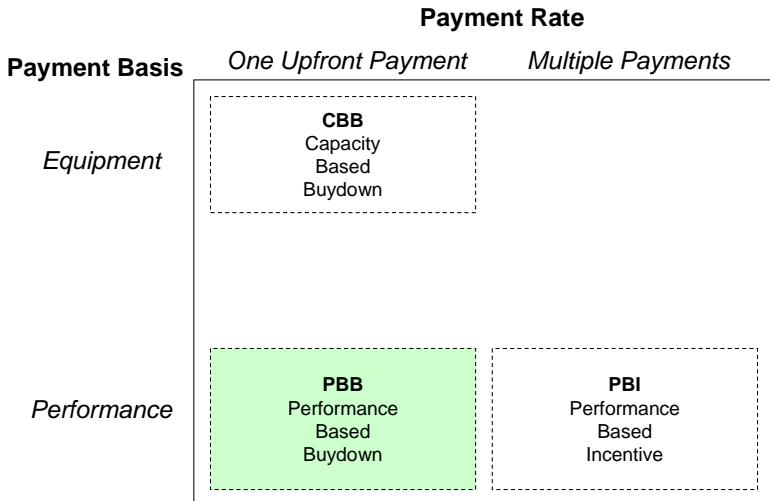
Most PV Incentive Programs are Capacity Based

Payment Basis	Payment Rate	
	<i>One Upfront Payment</i>	<i>Multiple Payments</i>
<i>Equipment</i>	CBB Capacity Based Buydown	
<i>Performance</i>		

Performance Based Incentives (PBI) Protect Against Poor Design, Installation & Performance



Performance Based Buydown (PBB) Pays Upfront with an Adjustment Made Over Time



Capacity Based Incentive Is Paid Over Time

		Payment Rate	
Payment Basis		<i>One Upfront Payment</i>	<i>Multiple Payments</i>
<i>Equipment</i>	CBB Capacity Based Buydown	CBI Capacity Based Incentive	
<i>Performance</i>	PBB Performance Based Buydown	PBI Performance Based Incentive	

Expand Framework

Payment Basis	Payment Rate	
	<i>One Upfront Payment</i>	<i>Multiple Payments</i>
<i>Equipment</i>	CBB Capacity Based Buydown	CBI Capacity Based Incentive
<i>Design & Installation</i>		
<i>Performance</i>	PBB Performance Based Buydown	PBI Performance Based Incentive

Expected Performance Based Buydown (EPBB) Pays Based on Expected Performance

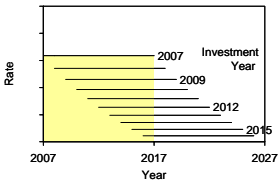
Payment Basis	Payment Rate	
	<i>One Upfront Payment</i>	<i>Multiple Payments</i>
<i>Equipment</i>	CBB Capacity Based Buydown	CBI Capacity Based Incentive
<i>Design & Installation</i>	EPBB Expected Performance Based Buydown	
<i>Performance</i>	PBB Performance Based Buydown	PBI Performance Based Incentive

There are Various Types of PBI Structures

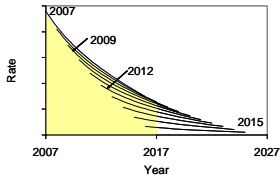
Payment Basis	Payment Rate	
	<i>One Upfront Payment</i>	<i>Multiple Payments</i>
<i>Equipment</i>	<p>CBB Capacity Based Buydown</p>	<p>CBI Capacity Based Incentive</p>
<i>Design & Installation</i>	<p>EPBB Expected Performance Based Buydown</p>	
<i>Performance</i>	<p>PBB Performance Based Buydown</p>	<p>Variable Duration & Fixed Rate PBI Fixed Duration & Fixed Rate Variable Duration & Variable Rate Fixed Duration & Variable Rate</p>

