BARRIERS TO CLEAN ELECTRIFICATION SERIES
PLANNING AND PERMITTING

Solution Toolkit: Actions for national/ regional governments and policymakers

Version 1 | January 2023

Energy Transitions Commission

Overview

This Solution Toolkit outlines the key actions that need to be taken by **national/regional governments and policymakers*** to speed up slow planning, permitting and land acquisition processes associated with clean power generation whilst maintaining strong environmental and social standards. For governments and policymakers, there are three principal areas of action:

- Setting a **strategic vision**
- Improving **processes and enforcement**
- Enabling better **information and systems**

As discussed in the accompanying Insights Briefing, there are three major barriers to planning and permitting: regulatory barriers, administrative barriers, and societal support barriers. This Solution Toolkit maps key actions across the barriers that it helps to address. Other Toolkits are available for Developers and Local Authorities/Civil Society.

Planning and permitting processes and barriers differ vastly depending on the local political and spatial context. For each key action, the Solution Toolkits highlight where actions are of particular relevance to certain types of countries. Four different types of geographies are outlined:

1. **Centrally-led countries**
   e.g., China, Vietnam, UAE
2. **Countries with strong democratic processes**
   e.g., Europe, United States
3. **Highly land-restricted countries**
   e.g., Japan, South Korea
4. **Infrastructure-constrained countries**
   e.g., South Sudan, Burundi, Niger

* Authorities who are responsible for major regulation and/or house administrative bodies. This may be at the supranational level (e.g., EU), national level (e.g., UK), or at regional/federal level, (e.g., US or Germany).

Barriers to Clean Electrification Series

The ETC's *Barriers to Clean Electrification* series focuses on identifying the key challenges facing the transition to clean power systems globally and recommending a set of key actions to ensure the clean electricity scale-up is not derailed in the 2020s. This series of reports will develop a view on how to "risk manage" the transition – by anticipating the barriers that are likely to arise and outlining how to overcome them, providing counters to misleading claims, providing explainer content and key facts, and sharing recommendations that help manage risks.

An Insights Briefing will be developed for each barrier, covering the context and major challenges, and assessing the impact of deploying key solutions. These Insight Briefings will be accompanied by a series of Solution Toolkits, which lay out a set of key actions that need to be taken by the most important group of stakeholders (e.g., governments, renewables developers, grid operators, civil society) and outlines supporting case studies.

Key actions for national/regional governments and policymakers:

Regulatory | Administrative | Societal support

Strategic vision:

- Create and communicate a strategic vision of the power system
- Assign priority development status to renewables
- Dedicate sufficient land
- Recognise biodiversity and social effects in auction tender processes

Processes and enforcement:

- Streamline and clarify legal process
- Set and enforce permitting targets
- Create one-stop-shops for permitting
- Sufficiently staff and train permitting departments
- Streamline repowering processes
- Utilise 'box-model' permits where possible

Information and systems:

- Digitalise permitting process
- Keep better environmental data banks and mandate developers to share study results
- Create digital mapping tools

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Create and communicate a strategic vision for the power system

Key actions

Countries should set out clear medium targets embedded in a strategic vision for the growth and decarbonisation of their power systems, providing a clear direction of travel and greater market certainty for developers, investors and society to scale up clean power supply.

These must be anchored to countries' net-zero commitments.

Governments should:

- **Set** clear quantitative targets for zero-carbon electricity capacity (e.g., UK's commitment to 50 GW of offshore wind by 2030) and firm binding targets for grid emissions intensity with clear dates for phasing out fossil fuels (e.g., US's commitment to a decarbonised power grid by 2035)[1] to drive accelerated investment in the next decade, as well as indicative targets for 2050. This should be supported by appropriate auction pipeline and power market design.
- **Design and implement** comprehensive plans for power system design, and for the integrated siting of generation and network build (e.g., generation sites connected to network build and siting plans) to ensure rapid development at the lowest cost.[2]
- **Communicate** the importance of the power sector transition, providing a clear signal that an energy transition is underway and is critical to meet climate objectives.

The UK has committed to decarbonise the power system by 2035.

