



Public Service Company of Colorado

**2016 Electric Resource Plan**  
**2017 All Source Solicitation 30-Day Report**  
**(Public Version)**  
(CPUC Proceeding No. 16A-0396E)

December 28, 2017

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## **Section 1. Regulatory Context and Introduction**

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Public Service Company of Colorado (“Public Service” or the “Company”) files this 2017 All-Source Solicitation 30-Day Report (the “Report”) in compliance with Resource Planning Rule 3618(b)(I). The 2017 All-Source Solicitation (“Solicitation”) is the resource acquisition phase of the Company’s 2016 Electric Resource Plan assigned Proceeding No. 16A-0396E. The Company issued its All-Source Solicitation on August 30, 2017; bids were received by the Company on November 28, 2017.

Rule 3618(b)(I) states:

Within 30 days after bids are received in response to the RFP(s), the utility shall report: the identity of the bidders and the number of bids received; the quantity of MW offered by bidders; a breakdown of the number of bids and MW received by resource type; and, a description of the prices of the resources offered.

In addition to the information required by Rule 3618(b)(I), the Company also identifies bids claiming Section 123 status and provides its position on proposed Section 123 claims. At the time of this report, the Company has determined bid eligibility for all bids received and has begun initial rounds of due diligence.

## **Section 2. Response to the All-Source Solicitation**

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The response to this Solicitation is unprecedented with 430 total individual proposals (238 total projects) received from bidders. Over 350 of these individual proposals are renewable energy proposals or renewable energy with storage proposals. For comparison, the Company received 55 bids in the 2013 All-Source Solicitation. Attachment A provides summary information of the bids received organized by generation type. Many developers provided multiple bids for a single project resulting in significantly more bids than projects. Differing bid information such as different proposed in-service dates, different power purchase agreements (“PPA”) terms (in years), and different ownership structures (PPA versus Company ownership) can result in multiple bids from a single proposed project (though each distinct bid has its own distinct bid pricing stream or purchase price). The Company has redacted pricing information for those generation types in which two or fewer bids were received, and a non-redacted table is included in Highly Confidential Attachment A.

Of the 238 projects proposed, 99 projects included some level of Company ownership. Such ownership can include, without limitation: (1) a self-build proposal, (2) a build-own-transfer proposal, (3) a sale of an existing asset, or (4) a joint PPA/Company-ownership proposal.

In describing the prices offered, the Company presents the median levelized price of the bids received for each generation type, and this median value represents the mid-point of the pricing such that 50% of the bids are lower priced and 50% are higher priced. Levelized pricing for PPAs is based on information presented by developers in their bids, while pricing for Company-ownership is a preliminary calculation of the levelized cost of ownership.

Pricing is provided in \$/kW-mo terms for those generation types that can be viewed as dispatchable and likely to provide high levels of generation capacity credit. Pricing is provided in \$/MWh terms for those generation types or resources that are non-dispatchable or that include a storage component with a non-dispatchable base generation resource. Pricing is provided on an “as bid” basis and does not include other costs such as resource integration costs, additional transmission network upgrade costs for interconnection or deliverability, or credits for items like quick-start capability; that is, these are not based on “all in” costs. Bid ranking for purposes of computer-based modeling will be conducted on all-in costs.

Finally, the Company has not yet sufficiently evaluated all of the proposals represented in Attachment A to determine if any contain any “fatal flaws” such that they are unlikely to achieve their proposed in-service dates. The Company’s due diligence efforts to identify such issues are continuing. Bidder identity along with the number of bids proposed by generation type is provided in Highly Confidential Attachment C.

### **Section 3. Proposals Claiming Section 123 Status**

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In its Phase I Decision (Decision No. C17-0316) the Commission directed the Company to process Section 123 claims consistent with the Phase I Decision in the Company's 2011 ERP (Decision No. C13-0094). The process has bidders who claim Section 123 status indicate why the proposal qualifies as both "new" and "clean". The Company then states its opposition to any claims and provides a copy of the disputed bids from which the Commission makes the final determination.

