

# **Review of Irrigation Modernization and Conduit Hydropower Funding and Support Programs**

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## Executive Summary

This memo reviews and evaluates existing funding mechanisms that support off-farm irrigation modernization and conduit hydropower projects. Irrigation modernization projects, both on and off-farm, can be challenging to move through planning, permitting, development and installation processes and some evidence indicates that funding mechanisms can be a barrier to successful deployments.<sup>1, 2</sup> This memo is important because access to equitably and efficiently deployed project planning and development funding may be a key pre-requisite to increasing the pace and scale of irrigation modernization project deployments that incorporate hydropower.

We evaluated an array of federal and state funding programs and took a close look at Energy Trust of Oregon's funding mechanisms due to the organization's apparent success in increasing the pace and scale of modernization in its state. We found that the federal and state funding mechanisms which support either irrigation modernization or conduit hydropower share many of the same characteristics:

1. Most funding mechanisms are competitive and are only open to applications once per year.
2. Many do not support project development activities. Those that do tend to focus on the later development steps of specific projects rather than early-stage development or comprehensive planning to identify and prioritize many projects.
3. With some exceptions, most funding mechanisms require matching funds.

In addition, while some federal and state programs have maintained relatively stable funding and processes, others have come and gone over time. By comparison, Energy Trust's programs, which have been stable for at least a decade, incorporate the following characteristics:

1. Non-competitive funding,
2. Rolling application periods,
3. Flexible funding for early-stage development and comprehensive modernization planning, and
4. Some programs do not have a matching funds requirement.

Energy Trust's funding programs also include the following attributes which may differ from other funders:

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<sup>1</sup> Mehata, Mukesh & Taghvaeian, Saleh. 2020. *Irrigated Agriculture in Oklahoma*. Oklahoma State University Cooperative Extension Service. <https://extension.okstate.edu/fact-sheets/irrigated-agriculture-in-oklahoma.html>

<sup>2</sup> Dinsdale, Berit & Re, María & Tomasek, Abigail. 2023. *Beating the Heat: A Statewide Assessment of Drought and Heat Mitigation Practices (and Needs) with Oregon-farmers and Ranchers*. Oregon State University Extension Service. <https://extension.oregonstate.edu/sites/default/files/documents/58891/drought-heat-final-report61623-edited-71123.pdf>

- Direct communication between project proponents and program staff.
- Employment of program staff who understand development processes specific to hydropower and irrigation modernization.
- Structures that allow the program to move quickly in supporting project proponents both informally and through application review, approval or rejection, contracting, and payment processes, including:
  - Using an application-form-contract that enables work orders through additional, easily approved forms.
  - Ensuring funding approval authorities are in place with staff at appropriate levels to keep application approvals moving quickly.
  - Integrating with existing organization payment processing functions to speed up the process of getting funding to project proponents.
- Learning from the challenges that projects experience to consider other programmatic actions to address market barriers.

## **Introduction: Irrigation Modernization and Hydropower Outcomes in Relation to Federal and State Funding Mechanisms**

This memo evaluates existing funding mechanisms that support irrigation modernization and conduit hydropower, building on and exploring anecdotal evidence that suggests Energy Trust of Oregon's Project Development Assistance programs have been an effective enabler of hydropower and irrigation modernization projects in Oregon. In addition, this memo explores whether other funding mechanisms may have contributed to successful installations elsewhere.

There are both federal and state funding mechanisms that exist to support the development and construction of irrigation modernization and conduit hydropower, but we've found there are limitations to these programs. For example, even federal funding opportunities which are available across the country can be subject to local and state interpretations. Meanwhile state level offerings also vary significantly. Importantly, regional and local factors also play a key role in the success of projects. While this memo looks at an array of funding sources, due to scope and budget limitations it is not exhaustive in listing or deeply analyzing all existing funding opportunities.

## **Funding Mechanisms Supporting Irrigation Modernization**

While there are many funding mechanisms and support structures, there are no known data sources that aggregate, consolidate or track irrigation modernization projects, which can include a broad range of comprehensive or discreet actions both on and off-farm. Farmers Conservation Alliance (FCA), an Oregon-based non-profit working with approximately 60 irrigation districts across seven western states and a nationally recognized expert on irrigation modernization, provided data for this memo related to funding sources they have successfully accessed. The lead author's experience in supporting the development of both irrigation modernization and conduit hydropower projects also helped in documenting the use of those funding sources and in researching other funding sources.

### **Federal Funding Mechanisms**

Seven federal funding mechanisms that are commonly used to support irrigation modernization were reviewed for this memo. The mechanisms include grants, loans, and direct technical assistance:

1. US Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Environmental Quality Incentives Program (EQIP)

2. USDA NRCS Watershed Protection and Flood Prevention Act (PL-566)
3. USDA NRCS Regional Conservation Partnership Program (RCPP)
4. US Bureau of Reclamation (Reclamation) Aging Infrastructure Account Loans
5. US Bureau of Reclamation (Reclamation) WaterSMART Program
6. US Environmental Protection Agency (EPA) Clean Water State Revolving Fund (CWSRF) Loan Program, and
7. Congressionally directed spending (CDS)

Table 1, below, shows an overview of the kinds of support these different mechanisms can provide. On-farm infrastructure support can include upgrades for individual agricultural producers, while off-farm infrastructure support can include upgrades for irrigation districts, such as piping or lining canal systems. While all the mechanisms can support infrastructure installations, fewer can support projects in the planning and development stages, referred to as early-stage funding in the table.

Program	On-farm infrastructure	Off-farm infrastructure	Early-stage funding	Installation funding
USDA NRCS - EQIP	Yes	No	Yes	Yes
USDA NRCS - PL566	No	Yes	Sometimes	Yes
USDA NRCS - RCPP	Yes	Yes	Yes	Yes
Reclamation Aging Infrastructure	No	Yes	No	Yes
Reclamation WaterSMART	No	Yes	No	Yes
EPA CWSRF	No	Sometimes	No	Yes
Congressionally directed spending	Sometimes	Yes	No	Yes

Table 1. Federal funding mechanisms that can support irrigation modernization.

### USDA NRCS – EQIP<sup>3</sup>

EQIP provides technical and financial assistance to agricultural producers. Under EQIP, NRCS works with producers to develop and implement a “conservation plan” based on specific NRCS approved “practices,” such as changes to on-farm water delivery systems to conserve water. NRCS can reimburse producers for a portion of the cost of the each implemented practice. EQIP can be a powerful tool to support producers in on-farm projects but cannot be used in support of off-farm infrastructure modernization projects.

### USDA NRCS – PL566<sup>4</sup>

NRCS’s Watershed Protection and Flood Prevention Operations Program manages funds appropriated under PL566. In recent years, PL566 funds have been a key driver for later stage irrigation district modernization project development and implementation in Oregon and are rapidly becoming more widely used in other states. Through PL566, NRCS is able to provide direct technical assistance to support project proponents moving through development and permitting processes, resulting in the creation of “watershed plan” National Environmental Policy Act (NEPA) documents. With an approved watershed plan, irrigation districts can apply for implementation funding that requires only 25% non-federal cost match. Watershed plans created as Environmental Assessments, a two-to-three-year process, can unlock

<sup>3</sup> <https://www.nrcs.usda.gov/programs-initiatives/eqip-environmental-quality-incentives>

<sup>4</sup> <https://www.nrcs.usda.gov/programs-initiatives/watershed-and-flood-prevention-operations-wfpo-program>

up to \$25 million in federal funding. An Environmental Impact Statement, a three-to-five-year process, is required for larger funding amounts.