The UK commitment is supported by comprehensive policy to drive renewables deployment, including a target of 50 GW offshore wind capacity by 2030. This is in turn supported by appropriate market design mechanisms that offer revenue stabilisation. Specifically, the UK runs a system of competitive auction rounds for renewable generation to guarantee a fixed power price over 15 years (Contracts for Difference). From March 2023, Contracts for Difference auctions will be held annually, instead of every 2 years.[3]

China's 14th Five-Year-Plan for Renewable Energy confirms the ambition to peak carbon emissions before 2030.

China's 1+N framework is driving the translation of the national target into provincial and sectoral action and contributing to world-leading renewables deployment rates.[4]

Chile has rolled out a series of successful auction frameworks to scale deployment of renewables.

Chile has launched technology-neutral auction based on time-blocks (both hourly and across quarters) to incentivise lower renewables bid prices at favourable timings.[2]

Implications

A clear strategic vision for the power system with medium-term targets and supported by appropriate market design mechanisms is critical to set the guidance for forward investment on renewables and to align incentives and stakeholders around a central vision. This approach lays the foundations for successful project delivery and supports an appropriate planning and permitting regime.

Key country groups

All country types would benefit from a guiding, clear strategic vision for the power system.

Assign priority development status to renewables

Key actions

Countries should ensure that wind and solar projects are given an appropriate level of priority in legal status and land use discussions.

Governments should:

- **Assign** renewable projects a priority development status in the permit-granting process and land use negotiations;
- ***Except*** where there is clear evidence that projects have major adverse effects on the environment which cannot be effectively mitigated or compensated for, whilst also respecting other protected areas such as national parks and military zones.

EU proposed legislation on priority status for renewable energy

In May 2022, the European Commission added Article 16d into the Renewable Energy Directive 2018/2001, granting renewable energy projects (in permit-granting, planning, construction, operation and grid connection) a legal status of being of "overriding public interest and serving public health and safety when balancing legal interests". The proposed revision of the directive is currently being considered by the EU Council and Parliament.

In November 2022, in response to the Ukraine crisis, the European Commission proposed a new temporary energy regulation under emergency measures with the same provisions as above, to be applied for one year, covering the time needed for the formal adoption of the Renewable Energy Directive.[5]

While this legislation is a significant a step in the right direction, it can be viewed as too blunt of a designation due to the lack of an environmental clause, as outlined above.

Implications

Assigning wind and solar projects priority development status in the permit-granting process and land use negotiations will send a clear signal to all stakeholders, and fast-track renewables projects.

Overall, it will facilitate speedy approval of renewable projects through initial site mapping and selection, increased priority and speed of renewable permitting with a reduction in planning objections, and lead to a reduction in the magnitude and number of legal challenges.

Key country groups

This solution is most relevant to country groups where regulatory system barriers currently place a lot of weight on local opposition factors, and where there is a need to provide a clear support structure and prioritisation for renewables construction.

Dedicate sufficient land

Key actions

Countries must ensure that there is a sufficient amount of land available for clean power generation and transmission to facilitate the massive scale up in clean electricity.

At a global level, there is clearly enough land resource to meet these needs. If 100,000 TWh of annual electricity production required under a net-zero scenario were produced entirely from solar PV, only 1–1.2% of land area of the world would have to be devoted to solar farms.[6] There is variation across countries, however, and analysis suggests that some countries, in particular in South and Southeast Asia, could face tighter constraints. For India, analysis by TERI highlights that under a net-zero trajectory solar and wind power could require between 1.5–8% of land.[7]

Overall, countries will need to ensure a regime which prioritises sufficient land for wind and solar, which will be more challenging for countries with higher population densities.

To ensure sufficient land for renewables, governments should:

- **Assign** an appropriate area of land for renewables development, e.g., X% of state/federal land to be devoted to renewables projects, taking into account environmental and social considerations.
- **Designate** "Renewable Energy Zones" based on detailed spatial planning, to create areas where renewable energy development takes priority and there is streamlined permitting.

  It is important not to designate these areas as "go to" areas, and leave areas outside of these zones as "no go" areas for renewables, to ensure that there is no adverse incentive to stop renewables development elsewhere.
- **Increase** the land available for renewable developments outside of Renewable Energy Zones, by reducing limiting factors such as turbine set-back distances, i.e. the distance between turbines and specified landmarks (e.g., roads, buildings). This should only be conducted where appropriate, i.e. national parks, military zones, certain fishing areas and habitats of endangered species should be respected.

