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Getting the most from your green: A case study for using public money effectively for large-scale renewable energy in California

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A CPI Report

Descriptors

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About CPI

Climate Policy Initiative is a team of analysts and advisors that works to improve the most important energy and land use policies around the world, with a particular focus on finance. An independent organization supported in part by a grant from the Open Society Foundations, CPI works in places that provide the most potential for policy impact including Brazil, China, Europe, India, Indonesia, and the United States.

Our work helps nations grow while addressing increasingly scarce resources and climate risk. This is a complex challenge in which policy plays a crucial role.

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1. Overview

This brief illustrates CPI's approach to identifying effective uses of public financial interventions for low-carbon projects. It presents our analysis of the financial barriers affecting large-scale renewable energy in California, utilizing the approach in Figure 1 below.

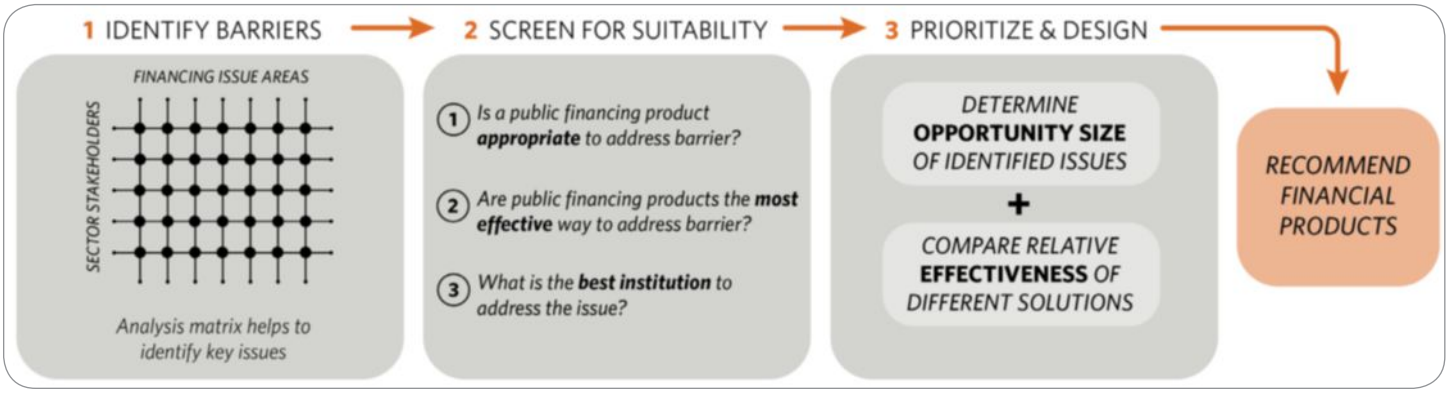
We use this to sort through the many possible applications of public financing and risk bearing mechanisms in a sector to identify where such mechanisms could have the greatest effect. We would ultimately aim to apply our framework across all relevant sectors in a jurisdiction, in order to identify the most effective ways a public financing mechanisms can drive decarbonization across the whole economy.

Our analysis of large-scale renewable generation in California showed that the majority of projects are well supported by existing policy and financing practices; however, there are still areas where public financing could effectively and substantively help the sector. The first step of our framework, illustrated in step 1 of Figure 1, revealed seven ways in which existing stakeholders in this sector may not have all of their needs met. The next steps of our framework—identifying which of those barriers can be most effectively solved by public finance institutions, and prioritizing and designing policy solutions —ultimately focused on three ways in which public financial interventions could be helpful:

- A public institution could aggregate and securitize projects to lower transaction costs associated with tax equity financing, either by holding the projects in the institution itself or by facilitating the creation of a separate entity such as a YieldCo.
- Small and medium enterprises could gain access to much more attractive renewable energy finance through alternate forms of loan security facilitated by public programs, like property taxes (as done with Property Assessed Clean Energy programs), or on-bill repayment.
- Finally, a public institution could bear project risk for innovative, early-stage renewable technologies through loan guarantees, an interest-rate buydown or concessional lending.

