Clean Energy-Related Economic Development Policy across the States: Establishing a 2016 Baseline

Jeffrey J. Cook
National Renewable Energy Laboratory

NREL is a national laboratory of the U.S. Department of Energy
Office of Energy Efficiency & Renewable Energy
Operated by the Alliance for Sustainable Energy, LLC

This report is available at no cost from the National Renewable Energy Laboratory (NREL) at www.nrel.gov/publications.

Technical Report
NREL/TP-6A20-67656
January 2017

Contract No. DE-AC36-08GO28308

NREL
NATIONAL RENEWABLE ENERGY LABORATORY

Clean Energy-Related Economic Development Policy across the States: Establishing a 2016 Baseline

Jeffrey J. Cook
National Renewable Energy Laboratory

Prepared under Task No. EP61.0101

NREL is a national laboratory of the U.S. Department of Energy
Office of Energy Efficiency & Renewable Energy
Operated by the Alliance for Sustainable Energy, LLC

This report is available at no cost from the National Renewable Energy Laboratory (NREL) at www.nrel.gov/publications.

National Renewable Energy Laboratory
15013 Denver West Parkway
Golden, CO 80401
303-275-3000 • www.nrel.gov

Technical Report
NREL/TP-6A20-67656
January 2017

Contract No. DE-AC36-08GO28308

This report is available at no cost from the National Renewable Energy Laboratory (NREL) at www.nrel.gov/publications.

Available electronically at SciTech Connect http:/www.osti.gov/scitech

Available for a processing fee to U.S. Department of Energy and its contractors, in paper, from:

U.S. Department of Energy
Office of Scientific and Technical Information
P.O. Box 62
Oak Ridge, TN 37831-0062
OSTI http://www.osti.gov
Phone: 865.576.8401
Fax: 865.576.5728
Email: reports@osti.gov

Available for sale to the public, in paper, from:

U.S. Department of Commerce
National Technical Information Service
5301 Shawnee Road
Alexandria, VA 22312
NTIS http://www.ntis.gov
Phone: 800.553.6847 or 703.605.6000
Fax: 703.605.6900
Email: orders@ntis.gov

Cover Photos by Dennis Schroeder: (left to right) NREL 26173, NREL 18302, NREL 19758, NREL 29642, NREL 19795.

NREL prints on paper that contains recycled content.

Acknowledgments

Support for this work was provided by the U.S. Department of Energy Office of Energy Policy and Systems Analysis under the leadership of Kate Marks. The author is indebted to Elizabeth Doris of the National Renewable Energy Laboratory (NREL) for her early and frequent input on the scope, design, and structure of this report and to Alfred Hicks of NREL for his graphics work. The Center for the New Energy Economy (CNEE) provided assistance and access to critical data for this report from their Advanced Energy Legislation Tracker database. I would also like to thank the interviewees that offered their time and insight regarding the three case studies included in this report. Finally, I would like to thank the reviewers for their detailed and insightful comments that strengthened this report, including Elizabeth Doris (NREL), Kristin Gray (NREL), Barbara Greene (Business Oregon), Steve Hill (Diversify Nevada), Jeffrey Logan (NREL), Jeff Lyng (CNEE), Tom Plant (CNEE), and Paul Schwabe (NREL). Any errors are the author's.

Executive Summary

States implement clean energy-related economic development policy to spur innovation, manufacturing, and to address other priorities. This report focuses on those policies most directly related to expanding new and existing manufacturing. The extent to which states invest in this policymaking depends on political drivers and jurisdictional economic development priorities. To date, no one source has collected all of the clean energy-related economic development policies available across the 50 states. Thus, it is unclear how many policies exist within each state and how these policies, when implemented, can drive economic development. Establishing the baseline of existing policy is a critical first step in determining the potential holistic impact of these policies on driving economic growth in a state. The goal of this report is to document the clean energy-related economic development policy landscape across the 50 states with a focus on policy that seeks to expand new or existing manufacturing within a state. States interested in promoting clean energy manufacturing in their jurisdictions may be interested in reviewing this landscape to determine how they compare to peers and to adjust their policies as necessary.

This report documents over 900 existing clean energy-related economic development laws, financial incentives (technology-agnostic and clean energy focused), and other policies such as agency-directed programs and initiatives across the states (see Figure ES-1). The top five states, in terms of total existing policies are:

- New York (42)
- Virginia (39)
- Oregon (36)
- California (35)
- Maryland (33)

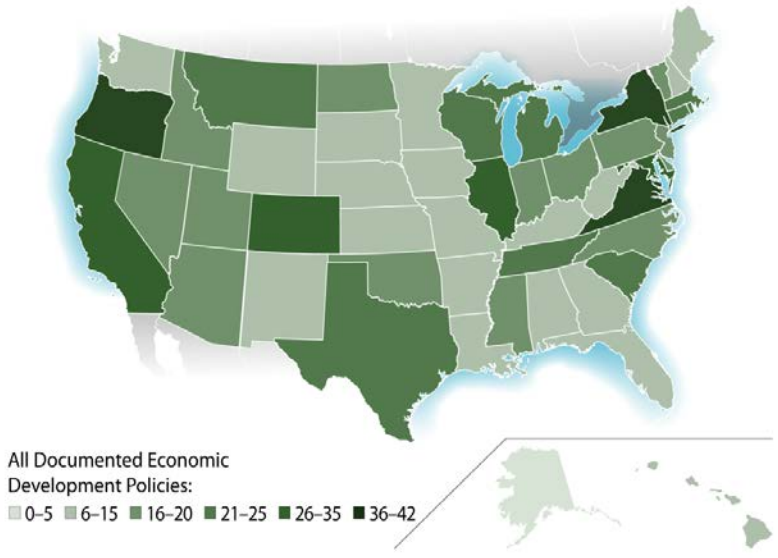

Figure ES-1. Documented numbers of economic development policies in U.S. states

The policies are distributed across three categories as follows:

1. State financial incentive programs (technology-agnostic [322] and clean energy-related [263]) are the most prevalent existing policy option used to spur economic development. Manufacturing recruitment, a traditional role of states in economic development across multiple fields, comprises 27 of these policies.
2. Other policy, generally spurred from executive action or previously existing authority, (188) is the second most frequent economic development policy offered by states. For example, six states have adopted clean energy manufacturing incubators or research centers with missions to spur technology innovation and subsequent manufacturing within their states.
3. Enacted legislation (138), though less frequently adopted, may generate long-term impacts on economic development, particularly through workforce development and training programs designed to prepare state citizens for a clean energy-driven economy.

These findings indicate states are actively implementing policies and programs to incentivize clean energy-related economic development using a variety of strategies. Some states target specific manufacturing opportunities and some are more generalized and opportunistic. This baseline does not attempt to explain policy effectiveness or the net benefit states may receive from implementing these policies. To explore the role and impact of state-driven clean energy-related economic development policies, this report includes three cases studies: the Tesla Gigafactory in Nevada, the Pacific Northwest Manufacturing Partnership, and the Maryland Clean Energy Center. In each case, state policymakers' actions have fostered economic development. Despite the variation in strategies used, four common themes emerged on the role states can play to foster economic development, including:

- Providing in-depth information to manufacturers and consumers
- Emphasizing collaboration and partnerships to achieve common goals
- Leveraging local competitive advantages to spur development
- Securing funding to carry out development priorities.

Securing funding for economic development priorities was a consistent challenge across the three cases. This challenge is likely to persist given state budget constraints. The baseline of policy documented in this report is a necessary step in evaluating the impact of these policies and their associated return on investment. Research along these lines should aid policymakers in their budget allocation processes. As the cases highlight, various factors can influence economic development outside the policy structure, including geographic, energy, and labor force characteristics, among others. Assessing the role of policy in relation to these other factors will be necessary to clarify its importance and determine the net benefit of economic development investments.

Table of Contents

List of Figures

1 Introduction

State policymakers have increasingly been driving economic development through the clean energy sector (NGA 2011, 2014). This activity coincides with growing job and economic impacts associated with clean energy deployment (Heeter et al. 2014; Navigant Research 2016; The Solar Foundation 2016). As one example, state renewable portfolio standards have supported over 200,000 gross jobs and investment exceeding $20 billion in gross domestic product (Wiser et al. 2016).

To date, no one source collects all the clean energy-related economic development policies available across the states. Thus, it is unclear how many policies exist within each state and how these policies, when implemented, can drive economic development. Establishing this baseline is a critical first step in determining the potential holistic impact of these policies on driving economic growth in a state. This report addresses this gap through an analysis of recently adopted legislation, existing financial incentives, and other policy such as executive orders or administrative programs related to fostering clean energy manufacturing. The goal is to offer a contemporary picture of clean energy-related economic development policy across the states. To begin to understand the potential impact of these policies and the role that state governments can play in driving economic development more broadly, this report includes three case studies addressing policy activity in Maryland, Nevada, and Oregon. These case studies describe how states have leveraged various economic development tools to foster clean energy manufacturing and by, extension, economic development.

Overall, state policymakers and other stakeholders may wish to review the policy landscape documented in this report to determine how they compare to their peers. Moreover, the common themes and challenges outlined in the case studies may serve as guideposts for policymakers as they consider the available policy options to address clean energy-related economic development in their states. This report can also serve as a foundation for understanding the holistic impacts of policy decisions on driving clean energy-related economic development.