For assigning appropriate area of land for renewables development:

German legislation to devote 2% of country's surface area for wind turbines

On 15 June 2022, the German Cabinet approved the Onshore Wind Energy Act which aims to support renewable deployment targets by dedicating 2% of national land area to be used for onshore wind power generation by 2032. The legislation breaks down the target by federal states.[8]

For Renewable Energy Zones, two types of areas should be mapped out:

1. **Primary priority areas** should be indicated as no regrets areas of development with low biodiversity and social issues i.e. rooftops, parking, rail and road infrastructure, former industrial sites, degraded land (no longer suitable for agriculture).

The potential for "no regrets" rooftop solar in the US

Installing renewables in "no regrets" areas could go a long way to closing the gap between forecast deployments and the ETC's vision for 2030. In 2016, in the US there was found to be over 8 billion square metres of rooftops which were suitable for solar panel installation, representing over 1 TW of additional solar capacity,[9] approximately equal to US total energy system capacity in 2021.[10]

2. **Secondary priority areas** – outside of immediate priority areas more land must be made available for renewable energy generation and transmission to demand centres through identifying high-quality areas with suitable topography, and sufficiently compensating land owners for access/purchase of the land. In many instances land for renewables is often dual use, with livestock able to graze and crops able to grow alongside wind and solar farms, providing additional benefit to land owners.

Renewable Energy Zones can offer immediate benefits in areas with low population density:[11,12,13]

Texas Competitive Renewable Energy Zones (CREZs), 2005–2013

Context:

- Western Texas has lots of wind potential (average wind speeds of more than 15 km per hour) and the region is sparsely populated (6.2 people per km^2) with high wind curtailment.
- Eastern Texas has high energy demand (with major cities such as Houston and Dallas) but network capacity and congestion issues.

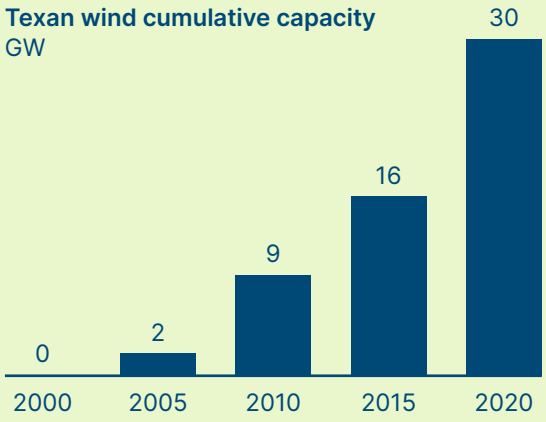
Solution:

- The Texan government passed a bill in 2005 to establish a series of CREZs where renewable deployment and transmission infrastructure is given permitting priority.

Outcome:

- The project was operational by 2013, and enabled deployment to well surpass the initial 18.5 GW target to over 30 GW today, with curtailment dropping from 17% in 2009 to 0.5% by 2014.
- The project has also prompted a solar boom with over 100 GW of solar projects in the pipeline.

Texan wind cumulative capacity
GW



Renewable Energy Zones can also greatly benefit areas with high population density:[14,15]

India's "Development of Solar Parks and Ultra-Mega Solar Power Projects" scheme, 2014–present

Context:

- India has one of the highest population densities in the world (428 people per km^2), and an ambitious 2030 wind and solar capacity target of 450 GW.
- Even in areas with high population density, India has been able to find land to dedicate to renewables whilst respecting other land use needs.

Solution:

- The Indian Government rolled out the "Development of Solar Parks and Ultra-Mega Solar Power Projects" scheme in 2014 to establish 25 solar parks with a combined capacity of over 20 GW.
- These parks provide developers with the land, including permitting clearances, transmission infrastructure, water access, road connectivity, and the communication network required to install solar panels at a rapid pace.

Outcome:

- As of 2022, India has approved 40 GW capacity and commissioned 10 GW within solar parks, including the world's largest solar farm, the 2,245 MW Bhadla facility in Rajasthan.
- Developers have shown a clear preference for the streamlined solar park process, with auction tenders within solar parks generally more heavily subscribed than those outside of solar parks.

Implications

Dedicating an appropriate amount of land to clean power developments via national and state-level targets, Renewable Energy Zones and making other land available is critical to send clear signals to developers, grid operators, as well as actors outside the energy industry.

