



CHOOSING OFF-SITE RENEWABLE PPAS

FOR ENVIRONMENTAL AND SOCIAL IMPACT

A CASE STUDY ON CUMMINS' VIRTUAL POWER PURCHASE AGREEMENT IN INDIANA

BY ROBERTO ZANCHI AND RACHIT KANSAL



AUTHORS & ACKNOWLEDGMENTS

AUTHORS

Roberto Zanchi and Rachit Kansal*

**All authors from Rocky Mountain Institute unless otherwise noted.*

CONTACTS

Roberto Zanchi, rzanchi@rmi.org

Lily Donge, ldonge@rmi.org

SUGGESTED CITATION

Zanchi, Roberto, and Rachit Kansal. *Choosing Off-site Renewable PPAs for Environmental and Social Impact: A Case Study on Cummins' Virtual Power Purchase Agreement in Indiana*. Rocky Mountain Institute, 2018. www.rmi.org/insight/choosing-offsite-renewable-ppas/

REVIEWERS

Jon Creyts, Lily Donge, Stephen Abbott, Kate Mark

EDITORIAL/DESIGN

Editorial Director: Cindie Baker

Editor: David Labrador

Creative Director: Romy Purshouse

Cover photo courtesy of Cummins

Images courtesy of iStock unless otherwise noted.

ACKNOWLEDGMENTS

The authors thank the following individuals/organizations for offering their insights and perspectives on this work:

Karen Cecil, Director, Global Environmental Sustainability, Cummins

Laurie Counsel, Director, Global Environmental Relations, Cummins

Michael Day, Executive Director, Capital Management, Cummins

Mark Dhennin, Director, Energy and Environment, Cummins

Donald G. Jackson, Vice President, Treasurer, Cummins

Tony Luo, Senior Analyst, Corporate Treasury, Cummins

Kelly Snyder, Senior Originator, EDP Renewables North America

Natalie Stucky, Assistant General Counsel, Real Estate, Cummins

ABOUT US



ABOUT ROCKY MOUNTAIN INSTITUTE

Rocky Mountain Institute (RMI)—an independent nonprofit founded in 1982—transforms global energy use to create a clean, prosperous, and secure low-carbon future. It engages businesses, communities, institutions, and entrepreneurs to accelerate the adoption of market-based solutions that cost-effectively shift from fossil fuels to efficiency and renewables. RMI has offices in Basalt and Boulder, Colorado; New York City; Washington, D.C.; and Beijing. www.rmi.org



ABOUT THE BUSINESS RENEWABLES CENTER

Rocky Mountain Institute's Business Renewables Center (BRC) is a member-based platform that streamlines and accelerates corporate purchasing of off-site, large-scale wind and solar energy. With over 250 members, including major corporations, leading renewable energy project developers, and transaction intermediaries, the BRC embodies the know-how of the industry. Today, BRC members account for over 13 gigawatts of renewable energy, and more than 98% of US corporate renewables deals to date have included a BRC member. With a goal to help corporations procure 60 gigawatts of renewable energy by 2030, the BRC is at the leading edge of the fastest growing sector of renewable energy procurement.

More information on BRC can be found at www.businessrenewables.org.



ABOUT CUMMINS

Cummins Inc., a global power leader, is a corporation of complementary business units that design, manufacture, distribute, and service a broad portfolio of power solutions. The company's products range from diesel and natural gas engines to hybrid and electric platforms, as well as related technologies, including battery systems, fuel systems, controls, air handling, filtration, emission solutions, and electrical power generation systems. Headquartered in Columbus, Indiana, (USA) Cummins currently employs approximately 58,600 people committed to powering a more prosperous world. Cummins serves customers in approximately 190 countries and territories through a network of approximately 500 company-owned and independent distributor locations and approximately 7,500 dealer locations. Cummins earned about \$1 billion on sales of \$20.4 billion in 2017.

Press releases can be found on the web at www.cummins.com. Follow Cummins on Twitter at www.twitter.com/cummins and on YouTube at www.youtube.com/cumminsinc.



TABLE OF CONTENTS

- 01: INTRODUCTION 06

- 02: THE VPPA AS A HIGH-IMPACT RENEWABLES PROCUREMENT OPTION..... 08
 - The role of renewables in Cummins' sustainability strategy 09
 - How the VPPA emerged as the highest-impact option10
 - Putting things in perspective: Different buyer motivations for a VPPA 14

- 03: A COST-BENEFIT FRAMEWORK TO SELECT HIGH-IMPACT RENEWABLE PROJECTS...16
 - A cost-benefit framework focused on project impact..... 17
 - The environmental and social benefits of a project.....18
 - The net financial cost of the VPPA to the company22
 - Using the cost-benefit analysis to win internal support23

- 04: CONCLUSION.....24

01

INTRODUCTION



INTRODUCTION

An increasing number of corporate renewables buyers are venturing into the virtual power purchase agreement (VPPA) market. They are driven by their environmental and social sustainability goals and the desire to achieve them by enabling new large-scale renewable energy projects.

This case study offers insight into the renewables strategy and procurement process of Cummins, a global power equipment manufacturer that announced its first VPPA in August 2017. The VPPA is for 75 megawatts (MW) of wind power from Meadow Lake, a wind farm located in Indiana.

The Cummins case offers valuable lessons to renewables buyers that are considering VPPAs to meet their sustainability goals and might need a framework to guide the selection of a renewable energy project that offers the greatest opportunities for environmental and social impact.