2 Methods

Establishing a baseline of clean energy-related economic development policy is challenging. First, no universal definition of clean energy exists; rather it is defined differently from state to state (Wasserman et al. 2014). This reality makes it difficult to conduct a uniform analysis of clean energy-related economic development policy across the states.

Second, no individual database tracks all clean energy-related economic development policy. The author identified five different databases that track clean energy or economic development policy in some fashion. Some of these focus on legislative activity (CNEE 2013a; NCSL 2016), others focus on financial incentives (DSIRE 2016; BLS & Company 2016), while some attempt to cover these and other actions (NGA 2015).

The scope, content, and historical coverage of these databases vary. For example, the National Governors Association (NGA) State Clean Energy Actions Database (NGA 2015) is the most comprehensive of the databases. It tracks state clean energy policy actions from 2008 to 2015. Though the database includes a lot of valuable information, it does not include policies adopted in 2016. Nor does it identify those policies, programs, and initiatives that may have expired, been repealed, or otherwise no longer exist. And, comparisons with other databases reveal gaps in the NGA data.

Given these challenges, and because a wide variety of policies may have an economic development component, it is necessary to draw boundaries around what policy is covered. For this reason, this analysis focuses on identifying the clean energy-related economic development policy directed at fostering new and expanded manufacturing or business development within the states. Moreover, it focuses on three policy areas: legislative activity, financial incentives, and other policy.

2.1 Generating the Baseline

To build the baseline, the author leveraged third-party databases and a web-based archival records search. One or two databases served as cornerstones for each of the legislative, financial incentive, and other policy components that comprise the broader clean energy-related economic development policy landscape. Each component requires a somewhat different methodology and is discussed in turn in this section.

2.1.1 Recent Legislative Activity

Since 2013, the Center for the New Energy Economy (CNEE) has tracked advanced energy[1] legislation through the Advanced Energy Legislation Tracker (AEL Tracker) (CNEE 2013a). CNEE categorizes legislation across ten categories, including economic development, energy efficiency, and electricity generation among others. Legislation included in the economic development category addresses education and workforce development, business attraction, research and development (R&D), and other economic development strategies (CNEE 2013c).

[1] The CNEE definition of advanced energy includes "energy efficiency, demand response, natural gas electric generation, solar, wind, hydro, nuclear, electric vehicles, biofuels and smart grid" (CNEE 2013b, para. 1).

CNEE offered the author access to all of the introduced and enacted economic development bills included in the AEL Tracker (as of June 1, 2016) for use in this report. This legislation served as the foundation to determine the quantity of clean energy-related economic development legislation adopted across the states.[2]

To be clear, policymakers enact policy to achieve a variety of goals. For example, policies that mandate the establishment of markets, such as renewable portfolio standard programs, also spur economic development (Heeter et al. 2014; Wiser et al. 2016). CNEE attempts to categorize legislation by best fit. CNEE categorizes a law addressing renewable portfolio standards as an electricity generation policy as opposed to economic development (CNEE 2013c). This is one reason why this report emphasizes policy directed at expanding new or existing manufacturing, which is more closely aligned with this and other database's definition of economic development policy.

2.1.2 Financial Incentives

The North Carolina Clean Energy Technology Center's Database of State Incentives for Renewables & Efficiency (DSIRE)[3] has tracked financial incentives for renewable energy and energy efficiency since 1995. DSIRE tracks and categorizes financial incentives available by technology, eligible sector, and incentive type. For this report, the author documented all incentives offered by state governments to the industry sector by incentive type.

Outside these renewable and energy efficiency specific incentives, states offer a variety of technology-agnostic incentives to prospective or existing manufacturers to support economic development. For these incentives, any manufacturer can apply regardless of the product produced. Biggins Lacy Shapiro & Company (BLS & Company) tracks these incentives within its State Economic Development Incentives Knowledge Center (BLS & Company 2016a) and these incentives are also documented in this report.

2.1.3 Other Policy Activity

As noted, the NGA has tracked a wide variety of state policy actions, including executive orders, legislation, and other policy actions such as administrative policies, programs, and initiatives that address similar clean-energy technologies to those included in AEL Tracker.[4] NGA published the most comprehensive listing of these policies by state in 2011 (NGA 2011). Those policies still in effect as determined by web-based searches were documented by state. And, those policies that had expired, been repealed, or were determined to otherwise no longer exist were excluded.[5]

---

[2] The National Conference of State Legislatures (NCSL) has also tracked energy and environmental legislation—since 2008—but this database does not allow for a similar search for economic development-related legislation (NCSL 2016). To cross reference and augment the enacted legislation identified via the AEL Tracker analysis, the author searched for the keyword term "economic development" within the NCSL energy and environmental legislation database for legislation enacted from 2013 to 2016. Any relevant legislation identified that was not included in AEL Tracker was added to the CNEE-generated data set.

[3] See http://www.dsireusa.org/.

[4] NGA relies on state clean energy definitions to populate its database (Wasserman et al. 2014; NGA 2015).

[5] Any policy or program listed in NGA (2011) was searched in a time-limited Google search for webpage "hits" after January 1, 2012. A webpage hit documents an updated webpage or newspaper article, if no webpage hit appeared for a policy in the time-limited Google search, that policy was identified as no longer existing.

To identify the policies that have since been adopted and remained in existence in 2016, the author first reviewed the state clean energy policy actions documented for 2013–2015 in the NGA database. Those policies that still existed as of June 1, 2016 were added to each relevant state.[6]

The number of policies included in the NGA database declined year over year from 2013 to 2015. The author augmented and updated these actions to reflect the contemporary state of clean energy-related economic development policy through a 50 state web-based record analysis from 2012 to 2016 based on the following keywords:

- [state] "clean energy" and "economic development"
- [state] "advanced manufacturing" and "economic development"
- [state] "green jobs"
- [state] economic development incentives.

The author followed links relating to these web searches to identify relevant state or quasi-state agencies to identify additional clean energy-related economic development policies. Those policies identified via these web searches were documented by state and then combined with the others (i.e., legislation and financial incentives) to establish the policy landscape for clean energy-related economic development.

2.1.4 Methodological Limitations Associated With this Baseline Analysis

Though this methodology was designed in an effort to build a comprehensive baseline of clean energy-related economic development policy, there are some limitations to the approach that are summarized in this section.

First, this report's focus on policies that support new or existing clean energy-related manufacturing limits the types of policies included. Employing a more flexible definition could broaden the policies included or vice versa. Using this somewhat limited definition was necessary to establish boundaries around the project and leverage available third-party data sets. Even with this definition, some analytical judgment is included in this report—particularly judgment relating to including policies considered "other policy" that support manufacturing.

Second, the use of third-party databases places a reliance on these sources to have complete and accurate records. In addition, policies adopted prior to the existence of these databases may still be in effect today and potentially not included in this baseline. Though this report does incorporate web-based archival research to identify policies that may have been missed by these databases, some may not be included.

Third, some policy duplication across the three categories may result in double counting in the baseline. More directly, a law passed to authorize a state agency to offer financial incentives for clean energy manufacturing would be documented in the legislative activity section and potentially again in the financial incentives section. The author identified and removed

[6] Legislation included in the NGA data set was cross referenced with the AEL Tracker data, and any legislative activity that was not already included in the AEL Tracker data set was added to the legislative data set.

duplicates where possible, but tracing statutory language through the implementation cycle can be challenging. Thus, some double counting might have occurred.

Finally, this report offers a snapshot in time of those policies that existed in 2016. Policy priorities, funding levels, and program offerings can change for various reasons. Therefore, this research can be used as a foundation to draw conclusions relating to policy impacts in the shorter term, but going forward, it may need to be revised to reflect shifts in the policy environment.

2.2 Examining the Link between State Policy and Clean Energy-Related Economic Development

By itself, the policy database developed in this analysis cannot explain policy effectiveness or the net benefit states may receive from implementing these policies. This is because the baseline does not document performance in terms of jobs created or technologies deployed and it does not account for other factors (e.g., geography, demographics, or spending) and policies that may influence performance.

A comprehensive analysis to evaluate the performance of these policies in driving economic development is outside the scope of this report. Nevertheless, the report includes three case studies that demonstrate how states have used certain policy levers to support clean energy-related economic development policy and to determine their effect. This section explores the role and impact of state policy on achieving economic development priorities as well as the factors that impact implementation.

The three cases selected for this project were the Tesla Gigafactory for lithium-ion batteries in Nevada, the Pacific Northwest Manufacturing Partnership, and the Maryland Clean Energy Center. These cases were selected because they offer geographic diversity and address different areas, including transportation, buildings, and business development respectively. In addition, each case reveals different policy options states can deploy to achieve outcomes. And, the conclusions drawn from the three case studies demonstrate the role state policy can play in shaping economic development outcomes in a state.

To generate the case studies, the author relied on archival—primarily web-based—research to provide context for each of the cases, including the history, timeline, and state involvement. These data were augmented by telephone interviews with nine individuals that have unique, expert knowledge regarding one of the three cases.[7] The interviewees also offered insights regarding best practices and lessons learned across the cases.

[7] The individuals interviewed for this study remained anonymous, so they could speak candidly about each case.

3 Establishing the Policy Landscape

Employing the methodology describe in Section 2, 911 economic development policies were identified that address clean energy across the 50 states. New York had the most policies (42), followed by Virginia (39), Oregon (36), California (35), and Maryland (33) (Figure 1).

