Google

Case Study: Accelerating Renewable Energy Purchasing through Auctions

Introduction

In the last decade, levelized costs for electricity produced by utility-scale solar and wind projects have decreased by 88 and 69 percent, respectively. Corporations and other organizations have responded to these historic price declines by procuring large amounts of clean power: in 2018, non-utility buyers purchased 13.4 gigawatts of renewable energy ("RE") worldwide, more than double the previous year's record of 6.1 gigawatts. And yet, despite RE's gains, corporations find it difficult to source and buy renewable resources at the scale necessary to meet their needs.

Historically, like most non-utility energy buyers, Google has sourced RE by issuing one-off Requests for Proposals ("RFPs"), specific to individual regions. These bespoke RFPs, as well as the contracting and negotiation phase that follows, are complex and time-consuming to develop, manage, and evaluate. Additionally, bilateral Power Purchase Agreement ("PPA") negotiations don't provide market participants (buyers or sellers) with price discovery. Given the pace of price declines and technology development in the RE industry, traditional RFPs are imperfect tools for scaling RE purchasing.

In 2018, Google matched 100% of its global electricity consumption with RE for the second year in a row. As we looked to the future, however, we recognized that sustaining a 100% match would require thinking beyond our historical procurement methods. To continue meeting our users' needs in a sustainable way, we decided we would attempt to streamline our RE procurement process by running our first ever reverse auctions for wind and solar projects. Our goal was to find a way to source, negotiate, and sign a large wave of renewable energy deals in a single, global push.

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A reverse auction is simply an auction in which the sellers of a product or service bid for a buyer's business, with the lowest priced qualified bid winning the auction. While governments and utilities often use reverse auctions to set the price for RE, the tool has not yet been widely adopted by the business community. In Google's case, designing our first RE auctions enabled us to purchase our largest ever tranche of RE, much faster and at a lower cost than would have otherwise been possible.

The energy industry is long overdue in providing standardized, renewable electricity offerings that developers can offer and customers can easily understand. We believe that purchasing models which simplify procurement of low-cost renewables will play an important role in enabling energy buyers to reduce fossil fuel emissions in electricity markets at the scale and speed demanded by the challenge of climate change.

In this case study, we share details about how our RE auction worked and the lessons we learned along the way. We hope our experience will be useful for other non-utility RE buyers, and inspire third parties to develop new tools and solutions that will democratize auctions as a tool for RE procurement.

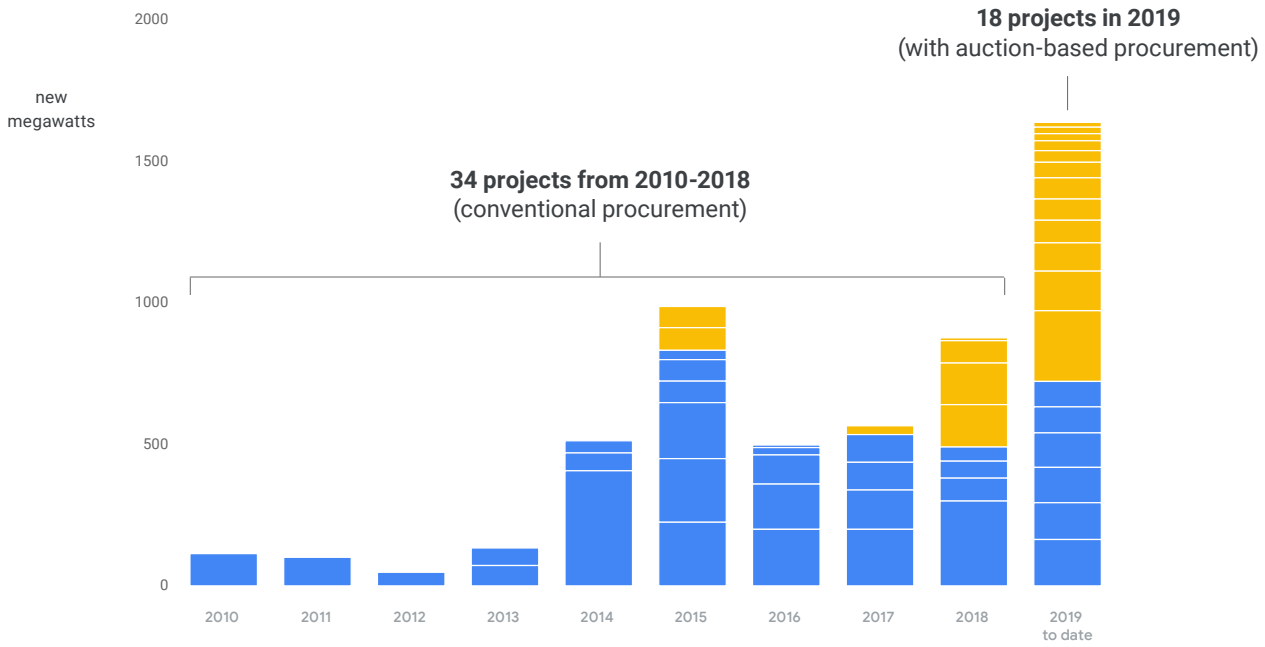
A Brief History of Renewable Energy Auctions

