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Battery Energy Storage Financing Structures and Revenue Strategies Post-Inflation Reduction Act

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Status: **Published on 10 Aug 2023** | Jurisdiction: **United States**

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This Practice Note discusses changes to financing structures for battery storage projects after the enactment of the Inflation Reduction Act. This Note also discusses the fixed and variable revenue sources available to battery storage projects based on the benefits they offer to electricity customers and grid operators. These benefits include shifting delivery of energy to times of high demand, frequency regulation, demand charge management, and voltage control.

The Inflation Reduction Act (IRA) (P.L. 117-169, 136 Stat. 1818 (2022)) made several changes to the federal tax credits available under the Internal Revenue Code (Code or I.R.C.). The IRA has expanded:

- The revenue strategies project sponsors (also referred to as project owners) can pursue for their battery energy storage systems (BESS) projects.
- Financing structure options for standalone storage projects and hybrid solar plus storage projects.
- The pool of potential investors in these projects by allowing project owners to transfer qualifying tax credits to unrelated third parties that do not own an equity interest in the project.

This Note:

- Explains the key benefits battery energy storage projects offer and how project owners can monetize these benefits (see Benefits of Battery Energy Storage Projects).
- Discusses the fixed and variable offtake structures a project company (special purpose vehicles project owners or project sponsors establish to own the project assets and enter into the project and loan documents) can pursue for their BESS projects (see Battery Storage Revenue Models: Fixed Price Contracts and Battery Storage Revenue Models: Variable Revenue Sources).
- Evaluates the changes the IRA made to federal tax credits under the Code and how these changes impact offtake strategies for BESS projects (see Impact of the IRA on BESS Projects).

Benefits of Battery Energy Storage Projects

BESS projects serve a variety of purposes for utilities and other consumers of electricity, including:

- Providing back-up power for intermittent renewable energy sources.
- Frequency regulation. BESS projects can be quickly dispatched (typically within a second) to provide power when demand exceeds generation. This is important because if there is not enough generation to meet demand, load is automatically removed from the electric grid in stages (meaning electricity delivery is temporarily interrupted to certain consumers) to prevent grid failures and extended outages until balance is restored.
- Balancing electricity supply with demand. Batteries can store excess clean energy generated at times of low market demand to inject energy into the grid at a later time, reducing the need for generation from other sources, including fossil fuel-powered plants. As a result, in addition to their other attributes, battery energy storage projects are viewed as a key component in the clean energy transition.

For more information on the benefits of storage and the different types of storage that may be used, including batteries, see Practice Note, Renewable Energy Project Development Issues: Siting Considerations for Co-Located Energy Storage: Benefits of Energy Storage and Types of Energy Storage Technologies.

Battery Energy Storage Revenue Streams

The varying uses of storage, along with differences in regional energy markets and regulations, create a range of revenue streams for battery energy storage projects. In many locations, owners of batteries, including storage facilities that are co-located with solar or wind projects, can generate revenue under contracts from multiple sources based on the different benefits BESS provide to the grid. The opportunities to generate revenue based on these benefits include:

- Fixed-price contracts for sales of capacity, rights to use the battery, or resource adequacy benefits.
- Variable revenue based on shifting electricity supply to times of peak demand and price and sales of ancillary services.

Battery storage project developers can enter into contracts with utilities and other parties to offer these services in addition to contracts for the sale of electricity (see Battery Storage Revenue Models: Fixed Price Contracts and Battery Storage Revenue Models: Variable Revenue Sources).

Combining (or value stacking) the different revenue sources available to storage projects enables project developers to improve the economics for their projects. They can seek tax equity and project financing based on anticipated cash flows from all or a portion of the components of the value stack.

Battery Storage Revenue Models: Fixed Price Contracts

Financing parties (whether project lenders or tax equity investors) traditionally prefer projects that have long term agreements from creditworthy counterparties to pay a fixed price for the project's output. This means that assuming that the project operates as expected, the project can generate revenue that does not fluctuate with changes in market prices for the output.

With long term agreements that ensure stable and reliable revenue streams, financing parties can size their loans or equity investments based on the following assumptions:

- The project can produce a minimum level of output.
- A creditworthy party can pay a fixed price for that output (on a per-unit, per-month basis, or a combination of those prices).
- The project's net cash flows is sufficient to repay the project loans and for equity investors to earn a return on their investment.