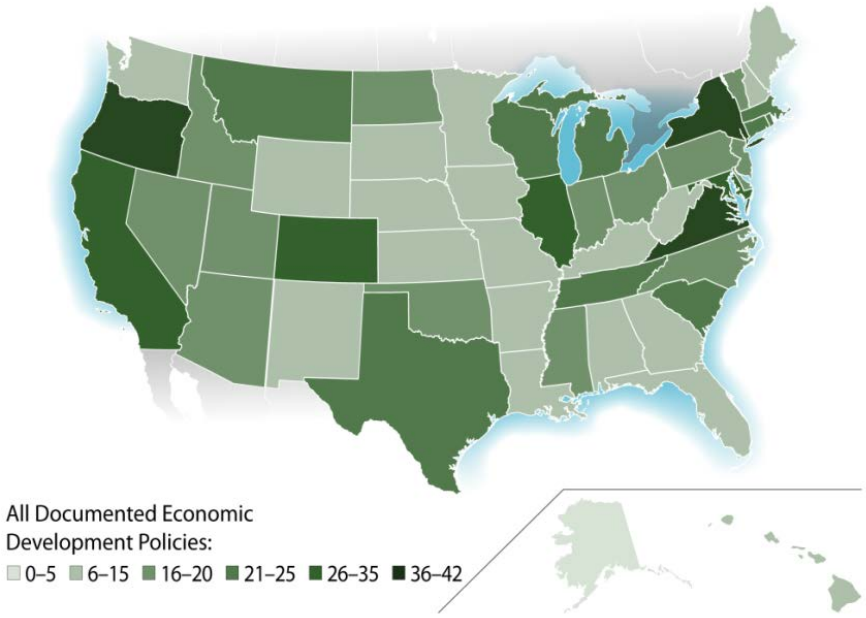

Figure 1. Documented numbers of economic development policies in U.S. states

Overall, technology-agnostic incentives were the most common policy identified across the states, followed by renewable and energy efficiency incentives. In comparison, enacted legislation was the least common policy identified (Figure 2). Each of these policy categories along with specific state examples are discussed in order in this section.

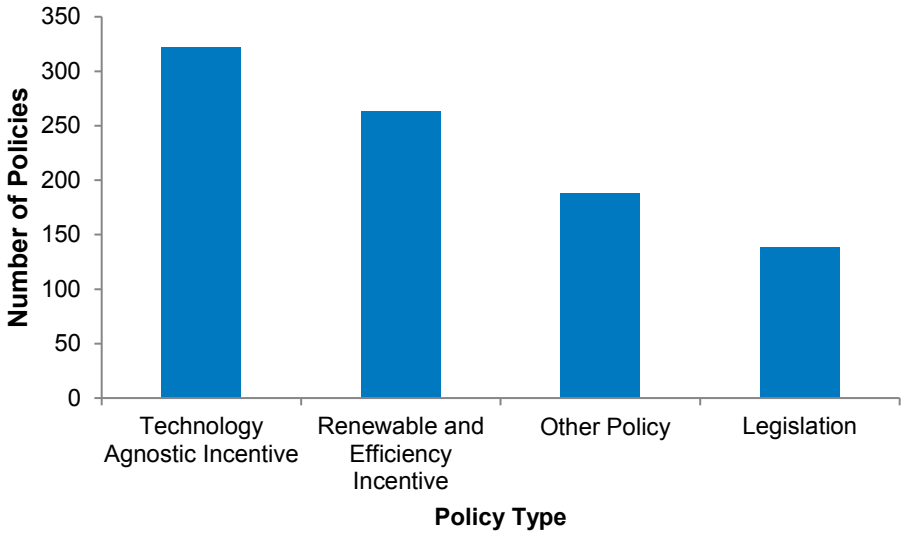

Figure 2. Clean energy-related economic development policy by type

3.1 Financial Incentives

Nearly 600 financial incentives are available to clean energy manufacturers across the states. About 55% of these incentives are technology-agnostic. The other 45% of these incentives are specifically directed at certain clean energy technologies. Ten percent (27) of the documented financial incentives for clean energy are directed at industry recruitment specifically. This section discusses the distribution and content of these various incentives.

3.1.1 Technology-Agnostic Incentives

States offer a variety of incentives directed at recruiting industry and manufacturing facilities to locate in their respective jurisdictions. BLS & Company tracks 322 such incentives, and the distribution of these incentives is reflected in Figure 3. Rhode Island leads with 13 financial incentives, followed by Idaho (11), Virginia (11), Montana (10), and South Carolina (10).

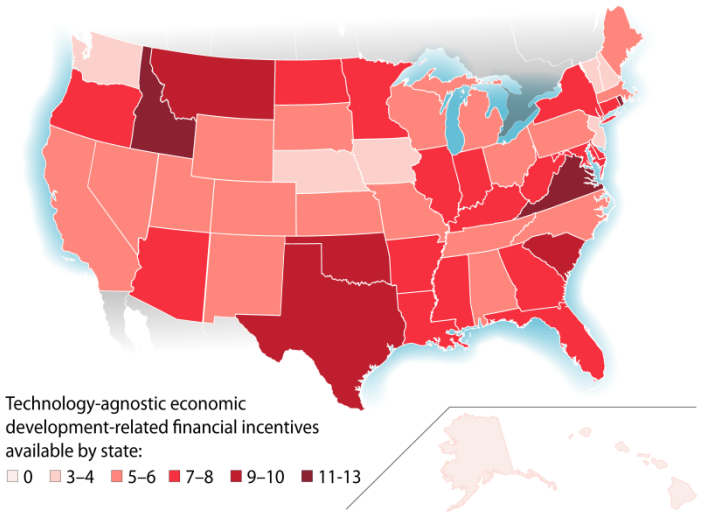

Figure 3. Technology-agnostic economic development-related financial incentives available by state

Adapted from BLS & Company 2016a

The types of incentives offered vary by state, but this report highlights those in Rhode Island and Idaho to offer some perspective on this variation. Rhode Island grants several tax credits and exemptions relating to job expansion, job training, and supply chain relocation, and other considerations (BLS & Company 2015). In addition, the state offers grants and loans for gap financing, start-ups, and industry clustering, and other purposes. Finally, the state provides tax increment financing[8] and funding for commercial redevelopment in certain areas of the state (BLS & Company 2015).

[8] Tax increment financing (TIF) is a funding tool with which a state or local government establishes a specified geographic area as a TIF district. If investment or growth in that district results in increased property tax revenue, a portion of those revenues can be fed back into development projects within the TIF district.

As was the case for Rhode Island, Idaho offers a range of tax credits for job expansion, investment, and R&D (BLS & Co. 2016b). The state also provides grants for workforce training and infrastructure improvements. In a unique departure from Rhode Island, however, Idaho caps property taxes for certain large businesses and employers (BLS & Co. 2016b).

3.1.2 Renewable and Efficiency-Related Incentives

In addition to these technology-agnostic incentives, DSIRE tracks 263 renewable and energy efficiency financial incentives provided by states to industrial and commercial entities. The total count of incentives across each state is documented in Figure 4. New York offers the most incentives with a total of 18, followed by Maryland (14), Oregon (13), New Jersey (11), and Wisconsin (11).

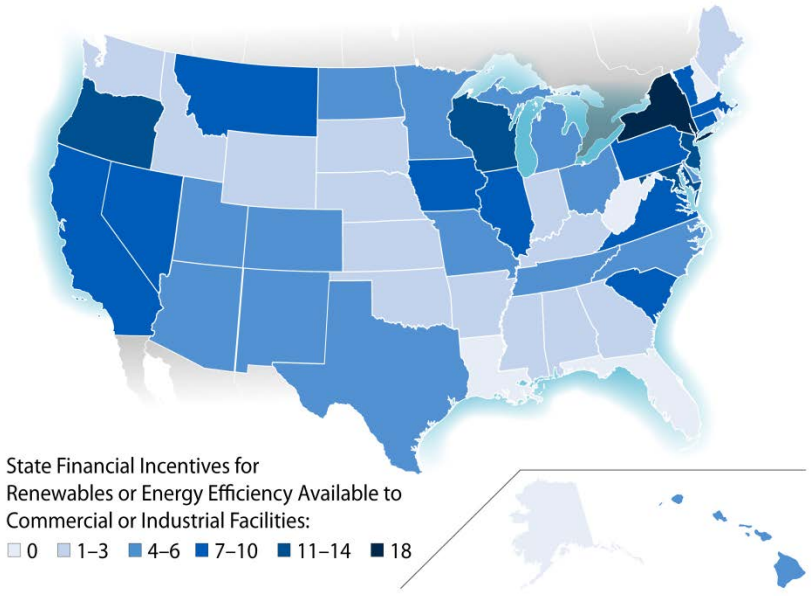

Figure 4. State financial incentives for renewables or energy efficiency available to commercial or industrial facilities

Adapted from DSIRE 2016

There is significant variation in the financial incentives offered, as is reflected in Figure 5. Tax incentives are the most common incentive; typically, industrial facilities use them to procure renewable generation. Loans and rebate programs are the second and third most common incentives identified across the states.

