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Sustainable Energy Advantage, LLC

California Feed-in Tariff Design & Policy Options

- Changes/Updates to the *Draft* Reports
- Final Recommendations & Conclusions
- Key Implementation Issues

California Energy Commission
Feed-in Tariff Workshop #3 - December 1, 2008

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Presentation Overview

Purpose: To review the proposed final results of the California Feed-in Tariff Design & Policy Options exploration, the path taken to get there, and where to go from here.

- Changes to draft reports
- Process – Phase I
  - Policy Drivers
  - Experience elsewhere
  - Policy Issues & Options
  - Stakeholder Feedback
- Process – Phase II
  - Lessons learned - Spain & Germany
  - Core, non-core & implementation issues
  - *Representative* Policy "Paths" & interactions
  - Stakeholder Feedback
- Recommendation
  - Cost-based Feed-in Tariff ≤ 20 MW
  - Potential broader application in future
- Implementation Issues
  - Establishing initial tariff prices
  - Adjusting tariff prices
  - Supporting efficient T&D and Supply Portfolio Planning
  - Legislative issues

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Changes to Draft Reports

Changes to Draft Reports

- Paper #1: Exploring Feed-in Tariffs for California - Feed-In Tariff Design and Implementation Issues and Options
  - Editorial changes, clarified dates
  - Make sure references current; updates (e.g. CPUC REC order)

- Paper #2: California Feed-in Tariffs Design & Policy Options
  - Edits/updates
  - Fine-tune policy interactions discussion
  - Added appendices: staff summaries of WS#1 & WS#2 stakeholder comments
  - Added last chapter to reflect recommendations for feed-in tariff design & implementation (core issues) & identifying implementation issues for IEPR process

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Process- Phase I

Goals, Objectives & Policy Drivers

Goals: e.g.
-reduce GHG
-Reduce fossil fuel use
- manage ratepayer cost & risk
-Etc.

Objectives: e.g.
-20% RE by 2010
-33% RE by 2020

CEC staff/REC Committee 'Policy Drivers' for feed-in tariffs: e.g.

- High priority:
  - Quantity
  - Financial security
- Medium priority
  - Diversity 'A' = Diverse mix (technology & operational characteristics
  - Sustainable renewable energy
  - Price stabilization
- Lower priority
  - Diversity 'B' = other policy objectives (e.g. biomass)

Subject to constraints…

- available transmission
- siting/permitting
- feasible build-out time
- cost-effectiveness
- environmental/resource sustainability

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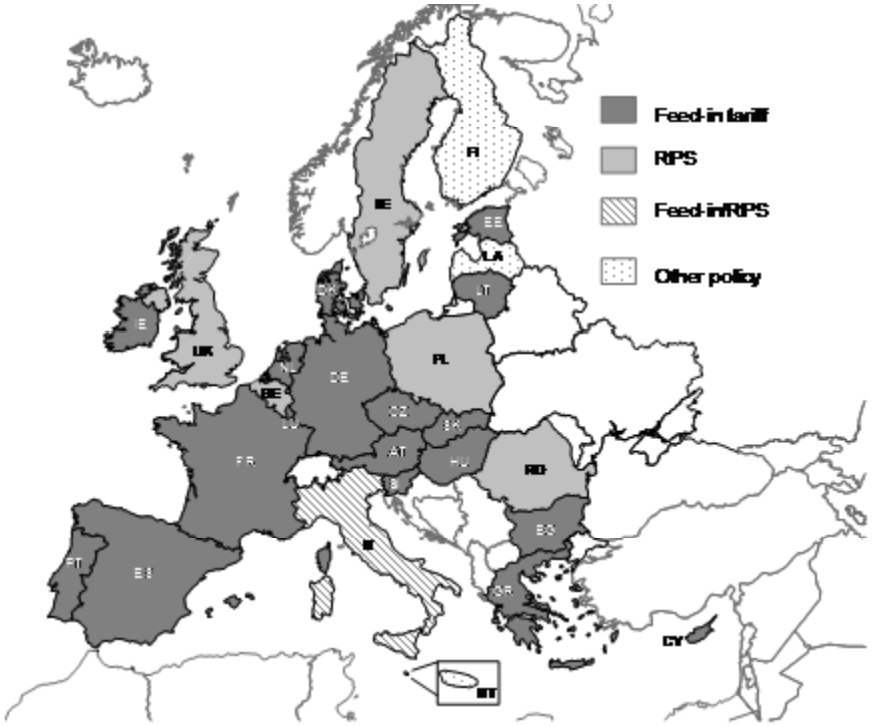
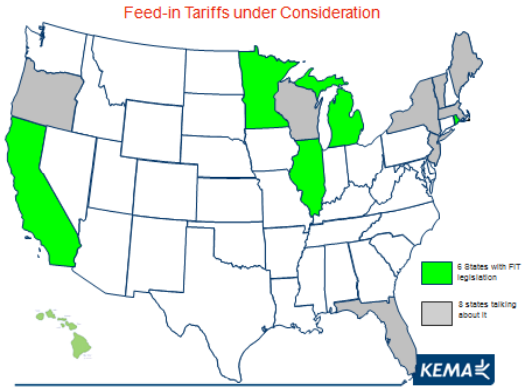
Feed-in Tariff Experience Elsewhere



