International Collaboration Project – Valuation of Renewable Energy Properties

IPTI White Paper – February 2026

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About the International Property Tax Institute (IPTI)

The International Property Tax Institute (IPTI) is widely recognized as the world's leading organization on property tax policy and practice.

IPTI's mission is to provide impartial, objective expert advice in the area of property tax systems and promote the concept that these systems should be fair and equitable and meet the needs of all stakeholders, i.e. governments, taxpayers, practitioners and academics. In addition, IPTI seeks to ensure that property tax systems contribute to the provision of high-quality services for the benefit of communities.

IPTI is a not-for-profit organization comprised of experts who support stakeholders in developing and maintaining effective and efficient property tax systems by providing them with:

- Research and analytical information
- Impartial, objective policy advice
- Strategic advisory and consulting services to create, test and implement policy, and to improve performance through innovative good practice
- Education and training services to enhance professional development and build technical competence
- Property information services to enable more effective decisions
- In addition, IPTI specializes in:
- Property valuation processes: including data collection, mapping and data management; mass appraisal valuation for residential and non-residential properties; quality control
- Property tax collection and enforcement
- Appeal systems
- Technology and process integration and implementation, including data management, data analysis and reporting systems
- Electronic and on-line learning
- Sharing best practice

IPTI has a Board of Advisors which is comprised of internationally respected professionals all of whom have extensive experience in their respective fields. The breadth of membership of the Board reflects IPTI's commitment to international participation and sharing best practice on a global basis. The Board contributes to the strategic direction and overall planning for IPTI.

More information about IPTI can be found on its website www.ipti.org

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IPTI Overview and Summary

Introduction

The initial idea for an international collaboration project emerged from the Conference of Valuation Agencies (CoVA 2022) held at St. Anne's College, Oxford, in the UK on 8-9 December 2022. That was the first in-person conference of its type held since the COVID-19 pandemic lockdown, and it was regarded as a very successful event.

Some of the key organizations that attended CoVA 2022 were keen to ensure that the benefits of sharing information and best practice that took place during the conference were maintained by valuation agencies between such formal events.

With that objective in mind, and having regard to the growing realization among valuation agencies of the need for – and benefits of – increased collaboration between them, three valuation agencies agreed to work together to carry out research into issues that were considered to be being faced by many such organizations around the world.

Those three valuation agencies were:

- The Valuation Office Agency (VOA) in the UK
- The Municipal Property Assessment Corporation (MPAC) in Ontario, Canada
- The Property Valuation Services Corporation (PVSC) in Nova Scotia, Canada

They created a Steering Group comprising the following senior leaders:

- Alan Colston, Chief Valuer, VOA
- Kathy Gillis, CEO, PVSC
- Greg Martino, Vice President and Chief Valuation and Standards Officer, MPAC

Following initial discussions, the Steering Group members agreed to set up the "International Collaboration Project" with the intention that it would involve a number of valuation agencies from around the world which would collaborate with each other in order to achieve the overall objectives of the project.

Those overall objectives, and the benefits of international collaboration, were seen by the Steering Group to include the following:

- Providing a forum where matters concerning the operation of valuation agencies can be considered and discussed.
- Creating an accelerated problem-solving facility for participating valuation agencies.
- Encouraging greater innovation, efficiency and customer service.

- Enabling best practice in the efficient and cost-effective delivery of valuation agency services to be discussed and shared in an appropriate environment.
- Developing networking opportunities for the staff of valuation agencies - at different levels - to exchange views and information relating to their work.
- Building a mutually supportive global network of valuation agencies.
- Supporting benchmarking between valuation agencies.
- Facilitating the exchange of appropriate staff to allow them to gain experience of working in a different valuation agency for a suitable period of time.
- Allowing the results of international research and collaboration to be shared among participating valuation agencies.

The Steering Group considered a number of challenges being faced by many valuation agencies. The initial topics considered by the Steering Group included:

- Staff recruitment and retention
- Training and education for staff
- The valuation of specialized properties
- Identifying best value technology
- Stakeholder relations and effective communications
- Minimizing property tax appeals

After discussion, the Steering Group decided that the most urgent issue for many valuation agencies was staff recruitment and retention. Of particular practical significance, the Steering Group agreed that they would provide resources to carry out the research that would be required to explore the topic and prepare a report with their findings and recommendations.

The Steering Group requested IPTI's assistance in managing the project and working with the resources they committed to undertake the research. It was agreed to proceed by setting up Focus Groups managed by IPTI to deal with the various issues involved.

In September 2024, IPTI published a White Paper entitled **"Future Proofing the Valuation Workforce"** which contained the reports produced by the six Focus Groups concerned along with an overview from IPTI which, inter alia, contained a summary of the main recommendations.

A copy of that White Paper is available on the IPTI website using the following link:

https://www.ipti.org/news/futureproofing-the-valuation-profession-white-paper

That White Paper featured in the next Conference of Valuation Agencies (CoVA 2024) which was held in Dublin, Ireland on 29-30 October 2024. Members of both the Steering Group and some of those involved in the Focus Groups made presentations and led discussions on the issues at CoVA 2024. The conference was again regarded as a very successful event which helped to maintain the momentum of the project.

Following CoVA 2024, the Steering Group decided that the international collaboration project should continue with the next phase (Phase 2) focusing on two topics likely to be of interest to most, if not all, valuation agencies around the world.

Those two topics – one concerned with the use of technology and the other looking at a valuation issue – were:

- To review how valuation agencies are leveraging technology - including artificial intelligence - to modernize/re-engineer their business processes and their interactions with stakeholders, i.e. customers, clients, taxpayers, etc.
- As governments consider new sources of energy to respond to growing consumer demand, to review how valuation agencies are undertaking valuations of new sources of renewable power, electricity generation and other innovative solutions, e.g. small modular nuclear reactors, battery storage facilities, etc.? Are agencies consistent in the collection of data and their methods of assessment? Are there any lessons to be learned from the appeals and resolution of such assessments?

As with what is now regarded as Phase 1 of the International Collaboration Project, the Steering Group agreed that Phase 2 would involve the use of Steering Groups which would be populated partly by staff from their respective organizations and partly with colleagues from around the world drawn from IPTI's international network.

To provide a bit more detail about the nature of the research to be undertaken by the Focus Groups under Phase 2, IPTI provided the following outlines:

Business Process Modernization through Technology

The Focus Groups will, inter alia, look at:

- what types of modern technology valuation agencies are currently using;
- what types of modern technology valuation agencies are planning to use over the next 3 years;
- how are valuation agencies using modern technology to re-engineer their current business processes;
- which business processes have been improved with the implementation of modern technology;
- how valuation agencies are utilizing modern technology to communicate with their stakeholders;
- what modern technology are valuation agencies finding most effective in supporting and improving their interactions with stakeholders.

Valuation of Renewable Energy

The Focus Groups will, inter alia, look at:

- what kinds of renewable energy sources are available within the jurisdiction of the valuation agency concerned;
- what data is available in respect of properties used to provide renewable energy and how the valuation agency is utilizing that data;
- for each different type of renewable energy source, what valuation method or methods are being used to assess these facilities for property tax purposes;
- what issues valuation agencies are facing in connection with these properties – in particular in relation to appeals – and lessons learnt;
- are renewable energy companies cooperating with the valuation agency to assist in understanding the way in which the properties are used and how values should be determined.

Project Timetable

To give an outline of the timetable for Phase 2 of the project, IPTI provided the following:

- Confirmation by the Steering Group of the foregoing terms of reference - December 2024
- VOA, MPAC and PVSC to identify suitable people from their organizations to join the Focus Groups - January 2025
- VOA, MPAC, PVSC to provide IPTI with the names of their resources for Phase 2 - February 2025
- IPTI to meet with the resources made available by VOA, MPAC and PVSC to discuss the project - March 2025
- IPTI to identify resources from global valuation agencies to work with VOA, MPAC and PVSC resources - March 2025
- IPTI to facilitate meetings of the Focus Groups to undertake the research required - April 2025
- Focus Groups to undertake research into the two topics and seek case studies from participating agencies - May to July 2025
- IPTI to oversee the work of the Focus Groups and organize monthly meetings to monitor progress
- IPTI to organize regular online update meetings for the Steering Group and an in-person meeting of the Steering Group during the Property Tax Policy Conference in Halifax, Nova Scotia on 16-17 September 2025
- Focus Groups to prepare draft reports on their findings and recommendations - September 2025
- IPTI to review the draft reports and provide comments to the Focus Groups - October 2025
- Focus Group to consider IPTI's comments and prepare final reports - November 2025

- IPTI to prepare a draft report for the Steering Group on the Focus Groups' work - December 2025
- IPTI to publish a White Paper with an overview and commentary on the research work undertaken - early 2026
- IPTI to prepare an agenda for CoVA 2026 to include the work of the Focus Groups - early 2026
- IPTI to organize an online event at which the work of the Focus Groups could be discussed with interested parties - probably in April/May 2026
- IPTI to organize CoVA 2026 - to be held in Ottawa, Canada on 6-7 October 2026 - at which, inter alia, the White Paper will be discussed.

IPTI is pleased to record that the foregoing timetable was followed and the project remains on track.

During the course of Phase 2 of the project, Kathy Gillis left PVSC and was replaced on the Steering Group by Rebecca Vostermans, also from PVSC.

Focus Groups

As indicated above, the research work was undertaken by Focus Groups using the staff resources provided by the three sponsoring agencies along with colleagues nominated by IPTI to work with them.

The two research topics were split among geographical areas of world as shown below along with the resources available allocated to each Focus Group. The names shown below are the original members of the Focus Groups and the organizations to which they belong.

(a) Business Process modernization

Focus Group 1 – Canada

- George Anderson (VOA)
- Anita Ng (Hong Kong RVD)
- Marco Kuijper (NCREA, The Netherlands)

Focus Group 2 – USA

- Terry Samson (MPAC)
- Ayoub Chouraichi (PVSC)
- Uche Obi (Cayman Land Dept.)

Focus Group 3 – Australia/New Zealand

- Micheal Boateng (MPAC)
- Tom Williams (VOA)

- Danie Malan (City of Cape Town)

Focus Group 4 – Europe

- Lorna White (VOA)
- Mia Parenteau (PVSC)
- Evelyn Khoo (IRAS, Singapore)

Focus Group 5 – Asia

- Mariam Jasat (MPAC)
- Katie Crane-Davis (VOA)
- Peck Yan Nang (IRAS, Singapore)
- Hyacinth Picart (NLA, Jamaica)

(b) Renewable Energy

Focus Group 6 – Canada

- Ryan Ford (MPAC)
- Katherine Cockhill (VOA)
- Llewellyn Louw (City of Cape Town)

Focus Group 7 – USA

- Jodie Parker (MPAC)
- Jack Stamper (VOA)
- Chye Ling Loh (IRAS, Singapore)

Focus Group 8 - Europe

- Thomas Tidy (VOA)
- Laura MacLean (PVSC)
- Chee Hua Mak (IRAS, Singapore)
- Luc Hermans (NCREA, The Netherlands)

Focus Group 9 – Australasia

- Ann Smith-Macquarrie (PVSC)
- Callum Taylor (VG New Zealand)
- Ruud Kathmann (NCREA, The Netherlands)

Although a couple of the people named above had to drop out during the course of the project for work-related reasons, IPTI is grateful to all Focus Group members for the time and effort they devoted to undertaking their research and preparing the reports that are contained in the appendices to this White Paper.

We should add that, although the Focus Group reports have been slightly edited for the purposes of this White Paper in relation to format, font size, etc., the content of those reports has not been amended and remains the work of the Focus Group members.

As the two topics researched under Phase 2 are quite different, IPTI decided to produce two White Papers, each dealing with one of the two topics. This IPTI White Paper deals with the valuation of renewable energy properties. The other IPTI White Paper deals with business process modernization.

Both White Papers are on the IPTI website: **www.ipti.org/property-tax-papers**

Summary of Findings and Recommendations

IPTI strongly recommends that those interested in the findings and recommendations should read the Focus Group reports appended to this White Paper. They will provide not only the detail of the various recommendations, but also the context in which they have been made.

Inevitably, many of the findings and recommendations of the Focus Groups within each of the two parts of Phase 2 overlap as they were researching the same topics, albeit in different parts of the world.

However, to provide a broad indication of the key findings and recommendations, IPTI provides the following summary based on the content of the Focus Group reports.

Valuation of Renewable Energy

Perhaps inevitably, the **findings** of the Focus Groups researching this issue are more jurisdiction related than of general application. However, there are some common themes.

In relation to **Canada**, the Focus Group found that British Columbia utilizes a cost approach to valuation for industrial wind turbines and solar generating facilities.

The valuation of hydro-electric facilities in British Columbia is achieved through a regulated cost approach. Structures are valued using established cost manuals which reflect rates for government owned (BC Hydro) facilities and independent power producers. The dam, penstocks and all related power dam infrastructure are assessable. Land is valued at market rates. Most land where hydro-electric facilities are situated is Crown owned land. The value of the leased Crown land to facilities operated by independent power producers is included in the assessed value.

The Focus Group found that the valuation of wind turbines in Ontario is based on a regulated approach. The valuation of solar generating facilities in Ontario is cost based with the focus predominantly on the land value. Similar to the valuation of wind turbines, solar generation facilities owned by non-corporate power producers benefit from regulated approaches to land value based on the mega-watt capacity of the facility and the ancillary nature of the generating equipment.

The valuation of hydro-electric facilities in Ontario is achieved by either a regulated approach or a cost approach. The application of approaches is determined by ownership of the property. If the facility is owned and operated by a designated utility, the improvements are valued using a regulated approach. No depreciation is applied to the improvements under the regulated approach. If the facility is owned by a private operator, then the structure is valued using a cost rate per kilowatt of installed capacity and then depreciated accordingly. Land value is derived by capitalizing an economic rent dependent on a facility's average annual production.

Renewable energy sources in New Brunswick include wind turbine and hydroelectric power. Both forms of energy production are valued following the cost-based method of valuation and having legislative rates applied on a replacement for new basis. To allow for depreciation, legislated tables are applied.

In Alberta, the Focus Group found that the valuation of properties with solar, wind, hydro and battery energy storage are highly regulated. The depreciated replacement cost approach is used as the only valuation method.

The Focus Group concluded that the valuation of renewable energy assets in all four Canadian provinces reviewed rely on a DRC approach to valuation. In each province, regulation of component rates is present. The Group stated that the use of the regulated approach has certain advantages. It could be argued to support the growth of the sector, as there is no penalty for increased production or investment. But they added that the converse can also be said to be true though – the blanket approach to cost makes no allowance for those generating a larger profit even though they may have a greater ability to pay.

While the use of regulated rates provides some degree of consistency and stability for municipal tax assessments, the Focus Group **recommended** that valuation staff explore other methodologies where applicable. This could include an income approach to value based on electricity production or a true replacement cost approach that allows valuers to adjust depreciation based on subject property conditions. As current technologies age and new forms of renewable generation advance, the ability to reflect functional and economic obsolescence will be required.

Steering Group comment: this may also make the income approach more relevant – as subsidies fall, energy companies/consumers may begin to see the benefit of entirely private investment.

In short, understand the market and the financial make-up of the investments being made

The acquisition of data to support valuations of properties comprising of renewable energy appear to be very dependent on a collaborative approach with developers and industry professionals.

The Focus Group also **recommended** that valuation agencies continue to enhance their collaboration efforts with industry participants. This has proved helpful in the setting of rates in some areas, reducing the number of assessment appeals and exchanging data. Continued collaboration will improve the valuation process and will assist in addressing changes to technology and assessment legislation as they arise.

In addition, and looking further ahead, the Focus Group **recommended** that, as technologies advance and new assets for renewable electricity are developed, the impact on existing legislation and the setting of regulated cost manuals and assessment rates could be the next area of focus for this property type. They added that further areas of research when reviewing valuation across renewable

energy could include factors such as income generated, and time taken to conduct valuations – this would result in providing detailed information on time spent and cost incurred v. income generated, to provide information on the most cost-effective form of valuation.

In relation to the **USA**, the Focus Group found that the growing prominence of renewable energy projects across the country spanning wind, solar, and energy storage facilities poses challenges to existing property tax valuation systems. Current methods remain fragmented, data-poor, and inconsistent across jurisdictions. The Focus Group went on to say that interviews revealed that reforms to valuation practices will require navigating entrenched fiscal, administrative, and political constraints.

This Focus Group made the following **recommendations**:

- Establish Uniform Valuation Standards

Valuation inconsistencies across states and counties undermine fairness and defensibility. We recommend developing a nationally recognized valuation framework for renewable energy assets - one that clarifies definitions, asset classifications (real vs. personal property), and standardized depreciation schedules.

However, they recognised that there are a number of **challenges** as property taxation in the U.S. is largely decentralized, governed at the state or local level, making national harmonization difficult. Many states apply different bases of value (market, cost, or use) complicating standardization. Smaller jurisdictions, lacking resources or political leverage, may struggle to align with new frameworks without external support. Any attempt at centralization must, the Group stated, therefore balance national consistency with respect for state autonomy.

- Improve Data Reliability and Sharing

The reliability of renewable energy valuation depends on credible data. We propose establishing a centralized database of verified cost, depreciation, and energy output data, accessible to assessors nationwide. This could include production volume, nameplate capacity, historic cost, PPA terms, lease terms, grant or tax credit info and observed sales of whole projects and land. Mandatory disclosure of development and operating costs by renewable operators would enable more accurate and defensible assessments, while inter-jurisdictional data sharing would improve consistency across states.

The Focus Group identified the following **challenges**. Data confidentiality and administrative feasibility are major barriers. Developers may resist disclosing proprietary information, citing commercial sensitivity and contractual restrictions. Additionally, counties often use different systems and metrics, making data aggregation difficult. Without legal mandates, funding, and standardized reporting formats, such a repository risks becoming inconsistent or incomplete. Sustained state/federal cooperation and clear data governance structures will be essential to its credibility.

- Refine Valuation Methodologies

While the cost approach remains the prevailing method due to its administrative simplicity, the Focus Group said experts argue that it may not adequately reflect renewable assets' economic life cycles. We recommend refining the cost approach with technology-specific depreciation schedules and

integrating elements of a usage-based or hybrid model, where assessed value correlates with production capacity or energy output rather than solely physical depreciation.

However, the Focus Group referred to the following **challenges**. Transitioning to hybrid or output-based models presents significant administrative and legislative hurdles. Measuring and verifying energy output requires coordination with utilities and regulators, potentially introducing new compliance burdens. It may also blur the distinction between property and excise taxation, raising constitutional concerns. Smaller jurisdictions may lack the technical expertise or data infrastructure to implement such models effectively. Any shift must therefore be gradual and accompanied by extensive training and pilot testing.

- Strengthen Technical Expertise

The Focus Group said that assessors would benefit from greater technical proficiency to handle renewable energy valuations. We propose specialized training programs, shared expertise networks, and regional appraisal teams supported by state agencies. Standardized tools, including automated valuation models (AVMs) calibrated for renewable energy assets, can also improve efficiency and consistency across jurisdictions.

But the Group recognised there would be **challenges**. They said many rural or small counties, where renewable projects are typically sited, lack funding for professional development or advanced tools. Training programs must be ongoing to account for rapid technological change in renewables. Furthermore, adopting new models may face internal resistance from assessors accustomed to conventional valuation approaches. Without coordinated funding and strong leadership at the state level, institutional improvements may remain uneven and short-lived.

- Enhance Policy Coordination and Stakeholder Engagement

Policy misalignment between legislators, regulators, and tax administrators is a recurring problem. We recommend formal consultation mechanisms to ensure assessors are involved early in legislative processes governing renewable tax incentives, exemptions, and PILOT arrangements. Engaging local governments and community stakeholders is equally important to ensure fiscal equity and public acceptance of large-scale projects. Operationally, implementing penalties or targeted audits should be considered so non-filers do not avoid reporting. Authorities should require developers to supply valuation data when seeking permits, using that moment to secure data for later valuation and to align expectations between local government and developers.

Again, the Group outlined related **challenges**. They said that, in practice, engagement is often fragmented. Legislative decisions are frequently influenced by lobbying and political priorities, while assessors are brought in only after implementation challenges arise. Policies such as mandatory reporting may be hard to enforce. Coordination across multiple tiers of government adds complexity, and stakeholder fatigue can slow reform. Institutionalizing such engagement will require procedural reforms, such as mandated assessor review or inter-agency advisory committees, to ensure technical feasibility is considered before policy adoption.