Of the 238 individual projects included in Attachment A, 32 projects claim Section 123 status. These 32 project-level Section 123 claims represent 79 of the 430 individual proposals (18% of the total). Section 123 claims were received from each generation type listed in Attachment A except for Combustion Turbines, Combined Cycles, and Waste Heat.

The Section 123 process, per Phase I orders in the 2011 and 2016 ERPs, requires that Section 123 resources be considered both "clean" and "new." The Commission's definition of "new" can take two forms as described in paragraph 92 of Decision C13-0094:

For the purpose of bid evaluation at the start of Phase II of this ERP, we further clarify that, per the statutory language, a Section 123 resource must be both new and clean. A new project shall either: (1) incorporate one or more technologies, representing a substantial portion of its overall installed cost, that have not been regularly commercially demonstrated, up to the point in time that the resource is formally bid, or if not bid, acquired; or (2) be a project used to demonstrate the feasibility of a technology not before implemented in its proposed configuration.

The Company provides in Highly Confidential Attachment B a list of Bid IDs and a brief description of those projects that claim Section 123 status and which the Company opposes. The Company provided the Highly Confidential bids from those projects it opposes to the Commission. Below the Company provides a brief overview of its position on Section 123 status claims based on the generation technology types in Attachment A that claimed Section 123 status. Overall, of the 79 bids claiming Section 123 status, the Company opposes 21. In addition, regardless of whether a bid qualifies for Section 123 status or not, it will still be evaluated in the Phase II bid evaluation process.

#### **Compressed Air Energy Storage: Recommended for Section 123 Status**

The Company received one compressed air energy storage proposal which claimed Section 123 status. The Company believes that Compressed Air Energy



Storage (“CAES”) resources are not commercially demonstrated and should be evaluated as Section 123 resources.

#### Biomass: Not Recommended for Section 123 Status

The Company received one biomass proposal which claimed Section 123 status. The developer proposes to burn waste wood (e.g., beetle kill pine or scrap lumber) in biomass generation units constructed in Colorado. The proposed project is 8.5 MW while the biomass generator company’s website indicates a total installation of 1.5 MW across four projects. The proposal contains insufficient information for the Company to deem these commercially-available generators as “new”. Based on this and the extremely high cost of the proposed energy pricing, the Company opposes this project as a Section 123 resource.

#### IC Engine with Solar: Not Recommended for Section 123 Status

The Company received one internal combustion engine and solar proposal which claimed Section 123 status. The project consists of a small photovoltaic field and a small “off the shelf” internal combustion engine burning wellhead and/or pipeline natural gas; approximately 60% of the annual energy would be solar and 40% would be gas-fired. Both the gas generation and the solar generation are non-dispatchable and the total energy sold to the Company would be the simple aggregate of the two non-connected generation resources. The Company opposes the designation of this proposal as a Section 123 resource as it has not identified any components of the project that qualify it as “new”.

#### Stand-alone Wind, Stand-alone Solar, and Wind/Solar Combination Bids: Not Recommended for Section 123 Status

The Company received 253 stand-alone wind, stand-alone solar, and wind and solar combination proposals with 7 of these claiming Section 123 status. Several developers make Section 123 claims for stand-alone wind and solar projects based solely on their unique definition of “new”. For example: 1) the project is located in a wind resource zone with little existing wind generation, 2) the sheer large size of the proposal (“largest in Colorado”), 3) a commercially-available turbine that has not yet been installed in Colorado, 4) the fact that the Company does not currently contract for both a wind and a solar project under a single PPA, or 5) a proposal to bring floating PV panels to Colorado even though the concept is commercially developed elsewhere in the country and the world. Based on its review of the stand-alone wind and solar bids, the Company opposes Section 123 status for any stand-alone wind, solar, or combination of wind and solar proposal.