While watershed plan approvals happen at the national level, PL566 planning efforts are largely driven by state NRCS offices, leading to differences in uptake and deployment. In Oregon, comprehensive early-stage planning supported by Energy Trust creates baseline project priorities and documentation that feed into the PL566 process, resulting in over \$160 million in PL566 awards.<sup>5</sup> In most other states, where early-stage planning funding is less readily accessed, PL566 funds have been more difficult to unlock. One caveat exists in Montana, where the current NRCS State Conservationist previously served as the Assistant State Conservationist in Oregon. Drawing on successfully experiences in Oregon, NRCS Montana has more flexibly shaped their PL566 process to also support early-stage planning.

### **USDA NRCS – RCPP<sup>6</sup>**

RCPP is a complex program described by NRCS as a “partner-driven approach to conservation that funds solutions to natural resource challenges on agricultural land.” Rules for the program were recently streamlined after the Inflation Reduction Act (IRA) appropriated significant new funds to RCPP, enabling it to expand beyond on-farm work to include off-farm water delivery system improvements that provide environmental and agricultural benefits. As with other NRCS programs, state and local offices become deeply involved in selected projects. Like EQIP, the program can provide direct technical assistance for late-stage project design and permitting. Financial assistance for project implementation comes as reimbursements based on authorized NRCS “practices” at set rates. The program offers up to 75% cost match for many practices, but the actual cost match is often reduced in many scenarios, sometimes leading projects to back out before installation.<sup>7</sup> The newly appropriated funds and expanded programmatic abilities are increasing interest in RCPP funding as the agency is set to deploy record funding over the next several years.

### **Reclamation Aging Infrastructure<sup>8</sup>**

The Bipartisan Infrastructure Law (BIL) appropriated \$3 billion to Reclamation’s Aging Infrastructure account, offering loans for “Extraordinary Maintenance” (XM). XM loans can be used for the modernization of Reclamation-owned infrastructure, known as “reserved works” (Reclamation-owned and operated) or “transferred works” (Reclamation-owned, operated by third party, often an irrigation district). In some “emergency” circumstances, 35% of a loan may be forgiven. Loans are offered with interest rates set by Treasury in the year work begins, meaning current interest rates are relatively high. Reclamation’s area offices lead outreach on an annual basis to identify and propose projects for funding. Funding can be used for project planning purposes, however planning tends to be around discrete and known projects, rather than comprehensive planning to determine priorities. While XM loans have been used to support many projects, not all projects qualify and some districts do not find loans attractive or politically viable among their water users if repayment will require a long-term, significant increase in water delivery costs.

### **Reclamation WaterSMART<sup>9</sup>**

Reclamation’s WaterSMART Water and Energy Efficiency grants can provide up to \$5 million for a variety of modernization and energy projects that can completed within three years. The funds are

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<sup>5</sup> Per data supplied by FCA. See Excel file include in the Appendix.

<sup>6</sup> <https://www.nrcs.usda.gov/programs-initiatives/rcpp-regional-conservation-partnership-program>

<sup>7</sup> Personal conversation with Lisa Seales, Program Manager for the Deschutes River Conservancy, Nov. 28, 2023.

<sup>8</sup> <https://www.usbr.gov/recman/pec/pec05-03.pdf>

<sup>9</sup> [https://www.usbr.gov/watersmart/docs/WaterSMART\\_FactSheet\\_2022.pdf](https://www.usbr.gov/watersmart/docs/WaterSMART_FactSheet_2022.pdf)

competitively awarded through a quasi-annual application process and require a 50% non-federal cost match. WaterSMART grants are targeted at projects that are ready to move into construction, and where NEPA reviews have already been completed. As such they are not used to support project development activities. Many smaller modernization and conduit hydropower projects have been supported by WaterSMART grants, but the total award and non-federal match requirements functionally limit their use to smaller projects, rather than projects at significant scale.

### **EPA CWSRF<sup>10</sup>**

As described by the EPA, “the CWSRF program is a federal-state partnership that provides low-cost financing to communities for a wide range of water quality infrastructure projects...” Monies are passed from the EPA to the states for distribution as loans with below-market interest rates and favorable repayment terms, sometimes including a portion of principal forgiveness. The pass through to the states converts federal funding into non-federal funds that can be used as match for federal funds, making the monies very attractive for use in combination with PL566 when principal forgiveness can convert a portion of the loan to a grant. Maximum loan amounts may be set by the states related to their lending capacity in any given year. CWSRF loans have been successfully used by irrigation districts to fund a wide variety of modernization and energy projects and, valuably, can be deployed as construction financing. However, not all states have implemented CWSRF programs the same way and in some states irrigation districts and modernization projects are not eligible to apply for funds. In addition, CWSRF monies, as loans, are not typically used early in the project planning process, though they may be used for engineering and design purposes during later development steps if other grant funding cannot be found.

### **Congressionally Directed Spending**

Known by a variety of names, such as earmarks, CDS is a direct federal appropriation to support a specific project. CDS funding amounts can vary widely, from tens of thousands to hundreds of millions of dollars. CDS can be a powerful tool to support project installations but is not widely available and may be inequitably distributed based on politics and relationships that favor certain states or well-connected entities. CDS funding is typically only used to support project installations.

### **State Funding Mechanisms**

There are many state-level funding resources targeted at on and off-farm improvements to agricultural water delivery systems. For the purposes of this memo, the lead author reviewed 20 programs in nine states, shown in Table 2 below, to assess their key characteristics, such as eligible project types, competitiveness, frequency of funding availability, maximum funding amounts, and match requirements.

Table 2 is not intended to be exhaustive; it does not attempt to cover all programs available in the listed states, it does not review philanthropic funding mechanisms, nor does it cover all of the 17 Western states where irrigation water is commonly delivered to agricultural producers from off-farm surface water sources. Nonetheless, as is discussed further below, many programs share similar characteristics and based on the experiences of the lead author, the list appears representative of the most commonly available funding mechanisms. Due to the large number of reviewed funding mechanisms, this memo synthesizes observations about key program characteristics rather than providing a detailed discussion of each program as was done for the federal funding sources.

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<sup>10</sup> <https://www.epa.gov/cwsrf>