For more information on these agreements, see Practice Notes, Offtake Agreements: Issues and Considerations and Identifying and Managing Project Finance Risks. For information on the issues lenders consider when sizing their loans, see Practice Note, Financial Covenants: Project Finance Transactions: Debt to Equity (DTE) Ratio.

Project developers typically use three types of long term contracts:

- Capacity contracts (see Capacity Contracts).
- End customer battery use contracts (see End Customer Battery Use Contracts).
- Resource adequacy contracts (see Resource Adequacy Contracts).

Capacity Contracts

In capacity contracts, the utility (referred to as the offtaker or buyer) pays a fixed capacity payment or **battery-use payment** for the right to dispatch energy from the storage system, subject to compliance with negotiated operating procedures. The fixed capacity payment is often conditioned on the project continuing to meet specific operating metrics, such as:

- Demonstrating an ability to hold an output at the delivery point.
- Maintaining a guaranteed level of availability during each measurement period.

The amount the utility pays the owner of the battery storage facility is either:

- Determined based on energy delivered to the battery storage facility by a generating facility (and the utility pays a price per kilowatt-hour for that energy whether or not it actually uses energy stored in the storage facility).
- A fixed monthly amount subject to adjustment based on performance of the battery storage facility.

In exchange for the fixed capacity payment, the buyer or offtaker receives the benefits of operating battery. The project company generally does not retain the right to additional revenue from the utility's sale of any electricity discharged from the battery.

From the perspective of the utility, entering into a capacity contract may enable it to:

- Draw on stored electricity during times of peak electricity demand (such as in the late afternoon)

rather than relying on electricity generated by gas-fired projects.

- Regulate frequency levels on the grid by charging or discharging the battery when there is an imbalance between supply and demand for electricity on the grid.
- Inject reactive power into the grid, which maintains the force (voltage) needed to move electrons through the grid ensuring its stability.

End Customer Battery Use Contracts

Commercial and industrial (C&I) customers may enter into battery use contracts that allow them to:

- Store electricity generated by a solar project during mid-day hours when market prices are low and then use stored electricity later in the day when retail electricity prices are high. C&I customers often pay for their retail electricity based on time-of-use (TOU) arrangements in which the price of electricity changes based on the time of day. Battery storage systems allows customers to pay for retail electricity when TOU rates are low, and then used electricity discharged from the battery (rather than electricity from the grid) when TOU rates are high.
- Access stored electricity when electricity from the grid is otherwise unavailable due to grid outages.
- Reduce demand charges. C&I customers often pay a surcharge (a demand charge) to their utility based on the highest level of electricity they use in a given period (usually 15-to-30-minute intervals). Utilities add the demand charge for that period to a C&I customer's bill even if it did not use that amount of power for the whole hour or longer. Battery storage allows customers to draw power from the battery instead of from the electric grid during these periods.

The C&I customer typically pays a fixed monthly fee for the right to use the battery. Ownership of the project, including the right to obtain any applicable tax credits, is retained by the project sponsor (through its ownership of the project company) or indirectly by tax equity investors, where applicable.

Resource Adequacy Contracts

Resource adequacy is the ability of the electricity system to supply electric power and energy to meet electricity demand at all times, taking into account scheduled and unscheduled outages. This requires management of energy supply (the construction of new generation facilities) and demand.

Several states have resource adequacy programs which require utilities and other load serving entities to procure these attributes to ensure sufficient capacity to meet customer demand. Battery storage project owners can sell and transfer these attributes under long term resource adequacy contracts to these utilities or other load serving entities. In California, utility-scale battery storage projects are eligible for resource adequacy attributes. Battery storage contracts (whether for standalone storage projects or solar or wind projects paired with storage) typically include a fixed-price payment for resource adequacy attributes.

Under many of these contracts, the project company:

- Retains operational control of the battery storage facility and the right to collect and retain revenue from sales of electricity discharged from the battery.
- May sell electricity to the same buyer of the resource adequacy attributes or to another buyer in the market.