For this example, we have completed framework step 2, 'Screen for Suitability,' but we have only done a preliminary look at the opportunity sizing and policy effectiveness analysis that comprises step 3. Our first look at the opportunity size for each of these possibilities suggests that public intervention in any one of them could have a significant impact. Pending interest from policymakers, CPI could conduct a more thorough investigation of the opportunity size, for example using financial modeling to quantify the impacts of public financing intervention and compare the effectiveness of various specific policies.

Figure 1: CPI's analysis framework for evaluating green banking and other financial interventions for low-carbon projects.



2. Financial Barriers and Solutions to Large Renewable Energy in California

Our analysis revealed several areas where a Californian green bank might accelerate decarbonization in the large-scale renewable energy sector. This assessment was informed by extensive stakeholder interviews and a review of California's policy landscape, discussed in the following section.

2.1 Identifying barriers

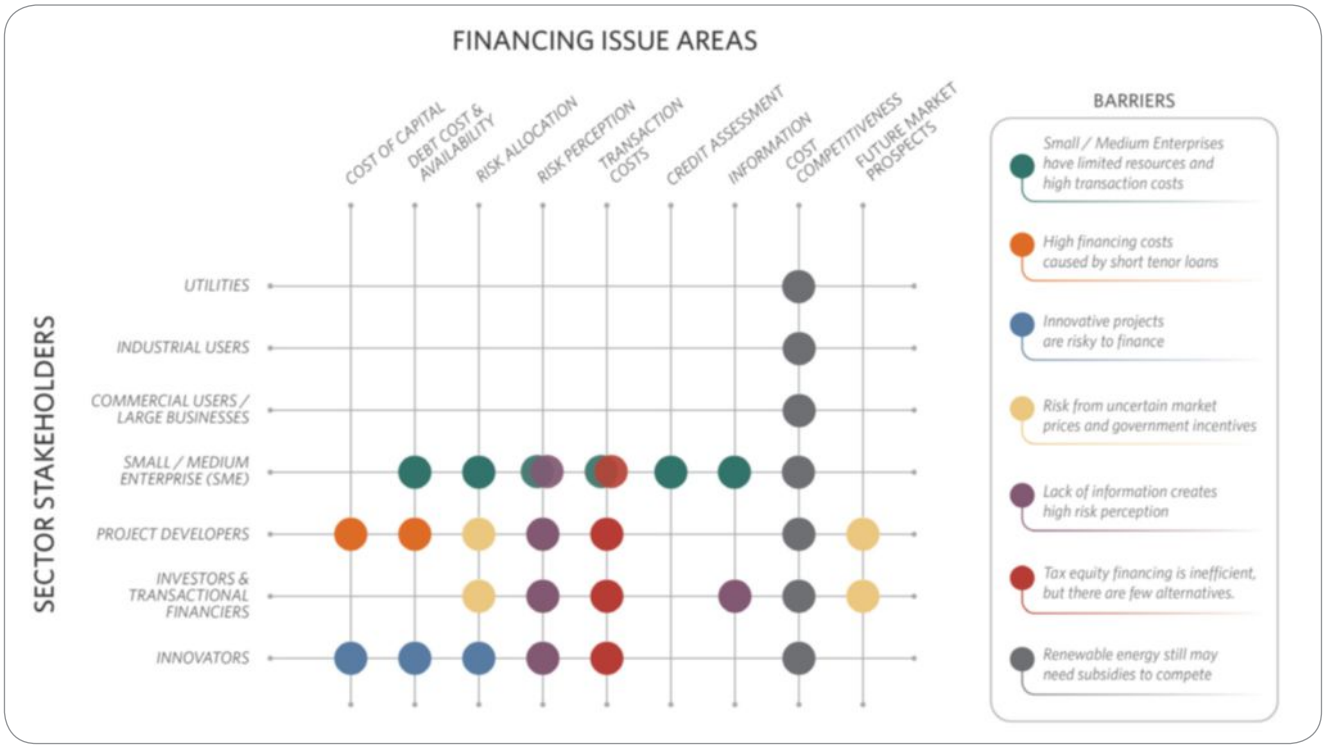
We considered the financial needs of the range of stakeholders in this sector, across different project sizes, technologies, and types of developers. Within each of these categories, we saw a few needs that are still unaddressed or poorly addressed by the relatively robust policy landscape in California. Those unmet needs are mapped out in Figure 1, which represents our process of identifying barriers by assessing the status of all major stakeholders across all significant financing needs.