In recent decades, reverse auctions have emerged as a primary tool used by governments and utilities to procure RE at scale. According to the International Renewable Energy Agency, more than 80 countries had used auctions to procure RE as of 2018, up from fewer than ten in 2005. However, very few corporations have set out to design and run reverse auctions for RE across multiple global markets. While we're not the first company to attempt an exclusively RE-focused auction, we believe our effort is unique in its global reach and in the scale of procurement enabled through our auctions.

FIG. 1

Google's renewable energy agreements by year

The use of reverse auctions allowed Google to sign more **wind** and **solar** capacity in 2019 than in any previous year



Our success in using auctions to procure RE benefited from several broader, positive developments in the RE industry. Until recently, few of the markets in which Google operates would have had enough RE project developers or financing institutions to support a competitive bidding process. Renewables have also become so inexpensive that purchasing them is the most cost-effective supply option in many global markets. The fact that we were able to run auctions in four global markets, on two continents, reflects the fact that there is now a liquid market for RE with qualified, experienced project developers working around the world.

Our Approach

We developed a five-step approach to designing and running our first reverse auctions for RE projects.

1. Assess and select markets for auctions

The first step we took was to issue a global PPA RFP in markets where we were seeking more RE to match our operational energy consumption. Based on information uncovered by our RFPs and other research, we chose to run auctions in four markets. These markets included the ERCOT and PJM grid regions in the U.S., and Sweden and Finland in Europe. We classified markets as suitable for auctions primarily based on two criteria: number of qualified projects and developers (e.g. would the market likely have enough viable, potential projects to support a competitive bidding process) and economics of proposals submitted.

2. Refine auctions based on market characteristics

Based on market interest and the number of RE offers for particular technologies (i.e. solar and onshore wind), we next selected regions and technologies to participate in each of our four auctions. We defined only one settlement location and technology type per auction, so as to ensure an apples-to-apples project comparison and adequate competition within each auction.

3. Pre-qualify bidders

Prior to hosting our auctions, we invited bidders to meet qualification requirements for participation in the auctions. We required that bidders meet minimum requirements related to the long-term financial health of their organizations, track record of delivering on RE projects, and development-stage assets in the markets where we sought to buy energy.

4. Refine and set terms for auction bidders

Based on our experience contracting over 30 RE PPAs and our understanding of infrastructure investor requirements, we developed a standard-form PPA and term sheet that would serve as the commercial foundation for sellers' bids.

To ensure that commercial items that affect PPA prices (e.g. security, liquidated damages, or change in law provisions) were identified and clearly articulated so that auction bidders could price their offers accordingly, we shared our term sheet with qualified auction participants in advance of our auctions, soliciting and incorporating feedback from the pool of sellers wherever possible.

