KEMA

Exploring Feed-in Tariffs for California

Feed-in Tariff Design and Implementation Issues and Options

June 30, 2008

Bob Grace, Sustainable Energy Advantage, LLC

Wilson Rickerson, Rickerson Energy Strategies, LLC

Feed-in Tariff Objectives, Measures of Success

Potential goals could include….

- **Quantity?**
  - Maximize generation (MW or % of retail sales)
  - Develop certain quantity in a specified time period
- **Cost?**
  - Minimize rate impact to retail customers
  - Minimize transmission costs
  - Minimize contract regulatory oversight cost
- **Diversity?**
  - Promote certain generation technology
  - Support smaller projects or businesses
  - Promote projects in specific geographic locations
- **Others?**

Survey Questions

Questions on Objectives & Measures of Success

- If California were to adopt feed-in tariffs (for generators over 20 MW), what broad policy objectives should it be designed to address?
- What are the appropriate measures of success?
- To the extent that policy objectives may conflict, what is an appropriate weighting or prioritization of these objectives? Which are more important?

Design Issues Outline

- Generator and Technology Eligibility
- Setting the Price - Approach
- Tariff Structure
- Contract Duration
- Adjusting Price over time
- Tariff differentiation
- What is being Sold/Purchased?
- Cost Distribution/Allocation
- Integration into Power Supply of Utilities and Others
- Access
- Credit and Performance Assurance
- Quantity and Cost Limits
- Policy Interaction

Design Issues Outline

- Generator and Technology Eligibility
- Setting the Price - Approach
- Tariff Structure
- Contract Duration
- Adjusting Price over time
- Tariff differentiation
- What is being Sold/Purchased?
- Cost Distribution/Allocation
- Integration into Power Supply of Utilities and Others
- Access
- Credit and Performance Assurance
- Quantity and Cost Limits
- Policy Interaction

Resource Type

Which technologies should specifically be targeted?

- Options: establish feed-in tariffs…
  - A set of tariffs applicable to **all** RPS-eligible renewables
    - Similar to most European countries)
  - Only for a certain **subset** of eligible resources
    - e.g. mature vs. emerging resources
  - Targeting certain **ownership** models (e.g. community-owned, or wastewater or water treatment facilities)
- Pros and Cons
  - Depends on other design considerations, such as state's policy objectives, and tariff's interaction with other policies

Survey Questions

Questions on Generator/Technology Eligibility

- If adopted, is it more compatible with the recommended objectives to offer feed-in tariffs for…
  - all RPS-eligible resource types
  - only certain subsets of RPS-eligible resources
  - only certain ownership structures, or
  - an alternative subset of resources?
- Why?

Vintage

New generation vs. maintaining existing generation

- Options
  - Current RPS definitions (includes existing resources)
  - New generators only (typical European approach)
  - Qualification life = Contract duration - years in operation
  - Generators online after a certain date

- Pros and Cons
  - Current RPS definition builds off of existing administrative infrastructure
  - Limiting to new projects can prevent overpayment for existing projects (depending on incentive structure), maximize impact of ratepayer expenditures

KEMA

Questions on Generator Vintage Eligibility

- Is it more compatible with recommended objectives to offer feed-in tariffs to…
  - All RPS-eligible generators?
  - New generators as of their in-service date?
  - Projects for the remainder of a fixed 'qualification life'?
  - Generators coming on-line after a specified date?
- Should a feed-in tariff be offered for existing generators?
  - Repowered generators?
  - If so, should they be required to surrender their mandatory purchase rights under PURPA?

Generator Location

Flexibility of generator location and tariff access

- Options: Generator eligible for…
  - Only for tariff of interconnecting utility
  - Any feed-in tariff for generators within CA
    - with delivery, or without (e.g. RECs)?
  - Any CA feed-in tariff conditioned on energy delivery?

- Pros and Cons

Continued on next slide...

Generator Location

Pros and Cons

	Pros	Cons
Only for tariff of interconnecting utility	Consistent with other feed-in tariffs known to work	Could restrict supply… Leaves out some areas if some utilities don't offer
Any feed-in tariff for generators within CA	Expands access & supply (e.g. when some utilities don't offer tariff)	If tariff rates differ, generators will chase the best available rate
Any CA feed-in tariff , with energy delivery	Would expand supply	If utilities are allowed to set their own tariff rates, generators will chase the best available rate Utilities could contract outside of CA, minimizing local benefits in CA

KEMA

Questions on Generator Location Eligibility

- Should a generator…
  - Only be eligible for a feed-in tariff offered by the utility to whom it interconnects?
  - Be able to choose from available feed-in tariffs outside of the service area in which the generator is located?
  - Why?

- If a generator may choose from available feed-in tariffs…
  - Can any generator elect do so, or only generators with no local option (e.g. POU territory without feed-in tariff)?
  - Could the generator elect any tariff or just the nearest?
  - Would the generation need to be transmitted to the utility paying the feed-in tariff, or could delivery be accomplished via RECs?
  - Would this alternative be available only to generators within California, or regardless of location?