We began with the lists of typical stakeholders and financial needs, which are provided in our first brief, and adapted them to the large-scale renewable generation sector. To identify barriers in a comprehensive way, we assessed how well each financial need was met for each stakeholder on our list.

We examined only stakeholders and financial barriers that are relevant to large scale renewable energy. Thus residential buildings and split incentives were not included, nor did we distinguish between end users and other stakeholders.

Overall, in California the majority of large-scale renewable energy projects seem well-supported by the existing policy regime, detailed in section 3 of this brief, and current financing practices. The Production Tax Credit and the Renewable Portfolio Standard— identified in our previous work as two key influencers of the cost of capital (Climate Policy Initiative 2011) — provide sufficient demand and long-term revenue certainty to

Figure 2: The analysis matrix, as modified for large-scale renewables in California.



This figure represents the practical application of the basic framework described in Section 2 and further Appendix 1. The stakeholders and issues it uses have been modified from the basic framework to fit the landscape of this sector. Where a stakeholder has an unmet need in a certain financing issue area, the relevant intersection is shaded. Unshaded intersections represent that a stakeholder's needs are well satisfied in this area or that the issue is not applicable. Related issues that extend across stakeholders or issue areas share a common coloring.

support many projects. This landscape may change as these policies sunset and are not replaced (see Section 3 for more detail), but for the time being we are left with just a few areas for major impact by public financing interventions.

We did identify seven distinct issues that could substantially impact the accessibility and cost of financing for such projects. They are listed in Figure 1 and in Table 1. These issues do not impact the entire sector in a crippling way, but rather they impact a subset of projects, may become a larger problem in the future, or currently keep some attractive projects from being as appealing as they could be.

2.2 Where could public financing mechanisms successfully intervene?

We narrowed down the list of barriers that a green bank should address by utilizing the filters outlined in Section 3 of our main brief. That process is summarized in Table 1, where the columns represent steps in our filtering process.

Transaction cost and information provision issues that do not directly relate to financing were eliminated from the list of potential targets for public financing and risk bearing mechanisms in California. They fall outside the scope of the type of interventions these mechanisms can perform. As well, we eliminated issues for which public financing was unlikely to be *the best* solution; for those issues, a non-financing approach would be more effective, even if public financing mechanisms could theoretically address the issue.

Table 1 identifies four major areas which seem to be likely candidates for successful, high-impact intervention by a green bank:

- Facilitate low-cost financing for small and medium-sized enterprises (SMEs) in a way that reduces the transaction costs, reduces reliance on traditional credit-assessment methods, and provides for businesses that have a first lien on their property.
- Lower the transaction costs for tax equity, making it more accessible and affordable, for larger projects as well as SMEs and other small actors.
- Provide financial support for innovative and early stage technologies, taking on a portion of the costs and/or risks inherent in innovation.
- Incentivize lending in new markets unfamiliar to lenders and collect data on those loans. This issue is likely to significantly overlap with any programs addressing innovative and early stage technologies.