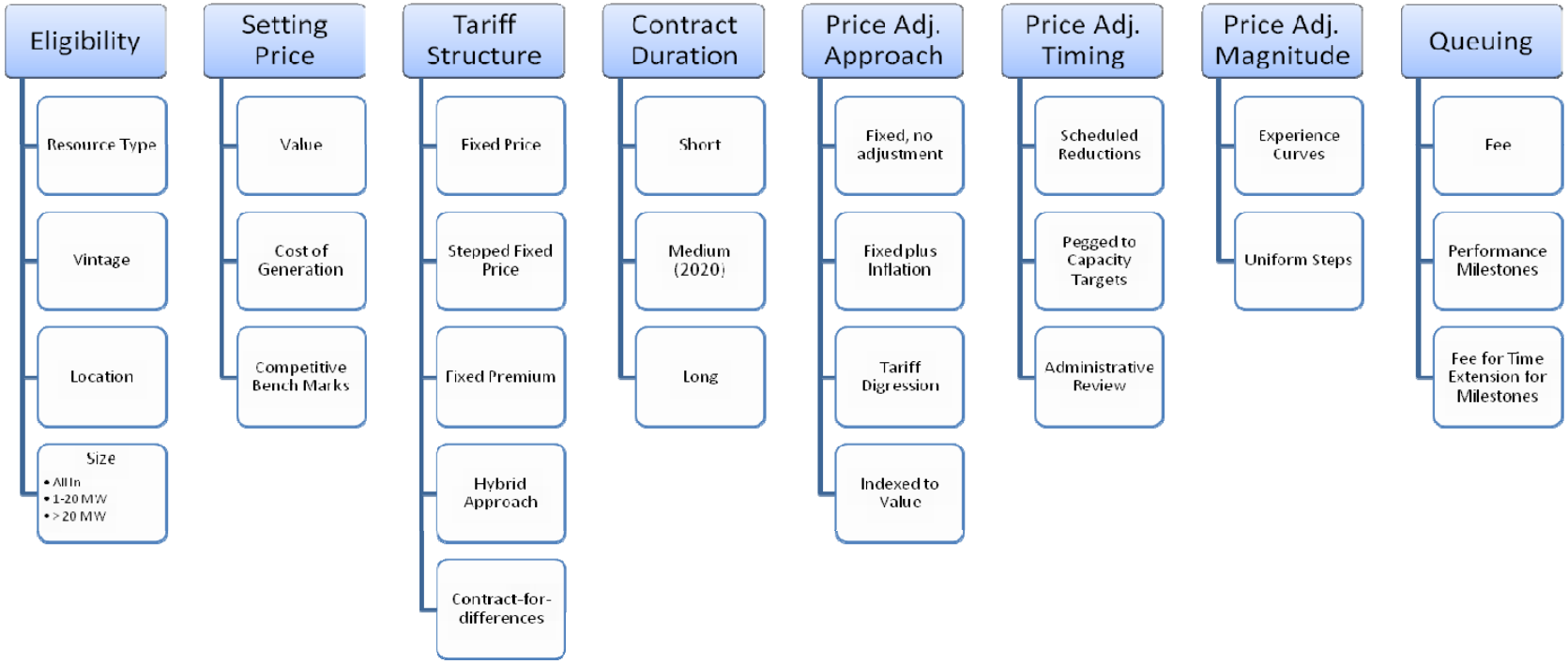
- Denmark
- Spain
- Germany

- Europe
- Ontario and Prince Edward Island