Overall, these actions will accelerate site mapping and selection, permitting processes and reduce the scope of opposition and legal challenges, particularly if linked with assignment of a priority status to renewables.

Key country groups

This solution is relevant to many countries, with the exception of centrally led countries which typically don't have issues dedicating sufficient land to renewables. For infrastructure-constrained countries, the core underlying priority is defining land ownership rights.

Recognise biodiversity and social effects in auction tender processes

Key actions

Countries must ensure that biodiversity and social effects (e.g., commitment to local value creation such as providing local jobs or building local infrastructure) are given sufficient weighting in auction tender processes, to make sure that the development of renewables does not hinder these other critical objectives, and encourage more support from local communities.

Governments should:

- **Utilise** non-price criteria in renewable energy auction tender processes to enable biodiversity and social effects of deployment to provide some of the weighting by which tenders are decided.

EU State aid guidelines for Climate, Environmental Protection and Energy for offshore wind

As of January 2022, EU member states are allowed to use non-price criteria (including for biodiversity and social effects, e.g., providing local jobs, distance of turbines from shore, budget for environmental measures) to make up 30% of the weighting by which tenders are decided.[16]

Implications

Giving sufficient weighting to biodiversity and social criteria in auction tender processes will provide a clear signal to developers and local stakeholders that biodiversity and social effects must be valued, as every government auction will have to consider these effects. This should streamline project development by ensuring higher levels of societal acceptance and a reduced number and severity of legal challenges.

Key country groups

Most countries could benefit from a more holistic approach to auction tender processes with environmental and social criteria. In some countries, this will foster improved biodiversity and social outcomes – which have been under strain – while in others it will ensure visibility and process clarity, and reduce legal challenges.

Streamline and clarify legal processes

Key actions

Countries must ensure that legal processes are fit for purpose, as renewables must be given sufficient legal priority in order to reach required deployment levels.

This includes streamlining the legal process, such as by: limiting the window in which challenges can be made; capping the number of appeals that can be made throughout the legal process; and ensuring that the process is clear to legal staff, developers, and claimants.

Governments should:

- **Limit** the window for legal challenges to developers from submission of the first permit, to a maximum of four months after acceptance of either the Environmental Impact Assessment (EIA) or acceptance of the final permit, whichever occurs latest. (The EIA is generally conducted in conjunction with the permitting process and is the often the permit most frequently challenged – see the Insights Briefing for a timeline of stages of project development).
- **Limit** the maximum number of legal appeals to 2 during the permitting process, by sending the case directly to the highest Court of Appeal or by limiting the appeals to where there is a specific deviation away from the specified plan (e.g., a wind turbine with a taller hub height than specified), not reopening the whole case.
- **Introduce** a screening processes for plaintiffs which deter speculative legal challenges that do not hold sufficient merit, to ensure that legal challenges can only progress through to litigation if they are deemed to pass an acceptable legal threshold (this may be different for each legal jurisdiction).

Implications

Limiting the window available for legal challenge could be one of the most significant drivers to reduce delays and provide more certainty to developers. These regulatory backstops can provide a clear endpoint in negotiations of conflicts of interest between consultees or differing areas of policy. This could potentially reduce the window available for legal challenges from up to 9 years to 1.5 years for offshore wind farms.[17]

Reducing the threat of extended legal challenges should increase developer confidence, and result in an increase number of project submissions, as well as moving faster through permitting application and examination which can typically be the subject of many legal challenges.

Key country groups

Other than centrally-led countries, most countries face severe delays from legal challenges and would benefit from a streamlining of the legal process.

Set and enforce permitting targets

Key actions

Countries must set clear permitting targets and enforce these in order to accelerate the time taken for government departments to process permitting applications.

