Presentation on Net Energy Metering Successor Tariff Proposal

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Matthew Freedman
Staff Attorney
The Utility Reform Network

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SUMMARY OF TURN PROPOSAL

KEY ELEMENTS

Export Compensation

- Net billing with avoided cost export rates

Existing Rates for Imports

- Any existing applicable TOU rate schedule is eligible

Customer-specific grid charge

- Collects Nonbypassable, Unavoidable and Shared (NUS) costs
- Tied to actual monthly usage attributable to self-consumption

Market Transition Credit

- Up-front buydown incentive to achieve 10-year payback period for CARE customers

Paired Storage

- New rate tariff with TOU rates better tied to grid conditions + obligations to discharge storage during extreme system stress and emergency conditions

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EXPORT COMPENSATION

KEY DETAILS

Net Billing with Hourly Netting and 12-month rollover

- Export credits provided based on each hour of exported electricity
- Excess monthly credit can be rolled forward for up to 12 months

Export compensation set at avoided cost

- Hourly values from most recent Avoided Cost Calculator (ACC) for all components other than energy supply
- Energy supply values based on actual CAISO market prices

Optional long-term export rate

- Opt-in for participants with new BTM resources
- Lock in recent ACC values for all components over 5 or 10 year timeframe

IOUs credit non-energy export values to DA/CCA customers

- Components of ACC relating to delivery services credited by IOUs to departing load customers
- DA/CCA customer energy supply and capacity export values credited by LSE

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IMPORT RATES

KEY DETAILS

Charges for imports based on applicable tariff

- No unique charges for imports other than tariffed rate

All TOU tariffed rates available

- Default rate, EV rates, Electrification Rates and other Experimental Rates would be eligible

No new demand or fixed charges

- No demand charges or fixed charges
- New grid charge based on self-consumption and not tied to imports

Allows participants to subscribe to the best tariff for their usage

- Customer needs may change over time due to varying consumption patterns and end-uses
- Permits participation in newly developed TOU tariffs

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GRID CHARGE

KEY DETAILS

Separate charge associated with self-consumption quantities

- Customer-specific and based on actual self-consumption in each month
- Self-consumption determined by either engineering estimate or metered production from a second meter

Recovery of Nonbypassable, Unavoidable and Shared Costs (NUS)

- NUS cost obligation = kWh of self-consumption x NUS costs/kWh
- NUS costs/kWh based on customer's existing tariffed rate for imports during relevant TOU period

Components of NUS rate

- TURN NUS includes all rate components tied to usage except generation
- TURN proposal identifies various cost categories that could be included in a Commission-approved NUS definition

TURN NUS definition prevents cost shifting

- Calibrates NUS cost responsibility to actual customer usage
- Ensures full collection of customer share of responsibility for costs not avoided/ reduced by BTM resource operation

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NONBYPASSABLE, UNAVOIDABLE AND SHARED COSTS

COMPONENTS

TURN proposed definition

Distribution
Transmission
All nonbypassable rate components (including PCIA)

Alternative Minimum Starting Point for NUS calculation

Wildfire costs (D, T)
CEMA/HSM accounts (D, T)
Transportation electrification programs (D)
New System Generation Costs (NSGC)
Reliability Services (RS)
Public Purpose Programs (PPP)*
Wildfire Fund Charge (WFC/DWR bond)*
IOU securitization for wildfire costs or other undercollections (separate NBC)
Competition Transition Charge (CTC)*
Nuclear Decommissioning (ND)*
Power Cost Indifference Adjustment (PCIA)
Energy Cost Recovery Account/PG&E (ECRA)
PUC Reimbursement Surcharge (PUCRF)

* Paid by NEM 2.0 on net consumption in each metered interval.