The case study consists of two main sections:

- A discussion of the VPPA as a high-impact renewables procurement option, which looks at why Cummins selected the VPPA as its preferred off-site renewables procurement option in Indiana to meet its environmental and social sustainability goals, and the approach it took in comparing the VPPA to two alternatives: renewable energy certificates (RECs) and utility contracts.
- A cost-benefit framework to select high-impact renewable projects, which presents the analytical framework the Cummins team used to find its preferred renewable energy project in Indiana, which may be of interest to other buyers that are strongly focused on sustainability impact and considering different VPPA project options.

To develop this case study, we interviewed the Cummins team and the project developer, EDP Renewables North America, in November 2017.



THE VPPA AS A HIGH-IMPACT RENEWABLES PROCUREMENT OPTION



THE VPPA AS A HIGH-IMPACT RENEWABLES PROCUREMENT OPTION

This section looks at why Cummins, a global power technology company strongly driven to the procurement of renewable energy by its environmental and social sustainability goals, selected the VPPA as its preferred off-site, large-scale renewables procurement option in Indiana; it was largely due to the VPPA's greater potential for impact than the alternatives: RECs and utility contracts.

THE ROLE OF RENEWABLES IN CUMMINS' SUSTAINABILITY STRATEGY

Cummins is an American Fortune 500 manufacturing company that produces engines, generators, and associated components. Founded in 1919 in Columbus, Indiana, where its headquarters still is today, Cummins has become a global company with operations in 197 countries and territories.

As its business has grown and expanded geographically, Cummins increased its commitment to environmental stewardship. Over the years, the company set targets to reduce its use of natural resources and to reduce and offset greenhouse gas (GHG) emissions. In 2006, Cummins set its first emissions target, which was to reduce its GHG intensity by 25% by 2010. The achievement of this target earned Cummins one of the Climate Leadership Awards cosponsored by the US Environmental Protection Agency. Since then, the company has expanded its ambitions through two additional public commitments. Cummins' most recent energy efficiency goal, set in 2016, is for a 32% reduction in energy use intensity by 2020. If and when this target is achieved, the company will also have reduced its GHG intensity by 32%.

EXHIBIT 1

CUMMINS ONSITE RENEWABLE ENERGY



Photo previous page: The Cummins VPPA team toured the wind farm expansion location in early 2017. Photo courtesy of Cummins



Although Cummins had made considerable progress reducing its energy use through energy efficiency, the company has found it increasingly difficult to identify cost-effective projects. As a result, the Cummins sustainability team started exploring renewable energy procurement as a complementary way to offset its GHG emissions.

Ultimately, the Cummins team created an ambitious internal plan to increase the use of renewable energy company-wide by 2020. However, unlike the GHG targets, Cummins chose to not publicly announce these targets. Mark Dhennin, director of energy and environment, explains why: “We want to make sure renewables procurement works for Cummins before making a commitment. That’s why we have a quantified internal renewables goal, but not yet a public commitment.”

Cummins’ procurement of renewable energy began with 13 on-site renewable energy installations for its sites in Australia, Belgium, China, India, Mexico, and the United States. These projects, totaling 8 MW of generation capacity, are mostly solar PV plants, but include one geothermal installation. The company either owns these facilities or has on-site power purchase agreements in place.

However, all of those on-site renewable projects combined generate electricity equivalent to only 1% of the company’s electricity usage. To accelerate progress toward its 2020 targets, the Cummins team decided to broaden the scope of its search to larger-scale renewable energy projects.

HOW THE VPPA EMERGED AS THE HIGHEST-IMPACT OPTION

Cummins identified and evaluated four off-site renewables procurement options: unbundled RECs, procurement through the local utility, direct PPAs, and VPPAs.

Faced with the challenge of picking one approach, Cummins looked to the Corporate Renewable Energy Buyers’ Principles—an initiative led by World Resources Institute (WRI) and World Wildlife Fund (WWF)—for guidance. The Buyers’ Principles provide six renewable energy procurement criteria that are widely recognized and endorsed by corporate buyers.

Cummins adopted two of the criteria for corporate renewable transactions recommended by the Buyers’ Principles initiative:

- **Additionality:** the transaction should enable access to, or help drive the development of, new renewable energy projects.
- **Cost-effectiveness:** the project should minimize the total cost to the company so that it can achieve the largest possible impact for its investment.

To ensure its renewables procurement would be fully consistent with the company’s values, Cummins then formulated two additional principles of its own:

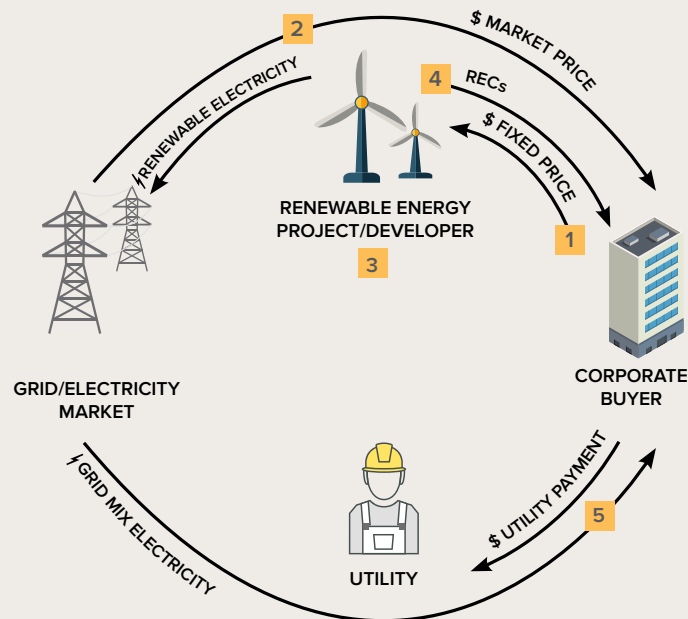
- **Tangible impact:** the transaction should be clearly understood and accepted by stakeholders as having significant environmental and social impact.
- **Transparency:** the transaction should be openly communicated via public disclosures and be properly accounted for in the company’s financial statements.