State	Program	On or Off-farm Eligibility	Development or Implementation Funding	Maximum Funding	Match required
Arizona	<a href="#">Water Infrastructure Finance Authority Water Conservation Grant Fund</a>	Both	Implementation	\$ 250,000	25%
Arizona	<a href="#">Water Infrastructure Finance Authority Water Project Assistance Grant</a>	Off-farm	Both	\$ 1,000,000	not indicated
Arizona	<a href="#">Water Irrigation Efficiency Program</a>	On-farm	Implementation	\$ 1,000,000	not indicated
California	<a href="#">Department of Food and Agriculture State Water Efficiency &amp; Enhancement Program</a>	On-farm	Implementation	\$ 200,000	not indicated
California	<a href="#">Department of Water Resources Agricultural Water Use Efficiency Grants</a>	Both	Both	program closed	program closed
California	<a href="#">Office of Sustainability Water Grant Program</a>	Both	Both	varies	varies
Colorado	<a href="#">Water Conservation Board Colorado Water Plan Grants</a>	Both	Both	no limit indicated	25-50% or more
Colorado	<a href="#">Water Conservation Board Water Supply Reserve Fund Grants</a>	Off-farm	Both	no limit indicated	50%
Idaho	<a href="#">Water Resource Board Aging Infrastructure Grant</a>	Off-farm	Implementation	\$ 2,000,000	67%
Montana	<a href="#">Department of Natural Resources and Conservation Irrigation Development Grants</a>	Both	Implementation	\$ 30,000	0-50%
Montana	<a href="#">Department of Natural Resources and Conservation Renewable Resource Grants</a>	Off-farm	Both	\$ 125,000	0%
Nevada	<a href="#">Department of Conservation and Natural Resources Water Conservation and Infrastructure Initiative</a>	Off-farm	Implementation	no limit indicated	not indicated
Nevada	<a href="#">Division of Environmental Protection Water Project Grants and Loans</a>	Off-farm	Implementation	no limit indicated	not indicated
New Mexico	<a href="#">New Mexico Finance Authority Water Trust Board Grants and Loans</a>	Off-farm	Implementation	no limit indicated	minimum 10%
Oregon	<a href="#">Energy Trust of Oregon Irrigation Modernization Planning Grants</a>	Off-farm	Development	\$ 200,000	0%
Oregon	<a href="#">Oregon Water Resources Department Water Project Grants and Loans</a>	Off-farm	Both	\$ 1,500,000	25%
Oregon	<a href="#">Oregon Watershed Enhancement Board Restoration Grants</a>	Both	Implementation	\$ 500,000	25%
Washington	<a href="#">Conservation Commission Irrigation Efficiencies Grant Program</a>	On-farm	Both	\$ 400,000	15%
Washington	<a href="#">Department of Ecology Columbia River Basin Water Management Grant</a>	Off-farm	Both	no limit indicated	0%

Table 2. State funding mechanisms that can support irrigation modernization

### Project Types / Eligibility

Most states offer funding or support for both on and off-farm improvements, sometimes from within the same program. About half of the surveyed funding mechanisms can provide support for at least some project development activities. Most funding or support for development activities is for pre-identified projects versus earlier stage funding support for comprehensive planning and project prioritization.

### **Competitiveness / Funding Frequency**

Most funding mechanisms are competitive, and most offer an application window once per year. A few offer application windows more than once per year and some are only open once every two years. Application review and awards from most programs happen within 2-10 months after the close of the competitive window. Contracting typically follows which can add several additional months before a successful applicant is able to start work and/or use the awarded funding.

### **Maximum Funding Amounts / Match Requirements**

A wide range of maximum funding amounts and match requirements were found in the surveyed programs. Maximum funding related to project implementation is typically much greater than maximum funding for project development support. For programs with no maximum funding limits on individual projects, often a functional limit exists based on total funding available to the program via a state appropriation.

### **Additional State Funding Mechanism Considerations**

Energy Trust of Oregon's funding mechanism to support irrigation modernization is an outlier. Relative to the other surveyed programs, Energy Trust's funding is focused on early-stage project development, is non-competitive, doesn't require match, and can be quickly deployed. The structure and results associated with these characteristics are explored in detail later in the memo.

Also notable, two recent studies from agricultural extension offices in Oklahoma and Oregon indicate that funding mechanisms are a barrier to increasing uptake of irrigation modernization. While both studies were focused on on-farm improvements, the results echo the anecdotal experiences of the lead author in working with irrigation districts on off-farm improvements. From the Oklahoma study:

*"According to the 2018 survey, a major barrier was related to financial challenges. Thirty-five percent of farmers said that they could not finance improvements, up from 26% mentioning this barrier in both 2013 and 2008 surveys. Twenty-five percent of producers mentioned that improvements would not reduce costs enough to cover installation costs and 26% noted that landlord would not share in costs. Only 16% of producers mentioned that water and energy conservation was simply not their priority, which shows a decline when compared to 19% in 2013 and 29% in 2008."*<sup>11</sup>

Findings in the Oregon study were similar:

*"While funding programs were extremely well utilized, producers noted that funding systems could be challenging to navigate, and application processes were often extensive and had slow turnaround times... It was also recommended that services be expanded to improve application assistance and turnaround times and that cost-share parameters be updated to account for inflation and increased losses due to drought and heat."*<sup>12</sup>

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<sup>11</sup> Mehata, Mukesh & Taghvaeian, Saleh. 2020. *Irrigated Agriculture in Oklahoma*. Oklahoma State University Cooperative Extension Service. <https://extension.okstate.edu/fact-sheets/irrigated-agriculture-in-oklahoma.html>

<sup>12</sup> Dinsdale, Berit & Re, María & Tomasek, Abigail. 2023. *Beating the Heat: A Statewide Assessment of Drought and Heat Mitigation Practices (and Needs) with Oregon-farmers and Ranchers*. Oregon State University Extension Service. <https://extension.oregonstate.edu/sites/default/files/documents/58891/drought-heat-final-report61623-edited-71123.pdf>

In addition, agricultural producers surveyed for the Oregon study noted the need for both on and off-farm improvements to happen in tandem:

*“These producers suggested that no on-farm infrastructure upgrades would adequately manage drought and heat pressures if certain off-farm infrastructure upgrades were not also pursued.”<sup>13</sup>*

## Funding Mechanisms Supporting Conduit Hydropower

The U.S. Department of Energy’s Water Power Technologies Office has supported the creation of centralized data sources that facilitate research into hydropower projects. Knowing where hydropower has been installed in recent years, it is possible to dig into the federal and state funding sources that can support projects in areas where success has occurred and investigate other factors that may be influencing project uptake, such as through the 2017 National Renewable Energy Laboratory report, “State Models to Incentivize and Streamline Small Hydropower Development.”<sup>14</sup>

To investigate where hydropower has been successfully installed in recent years, data was extracted from the HydroSource 2023 Existing Hydropower Assets (EHA) Plant Database,<sup>15</sup> produced by Oak Ridge National Laboratory. Table 3, below, shows a count of all new hydropower installations completed under Federal Energy Regulatory Commission (FERC) Exemptions, FERC Qualifying Conduits, or Bureau of Reclamation Lease of Power Privilege processes, by state, since the year 2000.<sup>16</sup>

To support a comparison between states and begin considering regional or local factors, the installations found in the HydroSource data were compared to the total national conduit hydropower capacity potential,<sup>17</sup> the state percentage of electric utility customers served by investor-owned utilities (IOUs),<sup>18</sup> average retail electricity prices,<sup>19</sup> and population.<sup>20</sup>

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<sup>13</sup> Ibid.

<sup>14</sup> Curtis, Taylor, et. al. *State Models to Incentivize and Streamline Small Hydropower Development*. United States. <https://doi.org/10.2172/1407466>

<sup>15</sup> Johnson, M. et. al. 2023. *Existing Hydropower Assets (EHA) Plant Database, 2023*. HydroSource. United States. [https://doi.org/10.21951/EHA\\_FY2023/1972057](https://doi.org/10.21951/EHA_FY2023/1972057)

<sup>16</sup> N.B. HydroSource data does not include the year of commercial operation for all projects. Table 3 includes data for all projects where the commercial operation year was specified (90) and all blanks (78), as the lead author recognized several projects that had been constructed since 2000 where the commercial operation date was not specified. As such, Table 3 may overstate the number of installed projects. HydroSource data is included in the Appendix.

<sup>17</sup> Kao, Shih-Chieh, et. al. *An Assessment of Hydropower Potential at National Conduits*. United States. <https://doi.org/10.2172/1890335>

<sup>18</sup> Annual Electric Power Industry Report, Form EIA-861, Sales to Ultimate Customers. <https://www.eia.gov/electricity/data/eia861/>

<sup>19</sup> U.S. Energy Information Administration’s U.S. Electricity Profile 2022. <https://www.eia.gov/electricity/state/>.

