



Unlocking Clean Energy Projects Using Tax Chaining: A Primer

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Grove Climate Group

Grove Climate Group is a strategic consulting firm that provides government affairs and public policy analysis, with a focus on the federal-state nexus, to help universities, nonprofits, startups, and corporations achieve their clean energy and climate goals.



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Executive Summary

Chaining is an emerging concept that marries two highly consequential provisions of the tax code established by the passage of the 2022 Inflation Reduction Act (IRA): Transferability of tax credits and direct (also known as elective) pay to nonprofit or public entities in lieu of tax credits.

Transferability provides clear rules for the transfer or sale of 11 clean energy tax credits to a separate, unrelated party,¹ making it possible for a project developer to raise capital by selling its tax credit to a third-party purchaser that in turn uses the transferred tax credit to reduce its own tax liability. By contrast, direct pay allows tax-exempt entities—such as school districts, municipalities, states, public utilities, and tribal governments—to receive a direct cash payment from the Internal Revenue Service (IRS) in lieu of a tax credit for clean technology and clean energy-related activities, thereby converting the tax credit into cash.²

Chaining links transferability and direct pay together by allowing those who earn a tax credit to sell the credit not to an entity with tax liability, but instead to an entity that can convert the tax credit into a cash payment.³

¹ Credits eligible for transfer include Section 48 Energy Credits, Section 48E Clean Electricity Investment Credits, Section 45 Renewable Electricity Production Credits, Section 45Y Clean Electricity Production Credits, Section 45U Zero-Emission Nuclear Power Production Credits, Section 45X Advanced Manufacturing Production Credits, Section, Section 45V Clean Hydrogen Production Credit, Section 45Z Clean Fuel Production Credits, Section 45Q Carbon Oxide Sequestration Credits, Section 30C Alternative Fuel Vehicle Refueling/Recharging Property Credits, Section 48C Qualified Advanced Energy Project Credits (IRS 2024a).

² The IRS describes chaining as “an Applicable Entity electing direct pay for a tax credit acquired in a Section 6418 transfer” (IRS 2024b).

³ To the extent that direct pay–eligible entities would participate in transferred credit markets but wouldn’t develop projects on their own, chaining increases the market for transferred credits to supply more capital to projects.

The last two years of implementing the IRA have provided a better understanding of what the law allows and what is required for the statute to achieve its goals. Current data indicate that transferability of tax credits has increased the deployment of clean energy, but is not sufficient in and of itself to deploy projects on the timeline required to realize the full suite of benefits envisioned by the IRA. Chaining, however, could help unleash even broader implementation of the projects the IRA was intended to catalyze.

Besides unlocking additional capital, chaining could reduce the cost of capital, ease cash flow, and allow for different parties to share risk. The US Department of the Treasury is actively accepting comments on chaining until December 1, 2024. Through those comments, Treasury is seeking to ascertain, in part, how much more capital chaining can enable and how chaining would be executed.

This paper provides a high-level overview of chaining, describes its necessity to raising the capital needed to meet climate goals and other benefits intended by the IRA, outlines specific examples of how chaining would work in practice, provides recommendations for addressing potential abuses, and delves into the additional benefits related to enabling local communities' access to clean technology and affordable low-carbon energy resources to the extent the IRA intended. It concludes by identifying remaining questions for consideration. Additionally, readers that wish to learn more or are considering submitting comments to Treasury on chaining are welcome to contact the authors.

OVERVIEW

One of the most significant measures created by the Inflation Reduction Act (IRA) for accessing capital needed to drive the clean energy transition is the ability for a clean energy or technology project developer to transfer certain tax credits to another for-profit entity to finance projects. In an equally significant step, the IRA made it possible for nonprofit entities to participate directly in tax-subsidized project development by allowing nontaxpaying entities to receive cash in lieu of a tax credit for the same project development activities. However, despite their highly catalytic effect, direct-pay and transferability provisions as currently and independently applied are not on track to meet the climate goals the IRA was intended to achieve. This means that not only is too little capital being generated to scale project development to the levels necessary to meet decarbonization goals, but the amount is also insufficient for creating the American jobs, manufacturing, and increasing climate resilience and clean energy affordability to the extent Congress envisioned.

Enter the concept of chaining, which combines these two new tax mechanisms of transferability and direct pay, to help fill the gap.

Chaining ensures that the fuller scale of greenhouse gas (GHG) emission reductions envisioned by the IRA can be achieved by unlocking new and potentially robust pools of capital to service the growing need and list of clean energy and technology projects, working alongside and expanding upon currently developing markets for tax credits.

The practice works by having an entity that earns a tax credit under certain provisions of the IRA sell or transfer the tax credit to another party who can receive cash for the tax credit instead of using the credit to cancel out its tax liability. The anticipated effect of chaining is to expand the ways in which project developers can raise capital by allowing them to sell tax

credits not only to for-profit entities, but also to nonprofits, government entities, and other nontaxpaying entities, thereby expanding the capital pool. The capital thus raised can be invested back into the project, addressing capital shortfalls, particularly in the short term when capital is most needed, and accelerating and scaling project implementation.

The potential benefits of chaining are numerous. On the financial side, these advantages include more counterparties to enhance tax credit monetization, reduced transaction costs, reduced risk, opportunities for risk-sharing, and enablement of swifter project deployment. There are also several nonfinancial benefits, primarily related to the types of projects that chaining is expected to foster (e.g., smaller, community-level projects). These include but are not limited to greater community involvement in IRA-incentivized projects, better environmental justice outcomes, the ability for low-carbon energy to keep pace with anticipated load growth, and the acceleration of climate-focused industrialization. This is because chaining both (1) adds marginal new projects that may not otherwise have been funded and (2) enables relationships and partnerships between for-profit developers and public entities via chaining transactions.

While chaining is gaining momentum as a potential mechanism to finance clean energy and technology projects, the Internal Revenue Service (IRS) has yet to approve it in practice. In March, the IRS began asking for comments on whether to allow chaining as an acceptable practice in its regulations governing transferability and direct pay, with comments due in early December 2024 (IRS 2024b). The IRS wishes to gain insights into chaining's use as a means for increasing uptake of clean technology and low-carbon energy project development.