Table 1: Maior Issues Identified From the Analvsis Framework

ISSUE IDENTIFIED	POTENTIAL PUBLIC FINANCING SOLUTION?	IS A PUBLIC FINANCING SOLUTION BEST?
SMEs have trouble accessing credit due to existing liens on their property and high credit assessment costs.	✓ **Yes**. For example, public institutions aren't regulated by bank regulations, and so would have an easier time lending to businesses with an existing lien.	✓ **Yes**. Policies addressing this issue like CEFIA's C-PACE program have been well received (Copithorne, 2013).
SMEs may be credit constrained and therefore have a low tolerance for risk.	✓ **Yes**. Providing contracts for differences could potentially help reduce the price risk.	**No**. Feed in Tariffs and PPAs would address price risk more effectively.
Obtaining sufficient information about available technologies may be too costly to SMEs.	**No**. This is not a financing issue.	N/A
Tax equity has high costs of capital and high transaction costs, but better alternatives are not available.	✓ **Yes**. A public institution could bundle and securitize projects to reduce transaction costs for tax equity financing, or provide subordinate debt to compensate for the difficulties of tax equity.	✓ **Possibly.** In the absence of political will to reform tax credits, public programs jump-starting markets for securitized investments and lowering costs of capital would effectively aid the private sector.
Short tenor debt, encouraged by short-term policy supports, increases costs of capital.	✓ **Yes**. Public financing institutions could provide longer-term debt.	**No**. Long term revenue supports, or long-term PPAs as encouraged by an RPS, would be more effective.
Innovation has a high cost of capital because of risk allocation and positive externalities.	✓ **Yes**. There are a number of ways public institutions could help finance, reduce the cost of capital, and shift risks for innovative projects.	✓ **Yes.** The public sector is best suited to bear innovation risks due to positive externalities.
Investors may be unfamiliar with segments of the RE markets, and may perceive higher risks.	✓ **Yes**. A green bank could 'buy data' by lending in unfamiliar markets, or provide a subsidy for hesitant investors.	✓ **Yes.** The information needed to motivate private investment is unlikely to come from within the private sector in the near term.
Not all renewable energy production is cost-competitive with fossil fuels in the absence of government supports.	✓ **Yes**. A green bank could provide an indirect subsidy through discounted financing.	**No**. It would likely be better addressed by explicit subsidies, and continuation of state RPS.
Uncertainty in market prices and government incentives creates revenue uncertainty, resulting in higher costs of capital.	✓ **Yes**. Yes. A public institution could provide insurance against changes in government policy, or contracts for differences which would reduce the price risk borne by the project.	**No**. It would be better to create longer-term policies, like RPS. Insurance could be very costly to government. An extension of the RPS would encourage more long-term PPAs, removing price uncertainty more effectively.

2.3 Finding solutions

These four areas are where a California green bank could focus its efforts in the large-scale renewable energy sector. The next step is to identify the most effective actions a public financing institution might consider taking to support renewable energy projects. CPI has yet to conduct an in-depth analysis of the relative cost-effectiveness of various options for addressing these issues in California, though we have already done related analysis "Supporting Renewables While Saving Taxpayers' Money," and hope to build on those techniques (Climate Policy Initiative, 2012). For now, there are several possible solutions to the issues outlined above which have been effective elsewhere or otherwise hold promise for bringing about meaningful change. We present three possible solutions, the third of which could potentially address the last two barriers that we identified in section 2.2.

- A green bank could offer low-cost financing to SMEs that are having difficulty obtaining financing for a renewable energy project by providing security through an alternative method like property taxes, as in PACE, or on-bill repayment. The additional security would address first lien and credit-assessment issues.
- Aggregating and securitizing projects could significantly lessen transaction costs for tax equity financing. A green bank could do this in-house, or could aggregate many projects and then spin them off as a YieldCo, which is a listed corporation that owns renewable energy projects with long-term power purchase agreements (Climate Policy Initiative 2014b). The structure allows investors to own portfolios of projects with substantially lower transaction costs by buying a stake in the YieldCo, and thus allows renewable energy projects to access lower-cost capital.
- For innovative, early-stage technologies, a green bank could bear some project risk through loan guarantees, an interest-rate buydown or subordinate debt; it could also offer concessional financing. This lending would both facilitate financing of innovative projects and build investor knowledge and participation in new sectors.

Appendix 1. Policy Background in California

We briefly describe the many policies already in place in California to support large-scale renewable energy. As discussed in section 2, the policy set is already robust, but a few financing issues remain for some stakeholders.

California Renewables, 2009-2013

Between 2009 and 2013, important federal and state energy policies (discussed in detail below) spurred significant renewable energy development in California, accounting for roughly a quarter of national renewable deployment (BNEF). The large volume of renewable energy deployment in California indicates that the policy landscape is, overall, quite conducive to these projects.

Public support was a significant driver of this rapid expansion. Money from federal supports, including accelerated depreciation, the production tax credit, the investment tax credit, and the 1603 cash grants flowed into California during this time, accounting for around 40% of project costs during this timeframe (BNEF).