<sup>20</sup> 2022 annual estimates made by the U.S. Census Bureau. <https://www2.census.gov/programs-surveys/popest/tables/2020-2022/state/totals/NST-EST2022-POP.xlsx>.

State	CA	CO	OR	ID	UT	Next 19 states	Total
Installed projects since 2000	48	32	23	18	9	38	168
Percent of all installed projects	29%	19%	14%	11%	5%	23%	
Installed capacity (MW)	51	53	15	14	15	16	165
Percent of installed capacity	31%	32%	9%	9%	9%	10%	
ORNL total identified conduit capacity potential	243	204	77	62	64	426	1,076
Ratio of installed capacity to identified potential	21%	26%	19%	23%	24%	4%	
Percent of electric utility customers served by investor-owned utilities	58%	57%	74%	84%	74%	N/A	
Avg. retail electricity rate (per kWh)	\$ 0.22	\$ 0.12	\$ 0.09	\$ 0.09	\$ 0.09	N/A	
State population (millions)	39	6	4	2	3	N/A	

Table 3. Conduit Hydropower Installations since 2000

There are several important observations and considerations that can be drawn from Table 3:

1. Most states have installed little to no new hydropower since 2000, with nearly 80% of all projects appearing in only five states.
2. The ratio of installed capacity to the ORNL identified conduit potential is relatively similar for the top five states. There are several states, not shown in the table, that have significant identified conduit hydropower potential but few recent installations.
  - a. Washington: 119MW of potential but only two installations (50kW installed capacity, 9 cent power, 43% served by IOUs)
  - b. New York: 66MW of potential but only two installations (435kW installed capacity, 18 cent power, 74% served by IOUs)
  - c. Texas: 57MW of potential but only one installation (1.3MW installed capacity, 10 cent power, 9% served by IOUs)

Below, the federal and state funding mechanisms and the local or regional factors that may have influenced successful installations are briefly explored for the top five states.

## Federal Funding Mechanisms

There are three commonly used federal funding mechanisms that can support conduit hydropower development and implementation. Given the nationwide availability of these programs, they set a floor for all projects but may not be sufficient to overcome regional or local barriers on their own.

- USDA Rural Energy for America Program (REAP) grants and loans<sup>21</sup>
- DOE Section 242 Hydroelectric Production Incentive Program, and
- The Investment and Production Tax Credits (ITC/PTC)

<sup>21</sup> <https://www.rd.usda.gov/programs-services/energy-programs/rural-energy-america-program-renewable-energy-systems-energy-efficiency-improvement-guaranteed-loans>

## **USDA REAP**

USDA's REAP program can provide grant funding for renewable energy project development activities<sup>22</sup> or installations. REAP offers funding for project development activities through Renewable Energy Development Assistance (REDA) grants, the Technical Assistance Grant (TAG) program, and the Renewable Energy Systems & Energy Efficiency Improvement Guaranteed Loans & Grants program (RES/EEI). With some exceptions, eligibility is limited to rural areas as defined by USDA and projects serving agricultural producers or rural small businesses. REAP programs were previously offered through annual application windows but the frequency has increased to quarterly to support new appropriations through BIL and IRA.

REDA is structured differently than many programs, offering grants of up to \$100,000 for eligible entities, enabling the entity to provide energy audits or renewable energy project development assistance to eligible agricultural producers or rural small businesses. TAG provides project development funding through grants of \$20,000 or less. RES/EEI can provide project installation grants of up to \$1 million requiring at least 50% non-federal match. Some states limit installation grants to \$20,000 or less.

## **DOE Section 242**

The Section 242 Hydroelectric Production Incentive Program can provide an ~2 cent per kWh incentive for generation, up to \$1 million annually, during the first 10 years of commercial operation of a new conduit hydropower project. This incentive can help projects overcome low power purchase agreement rates. Historically, the program was inconsistently funded by Congress, limiting its effectiveness, but the BIL provided a new appropriation expected to last several years, which may encourage project uptake. The program can only be accessed once a project reaches commercial operation and cannot help during development activities.

## **ITC / PTC**

The ITC and PTC are long standing tax credits that have not always treated hydropower projects the same as other renewable energy technologies. The passage of the IRA put hydropower on the same footing as other renewables, enabling these tax credits to further support project installations. As with Section 242, the tax credits can only be accessed once a project reaches commercial operation. Historical funding patterns with the PTC created boom and bust cycles in the development of utility scale wind,<sup>23</sup> showing how unstable funding over time can impact project development and deployment.

## **State Funding Mechanisms and Other Regional/Local Considerations**

Funding mechanisms and other potential factors for success were researched for each of the top five states found in Table 3:

### **California**

As seen in Table 3, California leads with the largest number of project installations and is close to Colorado in total installed capacity. Several funding mechanisms that could have supported conduit hydropower projects have come and gone over time, including the California Energy Commission's 2019

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<sup>22</sup> <https://www.rd.usda.gov/programs-services/energy-programs/rural-energy-america-technical-assistance-grant-program>

<sup>23</sup> <https://www.washingtonpost.com/news/wonk/wp/2012/11/26/the-rise-and-fall-of-the-u-s-wind-industry-in-one-chart/>

Renewable Energy for Agriculture Program.<sup>24</sup> At present, there do not appear to be any state funding mechanisms that would support conduit hydropower installations.

However, California's energy market forces and policies provide other strong incentives to support project development. The state has high retail electricity prices coupled with favorable net metering laws. In particular, the Renewable Energy Self-Generation Bill Credit Transfer (RES-BCT), creates a flexible form of virtual net metering open to irrigation districts. As described by the California Public Utility Commission:

*"This tariff enables local governments and universities to share generation credits from a system located on one government-owned property with billing accounts at other government-owned properties. The system size limit under RES-BCT is 5 MW, and bill credits are applied at the generation-only portion of a customer's retail rate."*<sup>25</sup>

In addition, the state's Net Energy Metering Aggregation (NEMA) program allows a similar result for agricultural producers.

*"NEMA allows an eligible customer-generator to aggregate the electrical load from multiple meters, and NEM credits are shared among all property that is attached, adjacent, or contiguous to the generation facility... For example, an agricultural customer could use a single renewable generation system to provide NEMA bill credits to offset the electrical load from their home as well as from an irrigation pump located on an adjacent parcel."*<sup>26</sup>

In 2020, to further support development, the California Energy Commission produced, "California's In-Conduit Hydropower Implementation Guidebook, A Compendium of Resources, Best Practices, and Tools."<sup>27</sup>

Together, market forces and energy policies may have resulted in developers and project proponents being willing to take on the risk to explore and finance projects without additional support being necessary.

## Colorado

As shown in Table 3, Colorado installed the greatest capacity and the second largest number of conduit hydropower projects over the period and the state has taken several proactive steps to support hydropower installations.

The Colorado Department of Agriculture created the ACRE<sup>3</sup> (Advancing Colorado's Renewable Energy and Energy Efficiency) program in 2007 to support renewable energy and energy efficiency projects among agricultural producers. ACRE<sup>3</sup> uses RCPP funding to offer an Irrigation Hydro support program<sup>28</sup> which provides financial and technical assistance through funding from the USDA's RCPP, EQIP, and REAP programs. The program's website states a goal of supporting the installation of 30 integrated hydromechanical or hydroelectric power systems across Colorado in the next four years. ACRE<sup>3</sup> is only available for on-farm projects and can support project development and installation for both hydropower

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<sup>24</sup> <https://www.energy.ca.gov/programs-and-topics/programs/renewable-energy-agriculture-program>

<sup>25</sup> <https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/demand-side-management/customer-generation>

<sup>26</sup> Ibid.