As written today, US Department of the Treasury guidance prohibits chaining. Moreover, to allow chaining, the IRS would likely need to amend its guidance on direct pay. According to Treasury's existing guidance, an entity can only receive direct pay if it holds an ownership interest in the qualifying tax credit-producing project.⁴ Chaining seems to be in direct conflict with this requirement. However, by requesting comment on chaining, Treasury has clearly opened the door for reconsideration. As chaining would definitionally allow direct pay entities to receive remuneration (cash payment) for credits transferred to them, these credits are not correlated to a project that is owned by the direct pay-eligible entity. Updated Treasury guidance could require ownership by a direct pay-eligible entity for direct pay but have different requirements if that entity engages in chaining. It could also use the transferability regime to govern the chaining transaction, making the ownership requirements under direct pay moot. Or, Treasury could establish a new regime specifically for chaining. Regardless of which of the three approaches is taken, we believe chaining is a legally viable tool that should be allowed.

To help readers appreciate the power and process of chaining when considering the IRS's request, this paper outlines the basics of chaining. We then apply and test those basics to underscore its potential to fill and scale essential financing of project development to the levels needed to achieve climate goals as well as fulfill the IRA's promise of community, environmental justice, and economic benefits. The paper sets forth background on how the IRA was designed to use the tax code to catalyze the levels of clean energy and technology development needed to meet US climate goals, then explains chaining's specific relationship to that

⁴ This is a matter of Treasury interpretation of statute, as the underlying IRA text is silent on this matter.

effort. We also argue that chaining is not only a logical outgrowth of the IRA's language and goals, but also adheres to the letter and intent of the law.

The paper then goes into depth on the mechanics of chaining—i.e., how chaining could work. It includes a spectrum of potential use cases to not only show the value of chaining but also underscore the types of opportunities likely to be left behind without the policy, not least of which are the anticipated local community benefits of chaining and specific IRA-intended community-oriented projects. Finally, the paper draws attention to the possible fraud and predatory behavior that chaining could invite, and that has been cited to oppose the policy, and provides recommendations regarding guardrails and other mechanisms to reduce those risks. In the conclusion, the paper underscores again the IRA's authority to recognize chaining and poses additional areas of research.

While the paper seeks to help readers better understand chaining, explain potential use cases, and highlight opportunities for chaining to fill market gaps that exist today, it is important to note that it is not a legal analysis, regulatory filing, or administrative how-to guide.

THE NECESSITY OF CHAINING FOR NATIONAL AND STATE CLIMATE GOALS

As a country, the United States has set significant carbon reduction goals, and many states have followed suit. In August 2022, Congress passed the IRA—landmark legislation providing billions of dollars in grants, loans, and tax credits to unlock the development and deployment of clean energy and other technologies to meet these goals.

While significant progress has been made in the less than two years since the IRA's passage—including dramatic increases of clean energy projects in various stages of development and operation—the United States is still far from being on track to achieve stated decarbonization goals (Groom 2024).

A key hurdle in this challenge is both a lack of access to and the high cost of capital necessary to catalyze the projects needed to meet carbon reduction goals. Another challenge is the lack of access to capital in places where it is most needed—that is, where clean energy can be easily produced and locally used. To solve these challenges, additional financing options that are fully within the scope and spirit of the IRA are crucial for IRS and Treasury to recognize—including chaining. Put simply, recognizing chaining as one of the capital-raising options available to clean energy and technology project developers of all sizes leads to greater competition in the financing market and reduces the cost of capital, ultimately resulting in more projects deployed.

TAX POLICY AS A MECHANISM FOR ACHIEVING CLIMATE TARGETS: PRE- AND POST-IRA

As the single largest investment in clean energy and clean technology development in US history, the IRA uses new as well as expanded tax code provisions to achieve its climate goals.⁵

Unlike many other nations that have legislated around climate, the United States' preferred method for catalyzing and spurring support for decarbonization and clean energy is through the tax code.

This includes the investment tax credit (ITC) and production tax credit (PTC)—both of which were expanded and modified by the IRA—and several other provisions related to climate-friendly, technology-neutral eligible projects, either expanded or newly created. Thus, while other nations or states may use nontax policy mechanisms to achieve decarbonization goals (e.g., a price on carbon, clean energy standard, mandates, or other “pushing” functions), US policymakers have targeted the federal tax code under the theory that reducing the cost required to “pull” them online will incentivize clean energy and technology projects.

The Investment Tax Credit as Baseline

Under the ITC, a project developer earns tax credits that it uses to reduce its federal income tax liability, thereby driving investment in project development. The ITC is based on the cost of the project. Importantly, the amount of the ITC a project will earn is known at the outset of the project and does not vary. By contrast, for a PTC, a tax credit is generated based on the amount of clean or carbon-free electricity generated, which means it can vary from year to year depending on how much power is produced. For the most part, project developers must choose between the two (DSIRE 2023, EERE 2023). For the purposes of consistency and because the ITC is less variable than the potentially fluctuating, output-dependent PTC, this paper uses the ITC as the baseline from which to illustrate how chaining would work in specific situations. However, the concept of chaining would apply the same logic to a PTC.⁶

Under the ITC an investor, business, or individual earns tax credits, a certain percentage of which they can apply against their annual tax burden (The Hartford n.d.). First created for use by the energy sector as part of the Energy Tax Act of 1978, the ITC started as a 10% tax credit for properties and equipment using non-oil and non-natural gas resources (CRS 2021). Over time, it has evolved significantly. For instance, through the Energy Policy Act of 2005, Congress raised the solar ITC from 10% to 30%. In 2022, the IRA then extended the credit through at least 2032 to reduce investment uncertainty (The White House 2023). The IRA-enhanced ITC now provides a 30% reduction in income tax liability, directly based on the level of investment made in clean energy projects.

⁵ The IRA contains a mixture of grants, loans, rebates, incentives, and tax policies to promote the deployment of clean energy technologies. There are several project financing mechanisms available through the IRA and similar federal laws (such as the Infrastructure Investment and Jobs Act or the CHIPS and Science Act), but most of the cost of the law is in tax credits.