Interconnecting Utility Requirements

Publicly-Owned Utilities and Investor-Owned Utilities

- Options
  - Require POUs and IOUs to establish feed-in tariff (statewide)
  - Require only IOUs to establish feed-in tariff
- Pros and Cons
  - Statewide requirement provides access for all eligible generators in CA (presuming generator can only access tariff of its interconnecting utility)
  - Feed-in tariff may pose burden to small POUs

Questions on Interconnecting Utility Requirements

- If instituted, should feed-in tariffs be established within…
  - Some IOU territories?
  - All IOU territories
  - All IOU and POU territories?
  - Why?

- If IOUs & POUs both offer tariffs, should requirement be exactly the same?

Project Size

Capacity-based or Energy-based ceilings and floors

- Options
  - No Size limit
  - Capacity-based project size caps
  - Capacity-based project size floors
  - Energy-based project size limits, e.g. resource intensity or capacity factor

- Pros and Cons

Continued on next slide...

Project Size

Pros and Cons

	Pros	Cons
No limit	Make small projects competitive Could accelerate progress	Large projects might dominate if overall quantity capped
Size caps	•Ability to target systems that might "fall through the cracks" •Ability to encourage DG •Potential to control market growth and policy costs	Possible for large projects to fragment into multiple smaller projects to circumvent the cap
Size floors	Encourages large-scale developments	Might not achieve small scale or distributed energy policy objectives
Limited resource intensity or capacity factor	Encourages project development in areas with marginal RE resources	Possibility of providing support for projects that do not generate a lot of energy (if not policy objective)

Questions on Project Size Eligibility

- Should there be a minimum MW capacity or annual energy production for a project to qualify for a feed-in tariff?
    - Why or why not?

- Should there be a maximum MW capacity or annual energy production for a project to qualify for a feed-in tariff?
    - Why or why not?

Design Issues Outline

- Generator and Technology Eligibility
- Setting the Price - Approach
- Pricing Structure
- Contract Duration
- Adjusting Price over time
- Tariff differentiation
- What is being Sold/Purchased?
- Cost Distribution/Allocation
- Integration into Power Supply of Utilities and Others
- Access
- Credit and Performance Assurance
- Quantity and Cost Limits
- Policy Interaction

Value-Based Payments

A generator is paid based on the value it contributes to the system

- Options
  - Base payments on value of energy delivered
  - Modified Avoided Cost Approaches
    - Time-of Delivery
    - Adders: Environmental Externalities, Grid-side benefits
  - Wholesale vs. Retail Price Reference

- Pros and Cons of value-based approach
  - Pros: technology-neutral, ability to create rapid market growth, send positive market signals to generators that can dispatch on peak (TOD approach)
  - Cons: Don’t address the value of diversity
    - could be achieved through selective use of adders

Generation Cost-Based Payments

Designed to ensure each technology's sufficient profitability

- Administratively-determined estimate of capital, operating, financing costs, tax incentives, etc.
- Options
  - Setting the profit level (e.g. against ROI given to utilities). Profits can be defined in different ways.
  - Defining a generator cost level
    - Conservative: Target the most competitive developers, scale or resource quality within each technology type
    - Aggressive: Set high enough to allow a broad range of systems of different sizes, types and resources etc.
- See also – tariff differentiation

Generation Cost-Based Payments

Pros and Cons

- Pros and Cons
  - EU concluded able to set prices more accurately and effectively than quantity targets (e.g. RPS)
  - Simultaneously moves each technology down its experience curve more rapidly
    - May be more cost-effective in the long-term than exhausting the cheapest technology first?
  - Aggressive tariffs can entice less mature and more costly technologies, or less efficient project sites or scales

Competitive Benchmarks

Variation on cost-based, least cost to secure the desired resources

- Replaces administrative determination of cost+profit
- Design Options:
  - What is eligible? All, or differentiated by type
  - Mechanism and Frequency for determining benchmarks
    - *All* prices determined by periodic auctions/solicitations
    - *Recent/ representative* benchmark
  - Adjustment Factor
    - e.g. 95% of recent auction clearing price
- Pros and Cons
  - Pro: Mitigate risk of setting tariff too high
  - Con: Administratively cumbersome

Questions on Approach to Setting Price

- Do the recommended objectives support value-based or cost-based setting of the feed-in tariff rates? Why?

- If a California feed-in tariff price is value-based, should the tariff price:
  - Be differentiated? (e.g. to reflect time of delivery)
  - Include adders for carbon or incorporate environmental externalities?
  - Include adders for grid benefits?
  - Be based on retail electricity prices, wholesale electricity prices or avoided costs?
  - Other?