- Brazil
- Korea



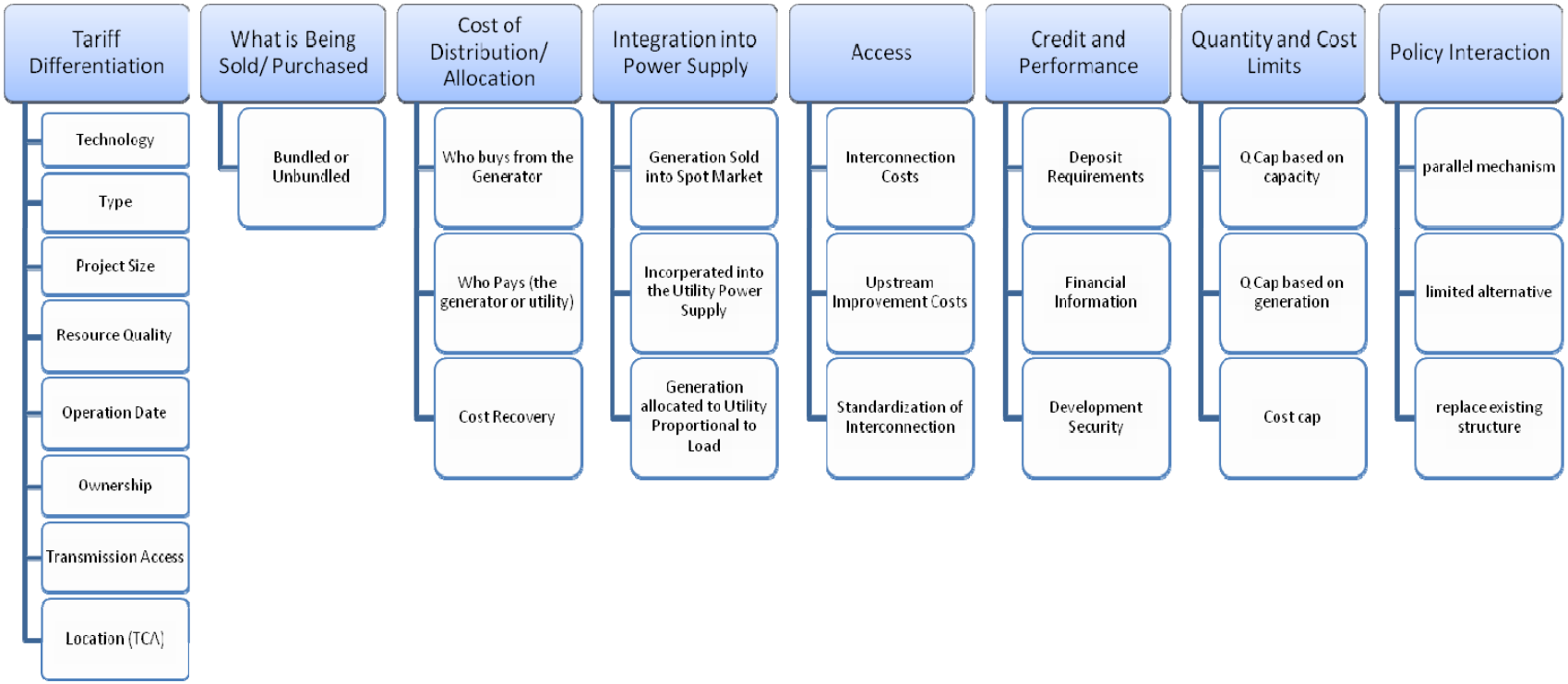
Feed-in Tariff Policy Design Issues (1)