⁶ PTC deals are generally simpler; ITC deals are subject to recapture and other project risk that can make them good candidates for insurance (Baker et al. 2024).

The ITC reduces risk because it is known upfront to project financiers, making it particularly attractive to those who invest in high-cost projects, especially those that may have large swings in electricity delivered or energy output. The ITC is also attractive not only to support projects with variable capacity factors resulting from their location, environment, or choice of technology, but has also served as the bedrock on which to finance and deploy clean energy even where projects do not face such variability risks. Importantly, the IRA also extends the ITC to include standalone energy storage projects, which are essential for maintaining grid reliability as renewable energy integration increases across the US power system.

Clean energy projects eligible for the ITC unlock a dollar-for-dollar reduction in the income taxes that investors in those projects would otherwise owe to the government. Given that the value of these income tax reductions is often greater than the tax liability of the companies or individuals investing in clean energy projects, clean energy investors historically turned to tax equity investors who could transact in tax credits at much larger levels and access capital by, essentially, selling them off to others. These tax equity investors are primarily large financial institutions, such as banks,⁷ that can take advantage of the benefits offered to them by the ITC. The banks achieve this by becoming an investor in the project in exchange for a share of the tax benefit and cash flows associated with its development. As a result, the banks perform extensive due diligence on a project and require some form of guarantee or insurance against the project by the developer.

Prior to the IRA, this approach also had its limitations. Historically, municipalities, nonprofits, cooperatives, and other nontaxpaying entities did not have access to the ITC, given that they had no tax exposure or liability. Additionally, tax equity partnerships are highly complex and extremely costly to put in place.

THE IRA UNLOCKS NEW CLEAN ENERGY AND TECHNOLOGY FINANCING MECHANISMS BEYOND THE ITC: TRANSFERABILITY AND DIRECT PAY

Since the IRA's passage, companies and developers have shown unprecedented interest in the newly formulated ITC resulting in increased deployment of clean energy and technology projects (*The Wall Street Journal* Editorial Board 2023).

This surge in uptake has the potential to yield a significantly greater boost to clean energy and technology development in the United States than even early estimates suggested during Congressional debate on the IRA (CBO 2022).

Prior to passage of the IRA, nontaxpaying entities did not have access to the ITC and clean energy projects were significantly more expensive for these entities to finance and deploy. The result was that it was incredibly difficult for nonprofits and public entities to build clean energy projects and meet their own decarbonization goals.⁸ Accordingly, lawmakers in Congress included two new mechanisms in the IRA to encourage adoption of clean energy projects by these entities through direct pay and transferability. These mechanisms widen

⁷ For example, renewable energy tax equity was an \$18 billion market in 2020; of the more than 40 tax equity investors in the solar market, roughly 50% of financing was supplied by just JPMorgan and Bank of America (Martin 2021).

⁸ While true, it is also the case that many more forward-thinking entities used power-purchase agreements (where able) to great effect.

the pool of entities eligible for clean energy incentives and significantly enhance the types and volume of projects that can access tax credits and their associated monetary benefits.

Transferability

One of the new mechanisms provided through the IRA is *transferability*, which allows businesses or developers to transfer all or a portion of their clean energy tax credits to a third party in exchange for upfront tax-free funding, enabling a business to take advantage of a tax credit even if it does not have tax liability to the extent needed to make the credit meaningful. Under the IRA, there are 11 federal tax credits eligible for transferability, which include the ITC, PTC, alternative fuel property tax credit, carbon capture tax credit, clean hydrogen tax credit, advanced manufacturing tax credit, and nuclear tax credit (Barakat et al. 2023). Notably, transferability allows credits to be sold or transferred only once and requires the recipient of the transferred tax credit to pay for it in cash. The point of transferability is to give more projects access to greater amounts of capital more quickly. The new transferability rules are catalyzing project development as anticipated: as of April 2024, more than 900 entities have requested approximately 59,000 registration numbers for projects or facilities, and 97% of them are pursuing transferability, according to the Department of the Treasury's dashboard (Treasury 2024, IRS 2024c). In 2023 alone, the transferability market supported \$7 to \$9 billion in economic activity (Crux 2024a).

Direct Pay

Direct pay allows tax-exempt entities such as governments, nonprofits, rural cooperatives, school districts, religious organizations, and others to monetize tax credits through an elective or *direct payment* function, essentially turning tax credits into a cash refund, which was not available prior to the IRA. There are 12 federal tax credits eligible for direct pay, including the ITC, PTC, renewable tax credits, alternative fuel vehicles tax credit, nuclear tax credit, clean hydrogen tax credit, advanced manufacturing tax credit, and technology-neutral electricity sources tax credit (Bzeih et al. 2024).

Because tax-exempt entities do not pay income tax, they were historically locked out of using tax credits to support clean energy project development. This matters because many of these entities either produce electricity or wish to develop clean energy projects for the benefit of others, such as local communities. Direct pay creates a pathway by which tax-exempt entities can monetize the value of tax credits heretofore only available to private for-profit entities, thereby creating greater parity in the cost of and access to clean energy development and deployment.⁹ What is more, direct pay applies beyond clean energy projects to a host of other clean technology-based projects. The result is that more than 1,300 projects, also as of April 2024 and including more than 75 state and local government projects, have registered to receive payment from the Treasury through the direct pay mechanism (Treasury 2024).

Volume and Risk

As a result of transferability and direct pay, the number of clean energy projects and related tax credits is expected to surge over the next decade (Nuccitelli 2023). This growth is crucial for both the country and individual states to meet their decarbonization goals.

⁹ Including for solar, electric vehicle charging, small wind turbines, biogas, fuel cells, geothermal heat pumps, battery storage systems, combined heat and power systems, and others.