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MARKET TRANSITION CREDIT (MTC)

KEY DETAILS

MTC provided as up-front buydown incentive

- One-time payment to eligible customers at time of system purchase
- Paid on a $/kW basis and assumed to offset up-front investment costs
- Consistent with historical approach used under CEC ERP and CPUC CSI

Eligibility limited to CARE customers with new installations

- MTC should be focused on CARE customers installing retrofits
- If non-rate funds are available, non-CARE customers can be included

Target payback period of 10 years for CARE customers

- Based on present value difference between 20-year ownership costs and present value expected bill savings over target period
- MTC value vintaged and updated to reflect material changes in system cost, tax benefits or compensation

MTC Cost Recovery

- Strong preference for non-rate sources (Cap-and-Trade/GGRF, General Fund)
- Fixed surcharge on NEM 1.0/2.0 customers ($/month) for a portion of MTC costs
- Remaining costs collected via PPP from all customers

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PAIRED STORAGE TARIFF

KEY DETAILS

No additional MTC for paired storage

- Incentives already provided via SGIP

Separate rate tariff aligned to grid conditions

- At least 3 TOU periods in summer/winter and optional CPP component
- Additional TOU granularity could better align storage operation to grid conditions

Obligation to discharge under extreme conditions

- Capability to be remotely dispatched during extreme system stress conditions, including CAISO Stage 2 Emergency
- Dispatch could occur through IOU, CAISO, CCA/ESP or third party aggregator
- Compensation for emergency dispatch based on market prices/CPP rates

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RELEVANCE OF SPM COST TESTS

Total Resource Cost (TRC)

- Benefits = ACC avoided costs + up front participant fees
- Costs = participant costs + income tax impacts + IOU up-front/ongoing costs
- Does not consider tariff design, export compensation, cost shifting

Rate Impact Measure (RIM)

- Benefits = ACC avoided costs + up front participant payments
- Costs = participant bill savings + MTC in rates + IOU up-front/ongoing costs
- Explicitly accounts for tariff design and measures cost shifting

Participant Cost Test (PCT)

- Benefits = Participant bill savings + MTC + ITC tax benefits
- Costs = Ownership/operation costs of BTM resource
- Reflects 20-year value proposition for participant under different tariff designs

Program Administrator Cost (PAC)

- Benefits = ACC avoided costs + up front participant payments
- Costs = IOU up-front/ongoing administrative costs
- Not useful in selecting between tariff options.

All cost tests calculate Present Value of costs and benefits

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SAMPLE COST TEST RESULTS FOR TURN TARIFF

PG&E CARE CUSTOMERS

PG&E Scenario	CARE Dual Fuel Coastal	CARE Dual Fuel Inland	CARE All Electric Coastal	CARE All Electric Inland
#1 -- EXISTING NEM 2.0				
RIM	0.725	0.642	0.753	0.660
PCT	1.196	1.191	1.150	1.159
TRC	0.871	0.772	0.862	0.766
PAC	15.736	24.534	12.967	19.570
Discounted Payback Years	15	15	16	15
#2 -- TURN SUCCESOR TARIFF - NO MTC BUYDOWN				
RIM	1.146	1.224	1.120	1.191
PCT	0.764	0.692	0.756	0.691
TRC	0.810	0.740	0.791	0.728
PAC	6.456	10.015	5.336	8.007
Discounted Payback Years	> 20	> 20	> 20	> 20
Year 1 NUS Monthly Charge ($)	$25.26	$43.22	$21.33	$33.55
#3 -- TURN SUCCESSOR TARIFF WITH MTC BUYDOWN @10-YEAR PAYBACK 100% OF MTC COSTS INCLUDED IN RIM				
RIM	0.666	0.623	0.655	0.614
PCT	1.229	1.195	1.225	1.195
TRC	0.810	0.740	0.791	0.728
PAC	6.456	10.015	5.336	8.007
Discounted Payback Years - prior to buydown	> 20	> 20	> 20	> 20
Discounted Payback Years - after buydown	10	10	10	10
Year 1 NUS Monthly Charge ($)	$25.26	$43.22	$21.33	$33.55
Upfront Capex Buydown $	$4,653	$9,051	$3,870	$7,225
Upfront Capex Buydown $/kW	$1,522	$1,629	$1,544	$1,636

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SAMPLE COST TEST RESULTS FOR TURN TARIFF