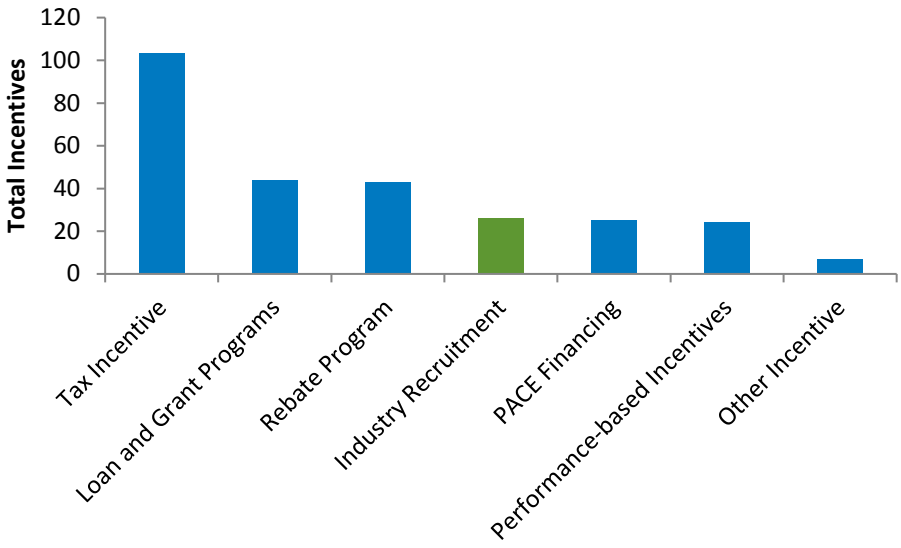

Figure 5. State financial incentives for renewables or energy efficiency available to commercial or industrial facilities by type

PACE = property-assessed clean energy

Adapted from DSIRE 2016

Most notable from an economic development perspective are the 27 incentives directed toward renewable and energy efficiency industry recruitment and support. These incentives are distributed across 19 states (Figure 6).

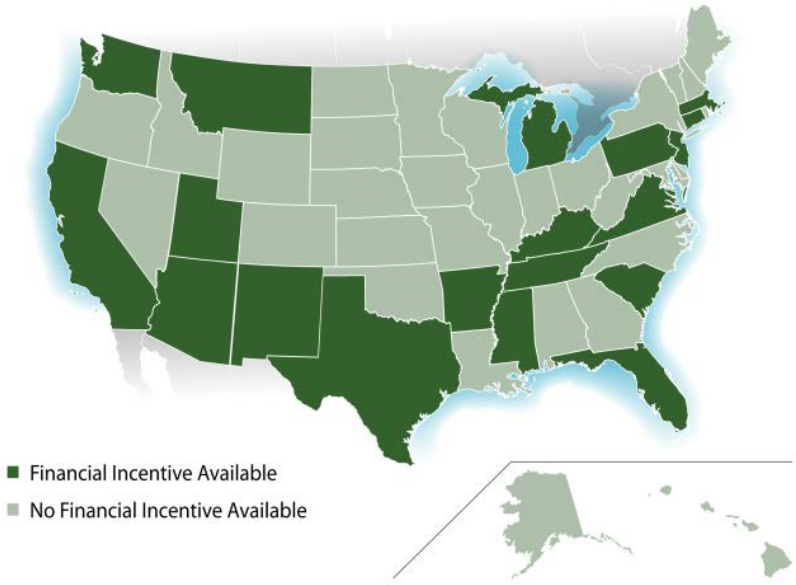

Figure 6. States that offer at least one industry recruitment financial incentive for renewable or energy efficiency-related manufacturing

Adapted from DSIRE 2016

Twenty-three of these incentives are tax incentives for manufacturing facilities. For example, Arkansas' wind energy manufacturing incentive applies to facilities that invest at least $150 million and hire 1,000 new employees within six years,[9] and Michigan's Renewable Energy Renaissance Zone Program exempts certain businesses from paying corporate, education, or property taxes among others provided they site facilities within certain jurisdictions.[10]

The remaining four incentives are a mix of loan and grant programs, such as New Jersey's Edison Innovation Green Growth Fund, which offers loans to "proof of concept" products[11] and Pennsylvania's Wind and Geothermal Industry Incentive program, which offers loans, grants, and loan guarantees for certain costs, including equipment purchases among others.[12]

3.2 Other Policy Activity

A total of 188 executive orders, programs, initiatives, and other clean energy-related economic development policies were identified across the states. New York had the most such policies with 16, followed by California (12), Illinois (10), Virginia (9), Massachusetts (9), and Michigan (9) (Figure 7).

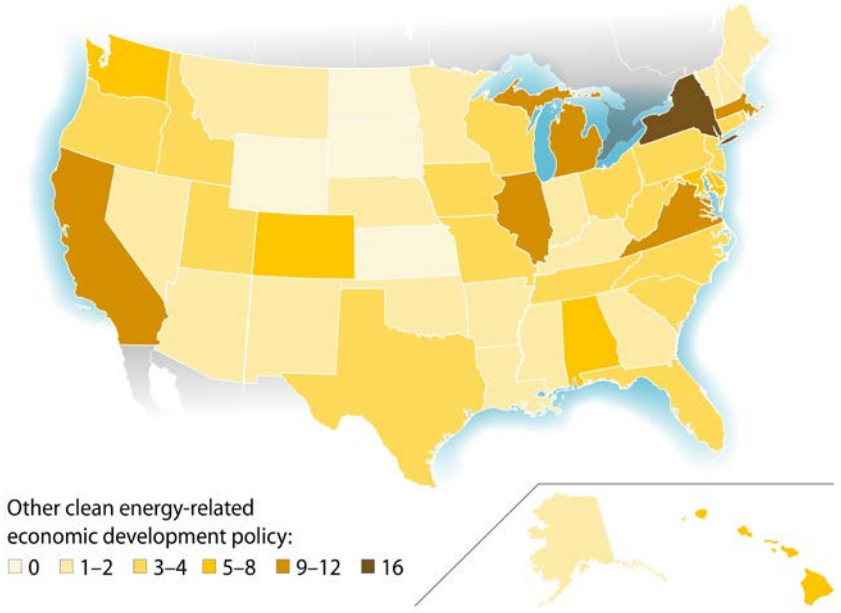

Figure 7. Other clean energy-related economic development policy

Though there was significant variation across the intent of these policies, a few notable themes were identified. First, some states are active via energy planning; examples include activities underway in Illinois and recently completed in Iowa, Missouri, and West Virginia.[13] These activities result in the publication of an energy plan. Though these documents can cover a variety

[9] See Wind Energy Manufacturing Tax Incentive here: http://programs.dsireusa.org/system/program/detail/4153.
[10] See Renewable Energy Renaissance Zones here: http://programs.dsireusa.org/system/program/detail/3216.
[11] See Edison Innovation Green Growth Fund Loans here: http://programs.dsireusa.org/system/program/detail/4848.
[12] See Wind and Geothermal Incentives Program here: http://programs.dsireusa.org/system/program/detail/3220.
[13] See Illinois Department of Commerce & Economic Development (2016); Iowa Economic Development Authority and Iowa Department of Transportation (2016); Missouri Department of Economic Development Division of Energy (2015); and West Virginia Division of Energy (2013).

of topics such as energy procurement and infrastructure development, they often emphasize the economic implications of future energy development and use within a state.

Another theme was the focus of some states on pollution prevention, a type of industrial energy efficiency. For example, Idaho, Michigan, and Tennessee have award programs that honor facilities that increase manufacturing efficiencies and drive down pollution.[14] Michigan also offers small business pollution prevention loans of up to $400,000 for certain practices including conserving energy.[15]

Finally, some states— including Hawaii, Maryland, Massachusetts, New York, Virginia, and Wisconsin—have adopted clean energy centers or clean energy technology incubators to help start-ups commercialize technology and address other priorities.[16] The activities of the Maryland Clean Energy Center in particular are discussed in detail in Section 4.

3.3 Legislative Activity

Finally, 858 bills addressing economic development were introduced between 2013 and 2016 and are documented in CNEE's AEL Tracker. Over that period, 138 unique bills were enacted.[17] As illustrated in Figure 8, total enacted legislation has declined year over year since a high in 2013. Hoffer et al. (2016) note this decline, but they do not speculate on its cause and only note that a decline in enacted legislation is a common trend across the other policy categories tracked by CNEE.

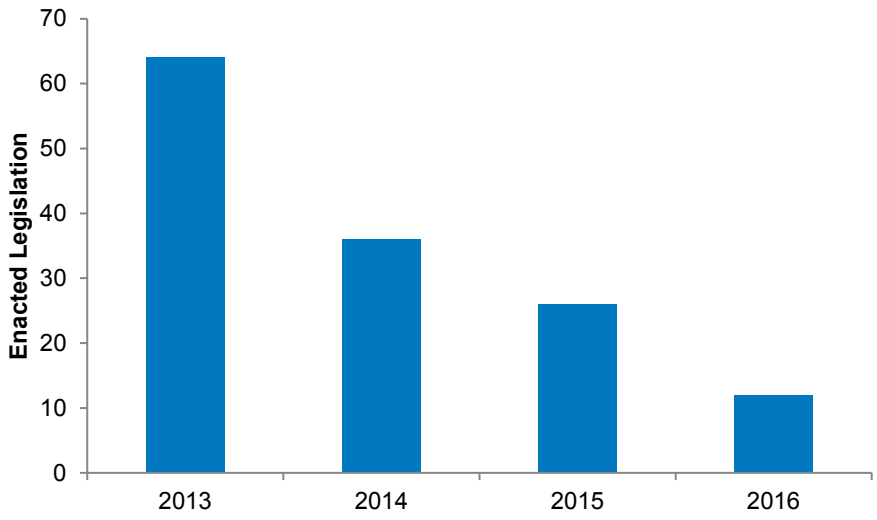

Figure 8. Enacted clean energy-related economic development legislation, 2013–2016

Adapted from CNEE 2013a

[14] See Idaho Governor's Office of Energy and Mineral Resources (2016), Governor's Energy Excellence Awards (n.d.), and Tennessee Department of Environment & Conservation. (n.d.)
[15] See Michigan Department of Environmental Quality (2016).
[16] See Hawaii Clean Energy Initiative (n.d.), MCEC (2014a), Massachusetts Clean Energy Center (n.d.), NYSERDA (n.d. 1), Virginia Offshore Wind Development Authority (n.d.), and Midwest Energy Research Consortium (n.d.).
[17] Companion bills are not double counted.