Variations on PBI Structure

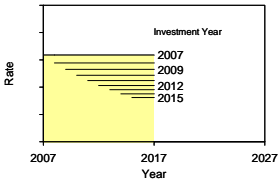
Fixed Duration, Fixed Rate



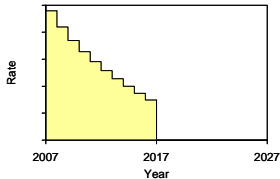
Fixed Duration, Variable Rate



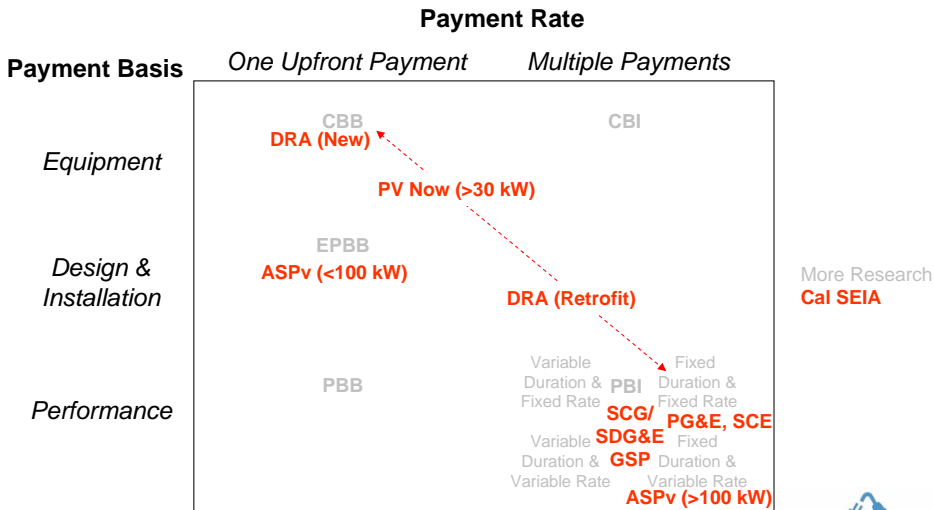
Variable Duration, Fixed Rate



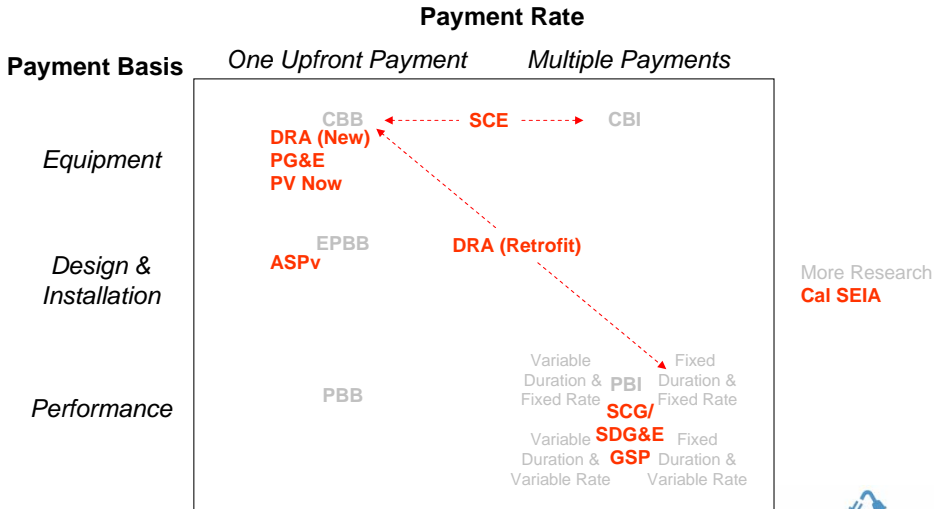
Variable Duration, Variable Rate



CSI Proposals: Non-Residential Customers



CSI Proposals: Residential Customers



Key Concerns from Various Perspectives

- Incentive Agency or Utility
 - Use of ratepayer funds (program cost vs. energy production)
 - Annual budget effects
- Manufacturer & System Reseller
 - Product sale
 - Product innovation
- Customer
 - Economic feasibility

Strengths and Weaknesses (Program/Utility Perspective)

	CBB	CBI	EPBB	PBB	PBI
Program's Use of Ratepayer Money (\$ per kWh)					
Direct Program Cost					
<i>Capitalizes on agency's lower discount rate</i>	+	-	+	+	-
<i>Reduces production risk premium required by customers</i>	+	+	+	-	-
<i>Promotes product innovation</i>	-	-	+/-	+	+
<i>Maximizes state and federal tax benefits</i>	?	?	?	?	?
Indirect & Administrative Cost					
<i>Minimizes number of payments to make to customer</i>	+	-	+	+/-	-
<i>Reduces need to verify system performance for payment</i>	+	+	+/-	-	-
<i>Minimizes number of customer interactions</i>	+	-	+	-	-
Assurance of Energy Production					
<i>Protects against poor system design and installation</i>	-	-	+/-	+	+
<i>Protects against poor long-term system performance</i>	-	-	-	+/-	+
Other Factors					
<i>Simple to have constant annual budget w/o escrow account</i>	+	-	+	+	-
<i>Structure can correspond to value being obtained over time</i>	-	+	-	+	+
<i>Easy to promote time-varying value of power</i>	+	+	+	+	-

Strengths and Weaknesses (Manufacturer & Reseller Perspective)

	CBB	CBI	EPBB	PBB	PBI
Product Sale					
<i>Promotes ease of sale</i>	+	+/-	+	+/-	+/-
<i>Represents transition from status quo</i>	+	-	+/-	-	-
<i>Reduces need for additional warranties</i>	+	+	+	-	-
Product innovation					
<i>Rewards products w/ high kWh production per kW capacity</i>	-	-	+/-	+	+
<i>Rewards products (e.g. inverters) with long life times</i>	-	-	-	+	+
<i>Lessens need to meet agency equipment perf. standards</i>	-	-	-	+	+

Strengths and Weaknesses (Customer Perspective)

	CBB	CBI	EPBB	PBB	PBI
<i>Customer Economics</i>					
<i>Minimizes payment risk</i>	+	+	+	-	-
<i>Reduces initial capital/loan amount required by customer</i>	+	-	+	+	-
<i>May improve long-term system performance</i>	-	-	-	+	+
<i>Can be engineered to provide various cash flow streams</i>	-	+	-	-	+

Next Steps

- Create apples-to-apples comparison of all proposals
- Evaluate results from multiple perspectives