<sup>27</sup> <https://www.energy.ca.gov/publications/2020/californias-conduit-hydropower-implementation-guidebook-compendium-resources>.

<sup>28</sup> <https://ag.colorado.gov/conservation/acre3/rcpp>.

and irrigation upgrades. The program has application periods twice per year and requires 25-50% match from the agricultural producer.

Additionally, in 2010 Colorado developed a Memorandum of Understanding with the Federal Energy Regulatory Commission (FERC) to streamline permitting processes,<sup>29</sup> resulting in five projects reaching commercial operation by 2014.<sup>30</sup> This MOU predated the Hydropower Regulatory Efficiency Act of 2013 which simplified the FERC permitting process for qualifying conduit hydropower facilities.

Notwithstanding the ACRE<sup>3</sup> program, most of the conduit hydropower installations in Colorado appear to have been developed by municipalities, electric utilities, or irrigation districts rather than agricultural producers. The success of these projects is not easily attributable to any single support factor and may be more driven by specific local circumstances, such as the Delta-Montrose Electric Association installing five conduit hydropower projects to meet energy needs and stabilize electricity rates.<sup>31</sup>

## Utah and Idaho

Neither Utah nor Idaho have state funding mechanisms that directly target conduit hydropower projects. Like Colorado, it is more difficult to identify clear factors that may have supported the hydropower development that occurred in these states.

As identified in the HydroSource data, Idaho's hydropower installations range from 20kW to 2.3MW in capacity and are owned by a mix of irrigation districts, municipalities, and private developers. Several of the irrigation districts that developed new conduit hydropower facilities also own older, larger traditional hydropower facilities. This experience with hydropower may be a factor supporting the development of newer facilities.

Utah's hydropower installations range from 40-800kW in capacity with one 13MW plant that is an outlier in several ways. The 13MW Jordanelle plant is a traditional hydropower facility that was jointly developed by an electric utility and water conservancy district. The state's smaller installations are owned by a mix of irrigation and water districts, municipalities, and private developers.

## Oregon

As in California, Oregon has had several grant and loan programs that have come and gone but which were able to support the development of conduit hydropower projects.

Past programs included:

- Community Renewable Energy Feasibility Fund<sup>32</sup> (CREFF): CREFF provided grants of up to \$50,000 to support the development of renewable energy projects. Grants to successful projects were intended to be repaid over time. It is unclear if repayments ever occurred as the program became fully subscribed by 2017 and was never re-opened.
- Renewable Energy Development (RED) Grants:<sup>33</sup> RED grants provided up to \$250,000, up to 35% of project costs, for the installation of new renewable energy systems. The grant was

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<sup>29</sup> Marriot, C. (2010) *Colorado Signs MOU for Small Hydro Development with FERC*. Stoel Rives.

<https://www.lawofrenewableenergy.com/2010/09/articles/renewable/hydropower/colorado-signs-mou-for-small-hydro-development-with-ferc/>.

<sup>30</sup> Colorado Energy Office. (2014) *The Colorado State Energy Report 2014*. State of Colorado.

<https://energyoffice.colorado.gov/about-us/reports>.

<sup>31</sup> <https://coloradosun.com/2018/10/18/dmea-breakup-tri-state-renewable/>

<sup>32</sup> <https://www.energybot.com/incentives/oregon/community-renewable-energy-feasibility-fund-program-3874.html>

<sup>33</sup> <https://www.oregon.gov/energy/incentives/pages/renewable-energy-grants.aspx>



available from 2012-2019 and may have supported the installation of conduit hydropower projects installed by irrigation districts or agricultural producers. The program did not support project development activities.

- Business Energy Tax Credit<sup>34</sup> (BETC): The BETC provided up to a 50% tax credit for the installation of renewable energy facilities owned by for-profit entities. A pass-through program allowed the credits to be sold at a discount, enabling not-for-profit entities to benefit as well. This pass through supported the development of several irrigation district conduit hydropower projects in the state. The program did not support project development and ended in 2014.

Current state funding mechanisms include:

- Community Renewable Energy Grant Program<sup>35</sup> (CREP): The CREP program provides grants of up to \$100,000 for project planning and develop and up to \$1,000,000 for project installation. Up to 50% match funding can be required, with match being reduced or eliminated for projects that will serve disadvantaged communities. Funding under the program has been awarded through annual application windows.
- Energy Trust of Oregon<sup>36</sup>: As described in detail in the sections that follow, Energy Trust offers grants of up to \$200,000 for project development activities, requiring 50% match. The organization also offers grants for project installations, with no limit on grant amounts and match requirements tailored to the finances of each individual project. Energy Trust's Project Development Assistance (PDA) programs supported 21 of the 23 installed projects in HydroSource. One project was ineligible for an Energy Trust grant due to programmatic restrictions for projects where the electricity would not be sold to one of the utilities that fund the organization's programs. The other project simply never reached out for assistance. Energy Trust's programs are unique in having supported most projects installed in the state.

## Energy Trust's Project Development Assistance Programs

Energy Trust is a non-profit organization delivering grant funding (referred to by the organization as "incentives") to support residential, commercial, and industrial energy efficiency projects and renewable energy systems less than 20MW in nameplate capacity. The bulk of Energy Trust's funding comes from system benefit charges levied as fees on the ratepayers of Oregon's investor-owned utilities, with the organization operating under a contract with the Oregon Public Utility Commission (OPUC) since 2002.

Among the organization's offerings, Energy Trust provides funding to support hydropower, geothermal, and biopower projects moving through development steps as well as separate installation grants to assist projects in reaching commercial operation. The organization also provides funding to support irrigation modernization planning efforts as a method of developing a pipeline of potential conduit hydropower projects.

Since approximately 2008, Energy Trust has offered "Project Development Assistance" (PDA) for renewable energy projects, analogous to what the Department of Energy often terms "Technical Assistance" (TA).

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<sup>34</sup> <https://harrang.com/wp-content/uploads/2013/05/031709-BETC1.pdf>

<sup>35</sup> <https://www.oregon.gov/energy/Incentives/Pages/CREP.aspx>

<sup>36</sup> <https://www.energytrust.org/incentives/renewable-energy-hydropower/>



Through PDA, Energy Trust provides funding or other direct support to project proponents trying to move projects through development steps such that a go/no-go decision can be reached to move a project into construction or through another prerequisite development activity. Energy Trust's PDA programs support the decision-making of project proponents, which de-risks later funding that can support successful project installations. From Energy Trust's perspective, providing funding for a feasibility study that determines a project concept is not feasible is considered a success because it enables the project proponents to move on to other projects that may be feasible while avoiding further spending in later, higher cost and higher risk project development stages.