Finally, we studied and implemented common features of other successful auctions, such as requiring that bidders agree to terms laid out in our term sheet and provide a bid deposit prior to participating in our auctions.

FIG. 2

A five-step approach to renewable energy auctions

We followed a sequential process to design and run our reverse auctions

5. Run the auctions

Working with a third-party technology vendor, we ran our auctions. Having never gone through the process before, we weren't sure what to expect. Would we see the volume of bids, or kinds of bids, necessary to make for successful auctions? Where would prices settle for different technologies in different markets? Each of our four auctions lasted only 45 - 60 minutes, and we watched in real time as bids (anonymized so that bidders could see the lowest price in each moment, but not the names of other bidders) flowed in. We awarded contracts to the lowest cost bidders, up to desired volumes, in each of our selected auction markets.

Results

Our global reverse auction for RE was well-received in the market. Globally we pre-qualified hundreds of projects, which led to hundreds of bids placed. This enabled us to execute a much larger volume of deals at lower costs than would have been possible using traditional RFPs.

Volume

Developers bid a total of more than 2 gigawatts of deals into our four auctions. In turn, Google signed 10 RE agreements comprising more than 1.2 gigawatts of capacity. Combined with more than 0.3 additional gigawatts of RE simultaneously procured using traditional RFPs, our auctions enabled us to announce the biggest purchase of RE in our history.

Speed

Using a traditional RFP process, it would take us 18-24 months to sign a single large RE procurement deal. With auctions, we were able to source and sign several such deals in under a year. For comparison, it took Google more than five years to procure the same amount of RE (~1.2 gigawatts) that we procured in a year using auctions.

Running auctions accelerated our procurement process in two ways.

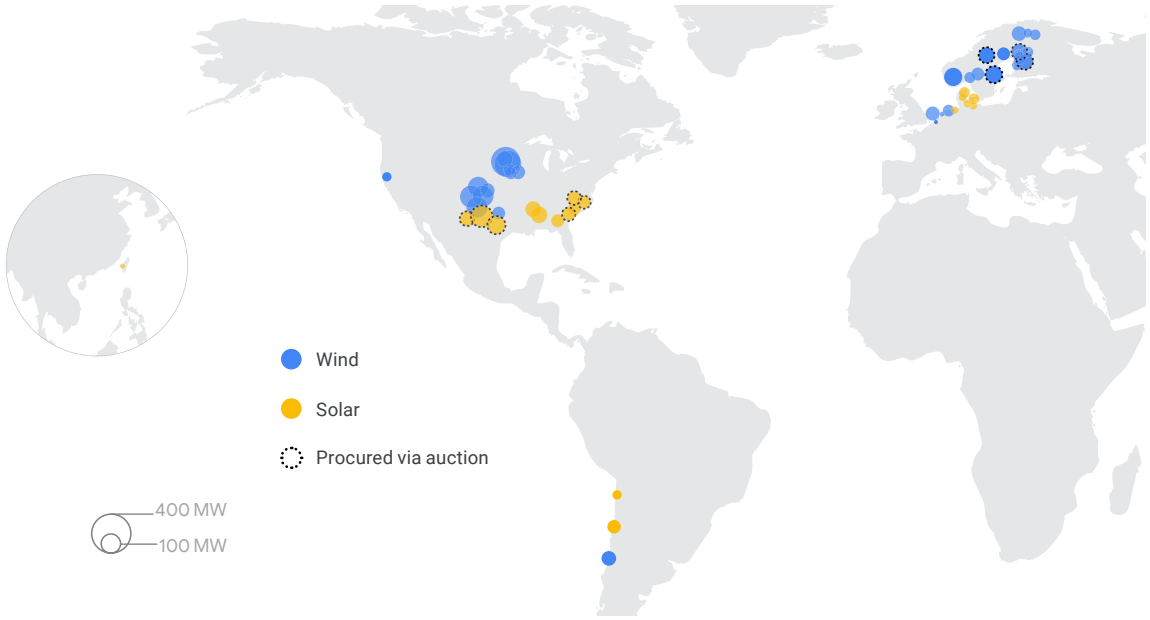
First, our auction reduced “dancing” between multiple negotiating parties. In many RFP processes, RE buyers go through multiple rounds of negotiations with multiple potential sellers before arriving at a vendor and best and final price. By creating price transparency and a clear process for selecting bid winners, our RE auctions allowed us to identify the most economic project in 45-60 minutes, versus 2-3 months using a traditional approach.