Although sales of resource adequacy attributes alone may not be sufficient to enable tax equity investors to meet target returns for investment or for project lenders to finance projects on a limited recourse basis, these sales provide a degree of fixed, stable cash flows for projects.

Battery Storage Revenue Models: Variable Revenue Sources

The revenue model for solar plus storage projects often includes a combination of:

- Electricity sales agreements (for example, power purchase agreements (PPAs)).
- Contracts for sales of renewable energy credits or resource adequacy attributes.
- Different types of uncontracted variable payments for ancillary services.

The variable payments related to storage facilities provide potential increased revenues to project sponsors and financing parties. However, lenders and tax equity investors do not typically account for these variable revenue sources in their upfront sizing of a project loan or equity investment because they are subject to potentially volatile swings in market prices for project output. For more information on how lenders size their loans, see Practice Note, Financial Covenants: Project Finance Transactions.

When a battery storage project includes variable and unpredictable revenue sources, project lenders and project

sponsors often negotiate how these cash flows are to be allocated when received by the project. Depending on the project and the negotiating strength of the parties, these additional cash flows may be addressed in one of the following ways:

- Allocated to the project lenders as a prepayment of the loans.
- Distributed entirely to the project sponsors.
- Shared between project lenders and the project sponsor depending on the overall financing structure. For example, 50% of the excess cash flow may be used to prepay the debt with the balance distributed to the project sponsor.

Distributions to the project sponsors are typically subject to no event of default having occurred and continuing.

Some tax equity investors are also unwilling to take these variable revenue sources into account in the sizing of their investments. In these cases, they do not benefit from these cash flows and the project sponsors receive a special distribution of cash from these revenue sources.

Depending on the project's geographic location and size, the following forms of variable revenue may be available to battery storage project owners:

- Increased revenue by shifting delivery to times of high electricity demand (see Wholesale Electricity Sales).
- Certain ancillary services (see Ancillary Services).
- State incentives (see State-Level Credits and Incentive Programs).

Wholesale Electricity Sales

Pairing a storage project with a solar or wind power generation project allows project developers to charge the battery system and store the electricity generated by a solar or wind project rather than deliver power to the grid when either:

- Market prices for electricity are low or negative.
- The electricity that would otherwise be delivered to the interconnection point by the project is curtailed. Grid operators often reduce power from renewable energy sources to maintain the balance of power supply and demand when there is insufficient demand.

The battery system can then discharge the stored electricity during times of high market prices and when the electricity is not curtailed at the interconnection point.

Similarly, the price buyers pay for electricity under a PPA is often higher during late afternoon periods. A battery storage system enables the project company to deliver electricity to the buyer during these peak pricing periods, even if the project cannot generate electricity because of adverse conditions (for example, rain, low sunlight, or low wind). Pairing a battery system with a renewable project also enables project sponsors to manage risks associated with financial hedge contracts that contemplate delivery of fixed volumes of energy during specified periods (see Practice Note, Mitigating Risk in Financings for Hedged Wind and Solar Energy Projects: Fixed-Volume Hedges).

Ancillary Services

In many regions, battery storage projects can sell ancillary services in addition to energy or capacity either to transmission owners or to regional grid operators (for example, Pennsylvania New Jersey Maryland Interconnection (PJM) and Midcontinent Independent Operator (MISO)).

Ancillary services include:

- Various forms of frequency regulation and operating reserves products that may be sold in market-based clearing price auctions.
- Certain voltage control and reactive power management services that are sold at cost-based rates that may be established in a utility or grid operator's tariff or in a project's own rate schedule.

State-Level Credits and Incentive Programs

Various state-level programs provide credits or other incentive payments for distributed generation solar and BESS projects. These programs compensate projects based on when and where they provide electricity to the grid.

In New York, for example, standalone and co-located battery storage projects may be eligible for the value of distributed energy resources (VDER) credit, which is a per-kilowatt credit that includes fixed-rate and variable-rate components. Under community energy programs, the project company can sell those credits to electricity customers (or subscribers) that are able to reduce their utility bills by the amount of these credits.

Hybrid Revenue Models

Co-located solar and storage projects usually feature a mix of the fixed and variable revenue sources, which continue to evolve as changes occur in regional energy regulations and markets.