Nevertheless, there is a material risk that the clean energy tax credit market could become oversaturated with IRA tax credits, potentially leading to fewer entities willing to exchange these incentives for cash. In this scenario, only the highest-value and lowest-risk projects will be able to find counterparties to monetize their tax credits, leaving countless clean energy projects and communities without a pathway to finance their own projects. As more small and large projects are developed, the competition by developers to find partners to unlock the value of the tax credit associated with the project increases, resulting in higher transaction costs and more clean energy projects with tax credit supply than counterparty demand.

This scenario could become particularly acute in the event of an economic downturn,¹⁰ where companies lose money—and lose tax liability—and thus do not have a need or ability to serve as counterparties to purchase tax credits, as those companies would owe far fewer taxes and have a lower tax appetite. With the current IRS guidance in place, there is a natural limit to the amount of clean energy tax deals the market can sustain. The supply of clean energy tax credits in the marketplace is increasing, but demand is not necessarily keeping pace. This situation could limit the effectiveness of the credit regime and hinder investments in clean energy projects. Chaining could help to increase the demand side and size of this market and unleash the volume and types of projects imagined by Congress when they authored the IRA, while providing additional pools of funding in the case of an economic downturn where private entities are likely to reduce tax credit appetite even further.

COMBINING TRANSFERABILITY AND DIRECT PAY TO ACHIEVE CHAINING

Chaining is the process of using transferability and direct pay for the same project.

According to Treasury guidance, tax-exempt entities that are eligible for direct pay of tax credits are not permitted to use transferability to sell their credits. But the statute does not prohibit the transaction in reverse order, although it appears that chaining would be available in limited situations and for only a subset of nonprofit entities. This will be discussed later as a risk-limiting feature.

As an example, transferability lets a company or developer transfer its tax credit (or a portion thereof) to a third-party buyer in exchange for cash. That buyer often has a larger tax appetite than the developer, while the developer has a smaller tax appetite than the tax credit for which they are eligible. Through chaining, the buyer pool would be dramatically expanded by allowing a direct pay–eligible body, such as a state, county, city, public agency or entity, or a nonprofit, to purchase the credit. That buyer would then monetize that credit via direct pay. It would then pass the value of the credit, perhaps minus a percentage for reinvestment in the jurisdiction, back to the developer. Illustrative hypothetical examples follow in later sections of this paper.

Enabling tax-exempt entities, like state governments, to use chaining could help to broaden uptake and accelerate the deployment of clean energy projects throughout the United States, particularly in communities that have been historically precluded from its benefits and

¹⁰ Like what happened post-2007 during the Great Recession, only the market is now much bigger for these types of transactions and the impacts could be greater.

especially if the projects are sited in these communities and the benefits stay local. Chaining opens the door to a new form of a public-private partnership, allowing the public and private sectors to work together to achieve mutually reinforcing goals.

In practice, chaining would work to expand the tax equity market beyond conventional players such as large banks and technology companies—whose interest may vary with time, economic conditions, and risk appetite and be less attentive to climate targets or goals—to more stable partners. For instance, many state governments possess statutory clean energy goals or have made commitments to reducing GHG emissions, and thus may be motivated to offer more favorable financing terms to developers for their projects. By empowering eligible nonprofit entities to chain tax credits, incentives like the ITC are more likely to achieve their full potential as intended by the IRA. This mechanism also enhances local self-determination, unlocking chaining as a potential tool to help finance locally driven and locally meaningful climate and clean energy goals.

THE IRS'S AUTHORITY TO RECOGNIZE CHAINING

Treasury clearly appreciates the opportunity to consider chaining, as evidenced by the agency's recent request for comments (IRS 2024b).

The arguments for chaining include allowing the IRA to be more fully implemented, increasing clean energy uptake, helping meet future load growth, and reducing the risk of building stranded energy assets in the medium-to-long term.

Chaining would also enable nonprofits and local governments to build clean energy projects with local workers in their communities in much the same way as direct pay.

Said another way, chaining is directly aligned and enabling of Treasury's goals. Moreover, the reason it is currently not recognized by the IRS is not because it is disallowed by statute (the IRA is silent on this matter), but rather because early IRS guidance sought to put parameters in place as it stood up the new authorities under sections 6417 and 6418 in the IRA and simply had not reached the issue of chaining.

Prior to the IRA's passage and the subsequent new rules on transferability, tax credits could only be passed on to others through complicated tax equity transactions. To promote access to capital for clean energy project development, the IRA, implemented through Treasury guidance, allows for the transferability of tax credits from the tax credit-eligible entity to a third-party entity who can buy the tax credit at a discount to offset or completely cancel out its tax liability. The transaction benefits the purchaser of the tax credits because the tax credits are a cheaper way to satisfy their tax liability. It also benefits project developers because the transfer transaction more easily puts cash in developers' pockets through the sale of the tax credit, which they otherwise would not be able to monetize.

It is now evident that, although tax credit transferability unlocks far more capital than was accessible via tax equity deals alone in the pre-IRA era (Martucci 2024), demand for clean energy tax credits is still not large enough to accommodate all the projects that could be deployed. As the volume of clean energy tax credits increases even further, a more abundant

supply of clean energy tax credits that outstrips demand based on what the IRS currently recognizes could limit decarbonization efforts.

Notably, Treasury guidance currently prohibits the transfer of direct-pay clean energy tax credits to another entity.¹¹ However, that same guidance does not prohibit the transfer of a credit from a clean energy developer to a direct pay–eligible entity. One potential opportunity for chaining under the current guidance is to enable direct pay–eligible entities to expand the purchasing pool for tax credits. Direct-pay entities could do so at a discount and convert the tax credit into a cash payment as opposed to using the credit to diminish their tax burden. By so doing, they would engage in chaining and increase access to tax credit-supported project financing.

There are additional legal and regulatory reasons why chaining could clearly be allowable. However, because this paper is not intended to serve as a legal analysis or argument, it will focus on what chaining is and how it might work.

POTENTIAL EXAMPLES OF CHAINING IN ACTION

The size of the clean energy project greatly influences the type of chaining partnerships that could be established.

Projects could fall into one of three categories: direct pay–to–direct pay, small deals, and large deals. What follow are examples of how chaining could work under these three scenarios. Note that these are illustrative examples only and do not represent the full scope of analysis required to determine important factors such as eligibility, placed-in-service date, apprenticeship requirements, and other complex definitions related to claiming the ITC.