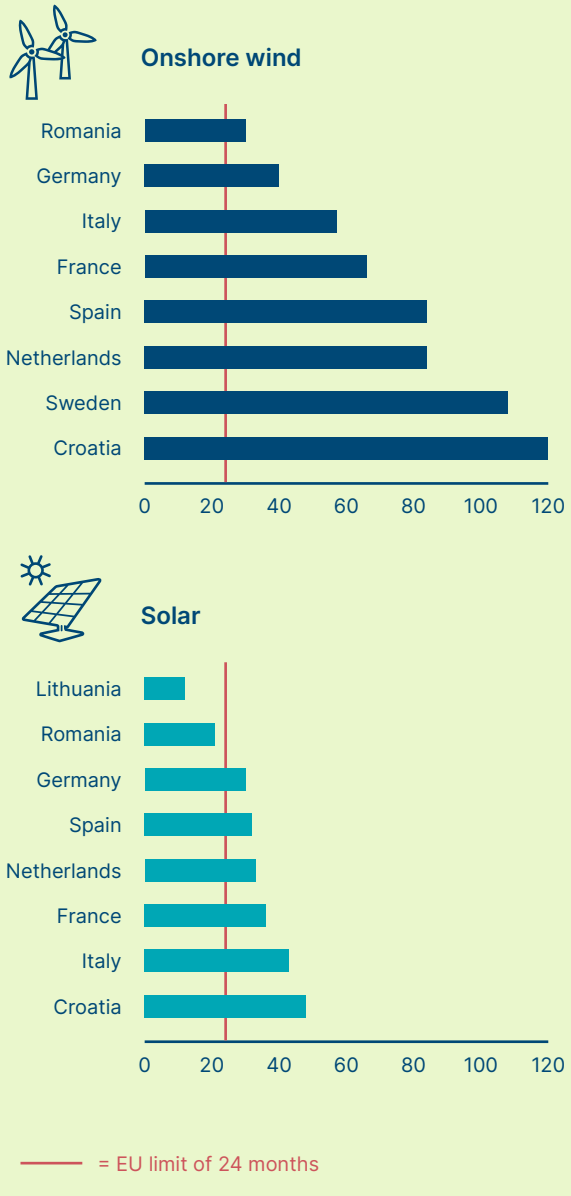
Enforcement of permitting targets is a widespread challenge, and most countries' targets are not met.

Governments should:

- **Set** clear permitting targets to provide frameworks for permitting departments and clarity to developers. These targets could be in line with EU Parliament proposals:
  - Permit-granting process shall not exceed 18 months for power plants and not exceed 9 months in renewable energy zones.
  - Repowering of existing plants shall not exceed 6 months inside renewable energy zones and 12 months outside of them.[18]
  - The permit-granting process should cover all administrative steps to build, repower and operate plants for the production of renewable energy, including hybrid power plants. It would also cover storage, connection to the grid and the integration of renewables into heating and cooling networks.
- **Explore** methods to enforce permitting targets, including via the use of the "rule of positive silence", and potentially through using fines where appropriate. Applying the "rule of positive silence" refers to a case where a lack of answer by the administrative authority within the time it is targeted to do so means that the permit or request are deemed to be approved.
- This recommendation should apply to projects currently in the permitting pipeline as well as projects applying for new permitting.

Permitting times in selected EU countries

In the EU, most countries are behind on solar permitting targets, and all countries are behind on onshore wind.[19] There are over 80 GW of wind projects stuck in permitting procedures across Europe as of the end of 2022.[20]



Spain's use of the "rule of positive silence" to speed environmental permitting[21,22]

Context:

- The importance of the speed and scale of the clean power transition has been magnified by the 2022 energy crisis, with countries exploring ways to rapidly accelerate permitting to substitute away from expensive fossil fuels.

Solution:

- The Spanish Government decreed that solar PV projects under 150 MW and wind farms under 75 MW could bypass the country's lengthy environmental impact assessment criteria provided that:
  - Projects are in low or moderate environmentally sensitive areas.
  - Authorities do not object to planning applications within 2 months (a form of the rule of positive silence).
  - Their aerial grid connection lines do not exceed 15 km in length and 220 kV in voltage.
- Spain's accelerated procedure is currently in place until the end of 2024.

Outcome:

- This policy should save an average of 2 years out of a 4-year project development time for solar projects.
- The policy announcement has led to an increase in BNEF's 2030 solar forecast from 73 GW (April 2022) to 86 GW (October 2022), far surpassing the government's target of 34 GW by 2030.

Implications

Setting and enforcing permitting targets will accelerate the speed of permit applications and examination.

Applying the rule of positive silence is one way of enforcing permitting targets, but permitting departments must be adequately staffed to ensure that each permit application still receives a thorough review and an excess of permits is not granted.

Further options to enforce permitting targets should be explored, the effectiveness of these will have to be assessed through the digitalisation and monitoring of permitting processes.