- If a California feed-in tariff is cost-based:
  - How should a reasonable level of profit be established?
  - Should a feed-in tariff be established on a 'conservative" basis (targeting only the most competitive developers, most competitive project scale or resource quality), or an 'aggressive' basis (set high enough to allow a broad range of systems of different sizes, types, resources)? Why?

- Should a competitive benchmark be used to establish the cost-basis?
  - If so, what mechanism(s) should be used and how might they be applied?

Design Issues Outline

- Generator and Technology Eligibility
- Setting the Price - Approach
- Tariff Structure
- Contract Duration
- Adjusting Price over time
- Tariff differentiation
- What is being Sold/Purchased?
- Cost Distribution/Allocation
- Integration into Power Supply of Utilities and Others
- Access
- Credit and Performance Assurance
- Quantity and Cost Limits
- Policy Interaction

Tariff Structures

Variations in terms of present risk profile, degree of revenue certainty, and interaction with electricity markets

- Options
  - Fixed price over multi-year contract
  - Stepped fixed-price: Fixed price payment that "steps down" to a lower payment level after a specified length of time
  - Fixed premium: Fixed price adder that floats on top of the market price
  - Hybrid: Generators can disaggregate the selling of certain commodity or attributes…not everything sold under tariff
  - Contract-for-differences (fixed-for-floating swap): The payment is determined as the difference between the strike price and spot energy market price. "Strike price" set at the level of revenue necessary to attract investment.

Tariff Structure

Pros and Cons

	Pros	Cons
Fixed price	•Revenue certainty	•No incentive to operate at system peak
Stepped fixed-price	•Revenue certainty •Transition off over-market support •Can differentiate resources	•No incentive to operate at system peak; •Administratively more complicated to set
Fixed premium	•Generators receive electricity market signals	•If electricity market prices rise, more costly for customers and more profitable for generators; •Forgoes opportunity for near market feed-in contracts to serve as hedge
Hybrid	•Shares policy risk between ratepayer and developer	•Investors partially exposed to volatility in REC market
Contract-for-differences	•Revenue certainty for generator	•No incentive to operate at system peak

KEMA

Questions on Tariff Structure

- Should the feed-in tariff be structured as a:
  - Fixed price over a set period of time
  - Fixed price stepped down over time
  - Fixed premium
  - Hybrid approach, for instance, in which the purchasing entity only buys certain commodities or attributes?
  - Contract-for-differences?

Design Issues Outline

- Generator and Technology Eligibility
- Setting the Price - Approach
- Tariff Structure
- Contract Duration
- Adjusting Price over time
- Tariff differentiation
- What is being Sold/Purchased?
- Cost Distribution/Allocation
- Integration into Power Supply of Utilities and Others
- Access
- Credit and Performance Assurance
- Quantity and Cost Limits
- Policy Interaction

Contract Duration

Setting the price and length of contract are closely linked, e.g. for capital intensive technologies, long-term contract yields lower required payments to meet ROI

	Pros	Cons
Short-term (3-7 years)	Potentially less risk for investors (if they can pull out investments quickly); Lower ratepayer impact for high-cost technology?	Upfront rate shock; Investors do not have incentive to maintain the technology; Lose potential for near-market technologies to serve as hedge to market prices over long term
Medium (10-14 years)	Lower investor risk due to longer-term contract; Balances out risks between short-term & long-term contracts	More moderate rate impact than short-term

Continued on next slide...

Contract Duration

	Pros	Cons
Long-term (15-20 years)	Creates opportunity for near-market technologies to serve as hedge	Create potential risk for technologies with fuel costs (eg. biomass) due to the difficulty to ensuring a fuel supply over the long-term
Optional Contract Terms, e.g. Offers developers a range of contract lengths to choose from	Provides developer with the flexibility to determine the appropriate contract length for financing a specific project	Creates administrative uncertainties with regards to total life of the program
Indefinite	Provides developers with a guaranteed revenue stream for the life of the project	Ratepayer cost may exceed duration required to achieve objectives

Questions on Contract Duration

- Are the recommended objectives best served by offering a feed-in tariff over a:
  - Short-term (3-7 years)
  - Medium-term (10-14 years)
  - Long-term (15-20 years or longer)
  - Range of contract durations, where the generator may elect the duration (within a range) which works best for the generator?
  - an indefinite period?