With these procurement principles in mind, the sustainability team initiated a discussion involving the company’s CEO and senior leadership that led to the selection of the off-site procurement option that best met the company’s needs.

EXHIBIT 2**HOW DOES A VPPA WORK?**

The virtual power purchase agreement is the form of large-scale renewables procurement chosen by the majority of corporate buyers (55+ companies) in the United States. More than 80 nonutility off-site VPPA deals with new renewable projects—wind and solar, for the most part—have been signed and publicly announced in the United States over the past 10 years.

A VPPA is financial contract whereby an energy project developer and a buyer exchange cash, but the buyer never actually receives electricity from the project. This is how a VPPA works:



1. The buyer pays a fixed price for the electricity generated by the project for the duration of the contract, typically 15 to 20 years, without taking title to, or physically consuming, the electricity generated by the project.
2. Instead, the electricity is sold into the wholesale market at real-time or day-ahead prices. The buyer is entitled to the money made from that sale and is therefore exposed to market price variability.
3. The buyer and the project developer settle the cumulative difference between the fixed price and the market price periodically. This is why VPPAs are also known as contracts for differences.
4. Usually, buyers have the option to acquire the renewable energy attributes (i.e., the RECs) associated with the electricity generated by the project, which they can sell or retain and use for their environmental claims.
5. The buyer needs to have a separate electricity contract with a utility or other retailer in place to supply power to its load. The VPPA does not provide physical supply of electricity or impact existing electricity supply contracts.

The table below offers a summary of Cummins’ assessment of the four options considered.

EXHIBIT 3

COMPARISON OF OFF-SITE RENEWABLES PROCUREMENT OPTIONS CONSIDERED BY CUMMINS, AND HOW EACH EITHER MEETS CRITERIA (GREEN) OR DOES NOT (RED)

OPTION	UNBUNDLED RECS	UTILITY CONTRACT	DIRECT PPA	VPPA
Additionality (from the Buyers’ Principles)	No credible connection with new projects	Helps utility install new renewable generation capacity	Helps utility install new renewable generation capacity	Tangible contribution to financing a new project
GHG reduction (from the Buyers’ Principles)	Modest cost premium for large-scale GHG offsetting	Cost premium with no GHG impact claim due to lack of recs	Cost premium with limited GHG impact claim due to small size of project	Acceptable cost and financial risk for large-scale impact
Tangible impact (from Cummins)	No credible connection with GHG footprint	No ability to claim GHG reduction due to lack of RECs	Tangible connection with GHG footprint and wider impact	Tangible connection with GHG footprint and wider impact
Transparency (from Cummins)	Cummins will abide by best practice in making claims	Cummins will abide by best practice in making claims	Cummins will abide by best practice in making claims	Cummins will abide by best practice in making claims

SOURCE: CUMMINS

UNBUNDLED RECS

In the United States, renewable energy facilities generate a renewable energy certificate, or REC, for every megawatt-hour that a facility produces. While RECs can be included in a power purchase agreement, RECs can also be purchased independently on an open market, in which case they are known as unbundled RECs because they are sold separately from the electricity.

Cummins’ leadership rejected the idea of managing the company’s GHG footprint through unbundled RECs even though unbundled RECs have a number of attractive characteristics. In particular, unbundled RECs are a cost-effective means to offset GHG emissions, as RECs are relatively inexpensive and can be purchased easily and at a large scale. Moreover, RECs in any form provide the basis for emissions reduction accounting based on the GHG Protocol, the most widely recognized corporate GHG accounting standard.

However, unbundled RECs failed to meet the additionality and tangible impact principles, which the company considered essential. Cummins took the view that the purchase of RECs alone was not sufficient for a buyer to credibly claim to have enabled a new renewable energy project in a way that would be understood and accepted by all of the relevant stakeholders.

UTILITY CONTRACT

Procurement of renewable electricity through a contract with the local Indiana electric utility was also considered, but was also ultimately rejected. On one hand, the Cummins team was convinced that the premium paid to the utility would enable the installation of more renewable generation capacity, and therefore meet the additionality principle.

However, because Indiana utilities retain all RECs by law, Cummins would not have been able to acquire the RECs from a new project through a transaction with a utility in Indiana. The resulting lack of a credible claim to GHG emissions reduction meant procuring renewable energy through a utility contract would fail to meet the cost-effectiveness and tangible impact principles.

DIRECT PPA

Cummins also considered a direct PPA, a procurement option where the electricity produced by a specific renewable project is delivered to its load via a special arrangement with the local utility. This option would also meet additionality and create tangible impact by enabling new renewable generation capacity.

In a direct PPA the electricity produced needs to be physically used by the buyer, so the project size needs to be tailored to the load, which places an upper limit on GHG impact. Additionally, the additional cost of the special arrangement with the utility would have diminished cost-effectiveness. For these reasons, the direct PPA was not selected.

“We want to maximize our impact,” said Brian Mormino, Cummins’ Executive Director of Worldwide Environmental Strategy & Compliance. “It was very important to us to choose a project that added renewable capacity while providing tangible environmental and community benefits. Our analysis showed that a VPPA is the most cost-effective way to achieve that in Indiana.”