- Ensure Fiscal Certainty and Fairness

Rapid depreciation under current cost-based models undermines local fiscal stability, as renewable assets often retain productive capacity long after their taxable value declines. Transitioning toward usage-based taxation or capacity-linked excise systems could be a more equitable approach to

aligning revenue with ongoing energy generation. Alternatively, reforming PILOT and exemption structures could help stabilize local revenues and ensure host communities are fairly compensated for hosting renewable infrastructure.

The Focus Group also referred to the following **challenges**. These reforms face fiscal and political obstacles. Developers may view new taxation models as deterrents to investment, especially in states that currently offer generous incentives. Moreover, changing the tax base or classification of assets would require statutory amendments in multiple states, each with distinct political climates. Transitional risks also exist; shifting from construction-based revenues to production-based taxation could temporarily destabilize budgets. Policymakers must carefully phase in reforms and use fiscal equalization mechanisms to cushion local governments.

The Focus Group that carried out research into **Europe** found that the valuation of renewable energy property relies heavily on data provided by occupiers and publicly available sources, particularly regarding installed capacity and estimated annual output.

This Focus Group also found that, across the countries reviewed, most have specific provisions to exempt machinery used in renewable energy production from property tax, reflecting a broader policy trend to encourage investment in renewable energy infrastructure.

From the interviews and research findings, this Focus Group also found that valuation agencies are increasingly confronted with complex challenges in assessing renewable energy assets, driven by evolving technologies, dated legislation, and emerging land use models involving hybrid uses.

This Focus Group concluded that the "land only" and "area-based" approaches in Estonia and Poland only give a notional commercial value, with no reflection of the specialist property type. The Netherlands adopt a cost-based approach on renewable energy properties, which can be said to be more credible in delivering an appropriate value, reflecting the cost to build the specialist and complex properties. However, it fails to reflect the purpose and benefit of the occupation. That is the considerable reward for taking the financial risk of investment to build the renewable energy properties. It appears that the UK closely follows the real-world market with regard to property value, whilst the remaining jurisdictions are less closely aligned.

The Focus Group made **recommendations** in relation to the following needs:

- Transparency in Valuation Methods and Processes

Providing clear and transparent information to owners, developers, occupiers or other stakeholders on the valuation methods used for renewable energy properties will allow for increased trust of the assessment process between parties.

- Clear Legislation

A transparent and easily digestible legislative framework for renewable energy properties will allow assessment jurisdictions to rely on regulatory powers to obtain information for data collection purposes, appeal positions or evidence. In addition, there may be opportunities to align legislative compliance with requests for information which may lead to higher response rates.

- Stakeholder Engagement

Collaboration with industry stakeholders allows for increased access to data collection methods such as physical site inspections or self-reporting, (e.g. requests for information to obtain financial

information or property inventory). It is also recommended to find ways to maintain confidentiality of information obtained from stakeholders that may be subject to proprietary or sensitive information.

- Government Schemes

Schemes such as development subsidies energy pricing subsidies, property tax exemptions or other mechanisms to encourage the growth of the renewable energy industry should be reviewed and considered to encourage collaboration between industry stakeholders and assessment jurisdictions. Many schemes may be at the national or state/regional level and may be applicable beyond individual assessment jurisdictions, depending on how things are governed in a particular country or jurisdiction.

The Focus Group researching **Australasia** found that the renewable energy industry is growing at a fast pace. In many cases it has out-paced policies and legislation that concern the valuation of land and capital assets. As many jurisdictions look for best way to capture the value of renewable energy projects, inconsistencies are emerging from one jurisdiction to the next. Uniform policies and methodologies and collaboration and information sharing within countries and internationally will be increasingly important in the future as new energy solutions are developed, such as small nuclear reactors, hydrogen and tidal.

They added that, while their report focuses on Australasia, they found parallels between Australasia and some North American jurisdictions. In particular, they noted the treatment of wind farms in Nova Scotia is similar to that of New Zealand. Land and some fixed capital improvements are assessed but any deemed machinery items are not.

They made the following **recommendations**:

- Legislation should clarify the difference between fixtures included in valuations and elements excluded from valuation such as defined plant, equipment and machinery.

This is particularly relevant for solar farms as the panels have no moving parts, which has been a traditional indicator of "machinery". As the photovoltaic panel converts solar energy into electricity, it is currently considered a machinery element. However, this could lead to a lack of valuation consistency between different types of renewable energy and likely lead to much lower values on a solar farm in comparison with a wind farm.

- Develop property categories that differentiate different renewable energy types, as is the case in Tasmania.

All renewable energy projects have the potential to provide and sell electricity into the grid at the same price, yet valuation methodology treatment means that variation can occur between generation types. Local councils/taxation authorities could develop tax rates that differentiate between generation types reflecting the different valuation methodologies and profitability profiles between each generation type.

- Information sharing should be encouraged between valuation agencies.

Emerging renewable energy projects are challenging existing methodologies for valuing energy-generation assets, especially those reliant on large capital investment in land and buildings such as coal-fired power stations or hydro dams.

By contrast renewable energy has a much lower cost profile and new technologies. However, methodologies developed for assessment with large investment required in land, buildings, plants and machinery are being deployed in the valuation approach to renewable energy projects.

We would encourage sharing information about renewable energy projects between valuation agencies, particularly valuation methodologies, case law and any changes to legislation regarding the approach to fixed structures versus machinery or chattels.

Utilizing existing networks, such as the Commonwealth Heads of Valuation Agencies (now the Conference of Valuation Agencies – CoVA), the International Property Tax Institute, and the International Association of Assessing Officers, would be useful in establishing a standardized approach and sharing information.

Further Reading

The Focus Groups provided helpful references to source material for anyone who would like to find out more about the topics that have been researched.

Additional International Collaboration Initiatives

In addition to the research undertaken by the Focus Groups, another international collaboration initiative was that, during 2025, the VOA sent a total of nine members of its staff out to various provinces in Canada on what it called "externships". The placement of the staff was facilitated by IPTI using its contacts in the provinces concerned.

Below is a copy of the plan prepared by the VOA setting out the various stages of the externship program.

Ref.	Workstep	Start date	Finish date	Apr-25	May-25	Jun-25	Jul-25	Aug-25	Sep-25	Oct-25	Nov-25
1	Set-up and planning.										
2	Create work plan.										
3	Preparation - including defining the scope and objectives of your research to align with the overall project questions outlined above.										
4	Define the key technology terms - utilise existing definitions.										
5	Initial research - using online facilities to identify potentially useful stakeholders, helpful reports, research papers, case studies, etc.										
6	Engagement with suitable participants - to include Canadian assessing agencies, relevant professional bodies, technology companies, etc.										
7	Recording of findings.										
8	Analysis of findings.										
9	Conclusions drawn from your research.										
10	Recommendations based on your conclusions.										
11	Preparation of draft report.										
12	Final report ready.										

The VOA staff members who participated in the externship program and the provinces which agreed to host them are as follows:

- Marcel Sarmiento – Nova Scotia
- Anya Lewis – Nova Scotia
- Alice Vaughan-Williams – Nova Scotia
- Adam Hall – Ontario
- Keira Gaunt – Ontario

- Louis Berrow – Alberta
- Will Robinson – Alberta
- Isobel McCully – British Columbia
- Oliver Peers – British Columbia

The collaboration initiative involved the VOA staff being hosted in the valuation agencies in the provinces concerned for a period of two weeks prior to IPTI's "Property Tax Policy" conference which was held in Halifax, Nova Scotia on 16-17 September 2025. Following their two-week externship, the VOA staff travelled from their various host provinces to attend the IPTI conference at which they provided a brief report of their experiences.

It was clear that not only had the VOA staff all enjoyed their experience and found it very informative, the host agencies had benefited from having the VOA staff with them and sharing information about the way in which the various agencies approached similar work requirements.

When the staff returned to the VOA, they provided more detailed reports about what they had experienced during the course of their externship.

Following this initiative, the VOA approached IPTI to suggest how this experience could be spread to other parts of the world. IPTI has provided the VOA with a suggested three-year plan for which valuation agencies around the world might be prepared to host selected VOA over the next three years.

In IPTI's view, this is a very practical example of international collaboration in action and we would welcome contact from any valuation agency reading this report to get in touch with us if they would like to participate in a similar scheme either in terms of hosting staff from other organizations or sending their own staff to other agencies in order to benefit from the experience.

Next Steps

Having now concluded Phase 2 of the International Collaboration Project with the publication of the two White Papers, IPTI is involved in three follow up activities:

1. Discussion with members of the Steering Group about the topic or topics to be included in Phase 3 of the project.
2. The organization of an online event – probably in May 2026 – at which the Phase 2 Focus Group members will be invited to share their findings and discuss their recommendations with other valuation agencies around the world.
3. The organization of the next Conference of Valuation Agencies (CoVA 2026) to be held in Ottawa, Canada on 6-7 October 2026. This White Paper will feature in CoVA 2026.

Conclusion

In IPTI's view, this project has been extremely worthwhile and we hope that readers of this White Paper will find it of value.

In particular, we are keen to find out whether the recommendations it contains are ones that valuation agencies will find not only useful, but also practical.

We welcome comments about the contents of the White Paper and look forward to discussing the outcome of the project with anyone who would like to get in touch with us.

If anyone would like to ask and questions or provide any commentary about the White Paper, please send an email to the following address and we will be in touch: info@ipti.org

Focus Group Number 6
Renewable Energy: Canada

Group Members:

- Ryan Ford (MPAC)
- Katherine Cockhill (VOA)
- Llewellyn Louw (City of Cape Town)

Overview

The goal of this phase of the Internation Collaboration Project was a jurisdictional review of properties comprising of renewable energy sources and how valuation agencies in Canada, the USA, Europe and Australasia undertake the valuation of these properties with new sources of renewable power, electricity generation and any other innovative solutions.

Focus Group 6 were selected to undertake this research in Canada – and research commenced in the provinces of Alberta, New Brunswick, British Columbia and Ontario.

The review looked at the following:

- The kinds of renewable energy sources that are available within the jurisdiction of the valuation agency concerned.
- The data that is available in respect of properties used to provide renewable energy and how valuation agencies are utilizing that data.
- For each type of renewable energy source, the valuation method(s) used to assess these properties for property tax purposes.
- The issues valuation agencies face in connection with these properties – in particular in relation to appeals – and lessons learnt.
- The extent to which renewable energy companies are cooperating with the valuation agencies to assist in understanding the way in which the properties are used and how values should be determined.

Literature Review

Renewable energy properties potentially feature electricity generation by means of wind, solar, hydro and also include properties with battery storage.

A literature review of how these properties are valued internationally was undertaken. Most of the available academic literature is from the United States of America. However, an article by the South African Institute of Valuers provided a good summary of the valuation practices in the United States, Australia and South Africa.

According to the above article (*South African Institute of Valuers, 2023*), the valuation practices can be summarized as follows.

South Africa

South Africa has a number of properties containing wind and solar facilities. In terms of the applicable national valuation and rating legislation (being the Local Government: Municipal Property Rates Act, Act 6 of 2004), "equipment and machinery" must be excluded from valuation. Solar and wind turbine structures are "equipment and machinery" in terms of the legislation and are therefore excluded from valuation. This therefore means that only the portion of land occupied by the solar or wind turbine structures is valued. Land value is most often determined by means of the comparable sales approach.

Australia

The practices and policies of the Government of South Australia – State Valuation Office and New South Wales Valuer General's Policy were examined.

Wind turbine structures are considered to be "plant and machinery" and excluded from valuations for rating purposes. Only the land area occupied by the structures is therefore valued. Land is valued with reference to comparable sales or the income capitalization approach if there are no sales, by determining an appropriate market rental for the land, often with reference to the leased rental. Wind turbines are generally regarded as secondary tenancy to the main use as a farming concern, and this is therefore a very important consideration in the determination of land value.

United States of America

In a study undertaken for the Assessors Association of Pennsylvania by Camins Associates, it was found that land value determination generally appears to be with reference to the income capitalization approach if rental information is available, else the comparable sales approach is utilized.

In an article written by P Barton DeLace, it was found that the Depreciated Replacement Cost (DRC) approach is the favored valuation approach in some parts of the US, given that there are tax incentives for wind farms, as well as consideration that is given to the Net Capacity Factor of specific wind farm valuations.

England

There are several key literature sources in England which are referred to for the valuation of all commercial property – including renewables – in England. These include Rating Valuation: Principles and Practice by Patrick Bond and Peter Brown. This includes a detailed breakdown of the receipts and expenditure method of valuation as used for renewables.

The RICS Red Book is the industry standard for all methods of valuation – and provides detailed guidance on valuation standards and procedure. It provides detailed guidance on valuation methodology and application.

The VOA Rating Manual is the primary source of rating valuation guidance in England and Wales – and provides detailed information on valuation approaches and links to relevant legislation and case law. This outlines the favored approach of valuation of all property classes including renewables, including valuation method and survey capture requirements.

Research Methodology

Online research from websites for the various assessment authorities was undertaken to gain a general understanding of how these assets were valued.

A questionnaire was developed by the Focus Group aimed at standardizing the questions being asked by each of the selected provincial agencies. The questionnaire was sent to contacts at each assessment authority.

Follow-up MS-Teams calls were arranged in some of the jurisdictions to clarify responses and to gain further insight into the various approaches to renewable energy valuation.

Findings

This section sets out the detailed findings, separately for British Columbia, Ontario, New Brunswick and Alberta respectively.

British Columbia

Wind and Solar

British Columbia utilizes a cost approach to valuation for Industrial Wind Turbines and Solar Generating Facilities.

Assessment of these assets by the cost approach can be separated into two components: land valuation and improvement valuation.

Land held in fee simple or leased land is considered assessable and valued at market. The valuation can be adjusted for location and size.

The improvements which comprise the wind turbines are assessable with a few exceptions including the generators, turbines and blades. Depreciation of improvements is regulated on a yearly basis to a maximum depreciation of 65%.

Like wind turbines, the improvements at a solar farm are assessable including the foundation and racking but not the photovoltaic panels. Any other generators on site are also exempt from assessment. Improvements are depreciated using a regulated rate to a maximum of 65%.

Detailed information about costing rates is contained in a regulated costing manual which was established with input from the Wind and Solar Industries and is available for a fee. A copy of this manual was not obtained.

There have been no substantial appeals on wind and solar in British Columbia. This may be attributed to the inclusion of relevant industries in the development of cost rates and schedules and a positive working relationship established between the industry and provincial assessors.

Hydro-Electric

The valuation of hydro-electric facilities in British Columbia is achieved through a regulated cost approach.

Structures are valued using established cost manuals which reflect rates for government owned (BC Hydro) facilities and independent power producers. The dam, penstocks and all related power dam infrastructure are assessable.

Land is valued at market rates. Most land where hydro-electric facilities are situated is Crown owned land. The value of the leased Crown land to facilities operated by independent power producers is included in the assessed value.

Battery Energy Storage

Battery Energy Storage Systems or BESS facilities are assessable in British Columbia; however, there are a limited number of these in the current inventory.

The valuation of BESS facilities is complicated by the lack of specific legislation or classification under the British Columbia Assessment Act for these types of improvements.

Assessors looking to value these facilities would most likely look to existing legislation and classification regulations to interpret the best approach to valuation.

Ontario

Wind

The valuation of Wind turbines in Ontario is based on a regulated approach.

The value of the wind turbine tower is determined by multiplying a regulated rate of $50,460 by the installed capacity in megawatts (MW) of the generator attached to the tower. The generator and ancillary components of the wind turbine are exempt from taxation similar to other machinery and equipment used to produce electricity in Ontario.

Ontario also has regulated conditions for the assessment of all renewable energy improvements if they are ancillary to another use on the property, including power generated by wind turbines. If the improvement is ancillary to another use on the property and its MW capacity is less than .01 MW, there is no change to value or tax classification. If the MW capacity is higher than .01 MW but less than .5 MW, there is a change in value but the tax classification is not changed. For capacity greater than .5 MW, the improvement is valued and the classification of land is determined on a ratio of .5/MW capacity.

The above conditions and respective assessment treatments are incentives for private landowners to utilize renewable energy resources without detrimental impact on property values and property tax levies. Corporate power producers do not benefit from the same stepped-up approach to renewable assets.

Land used to support the Wind Turbine is assessed at the industrial rate unless the conditions of ancillary use of non-corporate power producers are invoked.

Industrial land valuation is determined using open market sales of industrial land within the vicinity of the subject property. MPAC assigns 1.5 acres to each turbine tower. If lease information is available, additional lands may be assessed in relation to the tower or supporting buildings.

While Ontario has been utilizing a regulated approach for many years, in the early stages of Wind Farm development a straight cost approach was explored for valuation. This was halted due to the Ontario government's decision to regulate the valuation of the turbines.

There have been a minimal number of appeals on properties where wind turbines are situated, mostly due to the regulated nature of the valuation and, in particular, the low rate per MW when compared to the replacement cost of a similar turbine.

There have been a number of appeals on properties abutting or in proximity to wind farms where ratepayers have argued that the towers themselves have a negative impact on the value of neighboring properties. The courts determined that there was not market evidence of this claim and confirmed the assessments. MPAC continues to analyze the impact of wind turbines on the sales of abutting properties.

Solar

The valuation of solar generating facilities in Ontario is cost based with the focus predominantly on the land value.

Similar to the valuation of Wind Turbines, solar generation facilities owned by non-corporate power producers benefit from regulated approaches to land value based on the mega-watt (MW) capacity of the facility and the ancillary nature of the generating equipment.

For corporate power producers, the value of a solar generation facility is linked to the value of large acreage industrial land sites within the vicinity of the subject. Adjustments are made for location, size and servicing where applicable.

The value of improvements for a solar generating facility in Ontario is determined using rates developed by the provincial assessment authority in collaboration with third party cost service vendors. Improvement values are limited to support and ancillary buildings such as inverter housings and admin buildings, as Ontario's Assessment Act exempts the solar panel arrays and foundations on which they rest.

Depreciation of improvements is done using a useful life table relative to the character of construction for the improvements.

Most appeals on solar generating facilities in Ontario have been focused on the value of the land using industrial land sales to value large solar facilities in predominantly agricultural locations.

Hydro-Electric

The valuation of Hydro-Electric facilities in Ontario is achieved by either a regulated approach or a cost approach. The application of approaches is determined by ownership of the property.

If the facility is owned and operated by a designated utility, the improvements are valued using a regulated approach of $86.11 per square meter of the ground floor powerhouse area. No depreciation is applied to the improvements under the regulated approach.

If the facility is owned by a private operator, then the structure is valued using a cost rate per kilowatt of installed capacity and then depreciated accordingly.

Land value is derived by capitalizing an economic rent dependent on a facility's average annual production.

It is important to note that in Ontario, Hydro-Electric facilities are subject to a Gross Revenue Charge, which is a legislated payment based on a generating facility's gross revenue. This payment incorporates a property tax component which is payable to the Ministry of Finance and therefore the assessed value of each facility does not directly influence the property taxes paid to host municipalities.

Battery Energy Storage

Like British Columbia, Ontario does not have specific legislation that applies to Battery Energy Storage Systems and therefore, assessors of new BESS facilities must use existing legislation to determine the best valuation approach for these properties.

In Ontario, the valuation of Battery Energy Storage Systems (BESS) can vary depending on factors including improvement type and ownership.

Machinery and equipment used to manufacture or generate electricity is exempt from taxation under Ontario's Assessment Act. Battery Storage units that are fully self-contained and the foundations on which they rest are subject to the exemption under this provision of the Act. Batteries which reside within another form of housing which can be accessed by pedestrians would remain exempt but the housing itself would be assessable.

Ontario's Assessment Act instructs assessors to value properties used to generate or transform electricity at a regulated rate of $86.11 per square meter of interior ground floor area. This regulation only applies to property owned by designated utilities under the *Electricity Act, 1998*.

Therefore, BESS facilities could be valued at current value for the improvements, a regulated improvement value or land value only depending on the conditions outlined above.

Like BC, Ontario does not have specific legislation that applies to Battery Energy Storage and therefore, assessors of new BESS facilities must use existing legislation to determine the best valuation approach for these properties.

Land is valued at market value using industrial land rates for the area.