Key country groups

Countries with the highest administrative barriers experience permitting as a bottleneck and would benefit from setting more ambitious targets and enforcing these.

Create “one-stop-shops” for permitting

Key actions

Countries must streamline permitting processes by designating a single point of contact to be responsible for permitting of a specific renewable technology. This could be a central permitting department, which has the authority to grant all necessary permits, or a central engagement department, which collects data in a streamlined manner and then gathers permissions on behalf of a project. The department should be empowered to align processes across departments as well as levels of government (provinces, regions, states, etc.).

Governments should:

- **Create** a “one-stop-shop” for permitting, a single national contact point across regulatory bodies for the permitting of renewable projects.
- **Create** a permitting roadmap to determine sequencing, establishing how authorities will conduct reviews and work together, and specifying review and approval times.

Implications

One-stop-shops and permitting roadmaps significantly reduce the administrative burden for renewables developers and therefore reduces permitting times.

Designating a one-stop-shop relieves burden on satellite departments, but increases demands on one-stop-shop employees, so these departments must be adequately staffed and trained for permitting application and examination timelines to be expedited.

The US FAST-41 process for federal authorisation of infrastructure projects[23]

A tailored roadmap to the permitting process is created for each project which outlines:

- Roles and responsibilities for all entities with permitting responsibilities.
- A permitting schedule with interim and final milestones.
- Potential strategies for avoidance, minimisation, and mitigation of environmental and social harm.
- Plans and a schedule for public and tribal outreach and coordination.

Danish Energy Agency (DEA) as a one-stop-shop for offshore wind permitting

The DEA are responsible for leading permitting coordination between all relevant authorities which have different offshore interests. The resulting licenses are therefore “comprehensive” in the sense that they are granted on behalf each authority. Grid connectivity is the only application process that must be secured externally.

Interviewed stakeholders described the procedures as “very efficient”, the system is thought to ease the process for developers greatly, whilst also providing more certainty that the project can be established as joint confirmation comes from every authority.[24]

Key country groups

Many countries – with notable examples in Europe and the United States – with extensive bureaucracies have faced administrative barriers to the permitting process. This includes significant permitting delays for renewables, and these countries would benefit from central coordination.

Sufficiently staff permitting departments

Key actions

Countries must allocate a sufficient quantity and quality of administrative staff to permitting departments. While renewable targets are defined at national or supranational level, the installation of renewable capacity requires interaction with the local levels of government, therefore sufficient staffing at both national and local levels is crucial to streamline permitting processes.

Governments should:

- **Ensure** the necessary staffing and skilling of local authorities, commensurate with the expected growth in renewables deployment.

Energy Cities assessment of administrative staff needed to decarbonise the EU's built environment

The problem of adequate resourcing at a local level for renewables permitting can be illustrated by efforts around decarbonisation of the built environment. Energy Cities conducted a study for the EU and found that to decarbonise European cities a significant change in local staffing numbers is required, on average:

- 2.5 additional full-time positions per EU municipality are required, or 214,000 new local employment positions across the EU.
- Local governments will face a 50% increase in employee expenditures in their building and climate departments.
- Additional jobs include: energy analysts, project managers, engineers, energy advisers, communication officers, etc.[25]

Similar staffing increases could be required for renewables deployment to align with the EU's ambitious targets. Under REPowerEU targets, deployment must increase from 38 GW per year in 2021[26] to on average of 87 GW per year between 2023–2030.[27] Permitting staff numbers must increase if this is not to become a greater bottleneck.

Implications

Sufficiently staffing permitting departments will significantly reduce time taken for permit applications and examination.

This action will be most impactful at reducing permitting duration when paired with creation of permitting one-stop-shops and digitalisation of the permitting process.

Key country groups

To support faster permitting times, countries with the highest administrative barriers would benefit from increased numbers of permitting staff to process applications.

Streamline repowering processes

Key actions

Countries must ensure that repowering of existing wind and solar assets can be achieved through a more streamlined process, instead of applying for an entirely new permit for the asset, given the benefits of repowering in many cases. For example, repowering wind farms on average doubles the generation capacity (in MW) and triples the electricity output, as new turbines produce more power per unit of capacity in sites that have been previously assessed as having great wind potential.[28] Currently fewer than 10% of wind farms reaching the end of their life are being repowered across Europe.