Direct Pay–to–Direct Pay Deals

Governmental entities and nonprofits are now eligible to receive a direct cash payment for tax credits related to the ITC and PTC under the IRA. These entities include but are not limited to municipalities, counties, states, schools, nonprofits, green banks, governmental agencies, public power systems, and rural electric cooperatives. Direct pay seeks to achieve parity in access to project development abilities between nonprofit and for-profit entities by providing the same amount of access to capital. The asterisk on this parity is that, because of the complicated nature of implementing a cash payment versus a tax credit, direct-pay payment from the IRS may arrive a year or more after project construction is completed. Additional hurdles that complicate matters include the requirement that direct-pay recipients use a certain percentage of domestic materials in their projects (IRS 2024b), which can raise costs. Moreover, despite the 1,300 projects that have registered for direct pay as of April 2024, significant education and other logistical hurdles remain to fully realize the benefit of direct pay and derisking projects, particularly for small governmental entities (Feygin and Arun 2024).

¹¹ “Although prohibited under the Final Regulations, the IRS also issued Notice 2024-27, seeking specific comments on whether ‘chaining’ should be permitted. ... Written comments should be submitted by Dec. 1, 2024” (GreenbergTraurig 2024).

One potential solution to unlock deployment of more direct pay–eligible projects is chaining, which enables projects to be built sooner by providing access to capital earlier in the project development process. In the examples provided, chaining could unlock the ability of one or a few direct pay eligible entities to serve as experts in processing these complex regulatory requirements, in addition to educating and assisting project development.¹²

The following are five hypothetical examples illustrating how direct pay–to–direct pay could enable chaining to unlock clean energy and technology project finance.

Example 1: Local Church to Municipal Power Provider

A church wants to install \$100,000 worth of solar panels on its roof. With minimal cash reserves, it cannot front the required construction costs to the solar developer. It also cannot wait until direct pay is processed by the Treasury, as that would be too far after the proposed start date of construction. There is no green bank or similar low-interest financing institution available to provide construction financing to the church. Instead, the church transfers its right to a direct payment of \$30,000 to the local public power utility for \$25,000 in upfront cash. When the project is complete, the public power utility monetizes the \$30,000 credit from Treasury through direct pay, which helps cover the \$5,000 transaction cost and \$25,000 purchase to the church. The church can now use the \$25,000 to pay the developer and begin construction. The remaining portion of the project will be financed over the life cycle of the solar panel electricity generation.

Example 2: Village to County

A village seeks to outfit its public works department building with a solar array and colocated battery storage, reducing operating costs for the building and allowing charging of some of the village's vehicle fleet during periods of electrical outage. The total project costs \$1,200,000. The village is relying upon the 30% ITC of \$360,000 to help kickstart construction. The terms of a bridge loan from the state's green bank require payback on a low-interest loan in 10 years. While appealing, the village decides to explore additional options, including chaining. Chaining allows the village to transfer the ITC for the project to the county, which pays \$340,000 to purchase the credit from the village, using funding that the county had in reserves. The county later monetizes the credit through direct pay. The village now has funding to begin construction and the county will have funding in the coming months via direct pay, including an additional \$20,000 that it plans to use for further development purposes.

¹² Direct pay–eligible entities that do not own or construct a clean energy project could still help another direct pay–eligible entity finance their clean energy project through direct pay–to–direct pay chaining deals.

Example 3: Tribe to State

A Native American tribe wants to lower energy costs for tribal members and build on-shore wind facilities to power its communal facilities. The tribe has limited resources and insufficient upfront capital for the \$750,000 project. The state green bank will only cover bridge loans for projects costing up to \$500,000 for clean energy projects. However, the state authorizes its economic development agency to run a revolving fund program that purchases transferable tax credits from direct pay–eligible entities, minus a 5% administrative cost. After appropriate review and due diligence, the state provides the tribe with \$213,750 in cash to commence construction. The state monetizes the 30% credit once it is generated via direct pay for \$225,000, which it then uses to help recapitalize the revolving fund.

Example 4: Rural Electric Cooperative to State Energy Financing Institution

A rural electric cooperative seeks to build a new geothermal power plant to replace its aging coal plant. The project cost is \$200,000,000. While the co-op’s service territory spans more than one state, the state in which the geothermal plant will be located has an established State Energy Financing Institution (SEFI). The co-op staff does not have the expertise to pursue direct pay, nor the sufficient upfront capital to begin construction of the new facility. As part of the financing agreement, the SEFI will provide an additional 25% of what would otherwise be provided as a loan for this project, in exchange for the transfer of the value of the ITC. The SEFI will then monetize the credit to recapitalize its loan book with the 30% direct payment of the ITC.

Example 5: School District to State Economic Development Agency

A small, rural school district wants to build a new school. The gas boiler for a new school would cost \$6,000,000. A geothermal heating system would cost \$7,000,000. After tax credits, the geothermal system is the lower-cost option, but the school district does not have the expertise or experience to trust the validity of the incentives and does not want to ask voters for a larger than necessary increase in the tax bill for fear that it will threaten a “yes” vote on the debt for the new school project. The state economic development agency that serves as the clean energy tax credit clearinghouse has a standing offer to purchase clean energy tax credits from public entities in the state that plan to install eligible technologies. The school district submits documentation about the planned project to the state agency. The state agency reviews the documentation and agrees to provide a \$2,000,000 cash payment to the school district to support the geothermal construction project. The district sells the tax credit to the state agency. The state agency monitors project progress and files for direct pay once the project is put into service at the end of the state’s fiscal year.

Smaller Deals

Chaining could be a useful tool to unlock smaller clean energy projects, with the benefits flowing far beyond expanding project development to outcomes that greatly enhance community benefits. For purposes of this analysis, *smaller deals* are envisioned as projects less than \$5 million in scope, although larger projects could receive similar treatment. This threshold is used here because most counterparties do not find deals of such small size worthwhile to engage in the transferability market.¹³ Should they attempt to land a deal of this size, the costs associated with insuring and underwriting such a deal are nearly always too great to move forward with the transaction. However, transferability is still directionally less costly than through tax equity deals (Rubio et al. 2023). Chaining can help unlock transactions of a smaller size by reducing costs and risks for the clean energy developer, all without disrupting the current marketplace.