Second, developing a global, standardized PPA template enabled us to more quickly negotiate the details of contracts after we had selected vendors. We estimate that our standardized template shaved several additional months off our procurement process.

FIG. 3

Google’s global renewable energy portfolio as of October 2019

Reverse auctions cost-effectively enabled procurement of ~1.2 gigawatts of solar and wind capacity across four regional markets



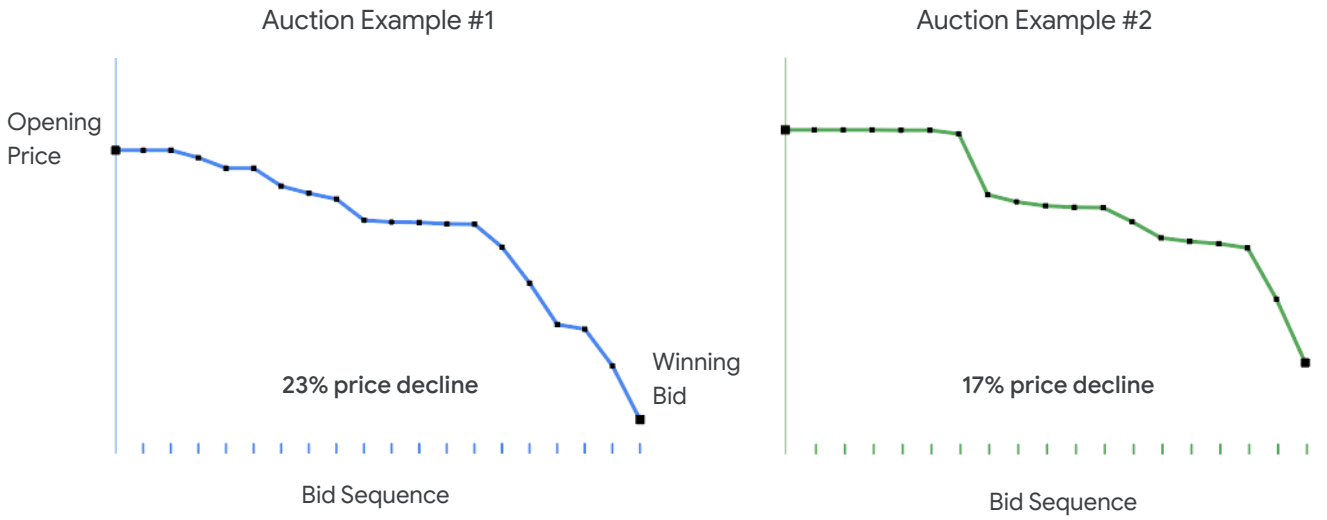
Price

By creating a more efficient mechanism for developers to compete on price, our reverse auction allowed us to meet our RE procurement goals at costs that were, depending on the market and technology, meaningfully lower than we would have obtained via a traditional RFP. Our reverse auctions also benefited participating bidders with price discovery and transparency, as they could see what other bidders were anonymously offering for exactly the same product throughout the auction process.

FIG. 4

Examples of how our reverse auctions led to cost-effective RE procurement

The price discovery and transparency of auctions resulted in competitive bidding that meaningfully reduced the cost of RE procurement



Lessons Learned

Our experience designing and running our first RE auction resulted in several lessons that may be valuable for other RE buyers.