BESS technology and development is an emerging property type in Ontario and the valuation treatment of these facilities has not been tested in Ontario's appeal system.

New Brunswick

As background, wind power in New Brunswick produces 355.5 MW across 7 facilities (Cap Pele, Oinpegitjoig, Wisokolamson, Wocawson, Lameque Wind Farm, Caribou Wind Farm and Kent Hills).

New Brunswick is centered on a cost-based approach of valuation. The appropriate legislation followed is A-14 Assessment Act and the New Brunswick Regulation 84-6. The legislation which impacts value is the New Brunswick Regulation 84-6 schedule C1 and C2.

For the purposes of this research paper, renewable energy sources in this province include wind turbine and hydroelectric power.

Both forms of energy production are valued in New Brunswick following the cost-based method of valuation and having legislative rates applied on a replacement for new basis. To allow for depreciation, legislated tables are applied.

Buildings and associated plant and machinery are costed with reference to Marshall and Swift, legislated rates and an inhouse industrial manual for a cost-based approach. The valuations include land, buildings, tanks that are for storage, and site improvements. Process equipment is not assessed. Information to carry out accurate valuations is obtained by site inspection and also by request for any required information. For example, there may be specific components that are not possible to inspect and information such as drawings and plans may be required to complete the assessed value.

This highly regulated approach is considered an incentive – where production is not penalized, and it differs considerably to the profits-based approach used, for example, in England.

The appeal process is also inconsistent with that followed in, for example, England. New Brunswick follows a system where the property owner receives an annual Real Property Assessment Notice (RPAN). The system for appeal is outlined in the Assessment Act. If the property owner disagrees

with the Service New Brunswick assessment, the procedure begins with a Request for Review, which must be made within 30 days of the RPAN. Starting from 2025, property owners receive their assessment notices based on their property's status as of January 1 of the preceding year.

For information, a RPAN contains property identification in the form of a property's account number and property ID, which helps identify the exact property for taxation. It also contains an assessed value for tax purposes, which may differ from the market value. It will also detail any tax rates and exemptions applicable to the property and detail the appeal process.

Following on from this initial procedure, if the property owner still disagrees with the valuation presented there is the right to submit a Notice of Appeal within 21 days of the RPAN submission. Appeals can be based on:

- The amount of the assessed value.
- Whether the property is in the correct property class; and
- Whether the property should be exempt from municipal and/or school taxes.

Once a hearing date is scheduled, the owner will have 15 days in which to provide all relevant documentation in support of their case. Hearings are held – and there is a public right of access – although all decisions are only sent to the parties directly involved.

There is a further right of appeal, should it be required, to the Court of King's Bench of New Brunswick.

Many commercial leases now contain "pass through" clauses which means that the tenant is responsible for property taxes. It is necessary for tenants to review their current agreements for this clause, as only the property owner can file the appeal. A tenant may want to ask their landlord to file the appeal on their behalf. However, if the property is under a lease for a term of five years or more, but fewer than sixty years, excluding any renewal periods or options to renew, the Director may assess the real property jointly in the names of the owner and the lessee if

(a) the lease is registered in the registry office of the county in which the land is situated and contains a full and accurate description of the land,

(b) the land referred to in paragraph (a) is able to be separately conveyed as described,

(c) one or more buildings are situated on the real property under lease and the lessee owns the building or buildings,

(d) the lessee has full use and occupation of the real property, and

(e) any other conditions or circumstances prescribed by regulation are met (Assessment Act 14(7.2)).

To ensure accuracy of information, data is requested by the province which includes "*reports, records, financial statements, statistics and other relevant information in the possession or control of the owner, occupier or user that he considers necessary and that relate to the ownership, quantity, nature, location, extent and value of such real property; and an assessment of real property at its real and true value may be made by means of examining such reports, records, financial statements, statistics or other information, and such assessment shall be deemed to be a valid and proper assessment for all purposes of this Act and the Real Property Tax Act notwithstanding that no other means were used to assess the real property at its real and true value and notwithstanding that an inspection of the real property has not been carried out" (Assessment Act 8 (1.1)).*

Owners have 30 days in which to submit the requested data. Failure to do so will result in the requested information being assumed by the valuer – and this will be deemed to be a real and true valuation of the property in question.

Failure to provide the required information will result in an offence punishable under Part II of the Provincial Offences Procedure Act.

Alberta

The findings equally apply to properties with solar, wind, hydro and battery energy storage in Alberta.

The valuations are highly regulated and undertaken in terms of the following legislation:

- Municipal Government Act (MGA) and Matters Relating to Assessment and Taxation (MRAT)
- Alberta Linear Property Assessment Minister's Guidelines
- Alberta Construction Cost Reporting Guide (CCRG)

In terms of the above legislation, land and improvements are valued at market value. The Depreciated Replacement Cost approach is used as the only valuation approach.

The generation equipment, if it has the ability to sell to the grid, is regulated and valued using the Alberta Linear Minister's Guidelines. If a property cannot sell to the grid it is considered "designated industrial property". It is regulated and assessed using the Alberta Machinery and Equipment Minister's Guidelines.

Electric Power Generation linear assessment is based on the total cost to build less excluded costs. The Alberta Construction Cost Reporting Guide (CCRG) sets out those costs that may be excluded if supporting documentation is provided.

The costs of construction, being all of the actual expenditures incurred to build the power plant, must be reported by property owners.

With regard to the determination of depreciation in the application of the Depreciated Replacement Cost approach, the Alberta Linear Property Assessment Minister's Guidelines contains the depreciation tables used for renewable energy properties.

No information to support the income capitalization, discounted cash flow or profits approaches is collected, since Alberta's renewable energy properties have a regulated approach to valuation.

There is no energy specific legislation applicable to the valuation of these properties.

There are no energy tax incentives that may impact on valuation, and electric power generation is exempt from School Tax in Alberta.

With regard to the collection of building cost information, the Alberta Municipal Affairs Office sends a request for Information to all stakeholders annually.

Electric power generation assessments are self-reported. The property owners, stakeholders and tax agents are responsible for providing cost reports. If the information is out of date, or if new information has not been reported, the onus is on the stakeholder to provide accurate and current information.

The Alberta Municipal Affairs Office is currently in the process of developing an inspection cycle for plants that have not responded to the request for information or plants that have been reporting no change for several years.

Plan information is also updated through the request for information process.

Accuracy of information is ensured by inspections, Alberta Electric Systems Operator (AESO), Alberta Utilities Commission (AUC), working with property owners, stakeholders and tax agents.

With regard to disputes, failure to comply with the request for information within the specified time frame means such property owners forfeit the right to file a complaint with the Land and Property Rights Tribunal (LPRT).

A property owner, agent, or municipality files a complaint with the LPRT if they disagree with an assessment or decision made by the Minister of Municipal Affairs (for regulated properties).

The majority of appeals are on the newly assessed plants. In the past year, there were 27 new builds and four complaints were received.

While the respondents respect the decision-making process, they are of the view that the consistent favoring of industry positions may undermine confidence in the fairness and balance of the appeal proceedings.

Discussion

This section sets out the high-level findings, separately for Ontario and British Columbia, New Brunswick and Alberta respectively.

Ontario and British Columbia

Both Ontario and British Columbia utilize similar methodologies to solve the valuation question on renewable energy properties.

In both provinces, the acquisition of data is essential to complete the valuation of renewable energy infrastructure.

British Columbia's regulated cost manuals assist in directing the valuer to prescribed cost rates and depreciation schedules. These rates are developed in conjunction with the industry and are a good example of a collaborative approach to valuation between assessing authority and ratepayer.

In Ontario, the legislation directs MPAC on the appropriate valuation approach for properties owned by designated electrical utilities. The regulated nature of these properties helps to stabilize the assessment base, but also removes assessor's judgement in cases with excess depreciation or unforeseen market influences.

Both provinces rely heavily on the building of relationships with industry stakeholders to facilitate the exchange of data. New participants in the industry, particularly around emerging renewable technologies, pose problems with the exchange of data due to the lack of existing working relationships.

Discussion with staff from BC Assessment indicated that there were no major appeals of note on any of the renewable energy assets discussed in this report. This could be the result of the collaborative work with industry stakeholders in rate setting and depreciation.

In Ontario, appeals with respect to renewable energy were more focused on the effect of these installations on residential and farm properties within the same geographic vicinity. Courts have typically reviewed sales information of comparable properties and determined that no market evidence exists to support a negative influence on value from a renewable energy resource.

New Brunswick

The cost-based valuation method is deemed to act as an incentive for clean energy production, although it makes no differential between those who can afford to pay more and those who cannot. It is a highly controlled form of valuation which is legislation led.

The appeal process is limited to a very small window. This results in a tight time frame for occupiers and owners and prevents appeals being submitted over a drawn-out period. It could be considered to reduce the timeframe within other countries involved in this study. This would condense the review/challenge period and could have the effect of reducing the overall number of appeals made, but how well this would translate to areas which have regular revaluations and sometimes significant changes in value would be uncertain.

The request for information process is closely aligned to methods across the research group countries, in that requests are made, and penalties can be put in place for those who do not comply with these requests.

Alberta

According to the survey findings, property legislation determines that land and improvements are valued at market, using the depreciated replacement cost approach. The generation equipment, if it has the ability to sell to the grid, is regulated and valued using the Alberta Linear Minister's Guidelines.

If a property cannot sell to the grid it is considered "designated industrial property". It is regulated and assessed using the Alberta Machinery and Equipment Minister's Guidelines.

Valuations of these property types are very regulated, with no consideration of alternative valuation approaches that may be more appropriate.

However, the use of the cost approach is beneficial from a tax perspective, which appears to be the main reason why this approach is therefore favored.

Property owners are requested to provide information on their properties and failure to comply with the request for information within the specified time frame means such property owners forfeit the right to file a complaint. In practice, the majority of appeals were on the newly assessed plants.

Recommendations for Future Study

Canadian Assessment jurisdictions rely heavily on the cost approach to value for properties in the renewable energy sector. Regulated rates are also quite prevalent in the provincial legislation. As technologies advance and new assets for renewable electricity are developed, the impact on existing legislation and the setting of regulated cost manuals and assessment rates could be the next area of focus for this property type.

The use of the cost approach is also limiting, particularly around determination of functional and economic obsolescence. This study did not consider how obsolescence, particularly non-physical depreciation, is determined by the valuation agency. This aspect potentially warrants research.

Further areas of research when reviewing valuation across renewable energy could include factors such as income generated, and time taken to conduct valuations – this would result in providing detailed information on time spent and cost incurred v. income generated, to provide information on the most cost-effective form of valuation.

Conclusions

The valuation of renewable energy assets in all four provinces reviewed rely on a DRC approach to valuation. In each province, regulation of component rates is present.

This can be viewed as a positive from a mass appraisal standpoint, especially when the development of rates involves input from industry stakeholders. The regulation of certain aspects of the valuation clarifies much of the guesswork on unique property types and stabilizes the assessments.

The use of the regulated approach has certain advantages. It could be argued to support the growth of the sector, as there is no penalty for increased production or investment. The converse can also be said to be true though – the blanket approach to cost makes no allowance for those generating a larger profit as they are evidently more able to pay a larger tax amount. In the cost/profit-based approach, which is used in England, those who can afford to pay the most do so. This creates an environment where investment and profit are supported as costs are relative to profit. To have a blanket cost-based approach may actually stifle investment as those with a lower profit margin may be unfairly saddled with a higher tax burden in percentage terms than those generating a higher profit – thereby reducing the amount of money available for further investment.

The use of regulated rates and the cost approach to value can also be limiting when considering the assessor's judgement for elements of depreciation including functional and economic obsolescence.

While the use of regulated rates provides some degree of consistency and stability for municipal tax assessments, it is recommended that valuation staff explore other methodologies where applicable. This could include an income approach to value based on electricity production or a true replacement cost approach that allows valuers to adjust depreciation based on subject property conditions. As current technologies age and new forms of renewable generation advance, the ability to reflect functional and economic obsolescence will be required.

The acquisition of data to support valuations of properties comprising of renewable energy appear to be very dependent on a collaborative approach with developers and industry professionals.

No significant case law or study was referenced by any of the provincial contributors. This is likely due to the regulated nature of the property valuations and the ability to address conflict through previously established relationships prior to formal appeals being considered.

It is also recommended that valuation agencies continue and enhance their collaboration efforts with their industry participants. This has proved helpful in the setting of rates in some areas, reducing the number of assessment appeals and exchanging data. Continued collaboration will only improve the valuation process and will assist in addressing changes to technology and assessment legislation as they arise.

Reference Material and Survey Contributors

As a group, we are extremely grateful to the contributors who gave their time to complete our questionnaire. Thanks go to the following:

Survey Contributors

- Darryn Beuthin, Senior Appraiser, MIP/EPG, BC Assessment
- Joseph Creegan, Appraiser, BC Assessment
- Joanne McKinnon, Linear Manager, Provincial Assessor's Office, Assessment Services Branch, Alberta Municipal Affairs
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- Daniel Cormier, Property and Assessment Services, Service New Brunswick.
- Earl Bovenizer, Heavy Industry Specialist, Property Assessment Services and Registries, Service New Brunswick.

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Focus Group Number 7
Renewable Energy: USA

Group Members:

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Introduction

The renewable energy sector in the United States is expanding rapidly, driven by climate goals, technological advances, and changing market structures. However, the taxation and valuation of renewable energy facilities are still at an early stage of development and marked by variation across jurisdictions. This report documents the team's research into current practices, challenges, and successes in renewable energy valuation, with the aim of informing more consistent and transparent approaches.

Scope and Objectives

The objectives of this research were to:

- Understand the renewable energy valuation landscape in the U.S.
- Examine current practices, valuation methodologies, and statutory frameworks.
- Document data collected and the availability of reliable inputs for valuation.
- Identify disputes, conflicts, and litigation trends in valuation of renewables.
- Highlight good practices that may be adopted as models.

The study covered the following major renewable and clean energy asset classes:

- Hydroelectric/pumped storage
- Solar
- Wind
- Biomass
- Geothermal
- Battery Energy Storage Systems (BESS) - *BESS are not renewable energy sources in themselves, but they are included in this study as they are complementary infrastructure that enhances the reliability of wind and solar power, and their deployment is expanding across the U.S.*

Research Methodology

Our research employed a mixed-methods approach combining desktop research with interviewing expert county and state assessors and property tax administrators. We are grateful for the assistance of both IAAO, and IPTI's President Paul Sanderson, who provided a critical starting point of contact. After initial outreach to local assessors yielded limited success, his support in facilitating introductions through IAAO helped us connect with more assessors for interviews. Desktop research included deploying search engines and generative AI to review statutes, regulations, assessor manuals, and case law specific to each state. The Director of IAAO's Corusy Memorial Library, Dr. Elizabeth Ferguson, has also shared renewable energy resource reference materials. These, coupled with articles on IPTI's Xtracts website, provided valuable supplementary information for our analysis. When experts are referred to in this report it means those people who kindly allowed us their time for interviews.

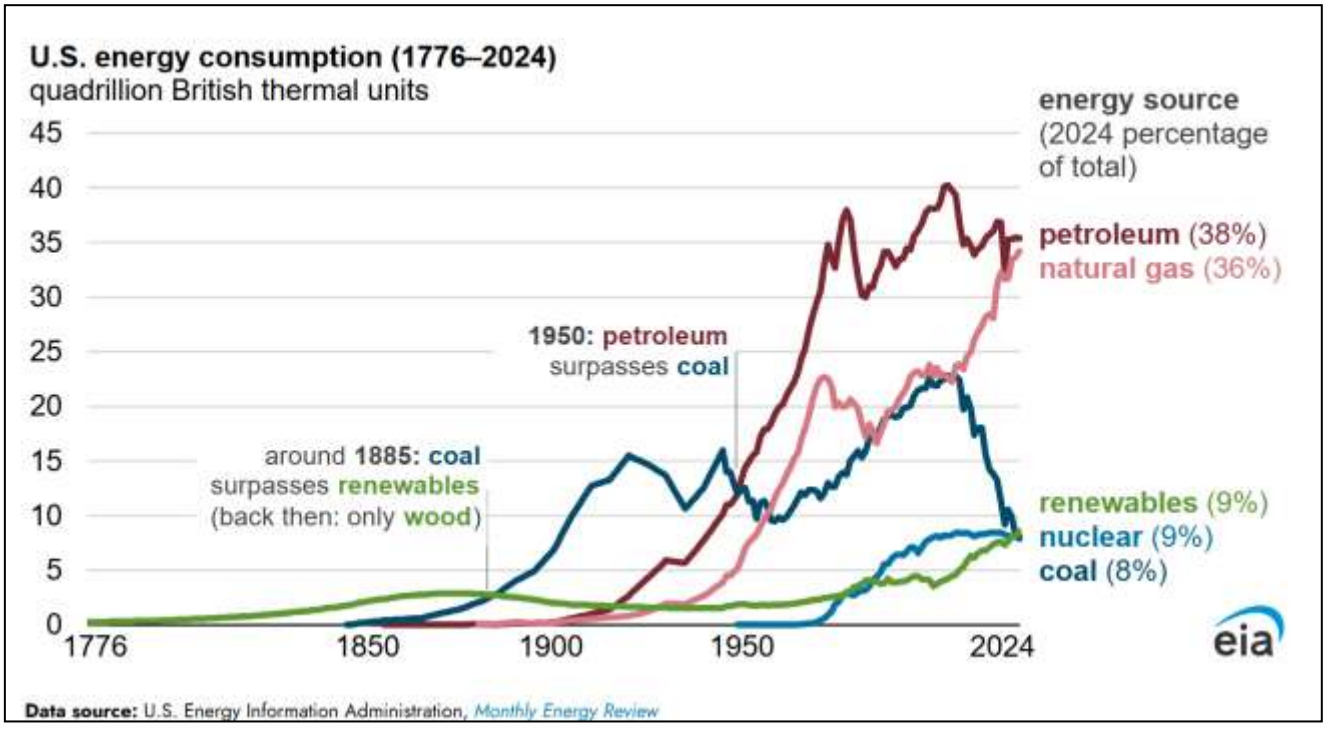
To ensure depth and breadth, the team selected six states, namely Iowa, Oregon, Colorado, Washington, Vermont, and California, for focused study. These states were chosen either for their high adoption of specific renewable energy sources or for their notable regulatory and policy frameworks governing valuation and taxation of renewables.

STATE	REASON FOR SELECTION
Colorado	Growing wind and solar, statute-based assessment approach.
California	Included for its high solar adoption, state-mandated property tax exclusion.
Iowa	Top state for proportion of wind generation. Special property tax arrangements for wind and solar, as well as utilities in general.
Oregon	Hydropower and wind form significant proportion of energy mix. Key incentive programs such as SIP and RREDZ.
Vermont	Near 100% renewables, solar-specific exemptions, centralized tax treatment.
Washington	Hydropower leader.