Design Issues Outline

- Generator and Technology Eligibility
- Setting the Price - Approach
- Tariff Structure
- Contract Duration
- Adjusting Price over Time
- Tariff differentiation
- What is being Sold/Purchased?
- Cost Distribution/Allocation
- Integration into Power Supply of Utilities and Others
- Access
- Credit and Performance Assurance
- Quantity and Cost Limits
- Policy Interaction

Price Adjustment Approaches

Provide flexibility to periodically adjust tariff towards the 'right' level

- Options
  - No adjustment: Tariff set and left at specified level indefinitely
  - Fixed with inflation adjustment: Tariff level is periodically adjusted for new and operating plants
  - Tariff digression: Level of the incentive payment available to new plants reduced over time
  - Indexed to change in measure of value: Tariff price for new plants periodically reset based on then-current projections of value

Price Adjustment Approaches

Pros and Cons

	Pros	Cons
No Adjustment	Stable framework	Fails to account for changes, or to push cost reductions
Inflation Adjustment	Provides for increases in operating costs	Fails to account for changes, or push cost reductions
Tariff Digression	•Ensures that incentive changes with new conditions to remain at the 'right' level; •Provides incentives for technology improvement, investment in, expansion of manufacturing capabilities to capture scale economies, encourage cost reductions; •Minimize risks of over-compensation	Administratively complex and potentially costly Projected tariff digression rate may not match actual changes in costs over time
Indexed to change in measure of "value"	Keeps prices in line with the current value of long-term contracts (like CA MPR)	Administratively complex and potentially costly Could diverge with costs necessary for generator to earn adequate returns

Questions on Price Adjustment Approaches

- If adopted, are the objectives of a feed-in tariff best met by:
  - adjusting the price available to new generators over time? or
  - leaving the available prices unchanged indefinitely?
  - Why?

- If adjusting the price available to new generators over time is desired, on what basis should the price be adjusted?
  - Why?

When to Adjust Price?

- Options
  - Periodic revisions: Scheduled price decreases (a schedule of annual % price declines is established)
  - Capacity dependent revisions: Quantity blocks. Price declines when a block is fully subscribed
  - Periodic review: No scheduled decline. Regulator reviews prices and/or digression rates according to set schedule or upon petition, to reconsider tariff price for new projects
- Pros and Cons

Continued on next slide...

KEMA

When to Adjust Price?

	Pros	Cons
Periodic revisions	Most predictable, encourages stable market. Administratively straightforward	If market transformation does not occur at the predicted rates, then the payment streams may decline at a pace that is detrimental to increasing generation
Capacity-dependent revisions	Moderately predictable, can encourage stable market. If steps are small, good at making viable prices visible over time. More likely to track market transformation progress than periodic revisions.	May create speculative queuing to capture the higher rate. If price decline lags behind market transformation,, the tariff may rapidly dry up.
Periodic review	Best able to adjust to changing circumstances	Least predictable

Questions on When to Adjust Price

- If you recommend adjusting the price, should it be changed:
  - on a pre-established timetable?
  - once pre-defined capacity blocks available at a specified price are exhausted?
  - subject to a periodic review?
- Why?

How Much to Adjust Price?

- Options
  - Experience Curves – Apply a calculated rate of annual cost decline based on past empirical and/or projected data on technology costs and efficiency
  - Uniform Steps – Price periodically reduced in often uniform steps (automatically, once trigger MW level is reached, or periodically)
- Pros and Cons

Continued on next slide...

How much to adjust price?

	Pros	Cons
Experience Curves	Highly transparent Predictable In theory, matches achievable cost decreases Incentives to build early Incentives for technological improvement	If digression rate set for many years, system is inflexible (rising prices may alter the trajectory) Difficult to administratively determine correct rate
Uniform Steps	Automatically respond to improved efficiencies from economies of scale Modest steps increase likelihood that tariff is still financially feasible	Administratively straightforward

Questions on How Much to Adjust the Price

- If you recommended adjusting the price, are the recommended objectives best served by:
  - reducing the price based on experience estimated curves, or
  - in uniform predefined steps?

- Why?

Design Issues Outline

- Generator and Technology Eligibility
- Setting the Price - Approach
- Tariff Structure
- Contract Duration
- Adjusting Price over time
- Tariff differentiation
- What is being Sold/Purchased?
- Cost Distribution/Allocation
- Integration into Power Supply of Utilities and Others
- Access
- Credit and Performance Assurance
- Quantity and Cost Limits
- Policy Interaction

Tariff Differentiation

When policy is based on generation cost rather than value, how and to what extent should feed-in tariff levels be subdivided?

- Technology Type – Technology (wind vs. solar), Fuel type (biomass ag waste adder), Application (BIPV vs. roof-mount)
- Project Size – e.g. Set higher levels for small projects
- Resource Quality – e.g. Set higher levels for low-wind to encourage geographic diversity
- Commercial Operation Date – e.g. Target existing or repowered generators
- Ownership Structure – e.g. Encourage community-ownership
- Transmission Access – Higher payments to facilities that are near transmission or load
- Location – e.g. Target load pocket or discourage transmission constraint area

Questions on Tariff Differentiation

- If adopted, should the feed-in tariff be differentiated?
  - Why?

- If so, are recommended objectives best served by differentiating by:
  - Technology type? (which?)
  - Project size? (what size?)
  - Resource quality? (in what manner?)
  - Commercial operation date? (describe)
  - Ownership structure? (which?)
  - Transmission access? (what is favored?)
  - Transmission location? (what is favored, or discouraged?)