The methods and scope of Energy Trust's PDA offerings have evolved over time, with robust, stable offerings in place for conduit hydropower since ~2011 and irrigation modernization planning since ~2014. Energy Trust's 2022 Annual Report to the OPUC succinctly describes the organization's PDA support:

*"The primary purpose of project development assistance is to increase the number of distributed renewable energy generation projects in Oregon by lowering early-stage development barriers and financial risk. Through project development assistance, Energy Trust builds a pipeline of potential projects that have achieved critical preconstruction activities, including technical and financial assessments. Development assistance also prepares proposed project owners to apply for Energy Trust installation incentives and other sources of financial support. The early-stage analyses delivered through development assistance, such as feasibility studies, build and reinforce Energy Trust's awareness of market factors and other considerations important for supporting distributed renewable energy resources while helping individual projects leverage other incentives, construction services and long-term financing.*

*Applications for project development assistance must be received and approved by Energy Trust prior to the start of the proposed development activity. Project development assistance incentive funds are provided as a reimbursement following completion of the activity and proof of full payment to all contractors. Incentive funding typically equates to 50% of the project activity cost, up to a maximum of \$200,000 per project. Project proponents have a significant financial stake in development activities, helping ensure that activities are necessary and fiscally prudent. Common examples of project development activities include feasibility and design studies, feedstock studies, irrigation district modernization technical investigations and assessments, and transmission and interconnection studies. In addition to this assistance, Energy Trust project development assistance funding supports regional energy planning and energy resilience investigations.*

*While project proponents using any eligible technology may apply for project development assistance incentives, staff focus most outreach efforts in two key areas:*

- *Electricity generation from the combustion of biogas, which is produced from the anaerobic digestion of organic material (i.e., wastewater sludge, fat/oils/grease, food processing material) at water resource recovery facilities.*
- *Hydroelectric projects made possible from the modernization (i.e., piping) of irrigation water delivery infrastructure (canals, ditches and laterals) by irrigation districts."*

In the statement above, Energy Trust notes three key purposes in offering PDA:

- 1) To increase project installations.
- 2) To build a pipeline of projects ready for installation funding.
- 3) To learn about market factors that may need to be understood or addressed through other programmatic efforts.

By maintaining focus on these purposes over the last decade, and providing a stable, long-term source of early-stage funding to support project planning and development, Energy Trust may have had a significant impact on small scale project development in Oregon.

## Energy Trust's PDA Funding Mechanisms

Energy Trust has two different PDA funding mechanisms. This memo distinguishes the offering available to conduit hydropower projects as ["Standard" PDA](#) to differentiate it from the [PDA offering specific to irrigation modernization projects](#). In both cases, incentive funds must be pre-authorized by Energy Trust and the activities which the funding is intended to support must not have yet begun. In addition, grants are restricted to support only projects where any resulting energy generation would be delivered to one of the investor-owned utilities that fund Energy Trust's programs.

### "Standard" PDA

Energy Trust's "standard" PDA program offers up to \$200,000 in funding to support conduit hydropower projects, paid as a reimbursement, and requiring a 50% cost match. Funds are accessed through a three-step process: Project Enrollment, Request for Funding, and Reimbursement. Project proponents are encouraged communicate with Energy Trust staff throughout the stages of the process to enable staff to develop familiarity with the proposed project and the project team. Through these interactions, Energy Trust staff may support project proponents in choosing best practices to limit both developer and organizational risk.

- **Enrollment:** Project proponents submit a five-page application<sup>37</sup> which captures proposed project and project team details used to determine eligibility. If eligible, Energy Trust can sign the enrollment form which acts as a master contract between Energy Trust and the project proponent. With the contract in place, project proponents can submit one or more requests in the second step.
- **Request for Funding:** In this step, via a second form<sup>38</sup> and attachments, project proponents submit details related to one or more eligible activities that are needed to support the project moving through development processes. Information requested includes scope(s) of work for one or more proposed eligible activities and their associated deliverables, budgets and schedules, and qualifications and potential conflicts of interest for the contractor(s) who would perform the work. Activities must be performed by third-party contractors; self-performed work is not eligible.

Energy Trust considers the following activities and costs *ineligible* for project development assistance funding:

- Purchase of equipment or facilities or investment in a physical asset
- Purchase or leasing of land or resources
- Permit fees
- Closing costs and other costs involved with finalizing a deal with an investor
- Project Proponent's or owner(s)' own time and materials towards the proposed project development work
- Activities already started or completed
- Proposed projects without any electric generation objectives

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<sup>37</sup> Form 910E, see Appendix.

<sup>38</sup> Form 930RF, see Appendix.

Energy Trust staff with expertise in project development processes often meet with project proponents in person or virtually to discuss potential activities that could be included in a funding request. These discussions support Energy Trust's understanding of project needs and support less experienced project proponents in understanding project development best practices. For example, Energy Trust staff may suggest breaking up multiple activities into smaller units with offramps that can minimize financial exposure, or which may enable a development path pivot depending on what is learned during an activity. Working closely with project proponents, Energy Trust receives a higher percentage of funding request applications that can be quickly approved versus rejected.

As with the enrollment form, the Request for Funding form is relatively short to minimize time and costs for both project proponents and reviewers. Energy Trust is often able to review and approve or deny funding requests in a matter of hours, enabling project proponents to move quickly. Upon approval, project proponents can allow their contractor(s) to begin work on the approved activity(ies).

- **Reimbursement:** Upon completion of the approved activity(ies), the project proponent is required to pay all contractors in full. The project proponent submits the deliverables required under the funding request along with proof of payment to Energy Trust. Energy Trust then provides a 50% reimbursement, with checks sent typically within 2-4 weeks of receipt of documentation.

Energy Trust staff commonly discuss the outcome(s) of the activity(ies) with the project proponent and support project proponents in considering appropriate next steps, which can include submitting additional Requests for Funding to perform additional development activities. This cycle can repeat many times, up to the \$200,000 funding limit, until a proposed project is found to be no longer viable, or the project applies for an installation incentive.

## **Irrigation Modernization PDA**

The "Standard" PDA program works well for pre-identified potential conduit hydropower locations and other small scale renewable energy project developments. However, Energy Trust realized that a different approach was necessary to support the conduit hydropower project opportunities that can be made possible through the modernization and piping of irrigation water delivery infrastructure.

Energy Trust recognized that irrigation district modernization could create new conduit hydropower sites but that the districts in Oregon lacked access to a stable source of early-stage, flexible funding which could support the planning and design of piping projects that might result in the identification of hydropower sites. Energy Trust hypothesized that if districts were better able to plan piping projects, the conduit hydropower sites that were identified could then be funneled into the organization's "Standard" PDA program.

In 2014, Energy Trust held an RFP to solicit contractors able to provide the specialized support and services needed and to help design what would become the organization's Irrigation Modernization Program. Farmers Conservation Alliance (FCA) won the RFP and worked with Energy Trust to design what would become a PDA offering specific to irrigation modernization. The resulting program differs from the "Standard" PDA program in its goals and outcomes, enrollment and activity processes, match requirements, and payment processes.

Importantly, though separate from the PDA program, Energy Trust also provided FCA with an annual “programmatic” budget to support program development and outreach activities with irrigation districts and other stakeholders.