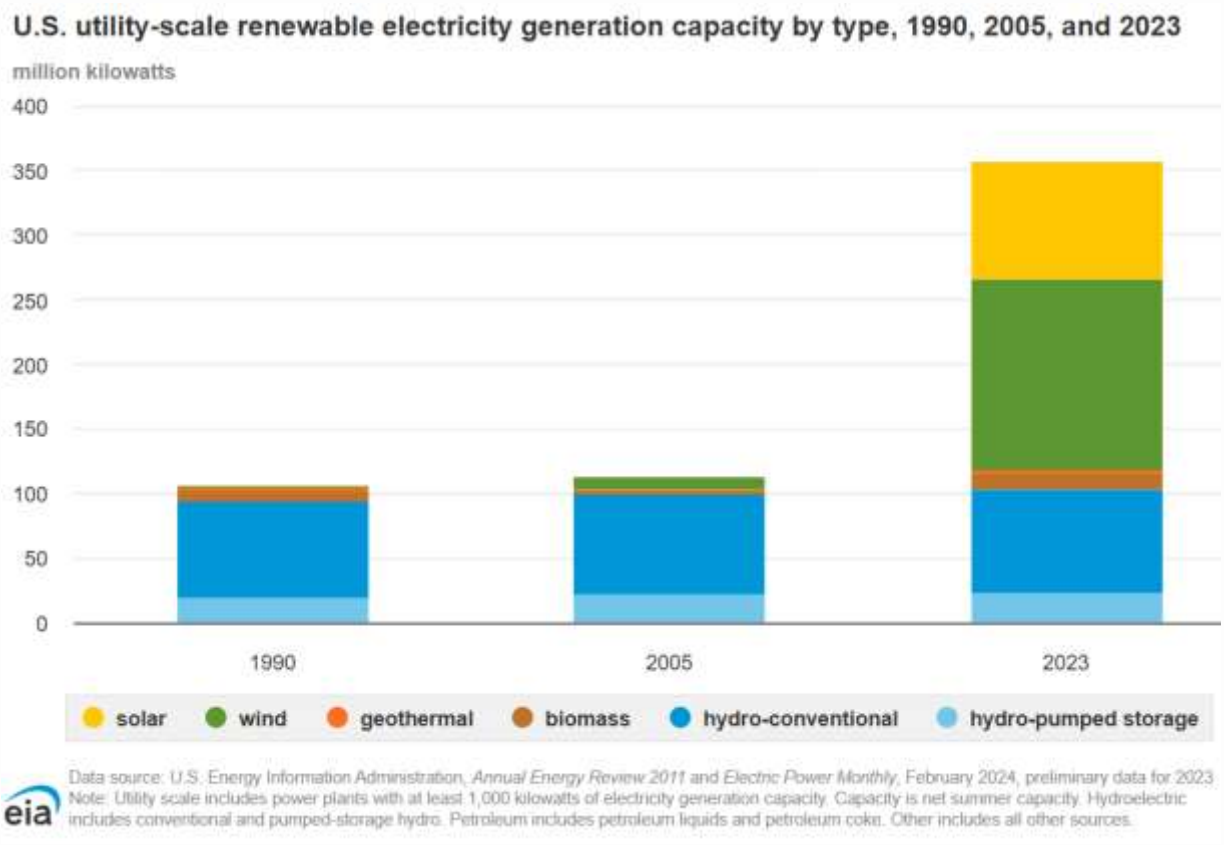
Findings and Analysis

Overview of Renewable Energy in USA

In 2024, the United States consumed about 94 quadrillion British thermal units (quads) of energy. Fossil fuels – petroleum, natural gas, and coal – accounted for 82% of total U.S. energy consumption in 2024. Non-fossil fuel energy – from renewables and nuclear energy – accounted for the other 18%.



Electricity generation from some zero-carbon sources, such as wind, solar and BESS, has increased rapidly in recent years, while generation from others, such as hydropower and nuclear, has remained relatively flat. In 2022, U.S. energy consumption from renewable sources surpassed nuclear energy for the first time since 1984, and in 2023, renewables surpassed coal for the first time since around the early 1880s. The United States now consumes more energy from wind and solar sources individually than from hydropower.



Drivers of Renewable Energy Growth in the U.S.

The rapid expansion of renewable energy in the U.S. is the result of converging market, policy and technological forces. While instrumental in propelling renewable energy growth, these drivers also introduce uncertainties that make accurate property tax appraisal more challenging.

State renewable portfolio standards (RPS)

State Renewable Portfolio Standards (RPS) is a state-level policy that requires electricity suppliers to include a certain fraction of renewable electricity in their total electricity sales over a specified time. States have created these standards to diversify their energy resources, promote domestic energy production and encourage economic growth. Roughly half of the growth in U.S. renewable energy generation since the beginning of the 2000s can be attributed to state renewable energy requirements. Many states have active RPS or clean energy standards (CES). CES typically refer to sources of energy that have zero carbon emissions.

Federal Incentives

The Clean Electricity Production Tax Credit and the Clean Electricity Investment Tax Credit, which were created by the 2022 Inflation Reduction Act, replaced the previous Production Tax Credit (PTC) and Investment Tax Credit (ITC) for projects entering service after 31 December 2024.

Clean Electricity Production Credit offers the following:

- Tax credit for electricity generated from any zero- or low-emission source
- This starts at a 0.3¢/kWh base rate and can be up to 1.5¢/kWh based on compliance with employment related conditions

Clean Electricity Investment Credit offers the following:

- Investment-based tax credit based on a proportion of a renewable energy generation or energy storage scheme's capital cost
- A base rate of 6%, or up to 30% if employment related conditions are met
- Additional 10% reliefs are available dependent on meeting domestic content requirements and community requirements

Both credits cannot be claimed for the same facility. The credits are available for tax-exempt entities and are transferable to others, meaning they have a market value.

Significant changes were made to this system under the One Big Beautiful Bill Act in July 2025. This brought forward the removal of incentives for wind and solar generation projects, which must now either begin construction before 4th July 2026 or be in service by 31st December 2027 to qualify. Phaseout of credits for technologies such as energy storage, hydropower, geothermal and other zero-emission generators remain on the previous timescale beginning in 2033. Additionally, the issuing of credits will no longer happen where facilities have specified links to Prohibited Foreign Entities as defined in the bill.

The phasing out of federal incentives is likely to have significant impact on future valuations and viability. Assessors at the state and local level remarked on the difference this would make to how projects are financed and valued. They stated that the change in perceived risk and lower financial subsidies would lead to projects no longer being viable.

Power Purchase Agreements

Corporate Power Purchase Agreements (PPAs) have been a major driver of renewable energy growth in the U.S. Over the past decade, large companies such as Google, Microsoft, Facebook, and Amazon have increasingly committed to sourcing their electricity from renewables to meet climate and sustainability goals. PPAs, especially virtual PPAs (VPPAs), enabled these corporations to contract directly with wind and solar developers, providing the long-term revenue certainty needed to finance new projects.

Technological advancement

Technological advancements have accelerated renewable energy adoption in the U.S. by sharply reducing costs and improving reliability. Innovations in solar panels, wind turbines, and battery storage have made renewables cost-competitive with fossil fuels, while digital tools and grid management technologies have eased integration of variable sources. These improvements gave

utilities and corporations confidence to sign long-term contracts, such as PPAs, driving large-scale deployment and positioning renewables as a mainstream power source.

Main Sources of Renewable Energy in the U.S.

Renewable energy is energy from sources that are naturally replenishing. Renewable energy installations usually take two forms: utility grade, which are designed to produce electricity for the grid, or distributed, which consists of smaller units such as solar rooftops designed to generate power for business, manufacturing, agriculture, and local networks. Major sources of renewable energy in the U.S. include:

Solar

Solar power generation captures the energy of the sun using photovoltaic (PV) cells that convert sunlight directly into electricity, or through concentrated solar power systems that use mirrors to focus solar radiation to produce steam and drive a turbine. Most large-scale facilities in the U.S. are PV-based.

Although solar technology has been experimented with since the late 1800s, utility-scale generation in the U.S. only began to accelerate in the early 2000s. This growth was largely driven by federal tax incentives such as Investment Tax Credit, state renewable portfolio standards, and falling module costs.

Installed solar capacity has expanded rapidly in the past 15 years. From less than 2 GW in 2010, it had grown to over 150 GW by the end of 2023, with more than 20 GW added in 2024 alone. Today, solar power represents the fastest-growing renewable energy source in the U.S., contributing significantly to grid decarbonization and energy diversification. Florida, California and Texas have consistently ranked as the top states for solar PV installations.

Wind

Wind-based power generation harnesses the energy of the wind by using it to spin a turbine, usually on a horizontal axis. This kinetic energy is converted into useful electricity via a gearbox and electromagnetic induction generator.

Whilst small scale generation from wind has happened in the US since the late 1800s, the first utility scale generation occurred in the 1980s in California. This is considered a response to federal and state policies encouraging the diversification of energy production following oil shortages in the 1970s.

Installed capacity has increased significantly in the past fifteen years. 47.0GW in 2010 increased to 147.5GW by the end of 2023 and in 2024 it increased by a further 6.5GW. This has made wind the fourth most prevalent source of power. Whilst Texas is the most prolific generator in terms of annual output at 92.9TWh in 2020-21, only 20% of the state's generation came from this source. In Iowa by contrast 58% of electricity generated was from wind making it the most used energy source. The states which generate the most electricity from wind installations tend to be in the Midwest owing to their favorable geographical situation.

Hydropower/Pumped Storage

Hydropower plants produce electricity using the elevation difference created by a dam or diversion structure. They contribute significantly to the flexibility and stability of electricity grids by providing energy on demand. Most hydropower produced in the U.S. is from large facilities on major rivers,

built by the federal government. There are two general types of hydropower, conventional and pumped-storage.

In 2022, hydroelectricity accounted for about 6.2% of total U.S. utility-scale electricity generation and 28.7% of total utility-scale renewable electricity generation. There are about 1,450 conventional and 40 pumped-storage hydropower plants operating in the U.S. The largest U.S. hydropower facility, and the largest U.S. electric power plant by generation capacity, is the Grand Coulee hydro dam on the Columbia River in Washington State, with 6,765 MW total generation capacity. About half of the hydropower generating capacity in the U.S. is in the western states of Washington, Oregon, and California.

Geothermal

Geothermal energy is heat from the hot interior of the earth or near the earth's surface. Geothermal energy was first used for electric power production in 1960 at The Geysers in Sonoma and Lake counties, California. Today, the U.S. leads in the world in geothermal generation capacity producing over 4 GW. The largest single source geothermal plant in the world is the Geysers Geothermal Complex in north California, with a capacity of 900 MW.

There are three main types of geothermal power plant technologies – dry steam plants, flash steam plants and binary-cycle plants. Currently, the U.S. has 93 binary cycle generators, averaging 8 MW of capacity each, and 79 steam generators that average 23 MW each. Dry steam and flash plants, which require rarer high-temperature, shallow reservoirs, have higher power output and are, therefore, more economically efficient than binary plants. However, because binary plants can operate at reservoirs with lower temperatures, they have more options for suitable locations.

Most geothermal steam fields are located in the western U.S states of California, Nevada, Utah, Oregon, Hawaii and Alaska.

Biomass

Biomass power generation uses organic material - such as wood waste, agricultural residues, or dedicated energy crops - to produce heat that generates electricity through steam turbines. In some cases, anaerobic digestion of organic matter produces biogas, which is then burned to create power.

Utility-scale biomass in the U.S. developed significantly in the 1980s and 1990s, often tied to paper mills, forestry operations, and waste-to-energy plants. Federal and state incentives, along with renewable energy mandates, encouraged its expansion as a means of both waste management and renewable power production.

Biomass growth has been more modest than wind or solar with installed capacity remaining relatively steady. As of 2023, the U.S. had roughly 12–14 GW of dedicated biomass generation capacity, with only small net additions in recent years. Biomass remains an important part of the renewable mix in states with strong forestry and agricultural sectors, including California, Florida, and the wider Southeast.

Battery Energy Storage Systems (BESS)

Utility scale BESS are found both standalone and collocated with generation assets. They take energy in the form of electricity from either those generation assets or the grid, store it as chemical energy and later release it again in the form of electricity. Such systems are playing an increasingly important

role in power grids and will continue to do so to support the transition to renewable energy generation.

There are multiple ways in which BESS can be used to aid the grid and provide a return for their operators. These include:

- Maintaining grid stability through frequency regulation, voltage support and backup power
- Load shifting to shave peaks in demand, reducing the need for fossil fueled peaking plants, curtailment of renewable generation and strain on the grid
- Energy arbitrage

The adoption of BESS in the US is rapidly expanding. The Energy Information Administration predicts 18.2GW of deployment in 2025, nearly doubling 2024's 10.3GW. This would mean a doubling of the installed capacity from the end of 2023 to the end of 2025.

California and Texas lead the way in utility scale BESS with 7,302 MW and 3,167 MW installed as of November 2023. At that time these were the only two states with more than a gigawatt of capacity.

Property Taxation of Renewable Energy Facilities

Background

Property taxes in the US are calculated on the assessed capital value of the owner's interest multiplied by a tax rate (or millage levy). This can include real property – land, building and improvements - and personal property such as furniture, equipment, materials, machinery and tools. In most cases, the assessed value is 100% of the fair market value of the property, although in some cases the percentage may be different (e.g. West Virginia adopts 60% as taxable value) and restrictions apply.

There is no single national standard for assessing renewable energy facilities in the United States. Property tax practices are highly fragmented and differ from state to state. Some treat utility-scale renewable assets as state or central (unitary) assessments, others as locally assessed property, and still others treat them as industrial property or, occasionally, public-utility property.

Statutory language and state assessor guidance typically define the valuation methodology, per-kW rates, asset life expectancy, and the distinction between real and personal property. In most states, the department of revenue oversees central assessment and issues directives for local assessors. Local assessors apply these rules when property is assessed at the local level, whereas assets that span multiple jurisdictions or involve utility infrastructure are generally subject to central assessment. As a result, assessment practices reflect a combination of legislative requirements and agency policy.

Valuation Methods

The three accepted methods of valuation for property taxation are adopted for renewable energy facilities:

Cost Approach

- Cost or depreciated-cost approach is by far the most common, especially for personal property components such as solar panels, turbines, racking and inverters. It determines value by estimating the cost to reproduce or replace a property and then deducting depreciation.

- Three key variants are widely recognized:
    - The Historical Cost Less Depreciation (HCLD) method, which adjusts actual incurred costs for depreciation
    - The Reproduction Cost New Less Depreciation (RPCNLD) method, which estimates the cost to create an identical asset at current prices
    - The Replacement Cost New Less Depreciation (RCNLD) method, which reflects the cost to build an equivalent facility using modern materials and technology. Each approach accounts for physical deterioration, functional obsolescence, and economic obsolescence to derive a depreciated value approximating fair market value.
- Jurisdictions often use historical or original cost (which are readily available) trended to replacement cost new and apply depreciation schedules. Most jurisdictions place a floor, typically of between 15% and 30%, on value after depreciation.

Steps in the Cost Approach

Step1: Estimate Current Cost (RCN, RPCN or Historical Cost Trended Forward)

- Direct costs: equipment, materials, labor
- Indirect costs: engineering, permits, overhead
- Entrepreneurial profit/incentive/reward for risk

Step 2: Deduct Depreciation

- Physical deterioration: wear and tear from use and age, typically measured using age-life methods or production-based ratios. Usually, cost to remedy any immediate physical issues are applied, before the age-life method is applied over the expected life of the assets.
- Functional obsolescence: reduction in value due to newer, more efficient technology (e.g., larger wind turbines producing more energy at lower cost).
- Economic obsolescence: external factors such as reduced subsidies, policy/regulatory shifts, or market oversupply. The phased-down of PTCs presents a clear case of policy driven obsolescence.

Step 3: Arrive at Replacement Cost New Less Depreciation

- This figure represents the taxable or market value of the facility.
- Jurisdictions vary in how they apply these methods. For example, Colorado employs a statutory RCNLD model, where assessors calculate value by multiplying the system's AC generation capacity by a standardized cost per kilowatt, then applying age-based depreciation and a level-of-value adjustment. This formulaic system ensures statewide uniformity for renewable energy valuation and is applied to all locally assessed renewable assets, with smaller solar facilities alternatively valued via an income-based tax factor method. In contrast, Washington State uses a trended historical cost model, where assessors apply published percent-good factors to original costs, adjusting for normal depreciation and obsolescence. Separate trend tables are provided for renewable energy, solar, wind, and battery storage.
- The cost approach provides a systematic framework to valuing renewable energy facilities by relying on actual construction costs and adjusting for depreciation and obsolescence. While it avoids the uncertainty of forecasting revenues, its accuracy hinges on correctly measuring

depreciation, particularly functional and economic obsolescence, which are highly relevant in rapidly evolving renewable energy markets.

- One problem faced by counties using the cost approach is that the asset may still be producing the same electricity after depreciation, but local tax revenue declines because of depreciation policies. Experts support exploring a usage tax which is excise-based, tied to energy consumption, as a more equitable and sustainable solution.

Income Approach

- This approach is used in some states but often constrained so the income-derived value must "back into" (or approximate) the cost approach outcome. Thus, in practice some states apply a hybrid or statutory rule that preserves the cost-based tax outcome. An additional problem in using the income approach is the monetization of tax incentives (PTC or ITC) related to property taxes. The ability to use these credits significantly increases the value to investors as costs are reduced and income increased from monetization of the credits rather than the production and sale of power. This distortion limits the use of both the market and income approaches to property valuation.
- The above is impacted by whether state rules include or exclude intangible value from valuations – which can vary based on classification as well as state and technology type.

Market Approach

- This approach is rarely, if ever, used because there are few arms-length sales of whole renewable facilities. Market evidence is stronger for the real property component, such as the pad land for wind farms, solar farms or BESS, or land/leased ground for small residential installations where paired sales may emerge.
- Renewable energy projects often involve intricate financing structures, such as those utilizing tax credits that obscure the actual sale price. These structures can make it difficult to determine the true market value of the underlying assets.
- In many transactions, the sale may include both tangible (real and personal property) and intangible (enterprise value) assets. Isolating the value attributable to the tangible assets, which are typically the focus of the property tax assessment, is difficult.

Experts explicitly note there isn't a single national valuation approach, and jurisdictions are all "doing it their way." They recommend a shared baseline of best practices but accept local statutory differences.

Exemptions, Abatements, Payments in Lieu of Taxes (PILOT)

States have autonomy to legislate for policies which they see fit to encourage desired development. In most cases, they are designed to make renewable energy projects more competitive with existing generation by improving financial viability. They may be adopted at either the state or local level.

Property tax exemptions eliminate or reduce the taxes paid on renewable energy properties such as solar or wind farms. These may mean no tax is paid on the entire property, or just that the improvements related to the renewable energy development are ignored.

Abatements similarly impact the taxes due on part of or the whole of a property, but they typically apply for a set period. Lowering costs in the early stages of a project can be effective in improving

viability as this allows time for development to be completed and revenues to start flowing before tax liability increases.

PILOT agreements replace value-based property taxation with a separate system which usually involves a formulaic approach to calculating tax liability based on factors such as a project's generation capacity. These make liabilities more predictable and stable which can aid in accessing finance.

Whilst such schemes appear to be effective in incentivizing the rollout of renewable energy generation technology, they may be criticized as being costly in terms of lost tax revenue.

Court Decisions on Renewable Energy Assessments

As the renewable energy sector continues to expand across the United States, state courts and legislatures are increasingly grappling with how to assess and tax these properties in ways that balance fiscal responsibility with climate and economic development goals. A growing body of case law reveals a spectrum of legal interpretations and policy strategies - some judicial, others legislative - aimed at clarifying how renewable energy systems should be valued for property tax purposes.

One illustrative case is ***Siete Solar, LLC v. Arizona Department of Revenue***, 2015 WL 8620672 (Ariz. App. Dec. 10, 2015). In this case, the Arizona Court of Appeals addressed whether a 2014 amendment to the state's valuation statute - excluding government grants and tax credits from the calculation of a renewable energy project's full cash value - could be applied retroactively. The court held that the amendment could not be applied to tax years prior to its enactment, emphasizing the principle that tax statutes affecting substantive rights must be applied prospectively unless the legislature clearly indicates otherwise. While the ruling limited the immediate tax relief for Siete Solar, it underscored the importance of legislative clarity and the boundaries of retroactive tax policy.

In contrast, the **Tennessee General Assembly** took a proactive legislative approach to encourage renewable energy development. Recognizing the financial hurdles faced by wind and solar developers, the legislature enacted a statute that explicitly limits the assessed value of renewable energy property by excluding the value of federal, state, or local grants and tax credits. This policy aims to reduce the tax burden on clean energy projects, making them more financially attractive and competitive with conventional energy sources. Unlike the judicial restraint seen in *Siete Solar*, Tennessee's legislative action demonstrates how state governments can directly shape tax policy to incentivize investment in renewables.

A third case, ***Seneca Sustainable Energy, LLC v. Department of Revenue***, from Oregon, adds another layer to the legal landscape - this time focusing on biomass energy. The dispute centered on whether a power sales agreement (PSA) - now more commonly referred to as a power purchase agreement (PPA) - should influence the valuation of a biomass facility under the income approach. The Oregon Tax Court ruled that any premium or discount associated with the PPA must be disregarded if it does not reflect the hypothetical market value of the property. The court emphasized that valuation must be based on objective market conditions, not the specific financial arrangements of a given project. This decision reinforced the principle that property assessments should reflect market realities rather than project-specific contracts, even when those contracts are essential to the project's financial structure.