(from *Exploring Feed-in Tariffs for California: Feed-in Tariff Design and Implementation Issues and Options* (referred to herein as the Issues & Options Report))



Feed-in Tariff Policy Design Issues (2)

(from issues/Options Report)



Stakeholder Feedback – Phase I

- Workshop #1 (June 30, 2008)
- Written Comments (announcement questions)
- On-line survey (specific design options)
- See: http://www.energy.ca.gov/portfolio/documents/2008-06-30_workshop/comments/
- Key takeaways:
  - Non-utility stakeholders support a broad range of different feed-in tariff options to grow the market, and “close gap” between net metering and RPS
  - Utilities state that FITs would conflict with RPS and would raise costs
  - Recognition that FITs do not address all constraints (e.g. transmission)

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Process- Phase II

Lessons Learned from Germany & Spain

- Long-term, generation cost based payments can rapidly grow renewable energy markets and achieve national targets
- Technology-specific tariffs create diversity when set at appropriate levels
- Investor security is determined both by price certainty and policy certainty
- Value-based incentives may not put downward pressure on renewable energy prices
- Feed-in tariffs can suppress wholesale market prices
- Both Spain and Germany distribute policy costs nationally
- Long-term payments have been used successfully in Germany and Spain
- Implementing support for emerging resources is challenging
- Setting the correct price for biomass can be challenging

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Feed-in Tariff Policy Design Options

- Issues & Options Report identified range of design issues & options
- Many potential combinations
- Sorted issues into 3 categories:
  - **Core policy issues**:
    - High-level policy decisions dictate CA's feed-in tariff strategy
    - Critical characteristics of alternative feed-in tariff policy paths
  - **Non-core policy issues:**
    - Important, modify feed-in tariff design, but don't fundamentally alter its core structure
    - Would require decisions to move forward, but are independent of policy path selected → appended to any of the selected policy paths.
  - **Implementation details:**
    - Issues that must be addressed, but do not require major policy decisions
    - Further discussion can be deferred

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Core Design Issues

- Narrowed through consideration of:
  - Policy Drivers & input from Commission's Renewables Committee
  - Pros & cons in Issues & Options Report
  - Practical constraints and California precedents
  - Stakeholder comments
  - Commission staff and consultant analysis
- Some issues found to have single viable choice
- Remaining issues used to craft a representative range of 'policy paths'

Representative Policy Paths

- Developed six fundamentally distinct feed-in tariff policy design alternatives
  - Constructed from narrowed options for “core” design issues
  - Representative models intended to stimulate dialogue
  - Guided by… CEC policy drivers, stakeholder comments, lessons learned from FIT experience elsewhere
- Representative range of options spanning direction, scope, timing
  - Potential forks on the road… yet interactions are possible leading to implementation trajectories
- Implicit seventh choice—maintaining the status quo

Policy Path #1: "Full German-style Tariff"

Unlimited size, cost-based and differentiated, but w/ competitive benchmarks, and implementation triggered by RPS performance; emerging resources capped

Resource Type	All
Vintage	New, separate price for repowering
Size	No limit
Timing	If RPS<20% contracted by 2010, start in 2012-13
Scope	Full Market
Setting the Price	Cost-based with initial differentiated auction without MPR to set competitive benchmark for subsequent tariff
Contract Duration	Long-term
Tariff Differentiation	Differentiation by technology & size
Limits	Capped at RPS targets; caps on more expensive technologies

PROS

- Rapid market growth
- Investor security
- Resource diversity
- Help stabilize rates, potential for wholesale price suppression
- 'Emerging cap' limits costs
- Trigger mechanism provides opportunity for RPS to perform

CONS

- Uncertain level of policy response
- Uncertain impact & cost
- Competitive benchmark untested
- Does not address technical barriers, such as transmission

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Policy Path #2: "MPR on Steroids"

Generators > 20 MW, undifferentiated value-based, 3-yr pilot, 1 utility

Resource Type	All
Vintage	New + repowering
Size	> 20
Timing	Now (available for 3-year duration)
Scope	Pilot (limited time, 1 utility)
Setting the Price	Value Based (time & peak differentiated with CO_2 & other adders)
Contract Duration	Long-term
Tariff Differentiation	Not Applicable
Limits	Uncapped

PROS

- Immediate implementation, gain experience
- Pilot nature could control costs
- Could demonstrate whether standard offers make renewable projects more viable, increase investor security, reduce barriers
  - (development & transaction cost, timing, risk premium, cost of capital, etc.)