#### Stand-alone Battery Storage: Not Recommended for Section 123 Status

The Company received 28 stand-alone battery storage bids with 12 claiming Section 123 status. The Company believes that sufficient battery installations

have occurred in the United States and in other countries that stand-alone battery storage in the electric utility industry (especially lithium ion technology which is the only battery storage technology proposed in this Solicitation) has been regularly commercially demonstrated.<sup>1</sup> Therefore, the Company believes stand-alone battery storage proposals do not satisfy the “new” component of the requirement of the Commission’s Section 123 standard.<sup>2</sup> This does not mean that stand-alone storage proposals will not be evaluated as part of the Phase II bid evaluation process; the Company intends to evaluate such proposals regardless of whether they are Section 123 resources or not.

#### Wind and Solar Bids with Storage: Conditionally Recommended for Section 123 Status

The Company received 105 wind and solar bids with integral battery storage with 52 of them claiming Section 123 status. These 52 bids represent 18 projects, and the 52 bids are a substantial majority of the total 79 bids seeking Section 123 status. We note here that 53 bids from this same technology category did not seek Section 123 status. Section 123 claims for the addition of battery storage with wind and/or solar were made based on both forms of the definition of “new” by various developers. In addition, many developers make the claim that “no utility-scale storage embedded wind or solar projects exist in Colorado”.

While the Company believes stand-alone battery storage projects should not be designated as Section 123 resources, wind and solar bids in combination with integral battery storage may be represented as Section 123 resources in this Solicitation. We reach this conclusion based on the Commission’s second definition of “new” based on the absence of any utility-scale battery storage projects embedded in a wind or solar facility on the Company’s system, and the relatively small cost adder for wind and solar bids with storage as compared to wind or solar only bids. For fairness in evaluation, the Company would move forward all wind and solar bids with integral storage as Section 123 resources whether the developer made a Section 123 claim or did not make such a claim or specifically disavowed Section 123 status.

However, we do not believe the Section 123 designation for this category is clear or definitive. Apart from the definition of Section 123, the Commission might consider other factors in whether wind and solar bids with storage should be deemed Section 123 resources. First, the large number of wind and solar with storage bids suggests this technology combination might not be a “new” technology application, though it is new to Colorado. Second, more than half of

<sup>1</sup> The Energy Storage Association and gtmresearch report that ~620 MW of battery storage projects were installed in the United States since the start of 2013; of this, 83% were installed on the utility side of the meter. 94% of the 620 MW was lithium ion technology. The researchers estimate that annual battery installations in the United States will exceed 1,000 MW by 2019.

<sup>2</sup> Several developers who propose stand-alone storage projects specifically stated that stand-alone batteries are not Section 123 resources.

the bids in this category did not request Section 123 status. While we believe this category of bids may meet the definition of Section 123 resources, the Commission may also justifiably deem this category as not qualifying for Section 123 status. Accordingly, given the ambiguity regarding whether these technologies satisfy the Commission standard for Section 123 resources, coupled with the divergence of developers in designating (or not designating) these bids as Section 123 – not to mention the sheer volume of these types of bids – the Company offers this conditional recommendation and believes it may be appropriate for the Commission to also weigh in on the appropriate designation (i.e., Section 123 or not Section 123) for bids employing these technologies.

#### Combustion Turbine with Battery Storage: Conditionally Recommended for Section 123 Status

The Company received 7 combustion turbine with battery storage bids with 5 claiming Section 123 status. The primary proposed benefit of such a project is to allow the combined turbine and storage project to qualify as a spinning reserve resource without the turbine component actually spinning and synchronized with the electrical grid. As long as the battery is fully charged, it can instantaneously discharge to provide grid support while the combustion turbine begins its start cycle and ramps to load. Consistent with the Company's position regarding the "newness" of battery storage embedded with wind and solar projects, the Company believes that the inclusion of battery storage with a combustion turbine may also qualify as a Section 123 resource for this solicitation. However, as with wind and solar with storage, the Commission may also justifiably deem this category as not qualifying for Section 123 status.