More recently, in ***Rocksprings Val Verde Wind, LLC v. Casanova (Val Verde County Appraisal District),*** the Texas Fourth Court of Appeals addressed whether intangible assets - specifically federal Production Tax Credits (PTCs) and Power Purchase Agreements (PPAs) - could be included in the 2018 appraised value of a wind farm. While the appraisal district argued that these financial instruments were "inextricably intertwined" with the operation of the wind farm, the court of appeal affirmed that only real and tangible personal property is subject to taxation. This 2024 decision reinforced the principle that tax credits and contractual revenue streams, while essential to project financing, do not constitute taxable property. Ahead of new trials for later tax years, both sides negotiated a comprehensive settlement covering 2018–2025, setting the 2018 value at $126 million. The agreement increased tax revenue for local entities by over $1.2 million, preventing higher tax rates for other property owners, and achieved stabilized valuations for future years.

On May 30, 2025, New York's Third Department confirmed that assessors must apply the state's uniform assessment model for solar and wind energy facilities under Real Property Tax Law 575-b. The confirmation follows an automatic stay of the Albany County Supreme Court's ***Airey v. State*** ruling, which had found the statute an unconstitutional delegation of taxing power to the Department of Tax and Finance. Enacted in 2021, the law authorizes the Department to create a discounted cash flow model ("the Model") for valuing renewable energy facilities. The stay keeps the Model in effect while the Third Department reviews the statute's constitutionality. The state maintains the Model ensures consistent, predictable taxation—critical to advancing renewable projects under the Climate Leadership and Community Protection Act. Earlier uncertainty had led to inconsistent local practices, but assessors must now use the Department's 2025 Model for the upcoming tax year. With final assessment rolls due July 1, both assessors and renewable developers must confirm valuations comply with the mandated Model.

Together, these cases and legislative actions illustrate the diverse and evolving strategies states are using to align property tax policy with renewable energy goals. Whether through judicial interpretation or statutory reform, the trend is clear: there is growing recognition that traditional valuation methods may not adequately account for the unique characteristics of renewable energy projects. By adjusting how grants, credits, and contractual revenues are treated in property assessments, states are not only clarifying legal ambiguities but also signaling their commitment to fostering a cleaner, more sustainable energy future.

Case Studies

California

California has long been a national leader in renewable energy development, setting ambitious targets and pioneering clean technologies. As of 2025, the state generates approximately 67% of its electricity from renewable and zero-carbon sources. Its Renewable Portfolio Standard (RPS) mandates 50% of retail electricity sales from renewables by 2030, with a goal of 100% clean electricity by 2045.

Solar power is California's largest renewable contributor, accounting for over 25% of the state's electricity generation. Utility-scale solar farms and widespread rooftop installations have flourished under supportive policies and abundant sunshine. Under California Revenue and Taxation Code Section 73, active solar energy systems are exempt from property tax reassessment until 2026. This includes rooftop panels and solar water heating systems. There is also a federal tax credit which

allows homeowners and businesses to claim a 30% federal investment tax credit (ITC) for solar installations.

California ranks fourth nationally in installed wind capacity, with over 7,400 turbines and another 400+ under development. Wind contributes about 7% of the state's electricity. Kern County leads in wind production and hosts the Alta Wind Energy Center—the largest wind facility in the U.S. Alta Wind Energy Center pays approximately $40 million in property taxes annually.

Wind farms in California are assessed using a dual valuation system that offers developers flexibility in managing tax obligations:

- **Proposition 13:** This constitutional amendment freezes property values at the time of completion, limiting annual increases to a maximum of 2%. It provides long-term tax stability for renewable energy developers.
- **Market Income Approach**: This method considers gross receipts, production costs, and a standard 30% capacity factor. Depreciation is calculated over a 25-year economic life, and values are adjusted using a market-derived capitalization rate.

Operators may choose the lower of the two valuations, allowing them to optimize their tax exposure based on project performance and market conditions.

Hydroelectricity is a stable contributor to California's grid, especially in wet years. Large-scale hydro is not counted toward RPS goals, but small hydro projects (under 30 MW) are eligible. Small hydro facilities may qualify for property tax incentives if they meet renewable energy criteria.

Biomass and geothermal energy provide reliable baseload power. California leads the nation in geothermal production, primarily from the Geysers in Northern California. Biomass facilities use agricultural and forestry waste to generate electricity and heat. Biomass and geothermal facilities are assessed based on income and production metrics, similar to wind. The Bioenergy Market Adjusting Tariff (BioMAT) program offers fixed-price contracts for small bioenergy projects.

California's clean energy sector employs over 545,000 workers, the largest in the U.S. The state continues to refine its policies to balance affordability, equity, and grid reliability. Legislative efforts in 2025 focused on extending solar tax exemptions and expanding access to community solar programs.

California's property assessment framework particularly its dual valuation system plays a critical role in supporting renewable energy development. By allowing developers to choose between fixed and market-based assessments, the state reinforces its commitment to flexible, incentive-driven tax policy. This approach helps attract investment, stabilize long-term project costs, and align fiscal policy with environmental goals.

Colorado

In 2024, renewable sources of energy accounted for 43% of Colorado's total in-state electricity net generation. Wind power accounted for the largest share of Colorado's renewable electricity generation at 67%, followed by the combined 27% for utility-scale (1-megawatt or larger) PV and small-scale (less than 1 megawatt), customer-sited solar. Hydroelectric power accounted for 6% and biomass was less than 1%.

In 2004, Colorado became the first state with a voter-approved renewable portfolio standard (RPS). The state's legislature amended the RPS several times, and the RPS now requires 30% of electricity sold by investor-owned utilities to be generated from renewable energy sources, with 3% from small-scale distributed generation. In January 2021, Colorado released its Greenhouse Gas Pollution Reduction Roadmap detailing how the state plans to reduce its greenhouse gas emissions by 26% from 2005 levels by 2025, 50% by 2030, and 100% by 2050.

Colorado values renewable energy facilities through a statute-based framework that delineates responsibilities between the state and the counties, prioritizing predictability over bespoke appraisals. Oversight is handled by the Colorado Division of Property Taxation (DPT), which establishes valuation formulas, rates, and guidance to ensure uniformity. The system sets out clear roles for state and local assessors: facilities that generate more than two megawatts of alternating current are state assessed by the DPT and apportioned to counties according to asset location, while smaller systems are locally assessed following procedures developed by the DPT and published in the Assessor's Reference Library (ARL). This two-tier structure provides a consistent basis for valuing large, multi-county projects and ensures smaller facilities are treated under the same guiding principles. This system encompasses major renewable technologies - solar, wind, biomass, geothermal, and hydro - as well as battery storage systems, though nuclear generation remains outside its scope.

Most of the taxable value, approximately 98%, lies in personal property, including generation equipment such as turbines, panels, racking systems, and inverters. The real property component, such as land, foundations, and fencing, contributes a comparatively small portion of overall assessed value. When projects span multiple counties, the state apportions value proportionately to each county, based on the spatial distribution of the facilities.

A distinctive element of Colorado's framework is its requirement that renewable facilities be valued based on the cost of a comparable non-renewable energy plant. When the law was introduced in 2001, renewable energy systems were more expensive to build than fossil-fuel power plants. To encourage development and maintain equity, the legislature directed that renewables be assessed as if they were gas-fired facilities of similar capacity. The DPT therefore uses a standardized per-kilowatt cost rate, derived from gas turbine pricing, to determine replacement cost new. This rate is updated annually and adjusted for scale - smaller facilities are valued at slightly over $600 per kilowatt, while large plants of 200 to 300 megawatts are closer to $300 per kilowatt. Facilities built before 2001 are assigned a 20-year economic life, and newer ones a 30-year life, regardless of expected operating duration. These parameters are documented in the ARL, ensuring consistent application by assessors.

In 2006 for wind, 2009 for solar, and 2010 for other technologies, legislation further refined the process by requiring that the income approach be used, but only if it produces approximately the same tax outcome as the cost approach. This change allowed the use of income-based modelling while protecting taxing entities from revenue loss. In effect, the income model now "*backs into*" the value that would have been determined under the cost method. The advantage of this approach is that it results in a levelized tax payment over the facility's operating life. Owners effectively pay the same amount of tax for the first 30 years of a facility's life, regardless of the declining book value that would normally result from depreciation. For developers, it reduces front-loaded tax burdens that would otherwise occur if the cost approach produced very high initial values. For the jurisdiction, it

provides stable and predictable tax revenues over the life of the facility, avoiding steep revenue declines as assets age.

Together, these statutory features - the use of comparable non-renewable cost benchmarks, the standardized per-kilowatt rate structure, the prescribed 30-year economic life, and the levelized tax outcome - form the basis of Colorado's valuation system. The DPT's administration of these procedures, supported by the detailed guidance in the ARL, promotes consistency, transparency, and stability in the valuation of renewable energy facilities across the state.

Iowa

As aforementioned, Iowa's largest source of electricity is from wind-based generation, and it is the state with the highest proportion of production from this means. The economic impact, particularly to rural communities, is significant. Despite the measures in place to mitigate property tax liability for wind farms, such installations paid $60,500,000 in 2022. This can make up a significant portion of county revenues, such as in O'Brien County where in 2021 20% came from this source. That revenue is important to support local infrastructure and services.

Iowa's Property Tax Replacement and Statewide Property Tax Act replaced property taxes paid by electric utilities with the Utility Generation Tax and the Statewide Property Tax. These are administered centrally by the Iowa Department of Revenue (IDR).

The Utility Generation Tax consists of a 0.06¢ charge per kWh of electricity generated and exported in the tax year on all generators, subject to the exceptions set out in the Iowa Code. The funds generated from this are distributed to local government subject to weighting by value and levy rate.

The Statewide Property Tax is paid to the IDR who use it to fund the administration of the replacement tax system. This consists of a charge of 3¢ per $1,000 of assessed value on all property captured by the utility replacement tax policy. It is the IDR's responsibility to assess the value of property subject to this tax

Affected taxpayers must file returns with the IDR annually including the necessary information such as the applicable generation figures and assessed value of their property.

Separate procedures for the taxation of wind energy conversion properties are allowed, but not mandated, under the Iowa Code. Counties may create ordinances which allow the following special assessment regime, which is applied locally:

1) The wind farm owner must inform the local assessor that they wish to be included in the special assessment regime.
2) The owner must file a cost report with the local assessor's office.
3) The assessor determines the net acquisition cost based on the information provided which is defined under Iowa Code as "The acquired cost of the property including all foundations and installation cost less any excess cost adjustment."
4) The assessed value is calculated as set out in the Code:
    a. Year 1 has an assessed value of 0% of net acquisition cost.
    b. Year 2 has an assessed value of 5% of net acquisition cost.

c. Year 3 has an assessed value of 10% of net acquisition cost.
d. Year 4 has an assessed value of 15% of net acquisition cost.
e. Year 5 has an assessed value of 20% of net acquisition cost.
f. Year 6 has an assessed value of 25% of net acquisition cost.
g. Year 7 has an assessed value of 30% of net acquisition cost.
h. The assessed value remains at this level whilst the ordinance is in place, or for a minimum of 19 years if it is repealed.

5) The tax bill is calculated from the assessed value in line with other properties other than being excluded from the equalization process.

It is understood that where these special procedures are available the taxpayers universally opt for inclusion as this leads to a lower tax bill.

In contrast to the adoption of wind-based energy production, Iowa is not at the forefront of the rollout of battery energy storage technology. This rollout is accelerating, with significant projects due for completion in late 2025 and 2026, but leaders such as California and Texas have far greater installed capacity.

There is no dedicated property tax arrangement for utility scale BESS in Iowa. If the facility is owned by an electric utility and used primarily for those purposes, then it will be treated as part of the arrangements under Iowa's Property Tax Replacement and Statewide Property Tax Act.

Wind and solar energy systems which are installed on site as an addition to existing properties and for which the energy produced is primarily used on site are treated differently. Their valuation is completed using a cost approach, typically with the assistance of the Iowa Real Estate Appraisal Manual published by the IDR.

The added value of the systems is exempt from taxation for five full assessment years. Building mounted solar power generators may not be included in assessment at all. Furthermore, under Iowa law, for these additions to be reflected in assessments, it must be proven that they add value to the property overall. In some jurisdictions this has led to none being included in assessments due to a lack of evidence.

BESS which are behind the meter and considered part of the wider renewable system may also qualify for this exemption.

Oregon

Oregon has a renewables mandate requiring large utilities to obtain 50% of the power sold to retail customers from renewable sources by 2040.

The state is home to notable projects such as the Shepherds Flat Wind Farm which began generating in September 2012. With a capacity of 845 MW, it is among the largest wind farms in the world and benefited from a combination of state and federal tax incentives and financing support.

By the end of 2024 BESS deployment had reached nearly 40GWh, and in May 2025 Morrow County approved the development of a 7,200MWh project co-located with solar.

The Oregon Department of Revenue is responsible for the annual assessment of energy related properties for property tax purposes, however the tax is still billed, collected and distributed at county level. The state has adopted in legislation the Western States Association of Tax Administrators Appraisal Handbook as valuation guidance for centrally assessed properties. Large scale utility and energy properties are valued as a single unit where they belong to one owner, and generally the results of the cost and income approaches are weighted to determine the final value. No exemptions exist for the likes of utility scale wind farms or BESS.

The cost approach is based on replacement cost new less depreciation for physical, functional and economic obsolescence. The income approach sums the present value of expected future cashflows. Considered better reflective of how investors value renewable energy generation projects, the latter is often preferred.

Certain energy systems qualify for exemption from property taxes where they are firstly intended to offset onsite electricity use. These are defined under Oregon law and include solar, geothermal, wind and BESS energy systems. The exemption means the systems are exempt from adding to the assessed real market value of the property.

Renewable Energy Certificates (RECs) are the mechanism used to demonstrate compliance with Oregon's renewables mandate, also known as the Renewable Portfolio Standard. A REC represents 1MWh of renewable electricity generated and exported to the grid. Organizations impacted by the mandate must acquire and retire enough RECs to show they are meeting their obligations. They are tradeable and are also sold in markets to business and individuals who want to show that they are using renewable energy.

Two incentive programs are in place to support investment in renewables, including BESS. These are the Renewable Rural Energy Development Zones (RREDZ) and Strategic Investment Program (SIP). Both can be used for the same property sequentially at different stages of the asset's life with the former typically covering the construction phase and the latter longer-term operations.

RREDZ applies to renewable energy projects in rural areas. The scheme provides between three- and five-years exemption on all new plant and equipment associated with a qualifying property. Local governments set the zone covered and apply a cap on the total amount of value exempted of up to $250 million.

SIP provides an abatement of 15 years to property taxes which is negotiated with developers. To qualify, a minimum investment of $25 million must be made in rural areas. A floor amount of value will be set depending on the total amount of investment between $15 million and $100 million, growing at a rate of 3% per annum. All value above this is excluded from the assessment. The developer will still be required to pay a fee of 25% of the abated amount capped at $2.5 million a year to local government to offset the lost revenue.

Washington

By capacity, the Grand Coulee Dam on Washington's Columbia River is the largest power plant in the United States and one of the largest hydroelectric power plants in the world. In 2024, it supplied about 15.4 million MWh of electricity to 8 western states and Canada.

Washington generated more electricity from hydropower than any other state and accounted for 25% of the nation's total utility-scale hydroelectric generation in 2024. The second-largest power plant in the state - Chief Joseph - is also a hydroelectric facility.

Grand Coulee and Chief Joseph are among the eight Washington hydroelectric power plants that are owned and operated by the federal government, and hence, these state-owned hydropower facilities are typically exempted from property taxes.

Hydroelectric power accounted for 85% of the state's total renewable power generation, and wind provided 12%, and biomass and solar provided the rest. Nuclear provided about 10% of total in-state generation, all of it from the Columbia Generating Station, which is Washington's only operating nuclear power plant.

Solar energy supplies a small amount of Washington's total electricity generation. In 2024, almost three-fifths came from small-scale, customer-sited solar PV power installations, such as rooftop solar panels. Washington's first utility-scale solar PV project, the Adams Nielson Solar Farm, a 19-megawatt facility, came online in 2018. A 150-megawatt solar project in Klickitat County came online in 2022 and is Washington's largest solar power plant to date. Other large solar projects are planned.

The Washington State Department of Revenue's 2025 *Personal and Industrial Property Valuation Guidelines* provide clear direction and valuation guidelines to assist county assessor's offices with estimating assessed values for tangible personal and industrial property.

The trended investment approach within the guidelines applies to utility-scale solar, wind, and battery storage systems with nameplate capacities of one megawatt or more. Two trend columns have been introduced - "Trend Renewable Generation (RG)" for utility-scale wind and solar generation, and "Trend Renewable Storage (RS)" for utility-scale battery storage - each offering a set of depreciation, or "percent-good," factors that reflect the typical decline in value over time.

In 2023 the legislature passed SHB 1756, which allows for an exemption from the state portion of property taxes for personal property for qualifying renewable energy generation companies. Taxpayers getting the property tax exemption must pay a production excise tax directly to DOR instead.

The trended investment method estimates an asset's fair market value in continued use based on its original or historical cost, adjusted by the appropriate trend factor for the acquisition year. The assessor first determines the correct trend category from the valuation index, locates the corresponding "percent good factor" from the combined table, and multiplies that factor by the property's historical cost to derive its estimated value as of January 1 of the current year. The cost should include all hard and soft expenditures necessary to place the asset into service - such as engineering, freight, and installation - but exclude sales or use tax. For renewable projects, any federal or state tax credits must be deducted from the reported cost before valuation to avoid overstating market value.

The guidelines generally impose a minimum floor of 15% good for property that remains in productive use, although renewable energy assets may fall below that threshold when justified by data reflecting shorter economic lives or rapid technological turnover. Assessors may also make further downward adjustments for functional or economic obsolescence if supported by evidence, such as declining output efficiency, curtailed production, or obsolete inverters.

Example 1 - Utility-Scale Solar (Trend RG)

A solar farm placed in service in 2018 at a net cost of $50 million has a percent good factor of 0.751 (75.1%).
$50,000,000 x 0.751 = $37,550,000
Estimated value for 2025 assessment: **$37.55 million**.

Example 2 - Battery Energy Storage (Trend RS)

A battery storage facility installed in 2020 at a net cost of $30 million has a percent good factor of 0.552 (55.2%).
$30,000,000 x 0.552 = $16,560,000
Estimated value for 2025 assessment: **$16.56 million**.

By incorporating these renewable-specific trend tables, Washington's 2025 guidelines aim to ensure consistency and fairness. The approach aligns renewable generation and storage assets with other industrial property while recognizing their distinctive cost structures, accelerated depreciation patterns, and the influence of evolving technology and incentive programs on market value.

Vermont

Vermont has long prioritized clean energy as a cornerstone of its environmental and economic policy. The state's Comprehensive Energy Plan (CEP) sets ambitious goals: meeting 25% of total energy needs from renewables by 2025, 45% by 2035, and 90% by 2050. These targets span electricity, heating, and transportation sectors, reflecting Vermont's holistic approach to decarbonization.

Solar power is Vermont's fastest-growing renewable source. Residential and community-scale solar installations are widespread, supported by net metering and streamlined permitting. In 2025, the passage of S.50 raised the threshold for ground-mounted net-metered solar projects from 15kW to 25kW, allowing more homeowners to install larger systems using a simplified registration process. This change reflects the increased efficiency of modern solar panels and supports the state's electrification goals. Vermont offers a 100% exemption on the value added to a property by a solar system. This means homeowners won't see an increase in property taxes due to solar installation.

Commercial solar systems are assessed using a standardized discounted cash flow (DCF) model outlined in 32 V.S.A. § 3481(1)(D). The model assumes a 25-year project life and applies a 70% valuation factor. Once assessed, the value remains fixed for the duration of the project or 25 years, whichever is shorter. Energy storage systems are taxed at a uniform rate of $0.25 per kWh of rated capacity. Land hosting renewable systems is assessed as if the facility were not present, ensuring installations do not inflate land value.

While Vermont's wind capacity is modest compared to larger states, it remains a valuable contributor to the energy mix. The state's mountainous terrain and community-driven permitting process have limited large-scale wind development. However, existing wind farms like the Sheffield and Georgia Mountain projects continue to supply clean electricity to the grid. Wind installations may qualify for property tax stabilization agreements at the municipal level, negotiated to support local economic development.

Hydroelectricity is Vermont's most established renewable resource, accounting for a significant portion of the state's electricity generation. Both large-scale hydro imports from Quebec and small in-state hydro facilities contribute to Vermont's low-carbon grid. The state includes small hydro under

its Renewable Energy Standard (RES), recognizing its role in local energy resilience. Small hydro projects may qualify for property tax exemptions if they meet criteria under Vermont's renewable energy statutes.