CONS

- Unlikely to promote resource diversity
- Unlikely to achieve quantity targets
- Difficult for long lead time projects to respond
- May not provide hedge benefit of long-term contracts

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Policy Path #3: "CREZ Only"

German-style Differentiated Cost-based, Limited to CREZ, > 1.5 MW

Resource Type	All
Vintage	New
Size	>1.5
Timing	automatically in 2010/2011 (so projects developed with transmission)
Scope	CREZ-Only
Setting the Price	Cost-based
Contract Duration	Long-term
Tariff Differentiation	Wind by size, geothermal, biomass by size, solar by technology
Limits	Capped at CREZ Transmission limit

PROS

- Encourage generation development ASAP after CREZ transmission committed
- Same benefits as #1 (rapid growth, security, diversity, etc.).
- Prices potentially lower b/c of good resources
- Eliminates multiple-contingency transmission & solicitation concerns

CONS

- Same Cons as #1 (uncertain response and cost)
- No caps on emerging resources (can be mitigated)
- Speculative queuing b/c of transmission capacity limits?

Policy Path #4: "Solar Only"

Systems > 1 MW (net metering threshold), pilot program in 1 utility, cost-based with competitive benchmark, capped

Resource Type	Solar
Vintage	New
Size	> 1 MW Net metering threshold
Timing	Now
Scope	Pilot within one utility
Setting the Price	Cost-Based w/ Competitive benchmark
Contract Duration	Long-term
Tariff Differentiation	By size, type
Limits	Capacity limit will be established for the sponsoring utility.

PROS

- Investor security
- Incentives for systems larger than net metering threshold
- Near-term CSP development
- Contributes to diversity
- Could be established quickly, either independently or with another path

CONS

- Does not fully achieve diversity goal
- Unlikely to meet 2020 goal
- Unlikely to stabilize or hedge prices
- Cap could cause speculative queuing and/or undermine investor security

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Policy Path #5: Biomass Only

Sustainable biomass > 1.5 MW only, cost-based

Resource Type	Biomass (sustainable)
Vintage	New
Size	>1.5
Timing	Now
Scope	Full Market
Setting the Price	Cost-based, calculated to consider sustainable yield of local biomass sources
Contract Duration	Short- or Medium Term
Tariff Differentiation	By fuel and size
Limits	Uncapped

PROS

- Responds to Executive Order S-06-06, contributing to diversity goals
- Reinforces the importance of sustainable biomass feeds tocks
- Could be established quickly, either independently or with another path

CONS

- Does not fully achieve diversity goal
- Unlikely to meet 2020 goal alone

Policy Path #6: "German-style for Under 20 MW"

Full market < 20 MW cost-based differentiated by technology & size

Resource Type	All
Vintage	New, separate price for repowering
Size	<20
Timing	Now
Scope	Full Market
Setting the Price	Cost-based
Contract Duration	Long-term
Tariff Differentiation	Differentiation by technology & size
Limits	Uncapped

PROS

- Similar to #1
- Responds to stakeholder concerns about 'gap', lack of small project under RPS
- Smaller size limits cost impact concerns

CONS

- Generator size limits progress toward 2020 goals
- Challenge to choose the 'right' price administratively