Fixed-price contracts allow a project to generate a relatively predictable and stable amount of revenue, subject to the project meeting technical operating assumptions. For many power projects, a single PPA provides the source of all revenue for the project. For battery projects and solar plus storage projects, this is rarely the case. For these projects, project developers piece together a variety of contracts and market participation plans to generate revenue, setting up a negotiation with financing parties regarding the treatment of the revenue streams under financing documents and the project developer's plans for maximizing the value of a storage project (see Battery Storage Revenue Models: Variable Revenue Sources).

Impact of the IRA on BESS Projects

The IRA expands options for financing BESS projects in two key ways:

- BESS projects are no longer required to be paired or co-located with a solar or wind project for the project costs to qualify for an investment tax credit (ITC) under the Code (I.R.C. § 48 and see Legal Update, Inflation Reduction Act: Key Energy Provisions).
- Project sponsors that do not have the tax capacity to take advantage of the ITC, are no longer required to enter into a tax equity transaction (for example, a lease-back transaction or partnership flip) with a third party to monetize these credits. Under the IRA and recent IRS guidance, project sponsors can transfer to an unrelated third party any ITC for which their project may qualify, subject to certain conditions (see Practice Note, Transferability and Direct Pay Provisions for Clean Energy Projects Under the Inflation Reduction Act).

These changes, taken together, allow project sponsors to monetize ITCs for standalone storage projects that do not have fixed, long-term revenue contracts, typically a condition precedent to the closing of a tax equity transaction.

While the IRA allows project developers more flexibility in their revenue sources, for projects with PPAs that include payments for all output of a solar facility and a co-located BESS project, a traditional tax equity structure may remain the most advantageous structure, because the full value of the tax credits and other tax benefits can be monetized (see Article, Sources of Available Project Financing: Tax Equity).

Other IRA provisions also benefit BESS projects. The IRA:

- Continues to allow project sponsors to develop solar plus storage systems and obtain an ITC based on the costs of the entire project.
- Now allows developers of solar energy facilities to claim a production tax credit (PTC) (and not just an ITC). Where the solar facility and BESS can be independently operated, this change makes it possible for owners of a solar plus storage project to claim:
  - a PTC based on production from a solar facility (where the tax credit is based on dollars per kilowatt hour (KWh) of production over a ten-year period). Project developers can also transfer the PTC to unrelated third parties subject to the terms of the Code and related regulations; and
  - an ITC on the BESS facility (where the tax credit is based on a percentage of project costs and claimed when the project is placed in service).

Reduced Need for Long-Term, Fixed-Price Offtake Agreements

Tax equity investors and banks that provide debt financing for energy projects generally require PPAs (or equivalent agreements such as a hedge or virtual PPA) to limit their exposure to market price volatility and revenue risk and create more certainty regarding whether project cash flows can meet a target rate of return.

Under tax equity transactions, the project company uses the revenues earned under the PPA to pay operating expenses and distribute profits to a holding company, which in turn distributes the profits to its equity owners, including the tax equity investors. Following the enactment of the IRA, project owners can take advantage of these credits without entering into tax equity transactions by transferring to an unrelated third party any ITC for which their project may qualify.

Tax credit buyers without an ownership interest in the project do not rely on predictable project cash flows in making their purchases. PPAs and other long-term revenue contracts are therefore less crucial in these transactions. Without the need to pursue fixed, long-term sources of revenue to satisfy tax equity investor demand, project developers have more flexibility to structure their projects in a manner that may work better for their strategic and operational objectives and can opportunistically pursue short-term variable revenue sources.

Availability of ITC for Storage Projects Paired with Wind or Solar Projects

In the years leading up to passage of the IRA, project sponsors in many electricity markets routinely developed storage projects that were co-located with PV systems. If the BESS is charged with electricity from the PV, costs related to the storage projects were eligible for an ITC. This continues to be the case post-IRA.

Co-locating BESS projects with a wind or solar project is particularly attractive to project sponsors in markets where projects may receive a higher rate for electricity that is sold in the afternoon during times of peak demand or when production from PV facilities is prone to curtailment at certain times of day due to excess production in the market.

With a co-located BESS, output from a PV facility may be used to charge the BESS at times of low demand or when production is otherwise curtailed and then electricity from the BESS may be discharged at times of high demand or when deliveries to the grid is not curtailed.