Table 2: Current California renewable energy policies

ABBREVIATION	NAME	DURATION	SUPPORT LEVEL
CALIFORNIAN POLICIES			
FiT	Feed in Tariff	10, 15 or 20 years	Market-set price
RAM	Reverse Auction Mechanism	10, 15 or 20 years	Bid-in price
RPS RFO	Renewable Portfolio Standard Request for Offer	10, 15 or 20 years	Bid-in price
TRECs	Tradable Renewable Energy Certificates	--	--
PTE	Property tax exclusion	n/a	100% exclusion from property tax
PG&E, SCE, SDG&E SPVP	Investor Owned Utility-run Solar PV Programs		Permits high electricity price
SGIP	Small Generation Incentive Policy	Upfront below 50kW	
NATIONAL POLICIES			
QF	Qualifying Facilities	n/a	Avoided cost of fossil fuel energy generation
MACRS	Modified Accelerated Cost Recovery System	5yr depreciation**	5 or 7 yr depreciation
ITC	Business Energy Investment Tax Credit	Upfront	30% of investment
REAP	USDA Rural Energy for America Program (REAP) Grants	Upfront	max 25% of costs, or $500,000
REAP	USDA REAP Loan Guarantee	varies	60-85% loan coverage
QECBs	Qualified Energy Conservation Bonds	17 yr bond maturity	70% interest subsidy
1703 Loan Guarantee	DOE 1703 Loan Guarantee for Innovative Technology	Varies	--

For more detailed information about any of these policies, please see dsireusa.org

California's Policy Landscape

In our review of Californian large-scale renewable energy, we identified the impact of all major relevant policies on a national and state level. Table 2 summarizes those policies.

In evaluating the adequacy of current policies to meet financing and risk-bearing-related gaps, we charted their coverage relative to the range of types of renewable energy projects. We also looked forward to see how the landscape would change in the remainder of this decade if no additional policies are implemented or existing policies extended. Table 3 and Table 4 below shows how adequate – or inadequate – policy remaining in 2020 will be to cover the identified potential gaps, compared to present-day policy

Key takeaways from this exercise include:

- Current policy is successfully spurring significant investment in renewable energy. The needs for additional support are limited, but may grow in the future if current policies are allowed to sunset and not replaced.
- The end of procurement mechanisms for the RPS will severely impact renewable energy projects, especially larger ones, unless the CPUC chooses to use its new powers under AB327 to extend the RPS. These mechanisms drive long term fixed-price PPAs, which satisfy the sector's needs for long duration of price support and revenue certainty.
- Not all types of developers are supported equally. For example, QECBs are available to municipalities and REAP grants are available to rural and agricultural businesses, for several types renewable energy projects, but no comparable support is available to small urban businesses.

Table 3: Current landscape of California renewable energy policies

POLICY LANDSCAPE 2013

TECHNOLOGY TYPE	DIRECT FINANCING SUPPORT	PRICE SUPPORT & OTHER FINANCING COST DRIVERS			
	All Sizes	< 1 MW	1-3 MW	3-20 MW	> 20 MW
(REAP- ineligible) Landfill gas & Anaerobic digestion	•ITC (eligibility thru PTC) •QECBs	•FiT •(PTC) •Net Metering •SGIP (selected tech)	•FiT •PTC •RPS RFO (>1.5MW) •SGIP (selected tech)	•PTC •RPS RFO •RAM	•PTC •RPS RFO
Geothermal, Wind, Biomass, Municipal solid waste, Hydro, Tidal/Wave	•ITC (eligibility thru PTC) •QECBs •(REAP)				
Geothermal, CHP	•ITC (10%) •QECBs •(REAP)				
Solar PV, (Small wind)	•ITC, •QECBs •(REAP)	•FiT •PTE •Net Metering •CSI/NSHP	•FiT •PTE •RPS RFO (>1.5MW) •PG&E-SPVP •SCE-SPVP (1-2MW) •SDG&E-SPVP	•RAM •PTE •RPS RFO •PG&E-SPVP •SDG&E-SPVP (<5MW)	•PTE •RPS RFO
Solar thermal electric (innovative)	•ITC •QECBs •(REAP) •1703 Loan Guarantee	•FiT •PTE •Net Metering •CSI/NSHP	•FiT •PTE •RPS RFO (>1.5MW)	•RAM •PTE •RPS RFO	•PTE •RPS RFO
Tidal/Wave & Other innovative technologies	•ITC (eligibility thru PTC, tidal/wave) •QECBs •(REAP) •1703 Loan Guarantee	•FiT •Net Metering •(PTC - tidal/wave) •SGIP (selected tech)	•FiT •RPS RFO (>1.5MW) •(PTC - tidal/wave) •SGIP (selected tech)	•RAM •RPS RFO •(PTC - tidal/wave)	•RPS RFO •(PTC - tidal/wave)