Governments should:

- **Ensure** the permit-granting process for repowered assets is simplified. Old plants have already run through procedures and assessments showing that power can be generated safely at that given site. Therefore, new permissions and assessments should only comprise new impacts, i.e. if a retrofitted wind farm has a considerably larger height, the new assessment should only be related to the difference between the new height and old height, which should be used as the baseline.
- **Ensure** the permit granting process is swift and the process does not exceed six months (as in EU repowering targets).[29]

German repowering legislation

In June 2021, the German Federal Parliament passed legislation stating that for permitting procedures assessing the repowering of wind, only changes compared to the status quo should be assessed rather than the effects of a new greenfield installation, as was the case previously.[30]

By 2025, 15GW of Germany's onshore wind capacity will have been in operation for more than 20 years, and will be subject to these streamlined permitting procedures.[31]

Implications

Streamlining repowering processes can shave many years off the project development timeline, from site mapping and selection through to environmental surveys, permitting, grid connection and legal challenges.

Countries with large existing fleets of onshore wind turbines and solar farms will benefit most from streamlining these processes, especially if these assets are close to end of life.

Key country groups

All countries with long permitting times and existing wind turbines can benefit from streamlining the permitting process for repowering assets.

Utilise flexible “box-model” permitting where possible

Key actions

Countries must ensure that permits are flexible enough to be fit-for-purpose. Permitting processes for onshore and offshore wind can typically take over 4 years and up to 10 years,[32] whilst turbines with more efficient rotors and blade heights are being developed all the time. Fixed permits often result in the technology being out of date by the time a permit has been granted.

Governments should:

- **Enable** permits to be developed through use of a flexible box-model*, where developers have flexibility to optimise the layout of turbines within a specified area, and increase/decrease hub heights and rotor speeds within specified ranges outlined in the initial permit.

Sweden’s use of the “box-model” of permitting

Sweden has been a pioneer of the box-model of permitting, which has been necessary to ensure that permits are still technologically in date given the average permitting time for onshore wind is over 8 years.[33]

Whilst Sweden has seen an increase in turbine deployment since box permits have been introduced, the Swedish Wind Energy Association has criticised the national authorities for not applying the box-model more widely, which they believe is a substantial barrier to reaching the national target of 100% renewable electricity by 2040.[34] The association calls for more flexibility in turbine placement and technology in order to accelerate permitting processes and ensure the construction of the most efficient technology in wind farms.

Eclareon note that “the box model was regarded as a promising way of wind power permitting as it was initially introduced in Sweden, but it has not lived up to its potential, yet.”[35]

Implications

Utilising flexible box-model permits can speed up site mapping and selection and permit applications and examination if the process is run effectively. For offshore wind, Environmental Impact Assessments and permits often have to be defined before there is complete certainty on final design or installation methods; therefore, these approaches streamline the process.

Local stakeholders should be consulted on the range of variables included in the box-model process when initial permits are submitted, to minimise legal challenges occurring later on in the process.

Key country groups

Countries with longer permitting times will typically have more to gain from moving towards using more flexible forms of permitting.

* The “box-model” approach when applied to offshore wind is often called a “design envelope” approach, and in the UK referred to as the “Rochdale envelope”.

Digitalise permitting processes

Key actions

Countries should ensure that permitting processes are digitalised and do not require physical paperwork. Digital permitting processes should be tracked in a countrywide permitting database to monitor where permitting bottlenecks occur and enable better mitigation.

Governments should:

- **Digitalise** renewable permitting processes, removing any need for paper-based forms.
- **Record and monitor** digital permitting records in a central database to enable tracking and mitigation of permitting bottlenecks.

Digital permitting and monitoring in the EU

Despite the EU being highly advanced in many regulatory regimes, most EU countries have not digitalised permitting, meaning that applications still require a lot of paperwork. In addition, there is no monitoring of the length of permitting procedures for renewable energy projects in the EU Member States.[36]

In Austria, all applications, even for very small installations, must submit several hard copies. In the case of small changes, which are common across projects, all applications to the authorities must be reprinted. This lengthens and complicates the process.[36]

In Germany, most authorities require applications in both paper and digital form. The number of documents for a minor change such as adding a small fish ladder to a hydropower plant can require 20 documents of 30–50 pages, including descriptions, grid sheets and expert surveys. Stakeholders generally believe a single signed digital version should be sufficient.[36]

Implications

Digitalisation of permitting should speed up permit applications and examination.