VPPA

The VPPA emerged as the off-site renewables procurement option that met all of Cummins’ procurement principles. Cummins determined that VPPAs provide significant GHG impacts as well as a number of other environmental and social benefits for an acceptable net financial cost.

A VPPA met Cummins’ additionality criterion in the sense that it would enable the financing and construction of a new renewable energy project. A VPPA contract provides a project with a fixed-price guarantee and, therefore, greater revenue stability. This, in turn, allows developers to secure the third-party financing required to build and operate the project.

Through consultation and engagement with stakeholders, Cummins established that the VPPA would allow the company to establish a tangible connection with the environmental and social impact of the project. These environmental and social benefits will be explored in detail in the following section of the case study.

Finally, the VPPA proved cost-effective in the sense that it comes with acceptable financial cost and risk relative to the expected (high) impact. As will be discussed in the following section, achieving confidence in the company’s ability to manage the downside risk presented by market electricity prices was the key challenge in winning internal support and approval for the VPPA.



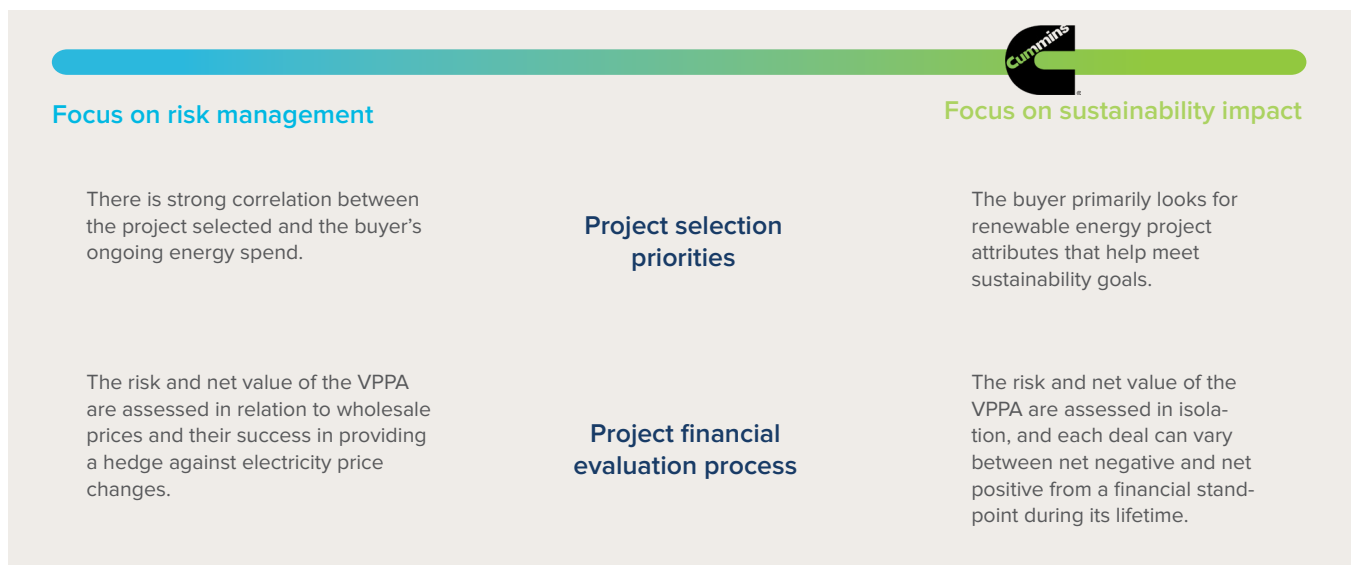
PUTTING THINGS IN PERSPECTIVE: DIFFERENT BUYER MOTIVATIONS FOR A VPPA

It is important to recognize that corporate buyers are driven to off-site procurement by means of a VPPA for a variety of reasons related to both energy procurement and sustainability. One can imagine two ends of a spectrum of buyer motivations, with many buyers falling somewhere in between the two extremes and having to balance concerns on both ends.

Some of the largest US corporate buyers use VPPAs as a way to stabilize their overall energy portfolio expenditures and mitigate financial risk. To understand this approach, consider that all companies that use electricity are, at some level, exposed to the risk that electricity prices could rise over time, thereby increasing their operating cost.

EXHIBIT 4

TWO ENDS OF THE SPECTRUM OF VPPA BUYER MOTIVATIONS: RISK MANAGEMENT AND SUSTAINABILITY—AND WHERE CUMMINS FALLS ON THE SPECTRUM



In this situation, a company would evaluate the success of a VPPA based on how well the deal offsets its current energy expenditures across its facilities. As such, companies will select projects expected to produce revenues that are highly correlated to the company's overall energy expenditures. It is worth noting that, in this situation, the company might not be concerned if a VPPA lost money when analyzed on its own, as that loss should be offset by a reduction in energy cost elsewhere.

That said, even buyers that are focused on risk management recognize that VPPAs can provide significant sustainability benefits. As a result, most of these buyers choose to both publicly announce that they have enabled a large-scale project in their sustainability report and acquire the renewable project's RECs, which they use to claim GHG emissions reductions.

BUYER FOCUSED ON SUSTAINABILITY IMPACT

Some corporate buyers in the United States choose projects that will have the greatest environmental and societal impacts. Beyond their impact on CO₂ emissions, renewable energy projects can provide a number of important benefits to the local community by supporting local jobs, increasing local tax revenue, and improving local air quality by displacing fossil fuel generation. Depending on their goals, companies may prioritize projects that maximize one or another of these environmental and societal benefits.