Design Issues Outline

- Generator and Technology Eligibility
- Setting the Price - Approach
- Tariff Structure
- Contract Duration
- Adjusting Price over time
- Tariff differentiation
- **What is Being Sold/Purchased?**
- Cost Distribution/Allocation
- Integration into Power Supply of Utilities and Others
- Access
- Credit and Performance Assurance
- Quantity and Cost Limits
- Policy Interaction

What is Being Sold or Purchased?

Bundled vs. unbundled

Renewable, env. attributes, energy, capacity, ancillary services

- Options
  - Bundled All
    - electric commodities (energy + capacity + ancillary services) + all RECs
  - 'Commodity'- only
    - e.g. energy, or electric commodities if applicable
  - RECs only
  - Energy + RECs
    - i.e. unbundle capacity rights & ancillary services
  - Commodity + RECs
    - i.e. unbundle other attributes (e.g. tradable emission rights) to be sold separately
    - Applies under very narrow circumstances (e.g. fuel utilization)

What is Being Sold or Purchased?

	Pros	Cons
Bundled	•Ensure CA ratepayers receive the energy and environmental benefits that they're paying for	•Maybe inconsistent with the CA RPS should the CPUC adopt the use of RECs for RPS compliance
Allow RECs or other attributes be unbundled	•Allow generators to access a supplemental revenue stream (cost-based tariff price could be lower)	•What can be claimed as "renewable energy"? •What can be counted for RPS compliance? •What can be counted towards complying with feed-in tariff contract if RECs or other attributes are unbundled?
Only include RECs	•Compatible with a RPS or a renewables market that is characterized by unbundling RECs from energy	•California does not allow RECs for RPS compliance, although CPUC is considering the use of RECs

KEMA

Questions on What is Bring Sold/Purchased?

- If feed-in tariffs are adopted, which option for products purchased under the tariff is most consistent with the recommended policy objectives?
    - Bundled All?
    - Energy only; not capacity, ancillary services or RECs?
    - All electric commodities, not RECs?
    - RECs only?
    - Energy only (not capacity, ancillary services) + RECs?
    - All electric commodities + RECs, not tradable emission rights?
- Why?

Design Issues Outline

- Generator and Technology Eligibility
- Setting the Price - Approach
- Tariff Structure
- Contract Duration
- Adjusting Price over time
- Tariff differentiation
- What is being Sold/Purchased?
- Cost Distribution/Allocation
- Integration into Power Supply of Utilities and Others
- Access
- Credit and Performance Assurance
- Quantity and Cost Limits
- Policy Interaction

Who Buys?

How are tariff's costs carried and reflected in rates?

Who must dispose of the products purchased?

- Options
  - Retail generation sellers (IOUs, POUs, ESPs, and CCAs)
  - Providers of transmission and distribution services to retail customers (IOUs, and if application POUs)
- The choice dictates:
  - how tariff costs are carried and reflected in rates
  - who must administer tariff and payments
  - Who must dispose of products purchased

Who Buys?

	Pros	Cons
Retail generation sellers	•Consistent with purchase of electricity to be treated as part of power supply	•Cumbersome for small sellers to administer •Could add a great deal of complexity in managing the power supply implications unless all of the supply were to be sold into the spot markets
Providers of transmission & distribution services	•Simpler to administer	•Requires distinct management/treatment of power supply for that load served by ESPs and CCAs

Questions on Who Buys?

- If adopted, who should purchase the products covered under a feed-in tariff?
  - Retail generation service sellers (investor-owned utilities, publicly owned utilities, energy service providers, and community choice aggregators)?
  - Providers of transmission and distribution services to retail customers (IOUs, and if application POUs)?
- Why?

Who Pays?

Should costs be allocated across the state regardless of location?

How can those costs be collected and allocated?

- Options
  - Without statewide reallocation
    - Each utility bears cost associated with interconnecting generation in it's territory
  - Reallocate the aggregate annual feed-in tariff costs to equalize the costs among utilities with feed-in tariffs.
    - Each utility will bear a share of costs in proportion to load, and their ratepayers would be subject to comparable collections/impacts
    - Accomplished by either:
      - Utility-to-utility transfers of collections in excess of outlays
      - Through an agent such as CAISO
  - All customer classes vs. exempting some classes

KEMA

Who pays?

	Pros	Cons
Without reallocation	•Simplicity	•May raise costs significantly for utilities in renewable-rich areas •Public support for feed-in tariffs may waver if costs are disproportionally incurred by LSEs in renewables-rich areas
State reallocation	•Resolve some of the equity issues	•Raise complexity
Utility-to-utility transfers	•Complexity	
CA ISO perform reallocation	•Operationally easy addition to current functions	•Seems to be at odds with its mission •Might need FERC approval
Exempting customer class		•Result in higher costs borne by the customers not exempted

KEMA

Questions on Who Pays?