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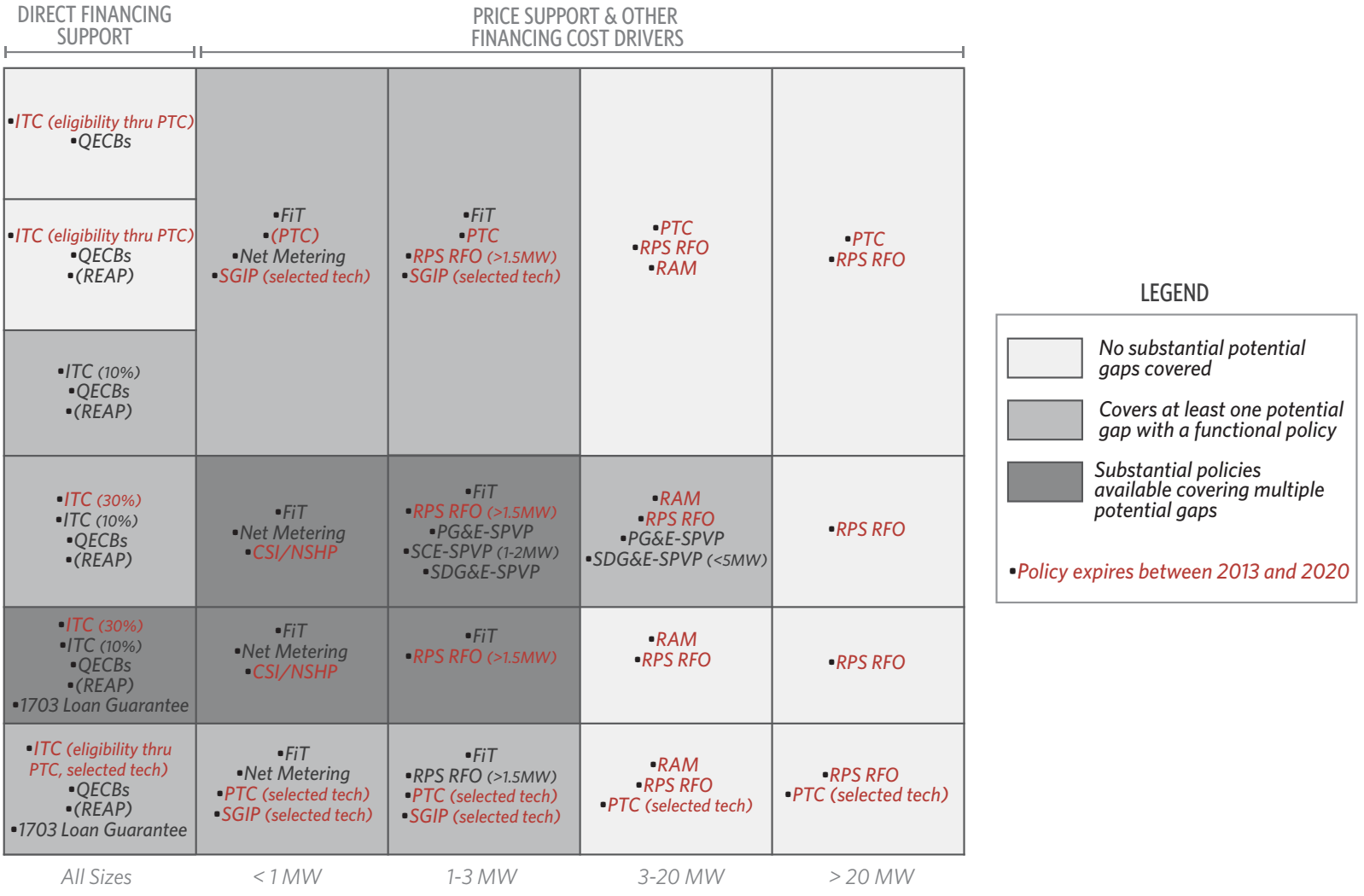
POLICY OUTLOOK IN 2020



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