Some state legislatures have been more prolific adopters of clean energy-related economic development legislation than others (Figure 9). The top five states in terms of enacted legislation include Virginia (12), Oregon (11), Colorado (11), California (9), and Tennessee (8).

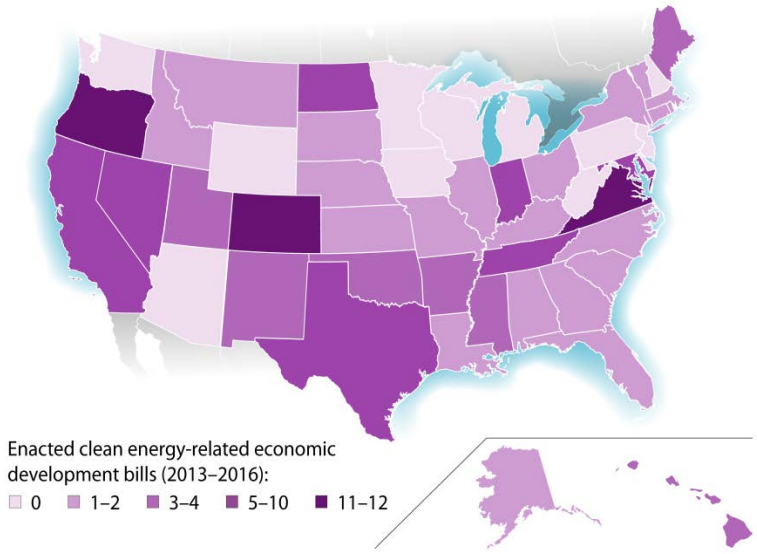

Figure 9. Enacted clean energy-related economic development bills, 2013–2016

Adapted from CNEE 2013a

Such legislation addresses a wide variety of topics, but the three most common are (1) incentives, (2) education and workforce, and (3) R&D policy (Figure 10). In fact, these three policy categories account for almost 75% of all enacted legislation. Therefore, this report briefly discusses some of the policies within these three categories.

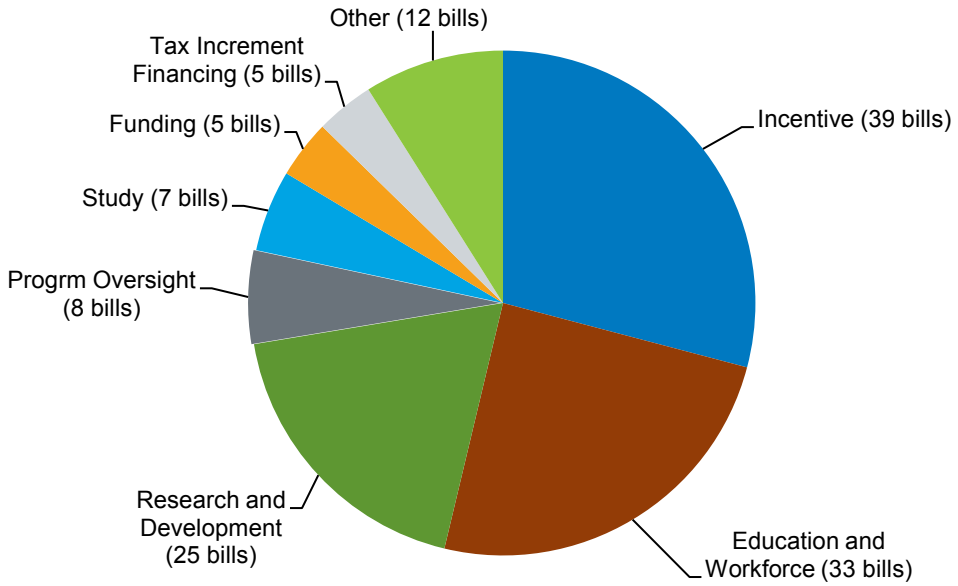

Figure 10. Enacted clean energy-related economic development legislation by policy type, 2013–2016

Adapted from CNEE 2013a

Incentive policy is the most common policy type enacted in the CNEE data set. This category includes financial incentives such as tax credits for certain manufacturers to site facilities within a state. For example, Colorado HB 14-1012, which was enacted in 2014, offered a tax credit for investments made by qualified advanced industries including energy.[18] In comparison, Virginia HB 1327, which was enacted in 2013, established one-time grants for certain manufacturers (including those engaged in offshore energy exploration or extraction), based on employees hired.[19]

The second most common policy enacted across the states addresses education and workforce initiatives. For example, Louisiana's HB 1033, which was enacted in 2014, established higher education funding for certain high demand degree programs and required a workforce gap analysis in the state.[20] Another bill included in this category is New Mexico's HB 182, which was also enacted in 2014. It created a new apprenticeship council to establish standards for apprenticeship programs including on-the-job training requirements.[21]

[18] See the bill language at http://www.leg.state.co.us/clics/clics2014a/csl.nsf/fsbillcont3/3E0C1FAACA18FD9187257C43006371D5?open&file=1012_enr.pdf.pdf. This bill was also highlighted in Hoffer et al. (2014).
[19] See the bill language at http://lis.virginia.gov/cgi-bin/legp604.exe?131+ful+CHAP0549.
[20] See the bill language at http://www.legis.la.gov/Legis/ViewDocument.aspx?d=915596. This bill was also highlighted in Hoffer et al. (2014).
[21] See the bill language at https://www.nmlegis.gov/Sessions/14%20Regular/final/HB0182.pdf.

The R&D category is the third most common enacted policy. Oregon SB 737 is included in this category. Enacted in 2013, the law established the Oregon Ocean Science Trust to fund research employing innovative and collaborative approaches to study and monitor Oregon's ocean and coastal resources.[22] Hawaii's HB 1513 is also included in this category. Enacted in 2015, this bill requires the High Technology Development Corporation to provide matching alternative energy research grants to Office of Naval Research awardees.[23]

[22] See the bill language at https://olis.leg.state.or.us/liz/2013R1/Downloads/MeasureDocument/SB737/.
[23] See the bill language at http://www.capitol.hawaii.gov/session2015/bills/HB1513_CD1_.PDF.

4 Examining State Policy and Clean Energy-Related Economic Development

The baseline analysis illustrates that states have adopted a wide variety of clean energy policies to support economic development. Though evaluating the cumulative impact of these actions or the role of multiple policies on influencing a manufacturer's decision to locate in a certain state, is outside the scope of this report, it is possible—via a more limited case study analysis—to illustrate the role that these policies might play in securing new manufacturing and achieving broader economic development goals.

This section describes the three case studies conducted for this baseline analysis. These case studies describe how Maryland, Nevada, and Oregon leveraged various economic development tools to foster clean energy manufacturing and by extension economic development. The conclusions from this section can be used to aid policymakers in their decision making processes. The three cases studies include the Tesla Gigafactory in Nevada, the Pacific Northwest Manufacturing Partnership, and the Maryland Clean Energy Center. Each case emphasizes the role that state policy and state governments more generally played in influencing the outcome. The section concludes with a discussion of lessons learned from these cases that could help policymakers in other states make more informed economic development policy decisions that relate to clean energy.

4.1 Tesla Gigafactory (Nevada)

As noted in Section 3, financial incentives are the most common economic development policy in place to promote clean energy manufacturing, or manufacturing more generally. State-authorized financial incentives proved important for the state of Nevada to land the Tesla Gigafactory in 2014. This case illustrates how financial incentives in tandem with other state activities and external factors impacted this manufacturer's decision to locate in the state.

Tesla Motors (Tesla) began pursuing a location for its proposed five million square foot lithium ion battery factory in 2013 (Business Facilities Editorial Staff 2015, personal communication). The $5 billion facility is expected to produce 500,000 battery packs annually by 2020 and host 6,500 long-term jobs. These long-term jobs along with the 13,000 construction-related jobs would serve as a strong economic driver for the local economy (Business Facilities Editorial Staff 2015, personal communication).

Tesla executives reportedly expected the winning state to—at a minimum—offer incentives worth about 10% of the total cost of the project or about $500 million in incentives to secure the facility (Baker 2014; Damon 2014). And, Tesla was reportedly interested in states with an appropriate climate and terrain for powering the facility from renewable sources such as wind or solar (Woodyard 2014) and the ability to permit construction quickly (Baker 2014).

By 2014, at least five states were competing to land the Tesla facility (Edelstein 2014; Woodyard 2014). As the bidding process unfolded, speculation began that possibly two states (Nevada and Texas) had made the shortlist (Gaar 2014). Nevada was considered a frontrunner in the project, because Tesla had scouted the state and broken ground at a possible site outside Reno in

February 2014 (Baker 2014).[24] In July 2014, Tesla CEO Elon Musk contended Tesla would conduct similar activities in one or two other states as well (Baker 2014). Tesla did evaluate a location near Austin, Texas that local officials considered the most pursued site outside of Reno (Gaar 2014). By September 2014, Tesla announced the agreement with Nevada to site the facility in Sparks, Nevada near Reno (Reno Gazette-Journal 2014).