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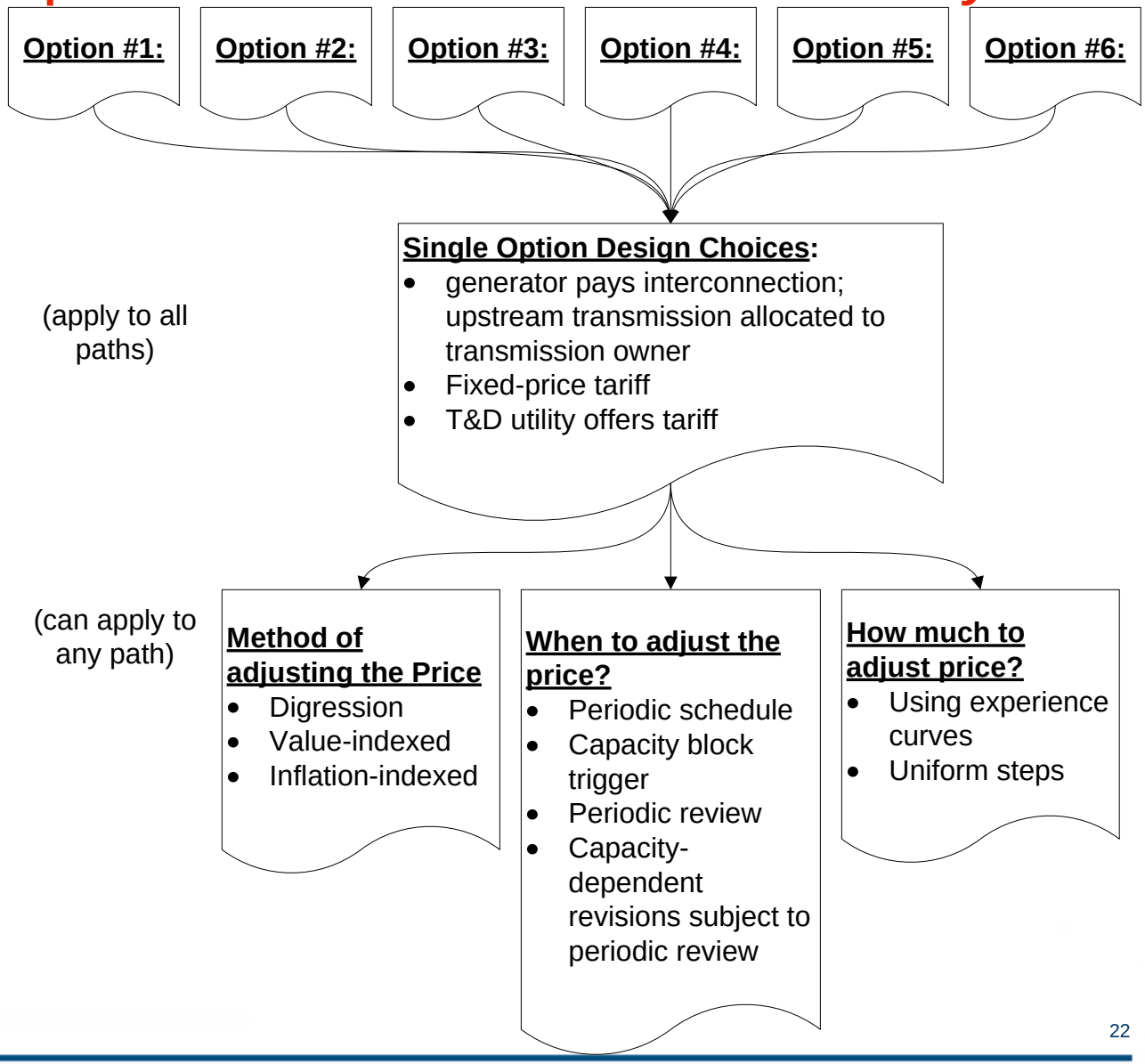
Representative Alternative Policy Paths



Timing, Scope and Triggers in Policy Paths Create Implementation Options

- Policy paths, while distinct, are not all mutually-exclusive, independent alternatives
- Interactions & Trajectories
  - Some could be adopted in concert with others
  - Partial-market, or pilot scale or duration, can be thought of as potentially working together along a ‘policy trajectory’
- Some could be adopted while awaiting a specific trigger for a more comprehensive option…
  - Allowing modest initial steps (a ‘go slow approach) before launching a comprehensive feed-in tariff policy regime
  - Buying time to prepare if necessary to implement

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Stakeholder Feedback – Phase II

- Workshop #2 (October 1, 2008)

- Written Comments on
  - Policy paths…
    - for which there is support/lack of material opposition
    - can be effectively implemented in the short term
  - Specific basis of opposition, barriers, concerns
  - Challenges in co-existing with current RPS solicitation process
  - Ways to mitigate concerns