- **Goals and outcomes:** Energy Trust’s intention, as noted above, is to support the identification of conduit hydropower sites that could be assisted through development activities in the “Standard” PDA program, which can provide support and funding for project proponents from project concept to the point of making a go/no-go decision on construction. Similarly, Irrigation Modernization PDA is highly flexible and can support irrigation districts with characteristics that are favorable for hydropower potential through comprehensive planning for the modernization of water delivery infrastructure. While “Standard” PDA often supports late-stage project development activities, like final design and interconnection assistance, Irrigation Modernization PDA tends to fund the earliest stages of the project development process, with handoffs to other funders that take piping projects through final design and financing.
- **Contracting and enrollment process:** In “Standard” PDA, Energy Trust contracts directly with project proponents. In Irrigation Modernization PDA, Energy Trust has contracts with both FCA, to deliver services, and the project proponent, typically an irrigation district, with whom FCA works. Energy Trust’s contract with FCA allows FCA’s staff and subcontractors to perform a wide variety of modernization planning services to the project proponent. Energy Trust also enters into a standardized contract with each project proponent which spells out the terms and conditions of the funding.
  - Using “programmatic” funding, FCA does outreach to project proponents to assess their readiness to participate in modernization processes and their underlying characteristics to see if they are likely to have hydropower potential. For project proponents with good readiness and potential FCA submits a hydropower potential assessment for Energy Trust’s review. If Energy Trust concurs with FCA’s assessment, FCA may support the project proponent in signing Energy Trust’s contract and submit work order specifying the types of activities to be performed on district’s behalf by FCA or its subcontractors. Energy Trust then reviews the submissions for approval, modification, or denial. Energy Trust and FCA can also amend the work order specifics, if needed, through an email exchange.
- **Funding amounts and match requirements:** As with the “Standard” PDA program, Energy Trust may provide up to \$200,000 to support the activities specified by FCA on behalf of the enrolled project proponent. In the early years of the program, for several very large irrigation districts, Energy Trust provided up to \$400,000. However, unlike the “Standard” PDA program, there is no match requirement for project proponents in the Irrigation Modernization PDA program. Energy Trust chose to waive match requirements for the program for several reasons. In its early years, the organization considered the program ‘experimental’ and wanted to reduce or eliminate participation risk for project proponents. In addition, Energy Trust recognized that match funding was a significant participation barrier for most irrigation district project proponents. The organization has not chosen to add a match requirement, believing that the lack of match is one of the factors of the program’s success.
- **Payment processes:** In contrast to the “Standard” PDA program, where Energy Trust’s funding is provided as a reimbursement after the project proponent has paid its contractors in full,

payments in the Irrigation Modernization PDA program are made to FCA monthly, based on time and materials invoicing. This payment structure supports FCA's cash flow while recognizing the organization as a trusted service provider.

Figure 1, below, shows the differences in the contractual structures and payment flows between Energy Trust's Standard PDA and Irrigation Modernization PDA programs.

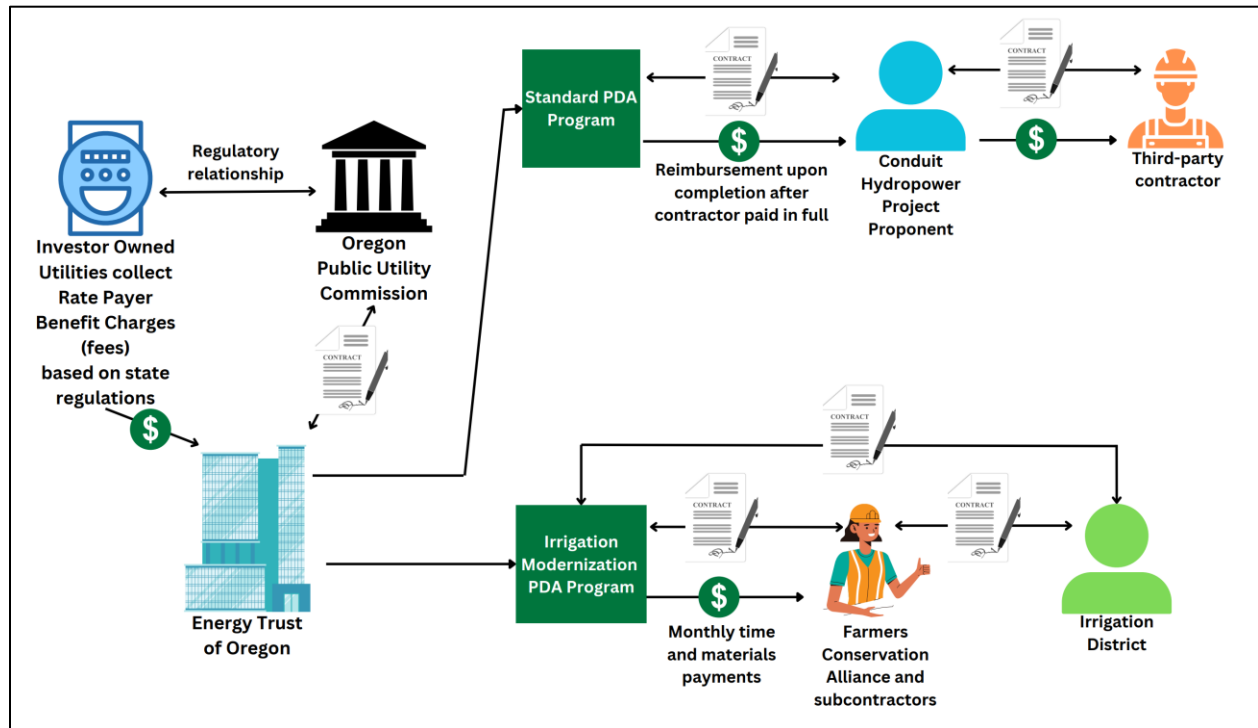


Figure 1. Contractual and Payment Differences in Energy Trust's PDA Programs

## Energy Trust PDA Metrics and Outcomes

Energy Trust staff provided several metrics that are helpful in building a further understanding of the overall reach and cost of their PDA programs.<sup>39</sup>

- Average time required for Energy Trust staff to approve or deny a PDA application once it is received: 4-8 hours
- Average number of projects supported with PDA annually (2015-2022): 25 total
  - Hydropower under Standard PDA: 9
  - Irrigation Modernization PDA: 16
- Average amount of PDA funding deployed to projects annually (2015-2022): \$1.28 million total
  - Hydropower under Standard PDA: \$135,000
  - Irrigation Modernization PDA: \$1.15 million
- Total number of hydropower projects that have reached commercial operation where Energy Trust provided an installation incentive (2008-2022): 19

<sup>39</sup> Personal communication with Dave Moldal, Senior Program Manager, November 9, 2023.

- Total additional funding leveraged by Farmers Conservation Alliance in support of Irrigation Modernization projects as a result of Energy Trust’s investments:<sup>40</sup> \$279 million

In 2022, Energy Trust published a review of the organization’s Irrigation Modernization Program (IMP), conducted through a contract with Apex Analytics, to better understand the program’s outcomes and potential from a market transformation perspective. The report<sup>41</sup> includes an important conclusion that speaks to the success of the program:

*“The IMP functions as a market transformation program, and its potential to expand available funding and support for irrigation modernization is central to its market transformation objectives. The scope of irrigation modernization projects is typically too large for an irrigation district to complete independently in a timely and comprehensive way. As a result, the most effective way to meet the market transformation objective of generating market-wide adoption that will extend beyond the program’s support is to build a network of organizations and funders working to support irrigation modernization. The IMP has done this successfully by demonstrating the specific benefits of irrigation modernization projects and generating a pipeline of projects ready to receive available support. Most notably, these efforts contributed to the reauthorization of the NRCS Watershed Protection and Flood Prevention Program (PL 83-566) funding, which has supported large numbers of irrigation modernization projects in Oregon and other states.”*

## Energy Trust’s Programmatic Learnings from PDA

Energy Trust’s 2022 annual report notes that one of the organization’s goals for to PDA is to, “learn about market factors that may need to be understood or addressed through other programmatic efforts.” The report goes on to provide a window into the learnings they gain through their PDA offering:

*“Energy Trust’s project development assistance incentive offer is designed to address development barriers and challenges. In 2022, lingering impacts on the supply chain from the pandemic, low avoided power prices and record high inflation presented market headwinds for hydropower and biopower. These barriers were present for some development assistance activities, slowing customer decision making and executing of feasibility studies.*

*The following summarizes barriers encountered in 2022:*

- ***Market conditions for distributed renewable energy generation in Oregon continue to be challenging.*** At all stages of the development process, project owners face poor market fundamentals, including persistent low avoided cost rates and high inflation causing increasing material, labor and consulting services costs. This has led to a long-term chilling effect for custom renewable energy project development. Utility interconnection for small-scale renewables continues to be time consuming and increasingly costly. This continues to reinforce project development assistance as an essential tool to attract investment in distributed energy resources.