A critical piece of the deal was the approximately $1.3 billion financial package, which was the largest in state history (Damon 2014). The package included significant sales and property tax abatement, along with various other tax incentives relating to jobs, business taxes, and electricity rates (Figure 11).

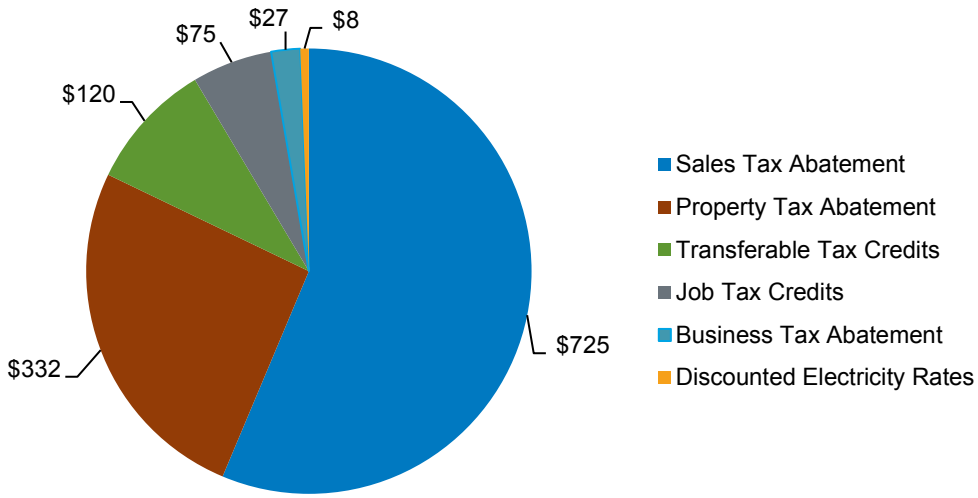

Figure 11. Nevada financial incentive package for Tesla Gigafactory (millions of dollars)

Adapted from Damon 2014

The incentives are distributed over 20 years, and Nevada requires Tesla to meet certain investment and employment thresholds over the life of the project to earn the full incentive package. If Tesla received the full incentive, Nevada estimated the project would provide $100 billion in economic benefits to the state (Damon 2014). This incentive package was reportedly lower than the financial package Texas was willing to offer, though the specifics of that competing package and others are not publically available (Gaar 2014). Despite this notable difference, according to the Reno Gazette-Journal (2014), Tesla CEO Musk said it was not just the incentives that won Nevada the facility and that other states had offered more attractive packages. According to Sieroty (2014), Musk said Nevada was a "really get things done state" and that impacted the company's decision to locate there. Interviewees for this report offered some insight regarding why the state received this moniker. First, interviewees noted that local officials worked with Tesla to streamline permitting processes. For example, Storey County, where the facility was located, has asserted that most grading permits in the county are finalized in seven days (Storey County, n.d.), a process that can take months in other locations (personal communication). In addition, Tesla staff had significant access to decision makers at

[24] Reno, Nevada was also in the process of rebranding itself as a high tech hub for businesses at the time (Searcey 2014).

the state and local levels who were committed to innovative problem solving. This included making changes to local construction inspector's shifts to allow for pouring concrete at night given the difficulty in setting concrete particularly during the hot summer months (Storey County staff, personal communication). Thus, Nevada's willingness to work with business in a possibly unorthodox way may have also helped the state land the facility.

Outside of these policy-related factors, Nevada also had other important, largely geographic benefits that likely influenced the decision. Nevada conducted a logistics analysis and determined that locating in the state could save Tesla an estimated $300 million in logistics costs as compared to other locations (Business Facilities Editorial Staff 2015, personal communication). This benefit was in part a function of Nevada's proximity to Tesla's home state of California, the project site's access to rail transportation, and a nearby lithium mine (Gaar 2014). Finally, Nevada's significant renewable resource potential also made the state attractive given Tesla's electricity procurement goals (Gaar 2014).

In summary, the financial incentive package offered by Nevada was important in landing the facility. Other state actions were also important, as alluded to in Tesla CEO Musk's stated interest to work with a "really get things done" state. This case thus illustrates that state policy can play a role in business attraction, and these activities can result in significant economic benefits. However, policymaker decisions were not the only factors that influenced Nevada's winning bid for this project, as the state benefitted from geographic proximity, a suitable location, and access to preferred power sources. Thus, evaluating the role of state policy in driving this decision requires attention to these other factors as well.

4.2 Pacific Northwest Manufacturing Partnership (Oregon)

As noted in Section 3, states can use various pathways to attract clean energy-related economic development that are outside the financial incentive approach leveraged in the Tesla case. Oregon and Washington's Pacific Northwest Manufacturing Partnership (PNMP) is one such example. In this case, the states did not secure new manufacturing, but instead sought to evaluate the potential market for manufacturing in the state. This initial market development research is another pathway by which states can achieve economic development priorities. Here, the state of Oregon in particular played a critical role in initially endorsing the partnership, fostering collaboration, and encouraging economic development that leverages local resources, namely timber.

The Pacific Northwest has a long history with the timber industry. At its height, the industry supported 70,000–80,000 jobs in Oregon alone (Lehner 2012). Since 2010, the industry has supported about 20,000 jobs in Oregon, and this decline has significant impacted largely rural economies in portions of the state (McDonald 2016). The partnership is a collaborative effort of communities, industry, government agencies, and research institutions across 17 counties in the two states, including those impacted by declines in the timber industry (Business Oregon, n.d. 1; Gardner 2015). It was founded in 2014 with the goal of enhancing manufacturing in the region. One pathway identified by the PNMP was the commercialization of cross-laminated timber, which is "an advanced wood product made of sheets of cross-hatched wood that can be cut into correct dimensions for wall, floor and ceiling panels" (Business Oregon, n.d. 2, para. 2). This product could potentially reduce material waste and construction times, while competing with steel and concrete as a building material. In addition, cross-laminated timber can be developed

by using lower grade timber and thus enhancing its appeal from a sustainability perspective (Business Oregon, n.d. 2). The commercialization and proliferation of this product in the U.S. market could drive significant economic investments in both Oregon and Washington (McDonald 2016).

In 2015, Oregon passed legislation lending support to the PNMP and its mission by developing the PNMP Advisory Committee, which is housed in the state agency Business Oregon.[25] The committee is charged with fostering collaboration to grow manufacturing in the region. An interviewee noted that the PNMP has a budget of about $127,000 to carry out this mission. To leverage additional funding and resources, the partnership sought a designation as one of 12 communities or regions in the federal Investing in Manufacturing Communities Partnership (IMCP) (Navas, Pair, and Grainger 2015).

The PNMP ultimately received the IMCP designation, which gives the partnership heightened access to federal personnel and grant funding (Economic Development Administration, n.d.). According to one interviewee with knowledge of the IMCP selection process, the state legislation added strength to the partnership's IMCP application, because it was the only applicant with a strong institutional structure. Leveraging these funding streams, PNMP was able to conduct its "catalytic project" focused on expanding the cross-laminated timber market (Business Oregon, n.d. 2). The project is being led by Oregon BEST[26] in partnership with the PNMP to achieve four objectives:

- Assess natural resource capacity
- Identify capable producers and local manufacturing capacity
- Quantify economic benefits
- Assess and work to overcome barriers to market.[27]

The overall project budget is approximately $204,000. According to an interviewee, the budget is a cost share between the federal government ($121,000) and a variety of state and academic institutions that is led by Oregon BEST and includes PNMP. This project will reveal the extent to which the Pacific Northwest could serve the future cross-laminated timber market and how to build that market.

One interviewee argued that absent the development and institutionalization of the PNMP and the IMCP designation the catalytic project may not have happened. Outside of the catalytic project, interviewees argued that the PNMP and its linkages to Business Oregon have offered a range of other important benefits, including serving as a formal means to fostering collaboration, a hub of information particularly for funding opportunities, and an access point to key federal support and expertise.

[25] See the bill language at http://www.oregon4biz.com/PNMP/docs/SB482E.pdf.
[26] Oregon BEST is a nonprofit organization in Oregon focused on fostering clean technology to spur economic development. For more information, see http://oregonbest.org/about-us/.
[27] For more information on these priorities, see Business Oregon n.d. 3.

Overall, this case offers a different perspective regarding the role state governments can play in driving economic development. Oregon policymakers did not attract a new facility, but rather they were interested in finding innovative pathways to spurring future manufacturing. The state then supported the development of the PNMP to determine what those pathways might be. Oregon has appropriated some funding to help the PNMP achieve its mission, and interviewees argued this initial investment was important in seeding research projects. Finally, Oregon's investment was lower than Nevada's was in the Tesla case, which illustrates that not all economic development policy activity comes at significant cost.

4.3 Maryland Clean Energy Center

The development of the Maryland Clean Energy Center represents a third approach to fostering economic development via a centralized quasi-state agency focused on clean energy business development. This example illustrates a novel and emerging approach that some states have taken to achieve economic development priorities. At the same time, this case highlights the potential importance of sustained funding to maximize effectiveness, should other states adopt this approach.