#### Section 123 Resource Evaluation Process

The process employed by the Commission in the 2013 All-Source Solicitation would have the Company "present a group of resource portfolios in its 120-day report where each portfolio is differentiated from the least-cost resource mix by the inclusion of a single proposed Section 123 resource."<sup>3</sup> The Company believes that for this Solicitation the Commission's language in Rule 3613(d) provides a more appropriate path forward given the unprecedented number of Section 123 bids (and bids overall).<sup>4</sup> Specifically, the Company would present select portfolios in its 120-Day report that include the most cost-effective renewable and/or cost-effective Section 123 resources in increasing amounts.

<sup>3</sup> Decision C13-0094, Paragraph 162.

<sup>4</sup> Rule 3613(d) - "Within 120 days of the utility's receipt of bids in its competitive acquisition process, the utility shall file a report with the Commission describing the cost-effective resource plans that conform to the range of scenarios for assessing the costs and benefits from the potential acquisition of increasing amounts of renewable energy resources, demand-side resources, or Section 123 resources as specified in the Commission's decision approving or rejecting the utility plan developed under rule 3604."



This will give the Commission and parties the opportunity to review and evaluate several different portfolios with differing levels of Section 123 resources.

## RFP Responses by Technology

Generation Technology	# of		# of	Project	Median Bid		Pricing
	Bids	Bid MW			Price or	Equivalent	
				MW			Units
Combustion Turbine/IC Engines	30	7,141	13	2,466	\$ 4.80		\$/kW-mo
Combustion Turbine with Battery Storage	7	804	3	476	6.20		\$/kW-mo
Gas-Fired Combined Cycles	2	451	2	451			\$/kW-mo
Stand-alone Battery Storage	28	2,143	21	1,614	11.30		\$/kW-mo
Compressed Air Energy Storage	1	317	1	317			\$/kW-mo
Wind	96	42,278	42	17,380	\$ 18.10		\$/MWh
Wind and Solar	5	2,612	4	2,162	19.90		\$/MWh
Wind with Battery Storage	11	5,700	8	5,097	21.00		\$/MWh
Solar (PV)	152	29,710	75	13,435	29.50		\$/MWh
Wind and Solar and Battery Storage	7	4,048	7	4,048	30.60		\$/MWh
Solar (PV) with Battery Storage	87	16,725	59	10,813	36.00		\$/MWh
IC Engine with Solar	1	5	1	5			\$/MWh
Waste Heat	2	21	1	11			\$/MWh
Biomass	1	9	1	9			\$/MWh
Total	430	111,963	238	58,283			

Bid ID	Bidder Company	Project Name	Generation Type	Size (MW)	Duration (hours)
E086			Stand-alone Battery Storage	75	4
E211			Stand-alone Battery Storage	50	4
E217			Stand-alone Battery Storage	25	4
E625			Stand-alone Battery Storage	50	4
E626			Stand-alone Battery Storage	50	8
E627			Stand-alone Battery Storage	50	10
E628			Stand-alone Battery Storage	100	4
E629			Stand-alone Battery Storage	100	8
E630			Stand-alone Battery Storage	100	10
E631			Stand-alone Battery Storage	150	4
E632			Stand-alone Battery Storage	150	8
E633			Stand-alone Battery Storage	150	10
B169			Biomass	9	
M089			IC Engine with Solar	5	
S171			Solar (PV)	10	
W087			Wind	248	
W227			Wind	700	
W228			Wind	700	
Q620			Wind + Solar Hybrid	800	
Q621			Wind + Solar Hybrid	500	
Q622			Wind + Solar Hybrid	400	

	30	7	2	28	1	96	11	5	152	7	87	1	2	1
Bidder Name	Combustion Turbines IC Engines	CT + Storage	Combined Cycles	Stand- alone Battery	CAES	Wind	Wind + Storage	Wind + Solar	Solar	Wind + Solar + Storage	Solar + Storage	ICE + Solar	Waste Heat	Biomass
									2		1			
				6					3					
				1					1		1			
1											1			
						7								
3					1									
1						11			10		10			
			1											
1											1			
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						6			8		8			
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				1					2		1			
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									4					
3	2			3		16			6		2			
						4			10		4			
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4				9		22	10	3	12	3	20			
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				1					3					
						8	1							
						1			4		1			
1														