- See: http://www.energy.ca.gov/portfolio/documents/2008-10-01_workshop/comments/

- Key takeaways:
  - Strong support for Option #6 with limited dissent
  - Little support for pilot policy (either limited to one utility or to a window of time)
  - Utilities favor status quo with current feed-in tariff for 1.5 MW and below

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Recommendation

Report Recommendation

- Establish feed-in tariff *initially* for projects up to 20 MW
  - Cost-based, must take tariff offering long-term contracts
  - Open to all RPS-eligible resource types
  - For new projects (separate tariff could be explored for repowering)
  - No waiting
  - Technology- and size-differentiated
- Consider recommended feed-in tariff as a potential bridge to feed-in tariffs for (a) projects > 20 MW or (b) projects in CREZs
  - if conditions merit expansion
  - as greater experience is gained with smaller project feed-in tariffs
  - as transmission and other barriers are addressed

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Key Implementation Issues for Resolution in the IEPR process

- Establishing initial tariff prices
- Adjusting tariff prices
- Supporting efficient T&D and Supply Portfolio Planning
- Legislative issues
- Non-core policy issues & implementation-level design issues

Establishing Initial Tariff Prices

Alternatives include…

- Government-established (e.g. NREL, LBNL, experts)
- Use current, applicable market information
  - For some technologies & project sizes, if good info available
- Alternatives with stakeholder input include….
  - *MPR-type docket*; parties propose/support tariff rates; CPUC sets parameters
  - *Technology working groups* (similar to the Procurement Working Groups in CA RPS) review (confidential?) cost data
  - CEC &/or CPUC prepare proposals based on publicly-available cost data for reaction (PIER as potential institutional home?)
  - Technology-specific auctions
  - Utilize aggregate prices by technology from utility RPS solicitations as starting point

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Adjusting Tariff Prices

Get the price 'right'

- Sufficient time to respond;
- Maximize market certainty;
- Minimize administrative complexity

Leave initial tariff prices alone for 2 to 3 years?

IEPR process should consider…

- **Method of adjusting the price** designed to place downward pressure on prices**:**
  - Scheduled (digression)
  - Fixed (nominal) → burden of inflation drives down the real value of tariff
  - ~~Value-indexed (not consistent with cost-based)~~
- **When to adjust the price**
  - Periodic schedule
  - Capacity-dependent block trigger
  - Periodic review
  - Hybrid (capacity-dependent revisions subject to periodic review)
- **How much to adjust the price**
  - Experience curves
  - Uniform (small) steps

Supporting Efficient T&D & Supply Portfolio Planning

IEPR process should consider how to…

- Design tariffs with responsive digression:
  - to encourage generation with highest system value ➔ Aggressive tariff rate price signals
  - discourage generation with lowest system value ➔ Conservative tariff rates to send signals
- Make impending generation visible to system planners
  - Notice provisions in tariffs?
- Provide to system planners a reasonable level of certainty as to what generation interconnect & when
  - Develop some means to solidify commitments, identify non-performing projects
- Are pre-operational or operating performance requirements necessary?

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Legislative Issues

Is legislation required…

- So that IOU 20% RPS does not serve as a cap on expanded feed-in tariff?
- To give CPUC or Energy Commission authority to…
  - Require feed-in tariffs for up to 20 MW?
  - Expand RPS past 20%?
  - Authorize cost-based, must-take tariffs?
  - Revise SB 380 to provide CPUC with authority to implement feed-in tariffs > 1.5 MW, cost-based, and allowing statewide cap > 500 MW?
- To allow statewide cost reallocation among LSEs?
- To make a feed-in tariff available to any generator located in California, including in POU territory?

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Non-core Policy Issues & Implementation-Level Design Issues

California Feed-in Tariffs Design & Policy Options, Table 4

Non-Core

- Generator eligibility – location
- Price setting details
  - Profit level
  - Aggressive vs. conservative
- Interconnection issues
- What is being purchased?
- Cost allocation/distribution
- Integration into power supply
- Development security requirements

Implementation details

- Operation security requirements
- Management & oversight
- Rule 21 changes?
- Queuing procedures

Questions?

Thank you for your attention.