Biomass plays a key role in Vermont's thermal energy sector, particularly for heating in rural areas. Wood pellet and chip systems are common in schools, municipal buildings, and homes. Geothermal energy, while less prevalent, is gaining traction through ground-source heat pump installations supported by state incentives. Biomass heating systems are exempt from state sales tax, and advanced wood heating systems may qualify for rebates through the Vermont Clean Energy Development Fund.

In 2024, Vermont enacted an update to its Renewable Energy Standard, requiring 100% of electricity sold by utilities to come from renewable sources by 2035. The RES includes specific targets for in-state distributed generation, aiming to reduce reliance on fossil fuel imports and strengthen grid resilience. The Standard Offer Program, originally established in 2009, continues to support small-scale renewable projects up to 2.2MW, though its capacity is nearly fully subscribed.

Renewable energy systems in Vermont are generally exempt from property tax increases if installed for residential use. Commercial properties are assessed using income-based valuation methods, factoring in system output, operating costs, and depreciation schedules. Municipalities may offer custom agreements or exemptions to encourage local renewable development.

Vermont's clean energy economy supports thousands of jobs across installation, manufacturing, and policy sectors. Legislative efforts in 2025 focused on protecting the RES from rollback attempts and expanding access to solar energy. The state's energy policy emphasizes equity, affordability, and environmental stewardship, aligning with its broader climate goals.

Conclusion and Recommendations

The growing prominence of renewable energy projects across the U.S. spanning wind, solar, and energy storage facilities poses challenges to existing property tax valuation systems. Current methods remain fragmented, data-poor, and inconsistent across jurisdictions.

Expert interviews reveal that reforms to valuation practices will require navigating entrenched fiscal, administrative, and political constraints. The following sections outline key reform proposals and implementation challenges identified across jurisdictions.

Recommendation 1: Establish Uniform Valuation Standards

Experts emphasize that valuation inconsistencies across states and counties undermine fairness and defensibility. **We recommend developing a nationally recognized valuation framework for renewable energy assets - one that clarifies definitions, asset classifications (real vs. personal property), and standardized depreciation schedules.** Such guidance could be developed under the leadership of professional organizations such as IAAO, in partnership with state departments of revenue.

Challenges:
Property taxation in the U.S. is largely decentralized, governed at the state or local level, making national harmonization difficult. Many states apply different bases of value (market, cost, or use)

complicating standardization. Smaller jurisdictions, lacking resources or political leverage, may struggle to align with new frameworks without external support. Any attempt at centralization must therefore balance national consistency with respect for state autonomy.

Recommendation 2: Improve Data Reliability and Sharing

The reliability of renewable energy valuation depends on credible data. **We propose establishing a centralized database of verified cost, depreciation, and energy output data, accessible to assessors nationwide.** This could include production volume, nameplate capacity, historic cost, PPA terms, lease terms, grant or tax credit info and observed sales of whole projects and land. Mandatory disclosure of development and operating costs by renewable operators would enable more accurate and defensible assessments, while inter-jurisdictional data sharing would improve consistency across states. Some experts recommended a central repository (managed by IAAO or similar) to pool observations because single jurisdictions lack sufficient sample sizes.

Challenges:
Data confidentiality and administrative feasibility are major barriers. Developers may resist disclosing proprietary information, citing commercial sensitivity and contractual restrictions. Additionally, counties often use different systems and metrics, making data aggregation difficult. Without legal mandates, funding, and standardized reporting formats, such a repository risks becoming inconsistent or incomplete. Sustained state–federal cooperation and clear data governance structures will be essential to its credibility.

Recommendation 3: Refine Valuation Methodologies

While the cost approach remains the prevailing method due to its administrative simplicity, experts argue that it may not adequately reflect renewable assets' economic life cycles. **We recommend refining the cost approach with technology-specific depreciation schedules and integrating elements of a usage-based or hybrid model, where assessed value correlates with production capacity or energy output rather than solely physical depreciation.** This would align taxation with ongoing benefit and ensure fiscal stability for local taxing jurisdictions. Suggestions include tracking and developing all three approaches (cost, income and market) wherever data permit; not relying solely on depreciated cost. After considering all approaches, why they were accepted or rejected per USPAP/IAAO guidance should be documented. Standard assumptions should be developed for key inputs: total economic life, residual floor, escalation assumptions, useful lives for panels/turbines/batteries, treatment of federal grants or tax credits in cost base. Experts recommend agreed-upon benchmarks, or ranges, so depreciation isn't arbitrarily low or high.

Challenges:
Transitioning to hybrid or output-based models presents significant administrative and legislative hurdles. Measuring and verifying energy output requires coordination with utilities and regulators, potentially introducing new compliance burdens. It may also blur the distinction between property and excise taxation, raising constitutional concerns. Smaller jurisdictions may lack the technical expertise or data infrastructure to implement such models effectively. Any shift must therefore be gradual and accompanied by extensive training and pilot testing.

Recommendation 4: Strengthen Technical Expertise

Experts agree that assessors would benefit from greater technical proficiency to handle renewable energy valuations. **We propose specialized training programs, shared expertise networks, and regional appraisal teams supported by state agencies.** Standardized tools, including automated valuation models (AVMs) calibrated for renewable energy assets, can also improve efficiency and consistency across jurisdictions.

Challenges:
Many rural or small counties, where renewable projects are typically sited, lack funding for professional development or advanced tools. Training programs must be ongoing to account for rapid technological change in renewables. Furthermore, adopting new models may face internal resistance from assessors accustomed to conventional valuation approaches. Without coordinated funding and strong leadership at the state level, institutional improvements may remain uneven and short-lived.

Recommendation 5: Enhance Policy Coordination and Stakeholder Engagement

Policy misalignment between legislators, regulators, and tax administrators is a recurring problem. **We recommend formal consultation mechanisms to ensure assessors are involved early in legislative processes governing renewable tax incentives, exemptions, and PILOT arrangements.** Engaging local governments and community stakeholders is equally important to ensure fiscal equity and public acceptance of large-scale projects. Operationally, implementing penalties or targeted audits should be considered so non-filers do not avoid reporting. Authorities should require developers to supply valuation data when seeking permits; using that moment to secure data for later valuation and to align expectations between local government and developers.

Challenges:
In practice, engagement is often fragmented. Legislative decisions are frequently influenced by lobbying and political priorities, while assessors are brought in only after implementation challenges arise. Policies such as mandatory reporting may be hard to enforce. Coordination across multiple tiers of government adds complexity, and stakeholder fatigue can slow reform. Institutionalizing such engagement will require procedural reforms, such as mandated assessor review or inter-agency advisory committees, to ensure technical feasibility is considered before policy adoption.

Recommendation 6: Ensure Fiscal Certainty and Fairness

Rapid depreciation under current cost-based models undermines local fiscal stability, as renewable assets often retain productive capacity long after their taxable value declines. Transitioning toward usage-based taxation or capacity-linked excise systems could be a more equitable approach to aligning revenue with ongoing energy generation. Alternatively, reforming PILOT and exemption structures could help stabilize local revenues and ensure host communities are fairly compensated for hosting renewable infrastructure.

Challenges:
These reforms face fiscal and political obstacles. Developers may view new taxation models as deterrents to investment, especially in states that currently offer generous incentives. Moreover, changing the tax base or classification of assets would require statutory amendments in multiple states, each with distinct political climates. Transitional risks also exist; shifting from construction-

based revenues to production-based taxation could temporarily destabilize budgets. Policymakers must carefully phase in reforms and use fiscal equalization mechanisms to cushion local governments.

Implementation Plan

Due to the challenges identified above as to the decentralized nature of property taxation in the U.S. and the limited resources of some assessing organizations, implementation needs to be phased over time. Therefore, the following plan is broken down in to short, medium- and long-term actions. The short-term actions are envisioned as being completed in two years or less, the medium-term actions in two to five years and the long-term actions in five to ten years.

Short Term

Develop Preliminary Valuation Guidance
Professional bodies such as IAAO and IPTI should work with state revenue departments to draft interim guidelines on valuation issues such as asset classification, depreciation schedules, and treatment of renewable energy improvements. This will reduce inconsistencies and promote best practice.

Create Voluntary Data Sharing Networks
A platform should be established to allow authorities and professional organizations at the state and local level to exchange valuation data. Whilst consistency and data quality may not be optimized in earlier stages this would still be a move towards improving consistency and transparency.

Research Exemption, Abatement and PILOT Systems
Further research should be conducted into tax schemes which significantly alter liability for renewable energy properties. It should attempt to determine where such schemes have been successful in achieving their aims and otherwise. The goal should be to establish which policies strike the best balance between encouraging development, supporting wider growth and maintaining tax revenues.

Medium Term

Formalize Uniform Valuation Standards
Based on the earlier work in developing and implementing preliminary guidance, states should adopt standardized frameworks to reduce inconsistencies and promote best practice across jurisdictions.
Develop Centralized Data Repositories
Voluntary data sharing networks should be further developed to create a secure, standardized and reliably maintained database of cost, depreciation, and output data useful for valuation and accessible to assessors nationwide.

Long Term

Create National Valuation Frameworks
Work should be completed toward nationally recognized standards through partnerships between states and professional organizations. These should improve consistency whilst respecting the flexibility required between states.

Mandate Data Disclosure Requirements
State legislation should be introduced requiring renewable developers to report verified cost and performance data to support accurate assessments. Provisions should be made to ensure that the database remains reliable in the long term.

Reform Exemption, Abatement and PILOT Systems
Earlier research should be built upon to bring forward and enact the policies found to best meet the goals of jurisdictions while balancing against costs.

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Focus Group Number 8
Renewable Energy: Europe

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Introduction

The valuation of renewable energy properties varies across property assessment/valuation agencies. Within Europe, there are distinctions between countries and varying economic status. The following research study will discuss renewable energy valuation practices: Estonia, the Netherlands, Poland and the United Kingdom.

Scope

The scope of the research study is to compare valuation practices regarding renewable energy properties across the varied economic landscape from the large, developed high-income economies, those experiencing rapid growth and the smaller high-income but still developed economy. Reviewing the practices, in the Netherlands and United Kingdom, Poland and Estonia respectively. Once findings have been reviewed and analyzed, the conclusions and recommendations will be shared.

Objectives

The objectives of the research study are to determine how four valuation agencies in Europe, (Estonia, the Netherlands, Poland and the United Kingdom), are dealing with the valuation of renewable energy properties; in particular:

1. Research the sources of renewable energy generation available in each jurisdiction.
2. Collect and analyze each jurisdiction's valuation methods for renewable energy properties for assessment purposes to develop into case studies.
3. Identify shared and unique features across the European jurisdictions, including patterns in valuation outcomes, recurring/evolving challenges (e.g. in appeals or disputes), and the administrative or legal responses to these issues.
4. Conduct interviews with assessors, policy makers, experts of the field of real estate, taxation agents or other professionals located in each jurisdiction to understand the challenges surrounding availability and collection of valuation input data.

Research Design

The research used qualitative methods to engage in an in-depth study of the valuation of renewable energy properties, allowing for a fulsome understanding of property assessment and taxation practices in four distinct jurisdictions across Europe's economic landscape.

Research Activities

The research utilized structured questionnaires containing approximately 10 questions to ensure consistent data collection across the different valuation agencies of different countries. Interviewees were identified through referrals from the International Property Tax Institute (IPTI) and team members, with potential participants contacted through email to solicit their availability for interviews. Online interviews were conducted with qualified assessors/valuers from Estonia, the

United Kingdom, and the Netherlands, providing insights into the types of renewable energy properties and their valuation practices of said renewable energy properties in their jurisdiction.

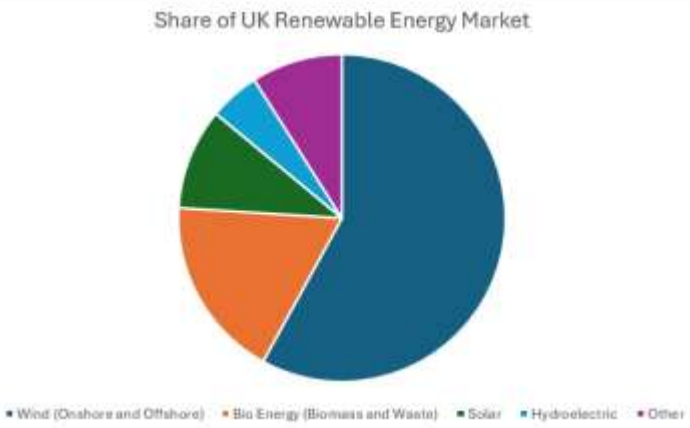
The following interviews were conducted in support of this report:

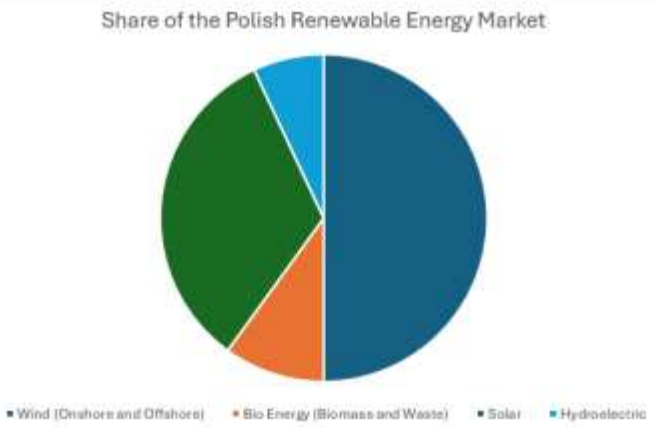
- July 24, 2025: Simon Lightfoot MRICS, National Valuation Lead, Valuation Office Agency, UK
- August 20, 2025: Aivar Tomson, Kinnisvaraekspert, Estonia
- September 3, 2025: Ruud Kathmann, Netherlands Council for Real Estate Assessment

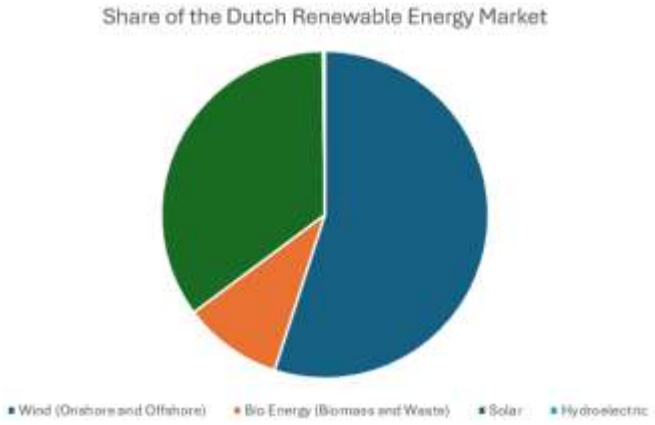
In addition to interviews, environmental scanning of property tax treatments of various tax jurisdictions was conducted online through established news sources, academic journals, professional publications, and jurisdictions' official websites to supplement interview findings. A copy of the interview questions is available in Appendix 1.

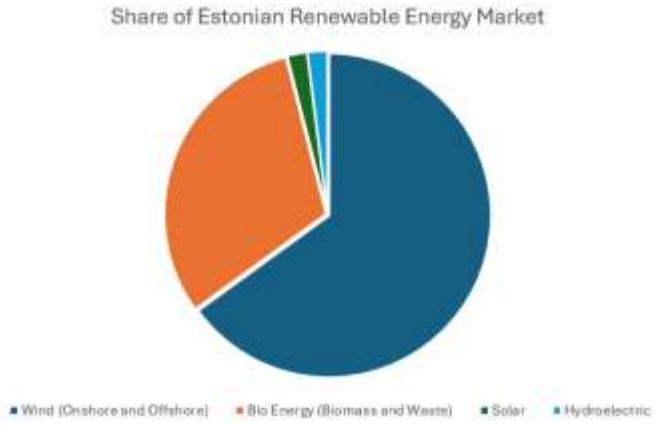
Overview of Renewable Energy Generation Properties in Europe

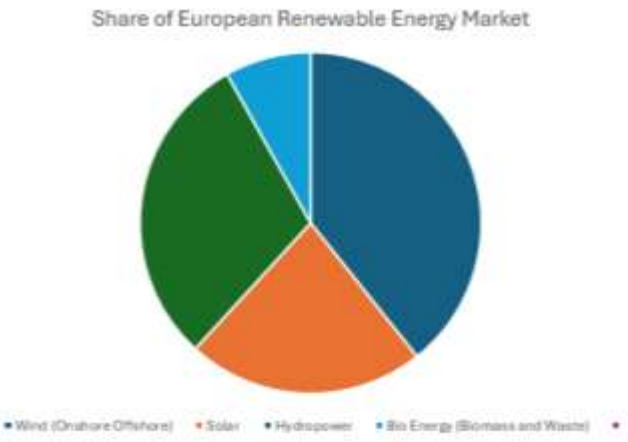
In 2024, 50.8% of the UK's electricity was generated from renewable sources while the European Union reported 47%, recent global events have seen renewed investment into energy generating infrastructure with a view to jurisdictions becoming self-sufficient. It has been found that the main source of renewable energy across all four jurisdictions include, Wind, Solar, Hydroelectric and Biomass. Below is a breakdown per jurisdiction showing the size of each generation per jurisdiction, showing Wind to be the predominant method.

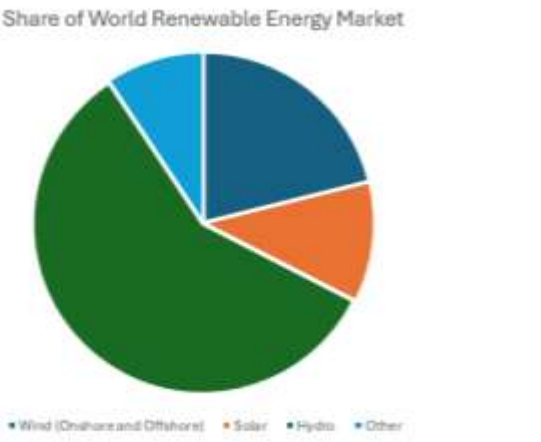

Share of UK Renewable Energy Market
Wind (Onshore and Offshore)
Bio Energy (Biomass and Waste)
Solar
Hydroelectric
Other


Share of the Polish Renewable Energy Market
Wind (Onshore and Offshore)
Bio Energy (Biomass and Waste)
Solar
Hydroelectric


Share of the Dutch Renewable Energy Market
Wind (Onshore and Offshore)
Bio Energy (Biomass and Waste)
Solar
Hydroelectric


Share of Estonian Renewable Energy Market
Wind (Onshore and Offshore)
Bio Energy (Biomass and Waste)
Solar
Hydroelectric


Share of European Renewable Energy Market
Wind (Onshore Offshore)
Solar
Hydropower
Bio Energy (Biomass and Waste)


Share of World Renewable Energy Market
Wind (Onshore and Offshore)
Solar
Hydro
Other

Overview of Property Tax Systems

Dutch

In the Netherlands, property tax is levied against all real estate annually on a market value basis. Each municipality values the real estate within its area of responsibility before supplying this to other government departments for collection and determination of relevant property taxes. The assessed value for a given property is known as the Wet Waardering Onroerende Zaken or "WOZ value" and aligns with the International Valuation Standards (IVS), definition of Market Value.

United Kingdom

The United Kingdom adopts a complex property taxation system, with layers of statute law and common law decisions give guidance on approaches and principles to be adopted in valuations. This report has focused specifically on the Valuation Office Agency in England and Wales. However, the separate jurisdictions of Northern Ireland and Scotland have their own legislation and common law, they follow a comparable process and approach to the VOA. The area of property tax that is based around the occupation of property. This area of property taxation is split between domestic (Council Tax) and non-domestic (Business Rates). Business Rates are based on a property's "Rateable Value" or (RV), this is a statutory basis, which is an estimation of the annual rent for a given property on certain specified lease terms. The Rateable value has consideration of the specific use and occupation of each property when determining the Rateable value.