PG&E CARE CUSTOMERS - CONTINUED

PG&E Scenario	CARE Dual Fuel Coastal	CARE Dual Fuel Inland	CARE All Electric Coastal	CARE All Electric Inland
#4 -- TURN SUCCESSOR TARIFF WITH MTC BUYDOWN @15-YEAR PAYBACK 25% OF MTC COSTS INCLUDED IN RIM				
RIM	1.011	1.027	0.989	1.004
PCT	1.107	1.091	1.105	1.091
TRC	0.810	0.740	0.791	0.728
PAC	6.456	10.015	5.336	8.007
Discounted Payback Years - prior to buydown	> 20	> 20	> 20	> 20
Discounted Payback Years - after buydown	15	15	15	15
Year 1 NUS Monthly Charge ($)	$25.26	$43.22	$21.33	$33.55
Upfront Capex Buydown $	$3,434	$7,188	$2,882	$5,740
Upfront Capex Buydown $/kW	$1,124	$1,294	$1,150	$1,300
SURCHARGE FOR NEM 1.0/2.0 CUSTOMERS TO RECOVER % OF MTC COSTS (SCENARIO 4)				
$/month Non-CARE NEM 1.0/ 2.0 - 25% share	$7.96	$16.67	$6.68	$13.31
$/month Non-CARE NEM 1.0/ 2.0 - 50% share	$15.93	$33.34	$13.37	$26.62

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SAMPLE COST TEST RESULTS FOR TURN TARIFF

PG&E NON-CARE CUSTOMERS

PG&E Scenario	NonCARE Dual Fuel Coastal Large No EV	NonCARE Dual Fuel Inland Small No EV	NonCARE All Elec Coastal Small No EV	NonCARE All Elec Inland Small No EV
#1 -- EXISTING NEM 2.0				
RIM	0.434	0.411	0.459	0.418
PCT	1.893	1.733	1.769	1.705
TRC	0.903	0.763	0.866	0.764
PAC	51.651	16.934	14.035	17.615
Discounted Payback Years	7	8	8	8
#2 -- TURN SUCCESOR TARIFF - NO MTC BUYDOWN				
RIM	1.120	1.024	1.013	1.033
PCT	0.852	0.766	0.834	0.764
TRC	0.881	0.719	0.799	0.722
PAC	20.985	6.941	5.768	7.216
Discounted Payback Years	> 20	> 20	> 20	> 20
Year 1 NUS Monthly Charge ($)	$138.87	$50.24	$37.45	$50.21
#3 -- TURN SUCCESSOR TARIFF WITH MTC BUYDOWN @10-YEAR PAYBACK 100% OF MTC COSTS INCLUDED IN RIM				
RIM	0.687	0.591	0.642	0.593
PCT	1.265	1.224	1.256	1.224
TRC	0.881	0.719	0.799	0.722
PAC	20.985	6.941	5.768	7.216
Discounted Payback Years - prior to buydown	> 20	> 20	> 20	> 20
Discounted Payback Years - after buydown	10	10	10	10
Year 1 NUS Monthly Charge ($)	$138.87	$50.24	$37.45	$50.21
Upfront Capex Buydown $	$13,503	$5,687	$3,769	$5,940
Upfront Capex Buydown $/kW	$1,327	$1,492	$1,386	$1,497

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SAMPLE COST TEST RESULTS FOR TURN TARIFF

PG&E NON-CARE CUSTOMERS - CONTINUED

PG&E Scenario	NonCARE Dual Fuel Coastal Large No EV	NonCARE Dual Fuel Inland Small No EV	NonCARE All Elec Coastal Small No EV	NonCARE All Elec Inland Small No EV
#4 -- TURN SUCCESSOR TARIFF WITH MTC BUYDOWN @15-YEAR PAYBACK 25% OF MTC COSTS INCLUDED IN RIM				
RIM	1.015	0.902	0.923	0.908
PCT	1.123	1.104	1.119	1.104
TRC	0.881	0.719	0.799	0.722
PAC	20.985	6.941	5.768	7.216
Discounted Payback Years - prior to buydown	> 20	> 20	> 20	> 20
Discounted Payback Years - after buydown	15	15	15	15
Year 1 NUS Monthly Charge ($)	$138.87	$50.24	$37.45	$50.21
Upfront Capex Buydown $	$8,871	$4,199	$2,545	$4,397
Upfront Capex Buydown $/kW	$872	$1,102	$936	$1,108
SURCHARGE FOR NEM 1.0/2.0 CUSTOMERS TO RECOVER % OF MTC COSTS (SCENARIO 4)				
$/month Non-CARE NEM 1.0/ 2.0 - 25% share	$20.57	$9.74	$5.90	$10.20
$/month Non-CARE NEM 1.0/ 2.0 - 50% share	$41.14	$19.47	$11.80	$20.39