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<sup>40</sup> Calculated by Farmers Conservation Alliance as of November 2023.

<sup>41</sup> Apex Analytics. (2022) Irrigation Modernization Program Market Transformation Assessment Final Report. [https://www.energytrust.org/wp-content/uploads/2022/06/Energy-Trust-IMP-MT-Assessment\\_Final-Report\\_june\\_6\\_2022.pdf](https://www.energytrust.org/wp-content/uploads/2022/06/Energy-Trust-IMP-MT-Assessment_Final-Report_june_6_2022.pdf)

- ***Early-stage development capital is scarce and high risk.*** Investing financial resources in renewable energy project development with above-market costs is often regarded as high risk. Investors are reluctant to commit funds into projects with unclear technical or financial viability, especially when a project is likely to have a lengthy return on investment. Without early-stage funding, a project cannot advance to the point where the risk is reduced. By providing early-stage funding, Energy Trust builds a pipeline and helps move projects forward, enabling them to attract additional financing and decide to proceed with construction. On the other hand, early-stage assessments may also help inform the market if a project is determined to not be technically or financially viable. Energy Trust helps project owners reach that point with less financial exposure.
- ***Project proponents whose primary business is not energy often encounter difficulties navigating the stages of project development.*** Energy Trust works with many project proponents (e.g., municipalities, private businesses, irrigation districts) that are not professional energy developers. Advancing a project through resource characterization, feasibility assessment, financing, permitting and interconnection can be lengthy and difficult. Project development assistance – both financial and technical – helps project proponents navigate these steps in less time and at a lower cost.”

Maintaining a close connection to on-the-ground activities enables Energy Trust staff to gain insights into the project development process, observing challenges, successes, and changes in the lay-of-the-land that may impact future projects. These insights helped the organization to build best practices, such as ensuring that project proponents working on interconnection activities always bring their own electrical engineer to all meetings with the utility, and led to the production of the written guides, linked below, to support project proponents:

- [Hydroelectric Permitting Handbook](#)
- [Interconnection Guidebook for Developers of Small Scale Renewable Energy Generation Systems](#)
- [Utility Interconnection for Small Renewable Energy Projects—Rules of Thumb, References, and Relevant Case Studies](#)

Dave Moldal, Energy Trust’s Senior Program Manager responsible for the conduit hydropower and irrigation modernization PDA programs provided the following statement for consideration:

*“Early-stage funding is critical to help advance distributed renewable energy generation and energy resilience project development. These resources are needed and vitally important to help customers determine a project’s technical and financial viability. A development assistance program must be easily accessible by the customer, but also include requirements that the customer has a vested interest and financial stake in the development step (e.g., cost-share obligation). For projects that would be publicly owned and provide community benefits, total eligible project funding should be increased, and cost-share reduced, versus privately developed for-profit renewable energy generation or resilience projects.”*

## Innovative characteristics in Energy Trust’s PDA that may be important for consideration

Energy Trust’s PDA programs supported the development and implementation of many hydropower and irrigation modernization projects in Oregon. The table below looks at individual features associated with Energy Trust’s PDA program designs that may have contributed to project installations.

Innovative Energy Trust Program Details
<b>Energy Trust’s programs have more than enough funding to meet demand, long-term stability, and are structured to operate in a non-competitive manner.</b> Energy Trust’s budget has enabled it to support all eligible conduit hydropower and irrigation modernization PDA requests in Oregon, at an average cost of ~\$1.3 million annually. Operating in a non-competitive manner is one of the foundations that enable many of Energy Trust’s other program design structures to function as intended.
<b>Ability to meet project proponents where they are, anywhere from concept to construction.</b> By offering flexible funding to support project development activities and funding for projects ready to move to construction and commercial operation, Energy Trust can support project proponents almost anywhere in the project life cycle.
<b>Open communication with project proponents.</b> Direct communication with project proponents is a relationship building opportunity that supports Energy Trust’s program efficiency by helping to weed out ideas that aren’t viable and directing project proponents through project development best practices. Supporting or guiding project proponents typically leads to higher quality applications, creates familiarity with project concepts and proponent strengths and weaknesses, thus decreasing risk, while increasing both the project proponent’s and Energy Trust’s staff capacity and knowledge over time. Often funders keep project proponents at arms-length believing this creates an equal playing field among program applicants. Energy Trust’s program demonstrates the upsides of direct communication.
<b>Energy Trust’s PDA program staff are well versed in project development processes,</b> enabling them to troubleshoot with project proponents, identify if proposals are reasonable or not and make suggestions about how to improve, and suggest best practices. In addition, the organization’s knowledgeable staff can connect project proponents with state/regional experts to go beyond their own subject matter expertise. This skillset and its direct application with project proponents supports risk reduction for both Energy Trust and project proponents.
<b>Ability to move quickly.</b> Energy Trust’s PDA programs are designed to enable fast approvals, in a matter of hours, to avoid creating delays for project proponents. In addition to the two characteristics noted above, this speed is created through several key features: <ul style="list-style-type: none"><li>• The program is always open to applications.</li><li>• The program uses simple, standardized, application-form-based contracts, eliminating time working with legal on individual projects or contracts.</li></ul>



- The program uses work orders under master contracts to enable quickly repeatable funding requests. Making it easy to access funding multiple times reduces risk by enabling project proponents to move through smaller chunks of work quickly, get answers, determine the next set of questions, and then come back for more funding. This avoids providing funding for activities that become irrelevant based on the outcome of an earlier activity.
- Program staff have all the authority they need to review and approve or deny applications.
- The program can use the organization's existing payment processing apparatus in place to support deployment of other grants. With a few exceptions, Energy Trust processes payments weekly throughout the year, minimizing funding gaps for project proponents.

**Match funding requirements.** Energy Trust requires 50% match in its "Standard" PDA program. In its 2022 annual report the organization notes, "*Project proponents have a significant financial stake in development activities, helping ensure that activities are necessary and fiscally prudent.*" This rationale is common among many funders, where there are concerns that providing 100% funding on a request exposes an organization to too much risk, or there is a belief that projects will be more successful if applicants have "skin in the game." However, not all Energy Trust programs require match funding, including Irrigation Modernization PDA, where the organization sees the lack of match as being important to the program's success.

In many cases, requiring match can mean project proponents will be required to seek and apply for funding from additional sources. This may be especially true in under-resourced rural or remote areas, potentially perpetuating past inequities. For project proponents that cannot provide their own match, seeking additional funding can significantly delay project progress, by as much as a year or more in this author's experience, which ultimately results in fewer successful projects.

**Payment timing.** Energy Trust's "Standard" and Irrigation Modernization PDA programs offer two different payment structures: reimbursement upon completion vs monthly progress payments for time and materials invoicing.

Reimbursements, while reducing organizational risk, limit participation to project proponents able to cash flow activities. Progress payments reduce this barrier but increase organizational risk that an activity could be partially or fully paid for and never ultimately be delivered. Up-front payments are not used by Energy Trust but would eliminate barriers for applicants while creating the most organizational risk.

## Appendix

Each of the documents listed below is attached to this PDF for viewing. To open the Attachments Panel, click Menu > View > Show/Hide > Side Panels > Attachments.

- Energy Trust form 910E - Enrollment
- Energy Trust form 930RF – Request for Funding
- Irrigation Modernization Program Market Transformation Assessment Final Report
- HydroSource data