Poland

In Poland, property tax (known as real estate tax) is levied annually on land, buildings, and structures based on their physical characteristics or asset value. Each municipality sets and collects the tax within its jurisdiction, applying rates that are reviewed annually and bounded by minimum and maximum thresholds linked to inflation. Unlike market-based systems, Poland does not adopt a typical market value standard for assessments. Instead, land and buildings are taxed based on area, while structures are taxed at 2% of their gross book value as recorded in the fixed assets register. Property tax may be exempted for public properties such as schools, hospitals, and charitable institutions. It also serves as a policy tool to ease financial burdens for specific sectors. For example, utility-related assets like electricity, gas, and water properties have previously received exemptions or reduced rates to support their financial viability.

Estonia

In Estonia, property tax (known as *maa maks*) is levied annually as a land tax, applied solely to the value of land, excluding buildings and improvements. Each municipality sets the tax rate annually within a statutory range of 0.1% to 2% (as of 2025), while the assessed cadastral value of land, determined by the government, is generally reviewed every four years. Estonia's property tax system is unique in Europe for taxing land only. The taxable value also considers the designated use of the land, which influences its valuation. Exemptions are limited to land used for public purposes such as public utilities or infrastructure, nature reserves, and churches.

Valuation Approach

Identifying the Unit of Property

As previously noted, jurisdictions pass legislation and statutory instruments setting out the taxation systems and with guidance on how property and valuation should be considered. It was found to be the case in the Netherlands and UK with both confirming that legislation assists the valuer in identifying the unit of property. However, the legislation referred to in both jurisdictions did not go as far as giving an absolute definition for a renewable energy property and the elements that would make it up. The legislation identified elements of plant and machinery that can be found in any and all types of property and sets out whether they fall subject to valuation or not.

Poland has been found to have statute setting out the basis of property taxation within its jurisdiction. The latest version of this statue, the *Real Estate Tax Act* was issued in 2025, setting out that taxation has consideration of land, buildings and structures. Similar to the Netherlands and UK, the statute sets out that the civil infrastructure of 'structures' fall liable to taxation.

Estonia was found to stand out as being a land tax jurisdiction, that being a jurisdiction that only considers the general use of the land for taxation purposes, i.e. residential or commercial. There is no specific consideration of any buildings, or business operations upon that land. The local assessment authority confirmed this poses limitations in their scope of valuation. As such, there is no legislative definition or guidance on the specific occupation/ use for renewable energy generation

It can be said then that although there is not a set definition for a renewable power generation unit of property, each jurisdiction has its own statute covering the identification and valuation of property for taxation. This statute, rather than giving an outright definition for renewable power generation property, allows for identification and valuation of component parts which can be said to form part of the unit of property, less those deemed to be 'part of the power generation process'.

Additionally, these jurisdictions have also confirmed that the principles had been tested by common law judgments, i.e. taxpayers contesting the valuation through the civil courts and a judicial decision giving confirmation and guidance on how elements of the statue are to be interpreted.

Basis of Valuation

It has been found that the prominent basis of valuation is one based on the property's capital value at a given date. This is employed by Estonia and Poland who have the most simplistic approach with analysis of transactional evidence at a given date determining an appropriate base value. The base unit value for each general classification of land i.e. residential and commercial is then applied to each property in the valuation make up. However, whilst this is as far as the Estonian system goes to reach a property valuation, the Polish approach utilizes the land value along with unit prices for buildings and structures leading to a slightly more complicated and property specific valuation. Albeit each value input is derived from analysis of transactional evidence in the broadest classification of property. This is then analyzed to give a regional unit price which can be applied.

In contrast the Netherlands apply a slightly more complex and individual property specific valuation approach whereby the basis of value is an assessed annual value derived from the capital value of the property. This assessed annual value is calculated from transactional evidence on an annual basis with the base value applied to the property attributes. This valuation work is undertaken on a municipality basis, with each area responsible for valuing all property in its area of responsibility.

In contrast to the other jurisdictions, the UK adopts an annual rental value known as the Rateable Value. The Rateable Value is defined in statute and sets out assumed lease terms for the hypothetical tenancy, irrespective of the actual properties' tenure. Whilst the other jurisdictions adopt arguably a simpler basis of valuation at annual reviews, the UK adopts less frequent revaluations, currently working on a 3-yearly valuation cycle.

Method of Valuation

This project has found the jurisdictions apply three different methods of valuation between them, with each applying the same method across the different renewable energy types in their jurisdiction. The simpler taxation systems adopted in Poland and Estonia undertake a comparable method of value, albeit with Poland undertaking a cost-based approach on the structures that make up the renewable power generation properties versus a land-based approach in Estonia. It can be said these approaches are not producing an appropriate and reasonable level of value which would be expected for the renewable energy properties. It is not surprising that the simple systems that attribute value to land classification adopt comparable method of valuation.

The more complex taxation systems of the Netherlands and UK adopt differing approaches while both jurisdictions employ comparison, income and cost-based methods within their wider taxation work. The UK adopts a receipts and expenditure method of valuation to value its renewable energy property, with consideration of the factual capacity of the power generation site and the awarded government subsidies to determine the hypothetical rental value for any given property. In contrast, the Netherlands adopt a cost-based approach with consideration of the actual construction costs but also nationally analyzed cost evidence to determine the depreciated replacement cost at any given valuation date.

The range of valuation methods employed to reach each jurisdiction's tax base in turn reflects the wider fiscal and economic policies within their respective areas. However, considering the differing approaches, and the available data it is hard to see how all jurisdictions valuation approaches reflect the value of renewable energy properties.

Valuation Input Data

Valuation of renewable energy property relies heavily on data provided by occupiers and publicly available sources, particularly regarding installed capacity and estimated annual output. In the UK where renewable properties may be assessed using the income-based approach, assessors are able to calculate potential income based on generation capacity rather than actual revenue which may not be reflective of potential income as it reflects occupier-specific arrangements. Key valuation inputs include government schemes and projected energy output and prices and generation trends, help to estimate income potential across different types of renewable properties. This majority of this information, regarding the government subsidy schemes and projected generation trends is all publicly available for individual renewable energy properties albeit this is mostly produced and managed by non-profit organizations. Statutory powers are then utilized for clarification of information and specific property data regarding to gain the fuller picture.

In contrast, the Netherlands adopts a cost-based approach and is supported by a nationwide data system that collects investment costs and asset lifespan information. This system streamlines compliance efforts of operators who will only need to submit data once to the Union of Municipalities, while local municipalities benefit from standardized and wider access to these

valuation inputs. This model of centralizing data collection offers a positive example for larger jurisdictions seeking to streamline their valuation processes, reduce administrative burden, and improve data consistency across regions.

In emerging markets such as Estonia, the move to a more predictable and transparent land valuation process has provided benefits to both taxpayers and developers, as well as government departments and property assessment officials. Prior to 2022, the process was not transparent and there had not been a revaluation in 21 years.

While valuation agencies generally enjoy cooperative relationships with renewable energy companies, some may be protective of commercially sensitive information. An agreed framework for data provision and assessment methodology helps streamline the process and reduce disputes as observed in the case of the Netherlands. Similar frameworks have been utilized in the UK with jurisdiction wide trade bodies/ associations acting on behalf of the commercial solar generation market work with the VOA to share evidence and reach agreement of valuation parameters. Where necessary, regulatory powers may be exercised to formally obtain evidence in support of valuations during appeals as seen in the UK.

Table 1: Data Use & Cooperation

Country	Data Use	Cooperation with Energy Companies
United Kingdom	Uses installed capacity, public data, and forecasted prices to estimate income.	Strong ties with operators; larger firms more compliant.
Netherlands	National level data on costs and depreciation.	Agreed framework reduces disputes.
Poland	Not Available	Not Available
Estonia	Relies on land market transactions	Greater transparency in land valuation process.

Exemptions of Plant and Machinery

Across the countries reviewed, most have specific provisions to exempt machinery used in renewable energy production from property tax, reflecting a broader policy trend to encourage investment in renewable energy infrastructure. Notably, the UK and Poland have introduced targeted legislative changes to support this goal. In 2022, the UK expanded its machinery exemption for business rates until 2035 to cover assets used for power generation, storage, transformation, and transmission, regardless of whether the energy is sold. Poland, meanwhile, revised its legislation effective from 2025 to clarify that only the construction components of renewable infrastructure such as wind farms, nuclear and solar plants and biogas properties are taxable under the "structures" category, explicitly excluding machinery and technical components.

Meanwhile The Netherlands, and on a wider footing the UK, maintains an ongoing exemption for machinery directly involved in production or processing, provided it is non-structural, removable without significant damage, and the building remains identifiable after removal. This distinction between movable and immovable assets is central to determining tax liability under the Dutch OZB system. Estonia stands apart from the other jurisdictions, as buildings are not subject to property tax, making machinery exemptions largely irrelevant under its current framework.

These approaches underscore the importance of clear asset classification and legislative certainty in shaping tax policy for renewable energy investments. Machinery exemptions help reduce tax burdens, improve project viability and attract investment, while driving infrastructure growth, operational efficiency, and progress toward sustainability goals.

Table 2: Tax Incentives for Plant and Machinery

Country	Policy Update & Scope	Effective Period
United Kingdom	Broadened exemptions for assets used in generation, storage, or transmission—regardless of sale, regardless of power sale.	1 Apr 2022 – 1 Apr 2035
Netherlands	Production equipment may qualify if non-structural, removable cleanly, and building remains intact identifiable upon removal.	Ongoing
Poland	From 2025, only structural elements of renewable infrastructure are taxable; technical components excluded.	From 2025 onward

Valuation Challenges

From the interviews and research findings, valuation agencies are increasingly confronted with complex challenges in assessing renewable energy assets, driven by evolving technologies, dated legislations, and emerging land use models involving hybrid uses.

A notable issue in the UK concerns the valuation of anaerobic digestion (biowaste) plants, which are assessed using the Receipts and Expenditure Approach. The key contention lies in determining the appropriate "tenant's share", i.e. the portion of divisible balance attributable to the land and building *vis-a-vis* the operator's business risk. This is particularly contentious in that the construction and commissioning of the plant involves significant uncertainties, i.e. increased risk, leading to the operator requiring a higher tenant's share for bearing a higher business risk.

Similarly, in the Netherlands, definitions around machinery exemptions continue to raise ambiguities, particularly in determining whether assets such as solar panels and wind turbine components qualify as exemptible machinery. While certain equipment may meet the criteria for movable machinery in a certain context, this classification does not automatically guarantee exemption in all scenarios. For instance, solar panels that are installed within farms could have different valuation treatment, depending on their functional intent and scale. If the installation is of commercial scale and primarily used for energy sales, the exemption may not be granted, as the installation serves a distinct commercial purpose that constitutes an assessable use, separate from the farm's agricultural activity. Conversely, if the installation is mainly intended to provide utility services for farm operations, the exemption could apply, as it does not alter the fundamental identity of the assessed property as a farm.

For Poland, similar disputes persist over whether renewable assets such as photovoltaic panels and biogas digesters fall under the definition of "structures" or "equipment," affecting property tax liability. With the 2025 legislative changes, these assets are more likely to be treated as taxable structures due to their function and permanence. However, reclassifying existing installations may pose initial challenges as taxpayers adjust to the revised assessment definitions and update their asset records accordingly.

These challenges underscore the need for clearer legal definitions within the property tax legislation, consistent valuation standards, and adaptive policy frameworks. Importantly, the outcomes of appeal for UK may offer valuable guidance to other tax authorities with similar valuation challenges. Commonwealth tax agencies, for example, could draw reference from these rulings to refine their own assessment practices and improve consistency in the treatment of renewable energy assets.

Table 3: Key Valuation Challenges

Country	Challenges	Developments
United Kingdom	Anaerobic Digestion (Biowaste) Plants	Determining "tenant's share" under Receipts and Expenditure Approach
Netherlands	Asset Classification & Machinery Exemption	Identifying movable machinery vs. Immovable property within solar farms & wind farms Solar installations within agricultural farms
Poland	Structure vs. Equipment Classification	Classifying renewable assets such as solar panels and digesters under new definitions in view of 2025 legislation changes
Estonia	Land Taxation	Determining rental fees for offshore wind projects

Future Renewable Energy Projects

Renewable energy projects continue to grow in all four of the assessment jurisdictions studied including both onshore and offshore wind farms, and solar projects. The following outlines a sample of these projects currently underway for the future of renewable energy facilities.

Calderdale Energy Park, West Yorkshire, UK

As a result of several energy strategy initiatives and decarbonization targets in the UK, there is a need for onshore wind and battery storage in locations with strong wind resources. The Calderdale Energy Park will provide long-term renewable energy and is currently in the phase of submitting their Environmental Impact Assessment scoping report to the Planning Inspectorate as part of the statutory consultation process. Once a decision of development consent is granted, construction can begin, likely in late 2027 or 2028.

Sopi-Tootsi Wind Farm, Estonia

Estonia's largest onshore wind farm, Sopi-Tootsi, is offering a sustainable future for the country. Started in 2012, as a result of a peat mine being shut down, the area has been repurposed for renewable energy with 38 wind turbines. It is predicted that the wind farm will cover 8.5% of Estonia's electricity consumption and 40% of its electricity. In 2023, the European Investment Bank provided a loan to support construction of the wind farm over the next 12 years.

Baltica 2 Offshore Wind Farm, Poland

The Baltica 2 offshore wind farm is in its 1st phase of development and will produce green energy for 2.4 million recipients, both residential and commercial or institutional. The operation is scheduled to start in 2026 with an operations and maintenance base, as well as the commissioning of connection infrastructure for an onshore substation in 2027. It is expected that this project will allow for a significant reduction in carbon dioxide emissions.

In addition to the Baltica 2 wind farm, Amazon Poland is purchasing renewable energy from a photovoltaic farm in Milkowice in Lower Silesia, Poland and will use the energy produced to help offset the electricity used by its data centers and operations.

Hollandse Kust (Noord) Wind Farm, Netherlands

The Dutch government is focused on developing wind farms in three key areas under the 2023 Offshore Wind Roadmap. The Hollandse Kust (Noord) wind farm project was developed in 2023, located 18.5 kilometers off the Dutch coast in Egmond Ann Zee. This project was built without government subsidies through the CrossWind consortium, a joint venture between Shell and Eneco.

Conclusions

Each of the four property assessment jurisdictions of Estonia, the Netherlands, Poland and the United Kingdom have unique valuation methods and processes for the valuation of renewable energy properties.

All jurisdictions have a variety of data and information regarding their respective renewable energy properties. A full consideration of the available data and business operations and the investment market in which they operate would result in assessments which more closely align with the value of each property.

When considering a valuation assignment, the valuer is to fully consider the unit of property. A key element of this for assessment/ rating purposes is to determine the purpose of occupation and the benefit of that occupation. Following these key principles, the valuer would reach an appropriate and reasonable level of value for that subject property.

Applying this notion to the renewable energy properties in the jurisdictions that have been considered, it can be said that this best practice is not widely adopted. The land only and area-based approaches in Estonia and Poland, only give a notional commercial value, with no reflection of the specialist property type. Whilst the Netherlands adopt a cost-based approach on renewable energy properties, which can be said to be more credible in delivering an appropriate value, reflecting the cost to build the specialist and complex properties. However, it fails to reflect the purpose and benefit of the occupation. That is the considerable reward for taking the huge financial risk of investment to build the renewable energy properties. It appears the UK closely follows the real-world market with regard to property value, whilst the remaining jurisdictions are less closely aligned. This view can be supported by the extent of appeal and litigation regarding the appropriate levels of valuation. Where there is clear evidence of the income tied to the renewable energy property, such as government subsidies, the income approach appears most appropriate.

The common key to success for these four jurisdictions is collaboration with renewable energy industry stakeholders such as developers, occupiers, and all levels of government. Without these

collaboration opportunities, there is the potential for gaps in valuation inputs, legislative compliance and transparency in valuation methods and processes. In addition, assessment appeals and disputes may increase in situations where industry stakeholders and assessment jurisdictions are not engaged in conversations and data sharing.

In conclusion, the renewable energy industry is continuing to grow across Europe, providing opportunities for assessment and property tax organizations to modernize their valuation methods and processes to align with industry standards, such as the IAAO's Standard on Mass Appraisal of Real Property which includes criteria for measuring fairness, quality, equity and accuracy[1].

Recommendations

The following recommendations have been gathered based on the successes and challenges discovered through the research process of the four property assessment jurisdictions: Estonia, the Netherlands, Poland and the United Kingdom.

Transparency in Valuation Methods and Processes

Providing clear and transparent information to owners, developers, occupiers or other stakeholders on the valuation methods used for renewable energy properties will allow for increased trust of the assessment process between parties.

Clear Legislation

A transparent and easily digestible legislative framework for renewable energy properties will allow assessment jurisdictions to rely on regulatory powers to obtain information for data collection purposes, appeal positions or evidence. In addition, there may be opportunities to align legislative compliance with requests for information which may lead to higher response rates.

Stakeholder Engagement

Collaboration with industry stakeholders allows for increased access to data collection methods such as physical site inspections or self-reporting, (e.g. requests for information to obtain financial information or property inventory). It is also recommended to find ways to maintain confidentiality of information obtained from stakeholders that may be subject to proprietary or sensitive information.

Government Schemes

Schemes such as development subsidies energy pricing subsidies, property tax exemptions or other mechanisms to encourage the growth of the renewable energy industry should be reviewed and considered to encourage collaboration between industry stakeholders and assessment jurisdictions. Many schemes may be at the national or state/regional level and may be applicable beyond individual assessment jurisdictions, depending on how things are governed in a particular country or jurisdiction.

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[1] IAAO Standard on Mass Appraisal of Real Property. https://www.iaao.org/wp-content/uploads/Standard_on_Mass_Appraisal.pdf

As assessment organizations continue to see growth in the renewable energy industry, it is clear that collaboration efforts are important to ensure alignment between all parties. By considering the above-noted recommendations, assessment organizations can create opportunities for the future of both the renewable energy and assessment and property tax industries.

Assessment Value vs Real-world Value

Each jurisdiction sets out the basis of its assessment value, whether for an annual rental or capital value, with some commenting on how their statutory basis aligns with the Internation Valuation Standards. However, from this research it appears some assessments do not take full consideration of the actual value tied to the renewable energy properties. All jurisdictions have Government subsidies that support the investment and construction of new projects with a view to a guaranteed minimum return for energy generated over a set time frame. It is not clear that all jurisdictions are considering this fixed and guaranteed return on capital employed with regard to reaching an appropriate and reasonable value.

Implementation

Based on the complexities of the valuation of natural resources in the researchers' jurisdictions, (Nova Scotia, Singapore and the United Kingdom), many of the recommendations noted above have already been addressed. Additional implementation plans are not being pursued at this time.

Bibliography

The following source material provides additional information for those interested in further reading on topics relating to the Future of the Valuation Profession.

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9. Baltica 2 Project: https://pgebaltica.pl/en/about-us/key-information-about-our-projects/baltica-2

10. Amazon Poland: https://renewablesnow.com/news/amazon-polands-first-renewable-energy-plant-starts-production-1270685/

11. Hollandse Kust (Noord) Wind Farm: https://www.eneco.nl/en/about-us/what-we-do/sustainable-resources/wind/wind-offshore/hollandse-kust-noord-wind-farm/

12. Interview with Simon Lightfoot (July 24, 2025)

13. Interview with Aivar Tomson (August 20, 2025)

14. Interview with Ruud Kathmann (September 3, 2025)

Appendix 1 – Interview Questions

1. Are there formal legal definitions or guidelines in your jurisdiction's law or tax regulations that define "renewable energy assets" specifically for the purposes of property tax?
2. What valuation method do you use to assess the taxable value of renewable energy assets in your jurisdiction, and how frequently is the asset being revalued?
    - Does the valuation approach differ for project types?
    - What is assessable: land, improvements, equipment, machinery, etc.
3. What valuation inputs/data (e.g., construction cost, economic lifespan, production capacity/output, land use, etc.) are you utilizing in your valuations? Is this available in the public domain, confidential taxpayer information?
4. Are renewable energy companies cooperating with the valuation agency to assist in understanding the way in which the properties are used and how values should be ascertained? For example, do they provide data or technical documentation to assist in the valuation?
5. Are there any exemptions or reliefs specifically designed for renewable energy projects? If so, whether such reliefs vary based on project scale or ownership?
6. What are the major challenges encountered when valuing renewable projects in your jurisdiction — for example, in terms of access to data, technical documentation, application of tax rules or exemptions or asset complexity?
7. Are there notable renewable energy projects in your jurisdiction that have faced valuation disputes, particularly in relation to tax appeals and lessons learnt.
8. How does the real estate market in your jurisdiction reflect the value of renewable energy facilities?
9. In your view, is the current tax regime supportive of fair, consistent, and transparent valuation of renewable infrastructure and whether you have any recommendations for other tax jurisdictions to consider when assessing renewable energy facilities?
10. Are you familiar with approaches to valuing renewable energy sources outside of your jurisdiction?
11. Have we missed any areas of research?