However, even buyers that are strongly focused on the sustainability impact must come to terms with the market risk associated with the VPPA. Unlike buyers that seek to manage financial risk, sustainability-

focused buyers typically focus on the net economic cost or benefit from each VPPA in isolation rather than considering the VPPA's hedge potential. The net economic value of each VPPA is subject to market price uncertainty, which makes it essential for a buyer to forecast future market price scenarios and become comfortable with a range of possible outcomes.

Cummins, with its strong focus on sustainability impact, belongs in the latter category of buyers, those focused on the sustainability impact of a VPPA. The following section of the case study offers insight into the analysis that led Cummins to select its preferred renewable energy project in Indiana for its first VPPA deal, in order to maximize the company's social and environmental impact.



Cummins employees attended the American Wind Week celebration at Meadow Lake in August 2018. Photo courtesy of Cummins

03

A COST-BENEFIT FRAMEWORK TO SELECT HIGH-IMPACT RENEWABLE PROJECTS



A COST-BENEFIT FRAMEWORK TO SELECT HIGH-IMPACT RENEWABLE PROJECTS

The previous section explored Cummins' motivation for off-site renewables procurement and its reasoning behind the selection of the VPPA option. This section offers insight into Cummins' analysis that led to the selection of a specific renewable energy project. This discussion may be of interest to other buyers strongly focused on sustainability and considering different renewable project options.

A COST-BENEFIT FRAMEWORK FOCUSED ON PROJECT IMPACT

Having secured the approval of the CEO and company's senior management to pursue a VPPA, Cummins' environmental sustainability team—which was put in charge of executing the deal—was faced with the task of finding the best renewable energy project.

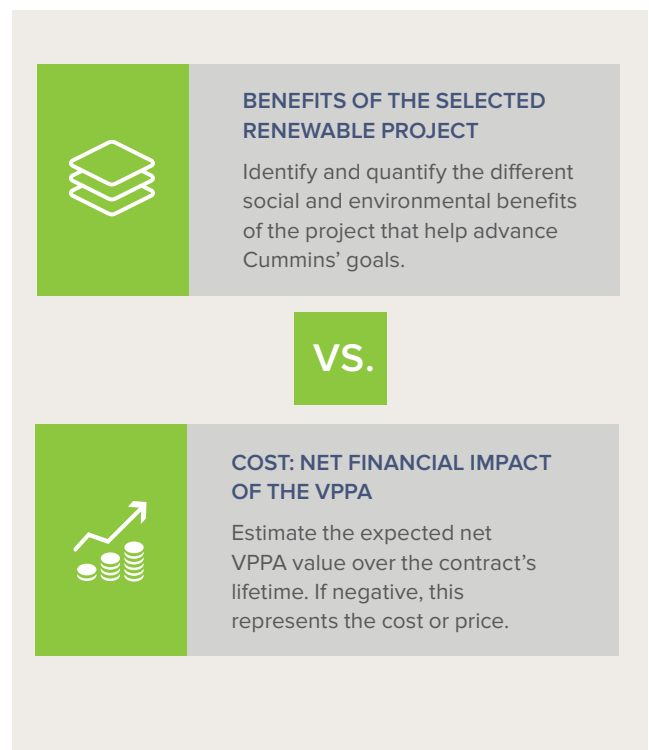
The team wanted a project located in Indiana, to demonstrate the company's commitment to improving the environment and society of its home state. An Indiana location would put the project in physical proximity to a significant portion of Cummins' manufacturing operations, which they believed would be received positively by the stakeholder community.

“To get this deal done we had to strike a balance between community benefit and environmental impact on one side, and financial risk on the other side,” explained Mark Dhennin, Director of Energy and Environment at Cummins. The cost-benefit framework enabled Cummins to identify the project with the highest impact and an acceptable net financial impact.

Even within Indiana Cummins identified a number of project opportunities, each of which would have had its own distinct impacts on the environment and local community. Moreover, Indiana is served by two different wholesale electricity markets, the Midcontinent Independent System Operator (MISO) and the PJM Interconnection (PJM); as a result, Cummins had to consider which market would be ideal for its transaction.

A rigorous approach was needed. To compare potential project opportunities, the Cummins team developed its own cost-benefit framework. On the benefit side, the company included a variety of the social and environmental impacts. On the cost side, they considered the expected net economic value of the VPPA, with a focus on understanding what the worst-case scenario might look like.

EXHIBIT 5 COST-BENEFIT ANALYSIS FRAMEWORK BEHIND CUMMINS' IMPACT-DRIVEN VPPA





On the benefit side, Cummins' analysis aimed to identify and, as much as possible, quantify the environmental and social impact of a particular project. The qualities assessed go beyond overall GHG emissions reductions and account for impact on the local environment, wildlife, and economic benefits to the local communities and government.

For the cost side of the analysis, the Cummins team used market price forecasts in order to understand what the potential net value of the VPPA could be over its lifetime. The team also created a worst-case scenario to represent the highest possible cost for the deal and, perhaps more symbolically, the price the company might have to pay to ensure the renewable project is built and its positive environmental and social impact is realized.

The rest of this section explores the two sides of Cummins' cost-benefit framework.

THE ENVIRONMENTAL AND SOCIAL BENEFITS OF A PROJECT

To dive deeper into the benefit side of the analysis, this section outlines the environmental and sustainability attributes that the Cummins team prioritized in their project search.