The concept for the Maryland Clean Energy Center (MCEC) came from an economic development potential study commissioned by the state. The authors of the report (Spears and Van Rest 2006) concluded that clean energy deployment could benefit Maryland through increased jobs and tax revenues. The report recommended the state establish MCEC as the focal point for clean energy industry expansion in the state, and the legislature established MCEC via HB 1337 in 2008. [28] The legislation directed MCEC to promote economic development and jobs through the deployment of clean energy technology.

This legislative directive charges MCEC to "advance clean energy and energy efficiency products, services, and technologies as part of a specific economic development strategy" (MCEC 2014a, para. 1). The center carries out this mission through efforts to create clean energy jobs, businesses, and commercialization of innovative clean energy technologies among other initiatives (MCEC 2014a). It is important to note the legislation did not establish a funding stream through the Maryland general fund for MCEC's activities. MCEC was intended to identify its own funding streams and could request funding from other state units such as the Maryland Energy Administration. MCEC's Fiscal Year (FY) 2015 Financial Statements showed the center has relied on Maryland Energy Administration funding, sponsorships, and energy savings revenue to support their activities (Mullen Sondberg Wimbish & Stone 2015).

With these resources, MCEC has focused its efforts on convening business interests and policymakers (MCEC 2014b), addressing financing barriers (MCEC 2014c), serving as an information hub (MCEC 2014d, 2014e), and offering business development and technology commercialization support.

[28] For the language of the bill, see http://mgaleg.maryland.gov/2008rs/bills/hb/hb1337e.pdf.

MCEC's business development activities are particularly novel. For example, MCEC supported the Maryland Clean Energy Technology Incubator, which offered start-up companies facilities to develop products. And, an entrepreneur-in-residence offered technical and business development assistance (MCEC 2014f). These companies could then also benefit from potential opportunities to collaborate with other entities across the Maryland technology incubation network.

An interviewee noted that MCEC funded the facility for three years, but MCEC did not allocate resources to this program in FY 2015 for lack of sufficient funds (Mullen Sondberg Wimbish & Stone 2015). When the program was operating, the incubator supported six start-up companies (Bwtech, n.d.). Companies seeking commercialization support can still request support from the Maryland Technology Development Corporation (TEDCo), but this entity does not have a stated clean energy focus (TEDCo 2015). Thus, these projects have to compete for resources with a wide variety of other industries and may not benefit from the industry-specific expertise provided by the former clean energy incubator.

The lack of funding for clean energy-related business development may be impacting MCEC and Maryland's broader goal to expand the market. Other entities with a similar mission and program offerings such as the New York State Energy Research and Development Authority (NYSERDA), which is funded through a ratepayer "system benefits charge" (NYSERDA, n.d. 2.) have a direct funding source. Since 2009, NYSERDA's clean energy incubator program has had 146 clients and produced millions in private investment and more than 1,000 new jobs (NYSERDA 2016). This example may suggest MCEC's financing issues could be limiting its effectiveness.

Given MCEC's finances, the Maryland legislature enacted SB 726 in 2016. It established a taskforce to identify a pathway toward financial sustainability for MCEC.[29] The taskforce was also required to determine the level of financial support necessary to maintain MCEC's activities in the interim.

Ultimately, this case offers some insights that policymakers might consider. First, the state established MCEC to drive clean energy-related economic development by fostering business and technology development. The state has not directly supported MCEC via an appropriation or a direct funding stream, which requires the agency to leverage financing via other means. This has proven challenging and may limit MCEC's ability to complete its mission. As a result, the case of MCEC illustrates a policy option that states can use to centralize their involvement in fostering clean energy-related economic development. At the same time, it illustrates the need for states to consider how to fund their economic development priorities to achieve outcomes.

[29] For the language of the bill, see http://mgaleg.maryland.gov/2016RS/chapters_noln/Ch_577_sb0726E.pdf.

4.4 Common Themes and Challenges

Though each of these three cases documents different state policy approaches to fostering economic development, several common themes appear. First, in each of the three cases, one of the underlying goals of the state agencies or regional organizations was to offer in-depth information. For example, Storey County, Nevada, offered Tesla marketing material titled the *Storey County Advantage* (Storey County, n.d.) and were in consistent contact with the company to answer questions and accommodate project development, according to one interviewee. Also, PNMP and MCEC offer clean energy technology and business information to the public as a means to further spur markets. Second, it is clear in each of the cases that these entities were focused on promoting collaboration, partnerships, and joint problem-solving to achieve common goals. MCEC's technology incubator and entrepreneur in residence programs are useful examples in this context. Third, there was a strong commitment in each of the cases to leverage local competitive advantages to attract development. This was illustrated most clearly in the PNMP's catalytic project and the logistics analysis conducted by Nevada.

Finally, securing funding was one notable challenge across each of the three cases. In the Nevada context, this was a one-time challenge that was overcome. However, interviewees from both the PNMP and MCEC cases noted that finding financing for their activities was an ongoing challenge. In fact, a lack of funding has directly impacted the work of MCEC, particularly as it relates to their incubator program, according to one interviewee. Thus, available funding for economic development investments may impact policy effectiveness going forward.

5 Conclusion

With over 600 clean energy-related economic development policies identified across the country, states are clearly interested in incentivizing clean energy manufacturing. Most often, they offer financial incentives, including business attraction incentives to spur clean energy manufacturing. States also adopt legislation directed at workforce development and R&D as a means to prepare for a clean energy economy and develop new markets. Such R&D efforts are also prominent in other policy, particularly through the development of clean energy incubators and research centers.

Though all states have at least one clean energy-related economic development policy in place, there is significant variation in the number and types of policy offered. Some states may thus look more attractive for prospective clean energy manufacturers than others. Thus, the policy landscape outlined in this report should serve as a decision-making tool for state policymakers by offering them a means to compare themselves to their peers. In addition, it offers a broad overview of the menu of policy options that states have adopted to foster clean energy-related economic development. Similarly, the report offers industry representatives the same information, which can be valuable when they consider expanding their manufacturing footprint.

In addition, this policy landscape and its implementation has been an important factor in achieving economic development priorities as exemplified by the three case studies highlighted in this report. They illustrate that state policy and personnel can play an important role in securing new manufacturing, promoting collaboration, offering in-depth information, and documenting and prioritizing local competitive advantages. An important challenge to completing these activities and achieving economic development priorities more broadly is the need for sufficient and sustained funding. This challenge is likely to persist given state budget constraints and varying policy priorities.

Thus, states may benefit from an assessment of the impact of these economic development incentives and the return on investment of spending. The baseline analysis of policy documented in this report is a critical step toward conducting broader research. The case studies in this report also illustrate that a variety of factors can influence both economic development and manufacturers' decisions to locate in certain states outside of the policy structure. These include geographic factors, energy-related considerations, labor force characteristics, and other factors. Evaluating the role of policy in relation to these other factors could clarify its importance and determine the net benefit of economic development investments.

References

Baker, David R. 2014. "Tesla Expected to Bypass California for Nevada 'Gigafactory'" *Government Technology*. http://www.govtech.com/state/Tesla-Expected-to-Bypass-California-for-Nevada-Gigafactory.html.

BLS & Company (Biggins Lacy Shapiro & Company). 2016a. *State Economic Development Incentives*. http://www.blsstrategies.com/content.asp?id=120.

———. 2016b. *Idaho Economic Development Incentive Programs*. http://www.blsstrategies.com/content.asp?id=120.

———. 2015. *Rhode Island Economic Development Incentive Programs*. http://www.blsstrategies.com/content.asp?id=156.

Business Facilities Editorial Staff. 2015. *Business Facilities Names Tesla Deal of the Year*. http://www.diversifynevada.com/news/news-articles/business-facilities-names-tesla-deal-of-the-year.

Business Oregon. n.d. 1. Pacific Northwest Manufacturing Partnership. http://www.oregon4biz.com/PNMP/.

———. n.d. 2. Catalytic Project. http://www.oregon4biz.com/PNMP/Catalytic-Project/.

———. n.d. 3. PNMP Catalytic Project Overview Advanced Wood Products Manufacturing Study Cross Laminated Timber Acceleration in Oregon and Southwest Washington. http://www.oregon4biz.com/PNMP/Catalytic-Project/Overview.pdf.

Bwtech (Bwtech @UMBC Research & Technology Park). n.d. *Client List*. http://www.bwtechumbc.com//facilities/clientlist.html.

CNEE (Center for the New Energy Economy). 2013a. *Search Advanced Energy Legislation*. http://www.aeltracker.org/.

———. 2013b. *About AEL Tracker*. http://www.aeltracker.org/p/about.

———. 2013c. *The Following Provides Examples of the Types of Legislation Found under each Policy Category*. http://www.aeltracker.org/graphics/uploads/PolicyCategoriesDescription2.pdf.

Damon, Anjeanette. 2014. "Inside Nevada's $1.25 billion Tesla Tax Deal." *Reno Gazette-Journal*. http://www.rgj.com/story/news/2014/09/04/nevada-strikes-billion-tax-break-deal-tesla/15096777/.

DSIRE (Database of State Incentives for Renewables and Efficiency). 2016. *About Us*. http://www.dsireusa.org/about-us/.

Economic Development Administration. n.d. "IMCP Overview." https://www.eda.gov/imcp/overview/.

Edelstein, Stephen. 2014. "For Potential Tesla 'Gigafactory' States, a Race to the Bottom" *Christian Science Monitor*. http://www.csmonitor.com/Business/In-Gear/2014/0829/For-potential-Tesla-Gigafactory-states-a-race-to-the-bottom.