Developing a RE auction is a long-term investment

From issuing exploratory RFPs to developing a clear term sheet, designing our first RE auction took considerable effort. However, the processes and tools we developed to carry out our first auction will substantially simplify future efforts.

In total, our inaugural auction process required less than one year from conception to the conclusion of our contract negotiations. Much of that time was spent developing or refining fundamental auction elements — e.g. creating term sheets of defining the timing, scope, and location of our auctions — that will be useful for our next round of procurement. Going forward, we believe we will be able to further reduce the time from initiating an auction to executing contracts.

Organizations considering RE auctions as a procurement tool should approach the process as an investment that requires upfront work, but which can pay off over the long term. We also hope to see more qualified third-party platforms develop their own auction capabilities to help bring RE buyers and sellers together.

Auctions are an effective tool for procuring large amounts of RE at once

Our first RE auction proved to be an ideal tool for procuring large amounts of RE, in multiple markets, at a global scale. Because they require streamlined contract terms and eliminate the need for lengthy negotiations, RE auctions can scale more effectively than traditional RFPs for large procurement efforts.

Auctions are an effective tool for accelerating widespread RE adoption

A number of factors, ranging from the pace of technological development to different geographic and policy contexts, present challenges for organizations seeking to evaluate what constitutes a "good deal" when buying RE. By creating price transparency in RE markets, auctions can create more competition among RE sellers and lower prices for RE buyers. Over the long run, lower RE prices — along with greater ease of procurement — will in turn bring more buyers into RE markets, which will help drive the nascent but rapidly expanding corporate RE market to maturity. As is the case in markets for many goods, creating price transparency and competition in RE markets can play a role in accelerating widespread RE adoption.

What's Next

Addressing the pressing challenge of climate change requires decarbonizing electric grids across the planet as quickly as possible. The good news is that renewable energy prices have declined to a point where RE is displacing fossil fuels in an increasing number of markets. And yet it still remains too complex and too costly for most organizations to buy RE.

Reverse auctions are one model among several emerging models that stand to make RE purchasing simpler, more efficient, and more cost-effective for a wider ecosystem of organizations. We found reverse auctions to be particularly effective for procuring a large amount of renewable energy at low cost in several markets at once.

Looking ahead, we hope to see RE auctions become democratized so that they become more useful to a broader array of energy buyers. Platform services, consulting intermediaries, or brokers could enable buyers (or consortiums of buyers) that lack our resources and expertise to participate in RE auctions. Additionally, purchasing contracts could be further standardized between energy buyers, sellers, and investors, in order to lower the transactional and setup costs associated with RE auctions.

As the world's largest corporate RE purchaser, we will also continue to experiment with a broader array of new models to simplify and expand RE purchasing. In addition to auctions, some examples of promising models that we have been involved with or are exploring are new marketplaces for RE, demand aggregation projects that enable smaller energy buyers to act as large buyers in the market, and new utility programs that empower customers to purchase RE through their power provider.

We also expect auctions and other novel procurement approaches will find applications that extend well beyond procuring greenfield renewable energy projects. As we move toward our own long-term aspiration of matching our electricity use with carbon-free sources in all places, at all times, we anticipate we will use auctions and other new platforms to source a variety of carbon-free energy products at scale.

Finally, we will continue to advocate for and celebrate policies, initiatives, and commitments that move the global energy system toward 100% carbon-free energy. In this ideal end state, auctions and other corporate RE procurement tools will be irrelevant, because the power provided to organizations through energy retailers will itself be carbon-free. To address climate change, it's critical that utilities and other energy providers accelerate their own efforts to commit to and buy carbon-free resources.

Climate change demands urgent attention and renewable energy is ready to scale, if we can make it simple and cost-effective to purchase. Reverse auctions represent one promising tool in a burgeoning RE purchasing toolkit.