The following are three illustrative examples to highlight how chaining could work for transactions of a smaller scale.

Example 1: Barbecue Restaurant and Local Economic Development Agency

A barbecue restaurant wants to install solar panels on its roof, with a total project cost of \$200,000. The restaurant owner is unable to finance the project because they do not have high cash reserves and the cost of insurance and underwriting to unlock the ITC using transferability is too high, preventing the project from moving forward. The barbecue restaurant instead transfers the \$60,000 ITC to the local economic development agency, who will monetize the credit through direct pay. After administering a small fee for the transaction, the economic development agency returns \$55,000 to the barbecue restaurant. The barbecue restaurant uses the \$55,000 as an integral part of the capital stack to pay for the installation of solar panels.

¹³ The first quarter of 2024 saw bids for transferability credits over \$5 million within a week of listing. Credits under \$5 million were trading at 70–91 cents on the dollar, averaging 83 cents on the dollar, with uncertainty about insurance remaining. Comparatively, credits over \$50 million were trading on the transferability market at 94 cents on the dollar (Crux 2024b).

Example 2: Solar and Battery Storage Developer and State Agency

A community solar developer has site control, permits, and design on a \$2.5 million project with a nearby apartment building agreeing to partner with the developer to purchase the electricity and share in the benefits. There is a small battery storage component associated with the project. Unable to access the transferability market because of high transaction costs, and in a location without access to a green bank, the developer is unable to make the project work financially. The city and county are unwilling counterparties. The state department of commerce, however, has authority to purchase transferable tax credits. The developer transfers the \$750,000 tax credit, which is monetized through direct pay after project completion. The state department of commerce returns \$715,000 to the community solar developer and uses the remainder for workforce training.

Example 3: Manufacturing Facility, Geothermal Developer, and County

A small manufacturing facility would like to reduce its operating costs by switching to a behind-the-meter geothermal power plant for the facility. The geothermal developer proposes a \$4 million project. The manufacturing facility has secured a \$1 million loan and will use additional debt financing for the other \$3 million. The project does not work financially without the ITC. Despite repeated efforts, the manufacturing facility cannot find a buyer for the \$1.2 million tax credit in the transferability market at a reasonable price. The county supervisor suggests the manufacturing facility work with the county supervisor's office, and the \$1.2 million tax credit is transferred to the county. The county pays the manufacturer to support the project and later monetizes the tax credit through direct pay. The use of geothermal electricity by the in-county facility helps the county achieve its GHG reduction commitments on top of electricity bill savings realized by the manufacturing facility, thereby enabling them to make long-term commitments in the county.

Larger Deals

Historically, tax equity markets helped monetize the ITC for large clean energy developers, often resulting in complex deals with a handful of the world's largest banking institutions. This occurred by an investor funding a large portion of the project's overall financing in exchange for a share of the project's tax credits, other ownership benefits, and cash flows (Hunter and Vliet 2024).

However, as the size, scope, and risk of clean energy projects and the marketplace continue to grow, so too do the transactions associated with these projects. Banks and other large counterparties are unwilling to absorb tax credits from clean energy projects indefinitely.

They have a ceiling to their risk appetite to transact in the tax equity and tax credit markets for clean energy projects, both because the size and volume of these projects continues to grow and because of the sheer volume of clean energy projects and tax credits.¹⁴ A bank is not willing to expose its own tax liability strategy to a single market or product, such as clean energy ITC deals.

As a result, and with a limited number of counterparties to execute tax equity deals for clean energy developers, the competitive nature of this marketplace will put clean energy developers at a disadvantage, slowing construction, increasing costs, and reducing uptake of projects. These risks will be even more pronounced in the event of an economic downturn, where banks and other counterparties no longer have large tax appetites to offset, but rather are exposed to losses. In both scenarios, chaining can unlock a new financing mechanism that does not threaten incumbent actors while providing alternative financing options to clean energy developers. Each project, developer, technology, location, and financial situation will have differing levels of risk and opportunity, resulting in different methods to monetize tax credits by the developer. As a result, chaining is but one of many options potentially available.

The following are four hypothetical examples to highlight how chaining could work for large transactions.

Example 1: Offshore Wind Developer and State

An offshore wind developer has a \$5 billion project. The developer has secured financing for \$1 billion worth of the project. They will be able to access an additional \$4 billion in financing, including the ITC on that portion of the project, once they find a counterparty. As a result of internal dynamics, the company wishes to transact in the transferability market while avoiding a tax equity deal. However, the time and competitive nature of a transferability deal of this size and scope have resulted in delays.

The offshore wind developer engages the state where the project is being developed—potentially the office of the governor, economic development administration, tax department, or another appropriate agency. The goal of the engagement is to transfer the value of the tax credit on the \$4 billion portion of the project, or \$1.2 billion. The state agrees to the deal, with certain conditions. Those conditions include a fee levied by the state of \$50 million to the developer, which the state then uses for enabling investments into clean energy–related programs already operating in the state, and transfers the remaining \$1.15 billion back to the developer, contingent upon the terms of the agreement. The developer transfers their tax credit to the state. Once the project is operational, the state submits the credit to the IRS for direct pay, which it receives in the amount of \$1.2 billion. The project is built and operational.

¹⁴ Including risks associated with Basel 3 (White and Marsh 2024).

Example 2: Solar Developer and County

A solar developer has a \$200 million utility-scale project in a rural midwestern county. The developer engages with the county supervisor and economic development authority to transfer the full value of their ITC to the county, totaling a \$60 million credit. In exchange, the county makes an advance payment in a similar amount to the developer, less a transaction cost. The county agrees to accept transfer of the credit, which they later monetize from the IRS through direct pay. The county collects a fee from the developer, which is used for workforce development initiatives to ensure the developer hires locally trained and skilled workers to build the project. In the meantime, the project is built and operational.