Gaar, Brian. 2014. "Tesla Dashes Texas' Hope for Gigafactory." *Austin American Statesman*. http://www.mystatesman.com/business/tesla-dashes-texas-hope-for-gigafactory/KXEX9wWW9w4ywKtyNaVpSJ/.

Gardner, Lisa. 2015. *Governor Signs Bill Authorizing Pacific Northwest Manufacturing Partnership*. http://www.oregon4biz.com/PNMP/docs/SB482PREugene.pdf.

Governor's Energy Excellence Awards. n.d. *About*. http://mienergyexcellence.org/about/.

Hawaii Clean Energy Initiative. n.d. "Goals and Objectives." http://www.hawaiicleanenergyinitiative.org/about-the-hawaii-clean-energy-initiative/goals-and-objectives/.

Heeter, J., G. Barbose, L. Bird, S. Weaver, F. Flores-Espino, K. Kuskova-Burns, and R. Wiser. 2014. *A Survey of State-Level Cost and Benefit Estimates of Renewable Portfolio Standards*. Technical Report: NREL/TP-6A20-61042. National Renewable Energy Laboratory: Golden, Colorado. http://www.nrel.gov/docs/fy14osti/61042.pdf.

Hoffer, Katherine Heriot, Jeff Cook, Chris Edmonds, Jane Culkin, Alison Smith, Jeff Lyng, Tom Plant, Ian Kelly, and Ben Brunmeier. 2016. *2015 Year in Review: State Advanced Energy Legislation*. Center for the New Energy Economy. http://www.aeltracker.org/graphics/uploads/2015-Year-in-Review-State-Advanced-Energy-Legislation.pdf.

Hoffer, Katherine Heriot, Jeff Cook, Jeff Lyng, Tom Plant, and Ben Brunmeier. 2014. *2014 Year in Review: State Advanced Energy Legislation*. http://www.aeltracker.org/graphics/uploads/CNEE-2014-Advanced-Energy-Legislation-End-of-Year-Summary.pdf.

Idaho Governor's Office of Energy and Mineral Resources. 2016. "Idaho Awards for Leadership in Energy Efficiency." https://oemr.idaho.gov/energy-efficiency/energy_awards/.

Illinois Department of Commerce & Economic Opportunity. n.d. "Illinois Energy Roadmap Project." https://sites.google.com/site/illinoisenergyroadmap/.

Iowa Economic Development Authority and Iowa Department of Transportation. 2016. *Iowa Energy Plan*. http://www.iowaenergyplan.org/docs/IowaEnergyPlan.pdf.

Lehner, Josh. 2012. *Historical Look at Oregon's Wood Product Industry*. https://oregoneconomicanalysis.com/2012/01/23/historical-look-at-oregons-wood-product-industry/.

Massachusetts Clean Energy Center. n.d. "Academic Collaboration." http://www.masscec.com/innovate-clean-energy/academic-collaboration.

McDonald, Rachael. 2016. "New Technology Could Revive Pacific Northwest's Ailing Timber Industry." *NPR*. http://www.npr.org/2016/05/10/477449851/new-technology-could-revive-the-pacific-northwest-s-ailing-timber-industry.

MCEC (Maryland Clean Energy Center). 2014a. "About Maryland Clean Energy Center." http://mdcleanenergy.org/about-us.

———. 2014b. "Legislative Reception Agenda." http://mdcleanenergy.org/legislative-reception-agenda.

——— . 2014c. "Financing for Businesses." http://mdcleanenergy.org/business/financing-businesses.

——— . 2014d. "Business Directory." http://mdcleanenergy.org/business/business-directory.

——— . 2014e. "Advocacy for Businesses." http://mdcleanenergy.org/business/advocacy.

———. 2014f. "Business Acceleration." http://mdcleanenergy.org/business/business-acceleration.

Michigan Department of Environmental Quality. 2016. "Small Business P2 Loans." http://www.michigan.gov/deq/0,1607,7-135-3307_3515_4144---,00.html.

Midwest Energy Research Consortium. n.d. "M-WERC Energy Innovation Center." http://www.m-werc.org/EIC.

Missouri Department of Economic Development Division of Energy. 2015. *Missouri Comprehensive State Energy Plan*. https://energy.mo.gov/energy/docs/MCSEP.pdf.

Mullen Sondberg Wimbish & Stone. 2015. *Maryland Clean Energy Center Financial Statements: June 30, 2015.* http://dlslibrary.state.md.us/publications/MCEC/EC10-826(b)_2015.pdf.

Navas, Melissa, Chris Pair, and Kristin Grainger. 2015. *Oregon Recognized for Collaborative Effort to Modernize Manufacturing for the 21st Century*. http://www.oregon.gov/newsroom/Pages/NewsDetail.aspx?newsid=750.

Navigant Research. 2016. *Advanced Energy Now 2016 Market Report: Global and U.S. Markets by Revenue 2011-2015 and Key Trends in Advanced Energy Growth*. http://info.aee.net/hubfs/PDF/AEN-2016-Market-Report.pdf?t=1469046905559.

NCSL (National Conference of State Legislatures). 2016. "Energy and Environmental Legislation Database." http://www.ncsl.org/research/energy/energy-environment-legislation-tracking-database.aspx.

NGA (National Governors Association). 2015. "State Clean Energy Actions Database." http://www.nga.org/cms/cleanenergysearch.

———. 2011. *Clean State Energy Actions 2011 Update Clean Energy Economic Development Task Force, Workforce Development, Incentives, Analysis, Etc.* http://www.nga.org/files/live/sites/NGA/files/pdf/1201CLEANENERGYGREENECON.PDF.

NYSERDA (New York State Energy Research and Development Authority). 2016. *Clean Energy Incubators*. https://www.nyserda.ny.gov/-/media/Files/About/Announcements/clean-energy-incubator.pdf.

———. n.d. 1. "NYSERDA Supports Business and Technology Growth Essentials." https://www.nyserda.ny.gov/Partners-and-Investors/Clean-Energy-Startups/NYSERDA-Supports-Growth-Essentials.

———. n.d. 2. "Funding." https://www.nyserda.ny.gov/About/Funding.

Reno Gazette-Journal. 2014. "Tesla Announcement: Press Conference Highlights." *Reno Gazette-Journal*. http://www.rgj.com/wlna/news/2014/09/04/tesla-gigafactory-live-coverage/15080355/.

Searcey, Dionne. 2014. "Reno Rolls the Dice on High-Tech." *The New York Times*. https://www.nytimes.com/2014/07/07/business/reno-nevada-recasts-itself-as-home-to-tech-start-ups.html.

Sieroty, Chris 2014. "Tesla CEO Elon Musk Says Nevada is a 'Get Things Done State' for $5B Battery Factory." *Nevada Public Radio*. http://knpr.org/knpr/2014-09/tesla-ceo-elon-musk-says-nevada-get-things-done-state-5b-battery-factory.

Spears John W. and Andre W. Van Rest. 2006. *Economic Development Potential of Clean Energy Technology in Maryland and Feasibility Study for a Maryland Clean Energy Center*. International Center for Sustainable Development Inc. http://www.solarcities.org/pdf/MCECStudyReport2-28-07.pdf.

Storey County. n.d. *The Storey County Advantage Getting Down to Business*. (1–8).

TED Co (Maryland Technology Development Corporation). 2015. "Programs: A Framework of Guidance and Funding." http://tedco.md/programs/

Tennessee Department of Environment & Conservation. n.d. "Governor's Environmental Stewardship Awards." https://tn.gov/environment/topic/sp-gesa-governors-environmental-stewardship-awards.

The Solar Foundation. 2016. *National Solar Jobs Census: 2015*. Washington D.C.: The Solar Foundation. http://www.thesolarfoundation.org/wp-content/uploads/2016/01/TSF-2015-National-Solar-Jobs-Census.pdf.

Virginia Offshore Wind Development Authority. n.d. “Virginia Offshore Wind Development Authority.” http://wind.jmu.edu/offshore/vowda.

Wasserman, Aliza, Sue Gander, Mary Jo Waits, and Erin Sparks. 2014. *Targeting Clean Energy for Economic Development: State Efforts to Align Economic and Clean Energy Strategies*. http://www.nga.org/files/live/sites/NGA/files/pdf/2014/1405TargetingCleanEnergy.pdf.

West Virginia Division of Energy. 2013. *Energy Plan 2013-2017*. http://www.wvcommerce.org/App_Media/assets/doc/energy/5yrplan/ENERGY_5year_Plan_ALL.pdf.

Wiser, Ryan, Barbose, Galen, Jenny Heeter, Trieu Mai, Lori Bird, Mark Bolinger, Alberta Carpenter, Garvin Heath, David Keyser, Jordan Macknick, Andrews Mills, A., and Dev Millstein. 2016. *A Retrospective Analysis of the Benefits and Impacts of U.S. Renewable Portfolio Standards*. Berkeley, CA: Lawrence Berkeley National Laboratory and National Renewable Energy Laboratory. TP-6A20-65005. http://www.nrel.gov/docs/fy16osti/65005.pdf.

Woodyard, Chris 2014. “Tesla’s ‘Gigafactory’ sets off 4-state bidding.” *USA Today*. http://www.usatoday.com/story/money/cars/2014/03/02/tesla-gigafactory-four-states/5891757/.