To ensure that the project choice be consistent with the company's renewables procurement principles, Cummins sought the following:

- The project had to be newly built (additionality principle).
- The project had to be close to the buyer's load (tangible impact principle).
- The project had to have a significant GHG impact (cost-effective GHG reduction and transparency principles).

Cummins also considered the following attributes to find projects that offered additional environmental and social benefits:

- Minimal land, water, and wildlife impact
- Positive local economic impact
- Buy-in from the local community
- A like-minded project developer

Following is a description of how the selected project, the Meadow Lake Wind Farm, met and exceeded all of Cummins' impact expectations.

THE PROJECT HAD TO BE NEWLY BUILT

One of Cummins' key principles for renewables procurement is additionality, which, to the company, means that a renewable energy procurement contract should enable access to, or help drive the development of, new renewable energy projects. Moreover, the company wanted the project to be tangible and easily understood by relevant stakeholders.

The development of phase VI of Meadow Lake Wind Farm was planned but had not yet commenced when Cummins negotiated the VPPA with the project developer. Additionality was therefore met because the project would be brand-new. Meadow Lake stood out because the developer had not yet found any other buyers for phase VI of the project, which gave the Cummins team confidence that the project was at risk of not being built at this stage, if not for the VPPA.

THE PROJECT HAD TO BE CLOSE TO THE BUYER'S LOAD

As previously mentioned, the Cummins team wanted their first VPPA to be for a project located in Indiana, the company's home state, to demonstrate its commitment to the local environment and communities.

Moreover, given that half of Cummins' US-based operations and electricity consumption are in Indiana, a local project would be received well by stakeholders advocating for project locations close to buyers' electricity loads in order to affect change to the grid more credibly. The desire to locate the project near its load was driven by Cummins' tangible impact principle, or its goal that the transaction should be clearly understood and accepted by stakeholders as having significant environmental and social impact.

Because two different liberalized wholesale electricity markets—MISO and PJM—serve different parts of the state of Indiana, Cummins considered project opportunities in the territories of both MISO and PJM.

CORPORATE GHG IMPACT

Cummins also sought to ensure that its project selection was consistent with the procurement principles of cost-effective GHG reductions and transparency.

Cost-effective GHG reductions are inherent in the choice of a VPPA, which is widely recognized among the buyer and stakeholder communities as a large-scale and high-impact impact corporate renewables procurement option.

Mark Dhennin, Director, Energy and Environment, Cummins. Photo courtesy of Cummins



To ensure full transparency, however, Cummins would need to abide by best practices and the guidelines of the GHG Protocol in the matter of corporate GHG accounting. These guidelines stipulate that for a company to claim a reduction in its GHG emissions inventory, it needs to acquire and retain RECs. However, Cummins found that purchasing and keeping the RECs associated with the Meadow Lake project increased the financial costs of the deal beyond what the company was willing to pay.

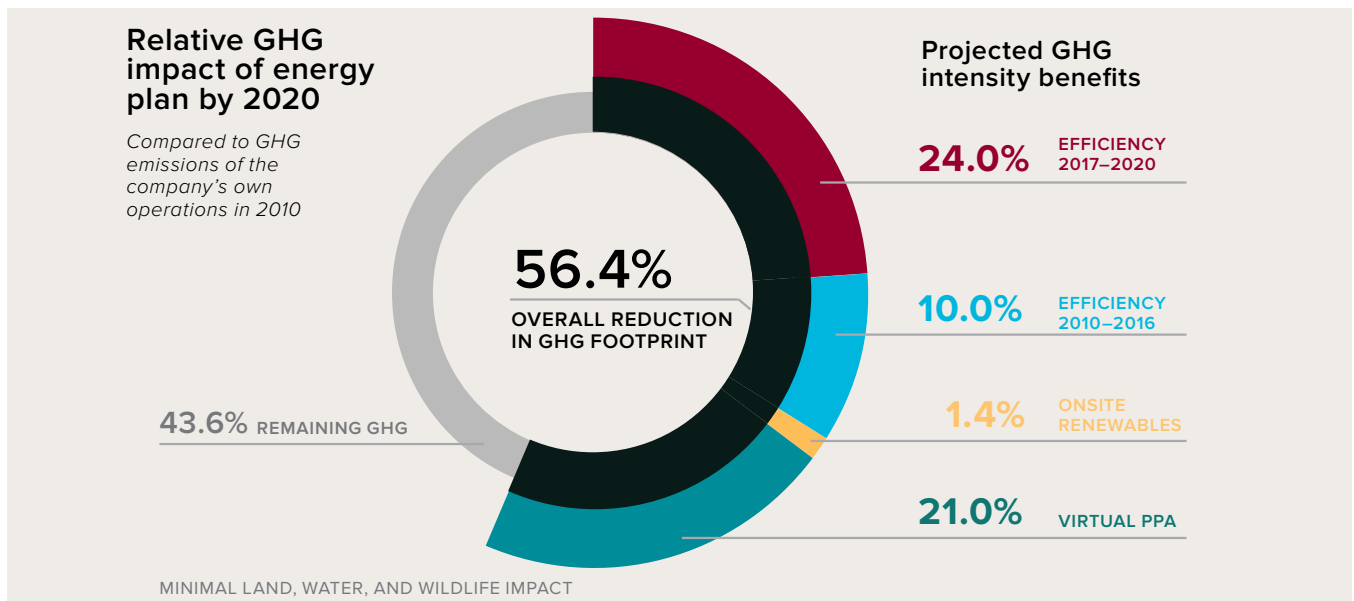
Fortunately, the Meadow Lake project offered an alternative. Meadow Lake is located in the PJM market, which currently commands high prices for RECs. In comparison, RECs from the neighboring MISO market could be purchased at a significant discount. This allowed Cummins to sell the RECs from Meadow Lake into the PJM market and then replace these RECs with an equivalent volume of RECs from a different project located in Indiana’s MISO market. This practice, which is known in the industry as “REC swapping,” improved the economic outlook of the VPPA to the point where Cummins could get the deal signed.