Focus Group Number 9
Renewable Energy: Australasia

Group Members:

- Ann Smith-Macquarrie (PVSC)
- Callum Taylor (VG New Zealand)

Overview

There has been significant progress in the adoption of renewable energy sources in the region defined as Australasia. Australia, in particular, is a leader and it is experiencing rapid growth nationwide in the use of renewables including wind, solar and hydroelectricity as it moves away from electricity generated from fossil fuels. Other nations, such as New Zealand and the Pacific Islands are also increasing renewable power generation efforts.

With the rapid growth of new technology and a relatively new industry comes the challenges most assessment jurisdictions face in how to value these properties and various components. Tax jurisdictions often face competing priorities. In an effort to reduce reliance on fossil fuels, some jurisdictions wish to promote the development of renewable energy projects, making it beneficial for developers by providing low tax rates or exemption status for certain components, such as turbines, solar panels or battery storage units. While the other priority is to improve the jurisdiction's revenue through the taxation of a lucrative industry.

Australasia is defined as Australia, New Zealand and New Guinea and neighboring islands of the Pacific. The areas researched as part of this project focused on Singapore, New Zealand two Australian states – Tasmania and South Australia. Also, a relevant court case in Victoria and New South Wales is discussed. Although not case law for the jurisdictions reviewed, it has provided guidance for some of the neighboring states.

Research Methodology

In order to gain an understanding of how various tax agencies value renewable energy sources and what has been developed for valuation policies and methodologies, the following jurisdictions were contacted. Initial research consisted of an internet scan and the distribution of a written questionnaire. See Appendix A

- South Australia, Australia
- Tasmania, Australia
- Singapore
- New Zealand

The main topics

- How data is obtained on new projects
- Policies and methodologies developed
- Which components are assessable
- What types of data collected
- Issues facing the valuation agency (appeals/objections)

In addition to the completed questionnaire, follow-up interviews were conducted with South Australia, Tasmania and New Zealand to further discuss some of the issues.

Singapore

Group Tax Specialist, of the Inland Revenue Authority of Singapore (IRAS), Chee Hua Mak, explained Singapore relies heavily on natural gas for its electricity generation. As with many jurisdictions, the use of renewable energy sources is in the early stages.

Fossil fuels, petroleum and liquids make up 86 per cent of the nation's energy consumption (https://www.eia.gov/international/analysis/country/SGP). Natural gas and a small percentage of coal account for the remaining energy used as of 2020. The country has launched a Green Plan which intends to increase its use of solar energy to two gigawatts of capacity by 2030.

Singapore currently relies heavily on natural gas for electricity generation. However, there is a growing adoption of solar energy facilities. Emerging renewable energy options such as hydrogen and the importation of clean energy from neighboring countries are also gaining traction. Other renewable technologies, including geothermal, carbon capture, and nuclear energy, are in the exploratory stage.

The IRAS gathers information on the development of renewable energy information by working closely with local government agencies, such as the Energy Market Authority, which is the lead regulator of energy matters in Singapore. As well, it stays informed by conducting periodic environmental scans of the latest energy trends in the market to anticipate any potential impacts on property tax treatment. IRAS maintains close communication with taxpayers to keep the agency informed and engaged in new developments.

There are currently no specific policies or methodologies for valuing renewable energy assets in Singapore. That said, the general tax policy, principles, and assessment methodology used to value other non-renewable industrial assets will similarly apply when valuing renewable energy assets.

However, with the government's push to encourage greater development of renewable energy locally, increased requests from taxpayers for property tax exemptions on these assets are expected. IRAS is working closely with the relevant ministry and agency to monitor market developments and are proactively engaging with taxpayers to clarify property tax obligations.

Most fixed improvements are subject to property tax in Singapore. This includes any structure, machinery and equipment affixed to and used within the property. There are specific provisions in assessment legislation to exempt fixed machinery used for production activities where the manufactured goods are intended for sale. Tax guides are provided on the IRAS website to help taxpayers understand the general property tax obligations and treatment of fixed machinery.

The data required for valuations vary depending on the type of asset and the valuation methodology applied. Commonly requested information includes the asset's completion date, construction costs, their specific functions, maintenance costs and property photos. In some cases, revenue and expense details of the property are requested, if the receipt and expenditure (income) approach is used for valuation.

The most common valuation disputes from taxpayers in Singapore concern whether a physical improvement qualifies as a fixture and whether fixed machinery is eligible for property tax exemption. These matters are typically legal in nature, with several past and ongoing objection/appeal cases addressing them. As the adoption of renewable energy assets increases, we may see more disputes or pressure arising in these areas.

Most renewable energy facilities are generally owner operated. However, for smaller-scale installations like solar photovoltaic (PV) panels, owners may lease rooftop space within their residential, commercial, or industrial properties to solar operators.

Tasmania

Tasmania is an island state of Australia with a population of more than 550,000 people, according to the Australian Bureau of Statistics 2021 census. It is situated 240 kilometers off the coast of Australia to the southeast. It covers an area of 68,402 square kilometers. It consists of one main island and thousands of small islands. There are 229,000 occupied dwellings as of the 2021 housing census. The majority of living units are single family dwellings at 88 per cent, where 70 per cent are owner occupied.

The state is striving to be a leader in renewable energy generation with several projects. Currently it produces 100 per cent of its energy through renewable projects. It is one of the few places in the world that have achieved this status. Tasmania has passed legislation to commit to generating 200 percent of its electricity required by 2024. Surplus electricity will be exported to the Australian mainland.

Guy Naish, Valuer-General, explained The *Valuation of Land Act 2001* requires the Valuer-General to make valuations of the land, capital and annual assessed values of all lands. The capital value of a property is taken to include any structure the Valuer-General determines is occupied or capable of being occupied.

There is a distinction between leased-land capital improvements and those improvements on developer-owned land. Improvements on properties that contain renewable energy sources, specifically wind farms, on leased land are not valued. The land itself is valued, but any components to do with energy generation are exempt from taxation provided they are to be removed at the end of the lease term. If the lease stipulates the structures are to be removed at the end of the lease, they are deemed to be chattels and not included in capital value. Similar windfarms that are on owner-occupied land are assessed. The legislation which deals with this requirement is found in Section 15 of the Valuation of Land Act 2001 Tasmanian Government.

For this policy, Tasmania has taken its direction from a decision made by the Supreme Court of Victoria (see *AWF Prop Co 2 Pty versus Ararat Rural City Council* below). The case raised questions over whether tenants' improvements erected on leased land can be regarded as structures.

A recent objection against the capital value of a property occupied by a wind farm, heard by the Supreme Court of Victoria, determined that the above ground wind farm infrastructure erected on leased land is to be regarded as tenant improvements in accordance with the Victorian Property Law Act. Therefore, the above ground infrastructure is not fixtures and is not part of the land to be valued for statutory purposes. The decision was appealed by the Victorian Valuer-General, but the appeal was dismissed.

There are currently three wind farms in Tasmania on the valuation roll. Since these properties are owned and operated by the wind farm operators, they are not considered to be impacted by the Victoria decision, which applies to leased wind farm properties.

Two new wind farm developments in Tasmania, Cattle Hill in the Central Highlands and Granville Harbour on the West Coast, are both operating on land leased from the property owners subject to conditions that the above ground improvements are to be removed at the end of the lease term. The Valuer-General's office has investigated the ramifications of this decision for Tasmania. It was determined the Cattle Hill and Granville Harbour Wind farms are subject to similar lease conditions to the Victorian case, and therefore the wind farm improvements will not be included in the capital value of the underlying land.

In 2024, the Tasmanian Office of the Valuer General (OVG) created new classification codes to identify properties where the primary use is for electricity generation, storage or transmission. Local councils are assisted in how they tax electricity-related properties within their municipalities.

The new classification codes distinguish properties as privately owned, or authority owned. Also, there are separate codes for power generation, hydroelectricity generation, wind farm electricity generation, solar electricity generation and battery storage. There is also a code for electricity substations, terminal stations or transmission systems.

These codes provide councils with the option to rate properties separately from other commercial or industrial type properties. According to Mr. Naish, none of the tax jurisdictions have made use of the new codes yet.

South Australia

The state of South Australia is located in the southern central part of Australia. It has a total land area of 984,320 square kilometers, making it the fourth largest of Australia's states and territories by area. The state includes some of the driest parts of the continent. There is a population of 1.7 million people. The majority of the population - 77 per cent - is centralized in the capital city of Adelaide and the surrounding areas along the southern coastline. The next largest population center is Mount Gambier which is comprised of 26,878 people.

After the 2002 election the new government created a plan to transition to renewable energy sources. South Australia is now one of the market leaders in Australia for renewable energy generation and use with over 70 per cent of its electricity needs being delivered by renewables - mainly rooftop solar and wind turbines. In 2021, South Australia met 100 per cent of its operational demand from renewable resources for 180 days - 49 per cent of the year.

South Australia has been involved with hydrogen production mainly from solar and wind as part of the South Australian Hydrogen and Renewable Energy Act 2023.

Stuart Bruce-Gordon, Director of Regulatory and Advisory Valuations in The Office of the Valuer General of South Australia, noted it has been difficult to obtain rental information from private property owners.

The Valuer General was approached by the Department of Energy and Mining to assist in developing regulations around charging market rents on Crown Land where third parties undertake feasibility studies and potential infrastructure development. The work was completed towards the end of 2024. As yet, there have been no renewable energy projects or developments the department has been notified about and no deadline for tender submissions for the current release areas.

Policies developed to value renewable energy properties involved valuing the market rental of any nominated parcel of land to be used for the generation of renewable energy. After discussions with

experts and other jurisdictions, the Valuer General's office recommended a rental amount based on megawatt capacity with a single $ rate/fee being warranted across all project types, whether they be all wind or hybrid wind and solar.

The main concern with valuing renewable energy properties is location, size and megawatt capacity although some of the capital improvements do produce value. Not all the components of a renewable energy operation assessable in South Australia. Mainly, the market rent of the land parcel being utilized is valued. For solar farms the residual annual lease income and lease for the site are included in the values. Wind turbine pads are valued but the rest of the structure, including the supports and turbine are not. Large scale battery parks have been developed. The batteries are not included in the values.

The widespread use of residential solar panels contributes to South Australia's success in meeting its green energy goals. Homeowners buy their solar panels and batteries outright for home operation. With regard to wind farms, these are typically erected on farmland or rural properties with the owner and proponent entering into a rental and production agreement. For wind-based energy many of the agreements are between privately-owned property owners and private operators where the terms of the agreements are not known.

Some of the challenges facing the valuation agency in and emerging market include no direct comparable evidence, a lack of certainty over investment horizons and government support, fluctuations in the end prices (energy, ammonia etc.), limited number of valuation experts in the field, difference approaches to valuation within the industry and easily manipulated inputs depending on if the valuer is acting for the proponent or government/owner.

New Zealand

New Zealand is a small country east of Australia made up of two main islands, with a population of 5.3 million people (Dec 2024 – New Zealand Department of Statistics) with approximately 84 per cent living in urban centers, primarily Auckland, New Zealand's largest city.

New Zealand is ideally situated geographically for renewable energy. It has high rainfall, especially west of the Southern Alps, and its location in the "roaring forties" (45 degrees of latitude) produces significant wind. As a result, around five per cent of energy is produced by hydroelectric power stations, followed by wind. Geothermal from underground pressurized steam is also significant contributor. Solar is growing rapidly, increasing by 45 per cent in three years (source NZ Ministry of Business, Innovation and Employment) but currently only makes up a very small portion of total generation. Overall, around 88 per cent of total energy in New Zealand is produced by renewables. By contrast, Australia current generates between 40-46 per cent of its energy by renewables.

Murray Gray, Registered Valuer at Quotable Value, New Zealand's largest valuation service provider to Councils, provided the following details.

Energy producing assets in New Zealand are currently valued using optimized depreciated replacement cost. This excludes plant and machinery as per Rating Valuation Rules and case law *Telecom NZ Ltd v Christchurch City Council* CA CA25/04 [7 March 2005] and *Mackenzie District Council v Electricity Corp of New Zealand* [1992] 3 NZLR 41. (CA).

For wind farms around 50 per cent is excluded as plant and machinery, while for solar farms, around 85-90 per cent of the cost is excluded as plant and machinery. The cost for developing a solar farm is reasonably consistent at around $1.5 - $1.9 million per MW (NZ dollars).

Most solar and wind farm developments are subject to occupancy agreements (i.e. leased).

Information sources include publicly available data; for example, the media and Government departments, and direct from energy generators and local authorities.

A broad property category of "Utility Generation" is available but it does not distinguish between generation types.

Challenges include keeping up with location of new solar farms, getting the right information about development costs and emerging technologies.

Case Law

As mentioned previously, a 2020 court decision in the Australian state of Victoria impacted taxation policies in the neighboring states within Australia. *AWF Prop Co 2 Pty versus Ararat Rural City Council* is a ruling that is used to guide policy. One of the most notable features of the decision is that it clarifies how to classify wind farm assets. It provides a precedent on the treatment of infrastructure in the valuation process.

Case 1 – AWF Prop Co 2 Pty Ltd vs Ararat Rural City Council [2020] VSC 853

This case involved a 75-turbine wind farm in a rural area of Victoria Australia. The wind farm operators leased the land for the wind farm for a term of 25 years through 16 leases from various landowners. The valuation was intended as a basis for a fire services levy under Victorian State Government statute and the Valuation of Land Act 1960, which sets the mass appraisal framework for statutory valuations in the state. The valuation for this purpose was initially set at $470,000,000 with a site value of $14,560,000 for the land.

The wind farm owners objected on the basis that local government levies should be based on site value and that the wind farm turbines should not form part of the land to be valued (and therefore the site value).

The Supreme Court determined the wind farm turbines were not fixtures attached to the land primarily due to:

- Planning permission for the wind farm required the above ground assets to be removed at decommissioning.
- The leases required the removal of the above ground assets at the end of the lease (the foundations and access roads would remain)
- The design and working life of the turbine was around 25 years and at the conclusion they would either be removed or replaced.
- The wind farm turbines were owned by the wind farm operator, not the landowner.

Turbine foundations, roads, fences, carpark and underground cabling were ruled to be fixtures and part of the land and therefore valued. The rental income from the wind farm payable to the landowners was utilized in the valuation approach favored by the Court (excluding the wind farm

turbines but including roads, foundations, etc.) and the rental being received was deemed to be market.

In 2023, the Valuation of Land Act 1960 was amended to include a definition of "fixture" and that fixtures form part of the Capital Improved Value. This law change appears to be intended to overcome the outcome of the AWF wind farm case.

There were numerous sales of windfarms and details of lease rentals detailed in the case which can be downloaded from:

https://www.austlii.edu.au/cgi-bin/viewdoc/au/cases/vic/VSC/2020/853.html?context=1;query=AWF%20Prop%20Co%202%20Pty%20Ltd%20vs%20Ararat%20Rural%20City%20Council%20[2020]%20VSC%20853%20%20;mask_path=

Case 2 – SPIC Pacific Hydro PTY Ltd vs Chief Commissioner of State Revenue [2021] NSWSC 395

This case involved the Taralga Wind Farm in New South Wales relating to duties payable under the Duties Act 1997 (NSW). The case covered valuation issues relating to fixtures vs chattels in a wind farm context - do tenants' fixtures give rise to a separate interest in the land and how the interests should be valued.

The Supreme Court in NSW found that wind turbine generators, masts, switchyard components, control buildings and underground cabling were fixtures, not chattels, and that the degree and purpose of annexation indicated an intention for long-term use of the land as a wind farm. It also held that there was a leasehold interest in the land but not a separate equitable interest in the land.

In terms of valuation methodology, the court utilized both actual and market rental income from the wind farm in the leasehold valuation methodology with a discount rate of 9.5 per cent. While not directly related to mass appraisal valuation as this case was heard under a different statutory regime, it does stand as a contrast to the outcome of the AWF Case in Victoria.

The case can be downloaded from:

https://www.caselaw.nsw.gov.au/decision/178d86cf6b42a4a7cc08aad5

Recommendations

1. It is recommended that legislation should clarify the difference between fixtures included in valuations and elements excluded from valuation such as defined plant, equipment and machinery.

This is particularly relevant for solar farms as the panels have no moving parts, which has been a traditional indicator of "machinery". As the photovoltaic panel converts solar energy into electricity it is currently considered a machinery element.

However, this could lead to a lack of valuation consistency between different types of renewable energy and likely lead to much lower values on a solar farm vs a wind farm, for example:

Jurisdiction	Windfarm components captured in value	Solar farm components captured in value
South Australia	Pads	0% of cost

Tasmania	Pads and tower	0% of cost
New Zealand	Pads, towers and cabling	10-15% of cost

In jurisdictions where legislation or case law determines whether improvements are included based on tenure type, an issue arises. This creates uniformity issues in the values and should be avoided where possible as uniformity of values in a mass appraisal system is paramount.

Case law, and in some cases legislation, can determine whether improvements on renewable energy assessments are valued. For example, in Tasmania wind farms are valued only when the wind farm improvements are owned by the landowner. If the wind farms are on leased land, improvements are excluded. This creates uniformity issues within the valuation system.

2. Develop property categories that differentiate different renewable energy types, as is the case in Tasmania.

All renewable energy projects have the potential to provide and sell electricity into the grid at the same price, yet valuation methodology treatment means that variation can occur between generation types (for example windfarms and solar – see previous table). Local councils/taxation authorities could develop tax rates that differentiate between generation types reflecting the different valuation methodologies and profitability profiles between each generation type. For example, solar farms have a significantly lower capital cost compared to wind farms and have much lower value on improvements due to current treatment in the jurisdictions surveyed.

3. Information sharing should be encouraged between valuation agencies.

Emerging renewable energy projects are challenging existing methodologies for valuing energy-generation assets, especially those reliant on large capital investment in land and buildings such as coal-fired power stations or hydro dams.

By contrast renewable energy has a much lower cost profile and new technologies. However, methodologies developed for assessment with large investment required in land, buildings, plants and machinery are being deployed in the valuation approach to renewable energy projects.

We would encourage sharing information about renewable energy projects between valuation agencies, particularly valuation methodologies, case law and any changes to legislation regarding the approach to fixed structures versus machinery or chattels.

Utilizing existing networks, such as Commonwealth Heads of Valuation Agencies (now the Conference of Valuation Agencies – CoVA), the International Property Tax Institute, and the International Association of Assessing Officers, would be useful in establishing a standardized approach and sharing information.

Conclusions

The renewable energy industry is growing at a fast pace. In many cases it has out-paced policies and legislation that concern the valuation of land and capital assets. As many jurisdictions look for best way to capture the value of renewable energy projects, inconsistencies are emerging from one jurisdiction to the next. Uniform policies and methodologies and collaboration and information

sharing within countries and internationally will be increasingly important in the future as new energy solutions are developed, such as small nuclear reactors, hydrogen and tidal.

While this report focuses on Australasia, there are parallels between some North American jurisdictions. One of the authors of this paper, Ann Smith Macquarrie, noted the treatment of wind farms in Nova Scotia is similar to that of New Zealand. Land and some fixed capital improvements are assessed but any deemed machinery items are not.

Appendix A

IPTI Global Collaboration – Renewable Energy

Questionnaire

1. What kinds of renewable energy sources are available within your jurisdiction?
2. How are you dealing with the valuation of renewable energy facilities?
3. What data is collected and how is it used to help value the property?
4. For each individual source, which method is used to assess facilities for property tax purposes? (Under construction value? Output, Cost etc.) How are properties dealt with different rating units or assessment units?
5. What are the issues facing valuation agencies, in terms of appeals and other disputes?
6. Are property owners co-operating with the valuation agency?
7. Have there been any policies or methodologies developed to deal with renewable energy?
8. Are all components of a renewable energy operation assessable? Have you developed any guidance or understanding on land/buildings as opposed to machinery and equipment?
9. Is it common for energy producers to lease or rent property for their operations?