Many PPAs provide that:

- The buyer pays a higher rate based on time of day.
- The buyer is not responsible for paying for curtailed output.
- The seller must meet minimum production requirements during certain times of day.

BESS projects allow project sponsors to optimize project revenue and manage compliance with these contractual terms.

While project sponsors can co-locate their battery project with a wind or solar project, they are no longer required to do so to take advantage of the ITC based on the eligible costs of the battery project.

Availability of ITC for Standalone Storage Projects

The IRA expanded the ITC to include a tax credit for energy storage technology (I.R.C. § 48). Before the IRA, BESS project costs were eligible for the ITC only if the project was considered part of energy property, which required at least 75% of the charging electricity for the BESS to be produced by a PV facility (this was 100% to be eligible for the full ITC). Following the enactment of the IRA, costs of a BESS are eligible for a full ITC regardless of whether any charging electricity for the BESS is produced by a PV facility (see Legal Update, Inflation Reduction Act: Key Energy Provisions).

This change creates new opportunities for project sponsors to locate BESS projects in areas where a PV facility is not feasible but where there is a strong economic case for a BESS project, and claim an ITC for project costs. For example, project sponsors may be able to develop a BESS project in parts of certain electricity markets where a PV facility cannot be constructed due to land or permitting limitations, but where there is a high variability between low and high market prices for electricity from the grid. This allows project sponsors to charge the BESS with low-cost electricity from the grid during times of low demand for electricity and then discharge the BESS and sell the output and higher prices during times of high demand for electricity.

If all project output is not transferred to a utility under a traditional PPA, project sponsors can also retain the value of ancillary services, including reactive power and sell them at market-based prices to other offtakers. Although revenue from these sources is often infrequent or unpredictable, it may spike at certain times of the year, such as during heat waves that strain the local electric grid, resulting in large windfalls to project owners.

Transferability of Credits

In many cases, it is not practical for owners of standalone storage projects to find a PPA that provides stable, predictable cash flows. Under the IRA, owners can claim an ITC on those projects. The transferability provisions of the IRA also allow sponsors to monetize the value of the ITC if they do not have the tax liability capacity to use the ITC themselves or cannot engage in a tax equity transaction. Even where obtaining a long-term PPA for a BESS project is practical, the option to transfer the ITC means that project sponsors are not limited to seeking stable, predictable sources of revenue that are typically required to close transactions with tax equity investors and sponsors may pursue higher upside, more volatile revenue strategies.

In a traditional tax equity partnership structure, the tax equity investor becomes an indirect owner of the project with the right to be allocated a percentage of all tax benefits (at full value) and cash flows. Negotiating and structuring these transactions are complex and costly. The transferability provisions of the IRA open tax credits to participants who might not have previously considered tax equity transactions due to their complexity. A challenge for project sponsors is that as the new market for transfers of tax credits develops, new entrants must take time to understand the tax credits and the related risks. There also may not be sufficient demand from buyers of tax

credits to meet the potential supply. Buyers pay a discount to the value of the ITC to, among other things, account for the risk that the ITC is recaptured or disallowed in the future. The value of depreciation and other tax benefits may also only be transferred in a traditional tax equity transaction.

For more information on some of these issues, see Practice Note, Transferability and Direct Pay Provisions for Clean Energy Projects Under the Inflation Reduction Act.

Availability of PTC and ITC for Solar Plus Storage Projects

In addition to allowing credits to be transferred, the most significant change to financing structures for solar plus storage projects as a result of the IRA is that, if the solar facility and BESS facility can be independently operated, project owners can now seek to obtain a ten-year PTC for output from the PV facility and an ITC based on project costs for the BESS. Previously, project owners were only able to claim the ITC for the entire project.

Depending on project costs and other factors, tax equity investors may prefer a PTC for a PV facility that can be spread over ten years, rather than an ITC claimed upfront when the project is placed in service. With a PTC, the credit is based on energy production rather than as a percentage of eligible costs, as in an ITC transaction, which creates risk that the eligible basis for the ITC is challenged. Investors may also make deferred contributions for PTC transactions over time rather than investing the full amount upfront.