RATIONALES FOR TURN'S APPROACH

Value-based compensation for participants

- Credits participants for actual value of generation
- Retail rates are not a proxy for value to all customers and the electrical grid

Eliminate ongoing cost shifting

- Rate design ensures non-participants are unaffected (except for MTC costs)
- Allows BTM resource deployment to expand to a much larger % of customers without unacceptable rate increases for all customers

End economic discrimination against low-income solar customers

- Existing NEM tariffs link BTM resource compensation to household income
- TURN approach provides similar value for non-CARE and CARE customers without any MTC
- MTC w/10-year payback for CARE customers prioritizes equity goals

Entire subsidy/incentive included in MTC

- Total subsidy defined and can be calibrated to serve various objectives
- Allows for alternative (non-rate) funding sources to pay some/all of MTC costs
- No tail of ongoing cost shifting

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TURN COST MODEL

PURPOSE AND DATA INPUTS

Purpose of the model

- Unlike in R.14-07-002, there is no Public Tool in this proceeding
- Need ability to calculate payback periods, cost test results
- Built by TURN consultant who worked on E3 NEM 2.0 Public Tool
- Fully functioning Excel model available to all parties

Data included in model

- Currently has complete PG&E data, will include additional SCE/SDG&E data
- Populated with bundled residential customer load shapes and solar PV data
- Can accommodate user input data for other customer classes/technologies
- Up to 32 loads shapes for each utility (CARE/Non-CARE, EV/none, Inland/Coastal, Large/Small, Dual Fuel/All Electric)
- Month-hour weekday-weekend timing granularity for loads, generation, 2020 avoided costs, rates
- Fully functional DER costing pro forma that includes Capital & Operating Costs, Technical Parameters, Finance, Tax, ITC
- Upfront IOU fees for estimated generation output or second meter

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TURN COST MODEL

RATE AND SUCCESSOR TARIFF ASSUMPTIONS

Extant rates used for analysis

- Can be specified for up to 3 TOU periods on weekdays/weekends for each IOU
- Input for retail rate escalation
- With/without baseline quantities
- Existing/future NBCs can be entered

Successor Tariffs (ST) modeled

- Net energy metering (NEM 2.0) and net energy billing (NEB) can be modeled
  NEB exports compensated at ACC values (some/all components)
- Monthly or hourly netting
- No transition period assumed
- ST generation/distribution TOU rates may differ from extant TOU rate ratios
- Revenue neutral by season
- NBCs may be assessed on consumption or consumption + self-consumption
- Applicable NBC components can be selected
- NUS Charge distribution and NBC components are assessed on self-consumption
- NUS can exclude PCIA, transmission, and can be adjusted by user-input % of distribution costs

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TURN COST MODEL

RESULTS

Results Provided

- Results for a given successor tariff type, customer, BTM resource, IOU
- TRC, PCT, RIM and PAC values for 10 and 20 year periods
- Average NUS costs/charges per customer per month
- LCOE of generation
- $/kWh bill savings
- Discounted payback period
- Required upfront buydown incentive (MTC) to achieve user input discounted benefit/cost ratio and payback year ($ and $/kW)
- Model does not contain adoption logic to assess impact on solar deployment

Model download link

https://theutilityreform-my.sharepoint.com/:x:/g/personal/matthew_turn_org/EQ9ZsLoNYDxGtJrvDcubFAIBlqnWyYpFCGIcCHsVnF_Z8Q?e=6axEWw