Moreover, the GHG Protocol does not require that RECs come from any particular project or location. So, provided that all the appropriate accounting and transparency guidelines are followed, and the RECs acquired by Cummins in the MISO market actually match the volume of renewable electricity generated by Meadow Lake, the company will be able to use the MISO RECs to offset a large portion of its corporate GHG footprint. Thus, when the contracted 75 MW of new wind generation capacity comes online, the electricity generated will be equal to the amount of Cummins’ usage in the state of Indiana, which is approximately 25% of its total company GHG footprint.

The chart below illustrates Cummins’ GHG reduction plans to 2020, with 100% defined as the GHG emissions of the company’s own operations in 2010. The chart shows the extent of the GHG reduction potential offered by the Indiana virtual PPA (thanks to the swap with MISO RECs), in green, compared with the potential offered by on-site renewables and energy efficiency measures.

EXHIBIT 6

PROJECTED GREENHOUSE GAS REDUCTION EFFECT OF CUMMINS’ ENERGY INITIATIVES, 2010–2020



SOURCE: CUMMINS

Beyond GHG impact, the Cummins team also considered the impact the project would have on land and water usages, and on wildlife.

LAND USAGE

Each wind turbine utilizes less than one acre of land and, of the 10,000 acres designated as Meadow Lake VI Wind Farm, over 99% is considered fully developed, farmable land that can continue to be put to productive use. Minimal undeveloped land will be disturbed by the project.

WATER USAGE

Cummins has well-defined goals in water stewardship. The company aims to reduce water use intensity by 33% compared to 2010 levels in all facilities by 2020, and to offset its water use in 15 facilities through community projects.

Cummins emphasized the importance of the link between energy and water usage. An estimated 0.5 gallons of water are consumed per kWh of conventional electricity. With no water usage occurring at Meadow Lake, the company estimates that its PPA will save over 70 million gallons of water in the region each year, enough to serve a 2,000-person town.

WILDLIFE

Cummins partnered with the Indiana offices of the Environmental Defense Fund and the Nature Conservancy, two environmental nonprofits, to make certain that the project location will be ideal from a wildlife preservation point of view.

While Cummins realizes that no energy source has zero impact, this partnership reinforced the position that wind energy from this project will have significantly lower negative environmental impacts than the conventional grid power it will replace.

In particular, Cummins worked with the developer of Meadow Lake to ensure that special care be taken not to destroy or interfere with the natural habitat of the local bat and bird populations.

POSITIVE LOCAL ECONOMIC IMPACT

Going beyond environmental concerns, Cummins also assessed the impact of the wind project on the local economy.

The development of Meadow Lake VI will bring significant economic benefits to the region by providing millions of dollars to the local landowners throughout the life of the project and increasing local and state tax revenue. Moreover, the project will both create jobs during the initial construction phase and support several permanent jobs over its life span.

BUY-IN FROM THE LOCAL COMMUNITY

“When engaging local stakeholders, we found that doing so early in the process is key. This helps us understand concerns early on, is a chance to present the value proposition of the project and makes them a valued part of the decision process,” explained Dhennin.

A LIKE-MINDED PROJECT DEVELOPER

Finally, Cummins emphasized the importance of selecting a project developer that shared its values. Cummins found that the developer of Meadow Lake, EDP Renewables North America, knew the local market well, operated with integrity, and shared Cummins’ key values, including environmental stewardship.

“Being stewards of the environment is a pillar of EDP Renewables’s business,” explained Kelly Snyder, senior originator at EDP Renewables. “We already had high environmental standards and practices in place at Meadow Lake, and this really tied us and Cummins together.”



EXHIBIT 7

KEY TERMS OF CUMMINS' VPPA DEAL WITH MEADOW LAKE WIND FARM IN INDIANA



TYPE OF CONTRACT: VIRTUAL PPA

(i.e., contract for differences)
Duration of contract: 15 years
RECs: Sold and swapped for MISO RECs



TECHNOLOGY: WIND

Project: Meadow Lake VI (sixth phase of a multiphase project)
Commercial operation date: January 2019 (expected)
Developer: EDP Renewables
North America
Location: Northwestern Indiana, United States
Wholesale market (independent system operator): PJM Interconnection



CONTRACTED CAPACITY: 75 MW

Electricity generation: expected to cover approximately 50% of Cummins' US electricity consumption
Total project size (of current phase): 200 MW
Other buyers (of current phase): A local Indiana utility, Nestlé USA

THE NET FINANCIAL COST OF THE VPPA TO THE COMPANY

On the cost side of its cost-benefit analysis, Cummins chose to determine not just the most likely scenario—that the net value would be negative—but also the worst-case outcome in order to understand the maximum financial loss the company could face from the deal. Although Cummins ultimately concluded that the net value of the VPPA would likely be negative, when comparing that cost to the equivalent CAPEX investment required to achieve a similar GHG reduction initiative, it decided that it was willing to absorb the potential losses predicted in its worst-case scenario in order to enable the project's environmental and social impact.

"We wanted to make the best investment from an impact point of view, and it is safe to say that the deal would not have been done based solely on its financial merits," explained Dhennin.