Digitalisation eases procedures for applicants and authorities alike. Officials can sort, store and review digital documents easily, and share them between the parties involved. This would allow applicants to see in what stage their application currently is. This accelerates the permitting process and provides transparency.

Monitoring of permitting processes enables the setting of permitting targets and provides the ability to track if these are met, and the effectiveness of policies seeking to enforce these targets.

Key country groups

Most countries would benefit from a more streamlined permit application and tracking process. Infrastructure-constrained countries would require additional fundamentals to ensure the success of these measures.

Keep better environmental data banks and mandate developers to share study results

Key actions

Countries should keep better environmental data banks and could conduct preliminary studies ahead of lease auctions, so that developers know the top-level environmental concerns of each site before bidding, and for ease of creating Renewable Energy Zones.

These data banks could include animal habitat information, bird and bat migratory pathways and information around endangered species. Where possible, data should be shared across borders to enable wider environmental mapping.

Governments should mandate developers to share the results and data from studies which they commission themselves with the government in order to have continuous data feeding into the countrywide models.

Governments should:

- **Create** and maintain extensive environmental data banks.
- **Mandate** developers to share all results of environmental studies.

The EU's Natura 2000 data bank

The EU's Natura 2000 data bank is a network of core breeding and resting sites for rare and threatened species. It is the largest coordinated network of protected areas in the world and stretches across all 27 EU countries on land and at sea. The aim of the network is to ensure the long-term survival of Europe's most valuable and threated species and habitats.

While the network does include strictly protected nature reserves, most of the land remains privately owned, and conservation is largely centered to people working with nature rather than against it.[37]

Implications

Keeping country-level environmental data banks is the most impactful way to reduce time taken for Environmental Impact Assessments conducted by developers without compromising environmental integrity.

Having the top-level information already in place means that developers can focus their Environmental Impact Assessment resources on where this is required and pre-screen out locations that would have failed an Environmental Impact Assessment process, saving time and enabling more suitable sites to be selected earlier in the process.

Key country groups

Most countries would benefit from a having strong underlying environmental databases, both to speed Environmental Impact Assessments and also to better protect nature.

Create digital mapping tools to aid deployment planning

Information and systems

Key actions

Countries should create countrywide digital maps which outline:

- Energy resource potential, e.g., showing solar irradiation and wind speeds at a high level of granularity.
- A map of the current and planned transmission network.
- Relevant permitting information (i.e. is the land in a Renewable Energy Zone?)
- Environmental and social factors for different regions, building on environmental data banks (as outlined in the prior solution).

This data should be made publicly available to provide developers with better clarity on the energy potential of the land, the extent of permitting required, and environmental factors to be considerate of.

Governments should:

- **Create** countrywide digital mapping tools which outline resource potential, transmission network connection points, and key biodiversity and social factors.

Implications

Creating digital mapping tools will aid deployment planning by making available to developers the best locations for renewable energy deployment at the earliest possible stage.

This should also enable better planning of transmission and distribution upgrades, as it will become clear to governments and grid operators where the likely future developments of renewable energy will be.

This action will be most effective if certain land has already been mapped out and given preferential treatment for renewable energy, and comprehensive environmental data banks have been created.

Spain's renewable energy zoning tool

Spain's Ministry for Ecological Transition and the Demographic challenge developed an online zoning tool to identify the geographic areas of Spain best suited for renewable energy projects in early 2021.

The tool builds on Natura 2000 data and energy generation statistics and divides the land according to environmental sensitivity indexes which should help decision making regarding the location of wind and solar projects. The maps classify land into 5 environmentally sensitivity grades (maximum, very high, high, moderate and low) taking into consideration protected areas and other regulations.[38]

The tool was initially designed not to replace Environmental Impact Assessments (EIA), but to provide a better picture of the places that are most suitable for RE projects. However, in 2022 Spain utilised this tool to enable wind and solar projects located in low or moderate environmentally sensitive areas beneath 75 and 150 MW respectively to effectively bypass the country's lengthy environmental impact procedure.[39]

Key country groups

Countries with higher thresholds for environmental considerations, siting competition, and data gaps would have the most to gain from the creation of digital mapping tools.

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