- If adopted, should :
  - costs be allocated across the state, or
  - costs incurred within specific utility service areas be borne only by ratepayers of that service area?
- Why?
- If costs should be allocated, should this be accomplished by:
  - Utility-to-utility monetary transfers?
  - CAISO as an agent?
- Should any customer classes be exempted?

Cost Recovery Mechanism

- Options
  - Through generation rates
  - Through a separate charge on distribution rates

- Pros and Cons

	Pros	Cons
Generation rates	•Tariff can be part of general rate case	•Limited opportunity for CPUC to focus on tariff oversight or evaluate effectiveness in context of broad rate case
Charge on distribution rates	•Transparency on how much tariff costs	•Should CEC or CPUC be the fund administrator? •What amount should the charge be set? •How often to adjust the charge? •How to allocate funds? •How true-ups be implemented?

KEMA

Question on Cost Recovery

- Should costs be recovered through:
  - generation rates?
  - a separate charge on distribution rates?

Management of Cost Collection & Distribution

Another dimension on administration… who manages/oversees collections, distributions?

- Options
  - State regulators
    - e.g. CA public goods charge
  - Utilities
    - e.g. Germany
  - Third-party management under contract
    - e.g. Vermont, New Jersey, Delaware, as well as Federal proposal

Questions on Management & Oversight of Cost Collection & Distribution

- If a feed-in tariff is adopted, who should be responsible for managing/overseeing cost collection:
  - Regulators?
  - Utilities?
  - 3rd-Party

Design Issues Outline

- Generator and Technology Eligibility
- Setting the Price - Approach
- Tariff Structure
- Contract Duration
- Adjusting Price over time
- Tariff differentiation
- What is being Sold/Purchased?
- Cost Distribution/Allocation
- Integration into Power Supply of Utilities and Others
- Access
- Credit and Performance Assurance
- Quantity and Cost Limits
- Policy Interaction

Integration into Power Supply of Utilities & Others

- Options
  - All generation products sold into the spot markets
  - All generation products delivered to a utility’s system are incorporated into the utility's own power supply (or, retail generation seller’s own supply).
    - If reallocation is needed, allocate dollars among utilities instead of energy
  - All generation products allocated to and delivered to each utility (or, retail generation service provider) in proportion to their respective load.
    - Reallocation of funds unnecessary.
    - Payments to the generators would come from each utility either directly, or through an agent

Integration into Power Supply of Utilities & Others

	Pros	Cons
All generation sell into spot markets	•Simplest option to implement… no interaction with power supply procurement & management	
All generation products incorporated into the utilities' own power supply, financial reallocation	•Reasonably straightforward if netted from loads •Similar to signing RPS contracts •Allocating costs may have a lower rate impact than allocating generation products	•Planning to supply the remaining load obligations somewhat more difficult than spot market option
All generation products allocated to and delivered to each retail generation service provider	•Consistent with setting a statewide feed-in tariff target	•Complexity for ESPs and CCAs, interfering with power supply management •May incur higher transaction & delivery costs than financial reallocation •Requires another party (CAISO?) to distribute generation products •If utility delivery is strictly enforced, it would be inconsistent with flexible delivery, shaping, firming allowed by RPS

KEMA

Questions on Integration into Power Supply of Utilities & Others

- If a feed-in tariff is adopted, Should all generation products:
  - be liquidated into spot markets?
  - that are delivered to a utility's system be incorporated into the utility's own power supply. If reallocation is necessary, allocate dollars among utilities instead of energy?
  - be allocated to and delivered to each utility in proportion to their respective load?

- Why?

Design Issues Outline

- Generator and Technology Eligibility
- Setting the Price - Approach
- Tariff Structure
- Contract Duration
- Adjusting Price over time
- Tariff differentiation
- What is being Sold/Purchased?
- Cost Distribution/Allocation
- Integration into Power Supply of Utilities and Others
- Access
- Credit and Performance Assurance
- Quantity and Cost Limits
- Policy Interaction

Access

Access is guaranteed, but questions remain: Who pays for direct costs of interconnecting feed-in tariff generators to the grid?

- Options:
  - Generators pay (current policy)
  - Costs socialized

	Pros	Cons
Generators pay	Encourage careful siting of the generator to minimize interconnection and transmission costs	-
Costs be socialized	Lower barriers to renewable generation and improve internal economics of generators	Remove important price signal for locating plants.

Access

Who pays for upstream transmission improvements required to interconnect a feed-in tariff generator?