Example 3: Geothermal Developer and City

A medium-sized city owns their own district heating system, which currently uses waste heat from a coal power plant. Knowing the system needs upgrades and considering state and federal regulations, the city decides to switch from a coal heat source to a combined heat and power system. The developer and city agree on a \$50 million system, which the developer will own and operate under terms agreed to with the city. The developer transfers their \$15 million ITC to the city, who later monetizes the credit from the IRS through direct pay. The city uses the funding from chaining, along with other incentives and state grants, to pay the CHP developer for the new system. Without the opportunity to utilize chaining, the developer would have had to wait too long and spend too much money on the transferability market to obtain financing. The project is complete, and electricity and heat are distributed to customers.

Example 4: Battery Storage Developer and Tribe

A Native American tribe has a \$30 million utility-scale solar project in service but seeks to add battery backup for redundancy. A battery storage developer proposes and wins a bid for the \$10 million project. The developer transfers the \$3 million ITC to the tribe, who later monetizes the credit through direct pay. After the tribe takes a small amount from the monetized credit to cover transaction costs, they pay the battery storage developer the nearly \$3 million remaining value.

THE VALUE OF CHAINING

For both transferability and direct pay, the volume and number of requests are proof positive of the value unlocked by tax policy changes in the IRA. Without a doubt, more clean energy projects are eligible to receive financing and begin construction today than they would have prior to passage of the IRA, both as a result of the long-term certainty in tax policy offered in the IRA and new clean energy financing mechanisms, especially transferability.

According to the Rhodium Group, US clean energy investment topped \$239 billion in 2023, a 38% increase from 2022 (Rhodium Group 2024). According to the St. Louis Federal Reserve, manufacturing investment in 2023 exceeded \$225 billion, a jump of more than 180% (Burns 2024). The manufacturing sector is growing in the United States, led by investments in clean energy.

However, many clean energy and technology projects, both big and small, continue to be left behind under the current mechanisms. By allowing chaining, projects that would otherwise be unable to obtain financing could find an alternative pathway to deployment and construction. Additionally, chaining could provide competition to tax equity, transferability, and direct-pay transactions, resulting in lower costs of transactions for all parties (Davis 2020).

The size of the market for large projects continues to grow. For example, Crux forecasts that the size of tax-credit sales could reach \$83 billion by 2031, citing estimates from Credit Suisse (Garcia 2024). That market size is far greater than the traditional tax-equity market, which grew from \$10 billion in 2017 to \$20 billion in 2021. Promises of further expansion in the market are limited by the observation that the traditional base of tax equity investors are maxed out (Burton 2023). In other words, as the size of this market grows, there is concern that there are not enough counterparties to make use of the growing clean energy tax credits. Without counterparties, these projects will not get built. Traditional tax equity partners and large institutions have a ceiling to the amount of transactions into which they will enter. Chaining could help raise that ceiling for the entire sector by providing additional financing options for large projects as outlined in the examples above.

Similarly, tax insurance requirements and fixed underwriting costs make smaller projects, especially those under \$5 million, nearly impossible for ITC transferability (Sapirie 2024).¹⁵ Chaining would unlock financing options for these types of projects because the public entities engaged in these transactions have different incentives than private insurers or underwriters. Or, as CAC Specialty states, “tax credit purchasers have been requiring tax insurance for any amount of ITCs being transferred,” therefore, “umminimum premium requirements and fixed underwriting costs can make smaller tax insurance policies uneconomical” (Tamchin et al. 2024). The smaller the transaction, the larger the percentage of cost associated with underwriting and insurance.

As a result, transferability deals for small projects are exceedingly difficult to execute. Larger transferability partners have more incentive to transact with larger projects, leading to a lower percentage of the deal in transaction costs, benefitting both the developer and transfer

¹⁵ “At the same time, 2023 credits under \$5 million in notional value, in particular ITCs, are still on the market and trade at lower prices than larger credits do” (Crux 2024b).

partner. Complex structures are often used to transact in the transferability space (Baker et al. 2024), which simply does not enable the participation of smaller clean energy projects. The result is that smaller clean energy projects are often unable to use transferability as a meaningful financing mechanism.

Chaining unlocks both big and small projects because of its lower-cost and innovative mechanism. This is particularly crucial not only to deploy more projects to help decarbonize the current electric grid, but also to make chaining available with projected electric load growth and increasing demand.

For example, while decarbonization goals have been set for the existing electric grid, new energy-intensive resources are still coming online—namely, data centers linked with artificial intelligence, electrification of vehicles and buildings, and domestic manufacturing (Aljbour and Wilson 2024, Halper 2024). This new energy load demand will result in the buildout of new electricity generation. As the need for more electricity generation continues to grow, it is essential that clean energy developers have access to adequate capital and financing mechanisms to meet load growth on the scale and timeline projected. Chaining provides another mechanism to meet market demands both where they are today and where they are projected to be in the years ahead.

COMMUNITY BENEFITS

The opportunity for local, county, and state governments to partner with private developers and pursue economic development that fits their needs and goals is a cornerstone of the value of chaining.

This public-private partnership can enable local self-determination in pursuit of clean energy generation, improved grid reliability, and reduced reliance on legacy polluting systems, to name but a few of the benefits.

Moreover, local and state governments may have more interest and capacity to support smaller projects through chaining that otherwise would be overlooked by traditional tax equity or transferability arrangements.

Additionally, chaining could unlock the opportunity to build a project that otherwise would not get built, providing a source of tax revenue for local governments. Manufacturers and local workers would benefit from chaining, as they do from the ITC and PTC, as more projects are deployed in more places.

Chaining also can help with creating local demand for clean energy, through public-private partnerships with locally owned businesses, startups, and other entities based in the community. Economic expansion and local growth through clean energy projects is foundational to the IRA.