WHOLESALE PRICE FORECASTING TO ASSESS PPA VALUE

As described above in the section titled "What is a virtual power purchase agreement?" the net value of a PPA from the perspective of a corporate off-taker is the difference between:

1. The wholesale market revenues generated by selling the electricity into the market.
2. The fixed PPA price.

The wholesale market revenues are both volatile in the short term and very difficult to predict accurately over the lifetime of a VPPA, which exposes the corporate off-taker to a significant potential financial loss if wholesale market revenues fall below their fixed PPA costs.

To evaluate their potential risk, the Cummins treasury and finance teams used two different methods:

1. Forecasting based on historical prices and forward price projections.
2. Monte Carlo simulations.

FORECASTING BASED ON HISTORICAL AND FORWARD PRICES

To evaluate how electricity prices might evolve over time, the team considered a variety of sources of information and analysis.

Initially they looked at historical data showing how electricity prices had changed during the past 10 years. They observed that prices had been quite volatile and determined that historical data was not sufficient to make an informed decision. To avoid any time-period bias, the team decided to review estimates of future market prices.

The price forecasts provided by industry experts consistently showed an upward skew in prices over time, which would result in a positive net value of the VPPA. Cummins' finance and treasury teams expressed skepticism that prices would continue to rise, considering that factors like new renewable capacity that put downward pressure on price in the long term.

This led to a search for an alternative method to evaluate the deal and determine a reasonable worst-case scenario or a tail event based on probabilistic models, which resulted in the company using a Monte Carlo simulation.

MONTE CARLO SIMULATION

To produce a more realistic picture of downside price risk, Cummins used a statistical analysis technique known as a Monte Carlo simulation. A Monte Carlo simulation works by first allowing a series of input variables to randomly vary (within certain constraints) and then feeding those values into a model to determine a range of possible outcomes and assess the probability of each.

Cummins used a Monte Carlo analysis to run a large number of simulated scenarios, which helped determine the probability of various price outcomes in the market, using historical pricing as input data. This offered the company a forecast of net-VPPA value scenarios that the team felt comfortable with.

With what they believed was a much more reliable view of downward risk in hand, the Cummins team compared multiple projects side by side.

With environmental and social impact dimensions on one side, and worst-case net VPPA financial value on the other, Cummins established that a VPPA with Meadow Lake delivered the best value in terms of dollar invested per environmental benefit.

USING THE COST-BENEFIT ANALYSIS TO WIN INTERNAL SUPPORT

The cost-benefit analysis that the Cummins team performed was an essential step in securing internal approval for this transaction.

Initially, the company's senior leadership was skeptical about the feasibility of a virtual PPA due to the novelty and complexity of the deal and the uncertainty of long-term electricity prices.

As such, it was clear from the outset that the deal would deliver on the necessary environmental benefits. Moreover, developing an internally accepted set of market price forecasts and a worst-case scenario was key to building alignment between the sustainability team leading the deal and the treasury and finance departments that would need to sanction the transaction.

By creating shared agreement on the environmental value of the VPPA, and leading a thorough assessment of the cost and risks associated with the deal, the sustainability team managed to win approval for the execution of the deal. This was done through a cross-functional task force of supporters and advisors from across the treasury, finance, tax, and legal departments.

"The expertise of different departments was critical to getting this deal done. Our finance and treasury colleagues in particular helped us do the thorough financial analysis required to satisfy the company leadership by asking tough questions," explained Dhennin.





CONCLUSION

This case study offers insight into the renewable energy strategy and deal process Cummins used to secure its first VPPA in 2017. To conclude, we present a summary of insights that may be useful to other corporate renewables buyers exploring or undertaking VPPA procurement:

1. On the role for renewables procurement in corporate GHG strategy

Cummins' first step in reducing its GHG emissions was to invest in energy efficiency, which provided both emissions reductions and an economic payback. The company then moved to on-site projects, and then to off-site renewables procurement once cost-effective efficiency projects became harder to find. Cummins found that the potential scale of off-site options offered the largest GHG impact opportunities in renewables procurement.

2. On the selection of the best off-site renewable procurement option

To select the best form of off-site renewables procurement, Cummins developed clear procurement principles, which were supported by senior leadership. Cummins started developing its principles by adopting concepts from environmental NGOs and then added on its own requirements to tailor its requirements to the company's needs.

3. On the net cost and financial risk of the VPPA to the company

For the VPPA to be approved by the treasury, finance, tax, and legal departments, the extent and likelihood of the worst-case financial scenario had to be understood and deemed acceptable. Because VPPA values are subject to wholesale price risk, which is a function of a large number of variables, Cummins relied on historical prices, third-party price forecasts and, ultimately, statistical forecasting via Monte Carlo simulations to evaluate the potential financial downside.

4. On the social and environmental benefits of the renewable VPPA

Cummins considered a wide range of environmental and social factors. In addition to GHG emissions reductions, Cummins identified a number of important social and economic variables that informed its project selection, including water and land usages, wildlife protection, acceptance by local communities, and local economic impact.

Virtual power purchase agreements are complex and are unfamiliar to most corporates. But Cummins' experience shows that they are a valuable tool, and can provide the most cost-effective and, in the end, easiest option for even a major player in heavy industry to achieve environmental and sustainability goals.



Wind projects add many benefits to local community. Photo courtesy of Cummins.



22830 Two Rivers Road
Basalt, CO | 81621 USA
<http://www.rmi.org>

© September 2018 RMI. All rights reserved. Rocky Mountain Institute® and RMI® are registered trademarks.