- Current California ISO policy allocates transmission upgrade costs > 200 kV across all customers
- For upgrades < 200 kV, options include:
  - Costs allocated to local transmission owner (current CAISO practice)
  - Costs socialized more broadly

Costs allocated to…	**Pros**	**Cons**
Local transmission owner	No action required Incentive to locate efficiently	
Broadly socialize	Consistent with cost allocation to equalize feed-in tariff impact among all ratepayers	Disincentive to locate where most needed or least cost imposed on system

Access

CPUC Rule 21 addresses grid access for distributed generation for up to 10 MW. Should greater tariff standardization be pursued?

- Options:
  - Update Rule 21 to allow interconnection of facilities over 10 MW on the distribution grid
  - Status quo

Costs allocated to…	**Pros**	**Cons**
Update Rule 21 for > 10 MW	Facilitates easier access, lower developer costs	May require careful study to ensure acceptable reliability impacts

KEMA

Questions on Access

- Under a feed-in tariff, should generators continue to pay for cost of interconnecting?
  - Why or why not?

- Under a feed-in tariff, should the local utilities continue to pay for upstream improvements necessary to interconnect generators, or should such costs be more broadly socialized?
  - Why or why not?

- Should CPUC rule 21 be adapted to address interconnection for feed-in tariff facilities >10 MW ti the distribution grid?
  - Why or why not?

Design Issues Outline

- Generator and Technology Eligibility
- Setting the Price - Approach
- Tariff Structure
- Contract Duration
- Adjusting Price over time
- Tariff differentiation
- What is being Sold/Purchased?
- Cost Distribution/Allocation
- Integration into Power Supply of Utilities and Others
- Access
- Credit and Performance Assurance
- Quantity and Cost Limits
- Policy Interaction

KEMA

Queuing Procedures

If price declines with quantity or quantity caps apply.

- Queuing procedures required for price certainty
- Minimize speculative queuing that ties up access to funds

- Options
  - Application fee
    - Non-refundable fee to get in line
  - Security accompanied with project milestones
    - Up-front fee, refundable if project reaches fruition by milestone date
    - Forfeit if project fails
  - Security increases in exchange for time extensions
    - Similar to previous option, but allows project to "buy an extension" by placing more security at risk

Note: in report, this topic appears in Ch. 6

KEMA

Queuing Procedures

Pros and Cons

	Pros	Cons
Application Fee	• Administratively straightforward	• If fee is modest, does little to discourage speculation
Security Accompanied with project milestone	• Encourages viable projects if security is sufficiently high • Somewhat more administrative burden than application fee	• Inflexible – if a viable project hits a delay, it can be kicked out of line
Security increases in exchange for time extensions	• Strong incentive to encourage projects that are real and discourage those that are not viable while acknowledging timing risks in development	• If tariff digression, may fail to discourage deep-pocketed developers from rushing into the queue if a time extension would expose the generator to lower revenue

Questions on Queuing Procedures

- What mechanisms should be considered in feed-in tariff design to minimize speculative queuing? (e.g. minimize the potential of generators to rush to get in line for feed-in tariffs?)
  - Application fee?
  - Security & Project Milestones?
  - Security increases with time extensions?
- Why?

Credit and Performance Assurance

- Options
  - Development security – Collateral for the period between contract execution and project operation
    - IOUs require development security for 2008 renewables RFO. Typically $/kW requirement.
  - Operation collateral or security – Protects the buyer against the cost of replacement energy, RECs or other products in the event a seller fails to meet its obligations, fails to properly maintain a generator, or seeks to get out of a contractual obligation to seek a more lucrative market
- Note: Feed-in tariffs have traditionally not required development or operational security…
  - risk is minimal compared to when buyer relies on supply for obligations

Credit and Performance Assurance

	Pros	Cons
Development security[1, 2]	• Provides protection if project or construction schedule is not met or if project defaults • More limited role possible to address queuing under declining price or caped quantity	• Little risk of contract failure if tariff is above the replacement cost of "commodity energy" • Barrier to small generators & developers → limiting viable projects & likely increasing costs
Operation collateral or security	• Protects buyer against default or non-performance by generator • Protect ratepayers if tariff payments front-loaded	• Buyer less reliant on delivery for power supply, so damages less than typical contracts • Overly stringent requirements may create a barrier to small generators or developers, and may increase costs

Notes:

1.If required, one option is to reduce credit or security requirements to facilitate emerging technologies.

Questions on Credit and Performance Assurance

- Should development security be imposed under feed-in tariffs?
  - Why or why not?
  - If so, what type, at what level and in what form?
- and/or operational collateral or security be imposed?

- Should operational collateral or security be imposed under feed-in tariffs?
  - Why or why not?
  - If so, what type, at what level and in what form?