Critically, chaining requires the buy-in of the public sector or a nonprofit to enable the transaction to occur. The necessary result of this is that clean energy developers and project financiers will need to do more, not less, community engagement, in addition to what is required of those same developers today. Especially through direct pay-to-direct pay eligible projects, the opportunities to engage the community early and often, while centering equity and environmental justice, are many. The same is not inherently true with projects that use transferability between two for-profit entities.

Finally, if the purpose of the IRA and the implementation of the tax credits in the law is to create more clean energy jobs, build more projects, empower local communities, and unlock new sources of domestic energy supply, chaining is entirely consistent with these goals. This is even more true if the clean energy projects that use chaining both generate and consume electricity locally. The revenue derived from chaining activity, instead of going to a bank or large corporation as it does in a strictly transferability-based transaction, could be put to use by local leaders to further their economic development and decarbonization goals.

STRATEGIES FOR CURBING POTENTIAL ABUSES

Any new tax credit program has the potential for risk, fraud, and abuse. Direct pay–eligible entities with fewer resources to hire tax advisors to conduct solid due diligence on tax credit purchases may be most at risk. Treasury and IRS are appropriately designing registration dashboards, mechanisms, and other oversight to ensure new authorities created from the IRA are adopted while protecting taxpayers against risks from bad actors. Similar efforts should be considered in adopting chaining.

There are four major considerations to address potential risk: cost, fraud, personnel, and revenue.

Cost

Opponents of chaining might claim that it is unnecessary because the IRA also created the Greenhouse Gas Reduction Fund (GGRF) to help capitalize green banks focused on supporting clean energy projects and climate action. They would contend green banks were designed to create bridge loans to finance projects upfront and help them get off the ground. That claim is partially true, and particularly useful in several settings. Chaining should be conceived of as a tool to increase the potential volume and scope of transactions.

The reality is, green banks alone cannot fill the same market gaps as chaining. In fact, green banks may be able to help finance projects alongside chaining transactions. There are also scenarios and jurisdictions where a green bank will not be a valid option, whether because a green bank does not lend in that location, has reached its lending capacity, the project doesn't fit its risk profile, or any other number of reasons. Additionally, especially for large projects, green banks simply do not have the capital required for the size of the transaction. Therefore, chaining is not a substitute for green banks, but rather another option available to meet market demands.

Moreover, the use cases of chaining are limited. Given the other financing tools and mechanisms available to clean energy projects and developers, chaining should not be seen as a large driver of cost, but rather a mechanism to solve discrete challenges in the existing pipeline of projects.

Fraud

One strategy to curb potential abuses and fraud is to follow the pathway outlined by the Department of Energy's Loan Programs Office (LPO). Through the designation of a SEFI, which is determined through an application that aligns with qualifying statutes, LPO identifies partners that are aligned in mission and have their own due diligence processes. A similar

approach could be taken with chaining, ensuring that at least one of the parties in the transaction is designated by Treasury to conduct due diligence through existing certification programs or criteria. Alternatively, project developers could bear the responsibility of paying for certification through a nonprofit or public entity. Ultimately, a robust and well-functioning chaining market benefits developers as much, if not more, than their counterparties.

Additionally, guidelines and parameters should be established to protect smaller municipalities, local governments, nonprofits, community benefit organizations, and others from predatory actions that private entities may engage in under the guise of chaining. Providing resources to enable these entities to directly ask questions, receive valid information, and report suspicious behavior or practices from fraudulent actors would be an important part of protecting the integrity and marketplace for qualified chaining activities.

Treasury has recently dealt with similar issues pertaining to direct pay. Insights from that experience include the need for more fora to discuss the matter, technical assistance for entities that may wish to hire experts to assist with the process, a working portal for registration and tracking of transactions, and other measures to reduce potential abuses.

Personnel

Identifying the personnel and technical capacity and bandwidth of direct pay–eligible entities is another potential hurdle to implement chaining. Chaining’s partnerships, structures, and arrangements are complex and multifaceted, requiring expertise and knowhow that may not currently exist, especially in the public and nonprofit communities. However, this type of problem is not unique to chaining and there are sufficient suitable solutions, including through technology, personnel, and repeatability, to name a few. Integrating the option of chaining into the IRS direct pay dashboard, for example, could streamline the process.

Similarly, offering dedicated staff to answer questions or providing easy-to-follow bolt-on instructions to existing processes would help reduce risks associated with chaining. It is worth noting that many chaining opportunities are directly linked to government entities or officials, as opposed to exclusively private parties. The fact that most of these transactions will likely occur in the public sphere should help provide a level of transparency and risk reduction compared to a nearly opaque and private market.

Revenue

Finally, revenue derived from chaining transactions could accrue to government agencies or institutions, as it does to private actors such as banks or other counterparties. One compelling question is whether there should be restraints on the use of this revenue by the public sector¹⁶ or whether revenue from chaining could be used in the same manner as revenue derived from taxes or fees the public institution already routinely collects. Most of these decisions will be made by the bodies administering the transaction, collecting the fees to do with as they choose. Self-determination is a bedrock principle of local clean energy projects, which chaining enables. However, some stakeholders may wish to track the amount of revenue raised from these transactions, as well as how that revenue is spent. For purposes of transparency and accountability, and to reduce the risk of fraud, Treasury could require this basic information to be disclosed to the public.

¹⁶ Or whether and if such restraints could be suggested in the first place.

CONCLUSION

Chaining is a mechanism that could be enabled by the IRS to help large, small, and direct pay-to-direct pay projects finance their clean energy ventures, thereby expanding and accelerating clean energy and technology development in volume, size, and location. Transferability and direct pay, while making significant progress in the expansion of capital and speed of deployment of clean energy and technology projects, could be bolstered to increase project deployment and reduce risk.

Chaining holds the key to unlock that potential.

Further analysis could be done to understand the amount of investment activity and project development chaining could enable. Additionally, chaining could provide an alternative financing mechanism to high-cost transactions for large and small deals that otherwise find transferability or direct pay unworkable. Tracking, reporting, and understanding these costs would be beneficial to compare between chaining and nonchaining transactions. Finally, if chaining were to take hold, the total volume of the transactions projected, and associated potential economic development revenue for government entities, would be useful to determine the size and scope of chaining's full potential.

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