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TURN COST MODEL DASHBOARD

Key Driver Inputs	Value
Discount Rates	
Active Participant	8.00%
Utility - PG&E	7.81%
Specification of Active Customer Load Shape	
Utility	PG&E
Customer Type (rates)	CARE
Location	Inland
All Electric or Dual-Fuel	All Electric
Size	Small
Electric Vehicle	No EV
Upfront Buydown Incentive	
Discounted Payback Period (years)	15
Ratio of PV Benefits to PV Costs ("Sustainable" over Payback Period)	1.0
Incentive Active Flag (1 = on; 0 =off)	1
If incentive, Buy-all / Sell-all Post-Payback Period (1=on, 0=off)	0
If BA/SA, compensation from year 16 (1 =Active ACC; 0 =NSC)	0
If Buydown & no BA/SA, exports comp from year 16 (1 =NSC; 0 =Active ACC)	0
Specification of Successor Tariff	
Baseline structure (1=with baseline, 0=no baseline)	0
Successor Tariff Scenario Selection	2
Minimum bill ($ per day)	$ 0.21371
Treatment for Exports (1= Net Billing, 0 = NEM2)	1
If net billing, 1= NBCs on consumption; 0 = NBCs on cons+ self-cons	0
If 0 selected above, NUS Costs Selection	0
0 = All NBCs Can Be Assessed on Self-Consumption	
1 = All NBCs Except PCIA Can Be Assessed on Self-Consumption	
2 = All NBCs Except PCIA & Transmission Can Be Assessed on Self-Consumption	
Share of Self-Consumption Distribution Costs Collected	100%
Collection of Above Charge (1=$/kW-mo PV, 2=$/cust-mo, 0=$/kWh self-cons)	0
NUS Distribution Charge for Self-Consumption ($/kW, $/month or $/kWh per se	$ 0.068
Year 1 Total NUS Charge ($/kWh self-consumption)	$ 0.128
Year 1 Monthly NUS Usage (kWh)	263
Year 1 Monthly NUS Charge ($/month)	$ 33.55
Monthly or Hourly Netting (1=monthly, 0=hourly)	0
Avoided Cost Compensation (Net Billing Scenario)	
Fixed Average or Varies Annual (1=fixed, 0=annual)	0
If Fixed, Term of Average Tranche (years)	10
Specification of Generator	
Active Technology Selection (storage activates CPP)	Solar PV
Customer Type (for finance costs)	CARE
Active Financing Type Selection	Lease
Generation Calculation (for incremental costs)	Estimated
% of First Year Load Served by Generator (<=100%)	100%
Storage SGIP Equity Adder (1=equity, 2=resiliency, 0=basic)	0
Installation Year	2022
LCOE	$ 0.146

Results

Cost Test Results	20-yr	10-yr
RIM	1.004	0.834
PCT	1.091	1.183
TRC	0.728	0.585
PAC	8.007	5.741

Discounted Payback Metrics	
Discounted Payback Years - prior to buydown	> 20 yrs
Discounted Payback Years - after buydown	15

Average Bill Savings ($/kWh generation)		
Years 1-5	$	0.061
Years 1-10	$	0.073
Years 1-20	$	0.102

Buydown Incentive Summary		
Calculated Buydown Incentive per Active Customer		5,740
Calculated Buydown Incentive ($/kW-ac nameplate)		1,300
PV Costs over Payback Period		$10,870
PV Benefits over Payback Period incl Incentive		$5,129
Benefit - Cost Ratio over Payback Period		1.00
LCOE Net of Incentive	$	0.030

Allocation of Buydown Incentive		
Annual Adoptions		100,000
Total Buydown Incentive ($)		**574,035,930**
Share paid by General Fund (%)		75%
Share paid by NEM 1.0 and 2.0 Customers		25%
Buydown Incentive paid by General Fund ($)		**430,526,947**
Share included in RIM (%)		25%
Buydown Incentive in RIM ($)	$	**1,435**
Include Buydown Incentive in TRC (1=yes, 0=no)		0
Number of NEM 1.0 systems		616,308
Number of NEM 2.0 systems (end 2019)		413,982
Collect Charge from NEM 1.0/2.0 CARE customers (1=yes, 0=no)		0
Share of Customers that are CARE		12.8%
Non-CARE NEM 1.0 and 2.0 charge ($ per customer-mo)	$	**13.31**

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