Design Issues Outline

- Generator and Technology Eligibility
- Setting the Price - Approach
- Tariff Structure
- Contract Duration
- Adjusting Price over time
- Tariff differentiation
- What is being Sold/Purchased?
- Cost Distribution/Allocation
- Integration into Power Supply of Utilities and Others
- Access
- Credit and Performance Assurance
- Quantity and Cost Limits
- Policy Interaction

KEMA

Quantity and Cost Limits

- Options
  - Quantity cap based on capacity
    - Cap feed-in tariffs at a specific MW capacity amount
    - Typically applied by technology
  - Quantity cap based on generation
    - Cap feed-in tariffs at a specific amount of electricity sold within the state
    - Similar to RPS tiers
  - Cost cap
    - Cap based on policy impact, i.e. % rate impact
    - Need to define whether queuing takes place until costs subside or whether policy terminates

Quantity and Cost Limits

	Pros	Cons
Quantity cap based on MW capacity	Limits uncontrolled growth and cost	Can create market uncertainty, especially depending on queuing protocols
Quantity cap based on generation	Limits uncontrolled growth and cost	Can create market uncertainty, especially depending on queuing protocols
Cost caps	Limits cost independent of capacity and directly tied to ratepayer impact	Can be less transparent for market participants

KEMA

Question on Quantity and Cost Limits

- If adopted, should a feed-in tariff be limited, or should it be an unlimited standard offer open to all generators that apply for it?
  - Why?

- If limited, which approach would be most consistent with the policy objectives?
  - A program cap based on quantity capacity (MW)
  - A program cap based on generation (MWh)
  - A program cost cap terminating or suspending tariff availability once a cost/rate threshold is reached?

- If a cost cap, should tariff suspend with wait list until costs subside, or terminate?
  - Why?

Design Issues Outline

- Generator and Technology Eligibility
- Setting the Price - Approach
- Tariff Structure
- Contract Duration
- Adjusting Price over time
- Tariff differentiation
- What is being Sold/Purchased?
- Cost Distribution/Allocation
- Integration into Power Supply of Utilities and Others
- Access
- Credit and Performance Assurance
- Quantity and Cost Limits
- Policy Interaction

Integration of Feed-in Tariffs with Existing RPS Framework

- Options: Feed-in tariff as…
  - Parallel to current RPS solicitation & contracting mechanism
    - e.g. expand the current tariffs by raising/removing caps on project size & cumulative MW eligible (currently 478.4MW)
  - Limited alternative to current contracting mechanism
    - e.g. only targeted certain types of resources or ownership models
    - Could be MPR-based (current) or generation cost-based
  - A replacement for the current mechanism, either…
    - Replace RPS immediately
    - Transition at future target % or specified future date

Integration of Feed-in Tariffs with Existing RPS Framework

	Pros	Cons
Parallel to RPS	•Help create diverse renewables mix •Provide safety net for projects unsuccessful in RPS bidding process •Provide "between-cycle" opportunities, allowing projects to go to market when ready •Mitigate some of concerns associated with contract failure	•CPUC stated that feed-in tariff should not be "open-ended" since Standard Offer No. 4 contracts resulted in a "overwhelming response with too much potential supply" (is this a real risk now?)
Limited alternative to RPS	•Addressed concerns over "open-ended" contracting •Support targeted policy objectives, generation technologies, ownership approaches unable to compete in RPS •Support diversity	
RPS replacement	•Could streamline, simplify, and accelerate the procurement process in CA •Cost-based contract for near-market resources could lock-in long-term renewable energy prices below MPR for most cost-effective renewables?	•Could raise risk of increased ratepayer costs if tariff level set too high and generation developed & delivered faster than policymakers can modify tariff

KEMA

Survey Questions

Questions on Integration of Feed-in Tariffs with Existing RPS Framework

- Under what conditions would a feed-in tariff be more effective and/or efficient than existing California RPS for projects > 20 MW?

- What other benefits might be:
  - provided by a feed-in tariff relative to the California RPS?
  - be lost under a feed-in tariff?

- If a feed-in tariff is adopted, should it:
  - Serve as a parallel mechanism to the current solicitation process?
  - Provide a limited alternative to current contracting mechanisms targeting only certain types of resources or ownership models? If so, which resource types and why?
  - Replace the existing structure entirely with a feed-in tariff?
  - Other?

Interaction of Feed-in Tariffs with AB 32

- AB 32 implementation details are not yet decided
- As a general rule, any energy generated from projects receiving a feed-in tariff would be anticipated to be treated in a similar manner as other renewables under AB32

Interaction with Competitive Renewable Energy Zone

- Options
  - Determine appropriate tariff prices for individual technologies based on RETI calculations for each renewable energy zone
  - There may be other options, but prior experience with feed-in tariffs provide few real-world examples
- Issues:
  - Cost estimates developed to date in Phase 1 of RETI are relatively wide-ranging, reflecting estimates from both CA and other states
  - Administration determinations of appropriate price levels for each renewable energy zone could be imprecise, complex, unwieldy to implement, depending on method to set price levels

Survey Questions

Question on Interaction with Competitive Renewable Energy Zone

- How might a potential feed-in tariff policy be integrated with the efforts of the Renewable Energy Transmission Initiative?

Thank you for your attention.