

# Expanding carbon-free electricity globally

## Microsoft electricity policy brief

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## Executive summary

Reliable and affordable electricity has never been more crucial as the world moves to a net-zero carbon emissions economy. Globally, there is increasing demand for electricity to meet the social and economic needs of a growing population, to electrify sectors like building, transportation, and heavy industry, and to support services like cloud computing. This expanded demand for energy is coupled with a requirement to transition to low- and zero-carbon electricity generation. At Microsoft, we support public policy

changes that will result in a significantly expanded and increasingly decarbonized grid. Microsoft is a major electricity consumer with ambitious climate and energy commitments, and we believe we have a responsibility and opportunity to help advance policies that will expand the grid and serve the world's increasing energy needs. We will actively support policy action designed to accelerate the transition to clean electricity generation, modernize and improve existing grid infrastructure to accommodate this transition, and enable an equitable energy future for all. This policy brief outlines the need for action to expand supply and decarbonize the grid and identifies the principles that will guide our policy advocacy work in this area.

## Introduction

Electricity is an enabler of improved economic development, social welfare, health, and other positive societal outcomes. In an increasingly interconnected, technology-driven global economy, the demand for reliable electricity will continue to grow. According to [McKinsey & Company](#), global electricity demand will triple by 2050, an increase driven by both electrification and improvements in living standards. [Recent research](#) shows that in the United States alone, the electric transmission system specifically will need to expand by 60 percent by 2030 and triple in size by 2050 to meet the need for expanded energy supply. As we increase Microsoft operations around the globe, we see a growing need to expand the grid, not only to meet our own requirements but also to ensure reliable access to electricity for all.

### An urgent need to decarbonize the grid

In the context of a global climate crisis, it's problematic that today's electricity demand is met in large proportion with fossil fuels. The continued use of carbon-emitting resources will only intensify the consequences of climate change. Furthermore, we are reminded daily of the importance of access to electricity in all regions. There are currently [more than 770 million people without access to electricity \(mostly in Africa and Asia\)](#). Enabling sustainable development for these regions will require a reliable electric grid. Disruptions associated with Russia's invasion of Ukraine have highlighted the importance of affordable energy security and the advantage of electricity generation that does not depend on fuel to ensure the reliability of the European grid. Ice storms, fires, and heat waves have put grids around the world under massive stress. These grids are coming under pressure right at the time that they are becoming a necessary foundation of transformation to electrify the economy and increase access to carbon-free energy—underscoring the need for urgent action.

The electricity sector has made progress in addressing these challenges by diversifying energy generation sources on the grid. However, the transformation to a carbon-free and resilient electricity grid must rapidly accelerate, not only to mitigate climate change impacts, but to ensure access throughout the world to affordable, reliable, and sustainable clean energy. We applaud policy changes like those recently enacted in Europe under the Fit for 55 Package and in the United States with laws that provide historic levels of investment to modernize and decarbonize the US energy system, but much more needs to be done to enable a carbon-free electricity grid around the world.

## Investing in and advocating for renewable and clean energy

At Microsoft, we have a direct interest in an expanded and carbon-free electric grid. The datacenters that power our global cloud services depend on having a reliable, consistent, flexible, and resilient supply of electricity in every country where we operate. As more companies and customers choose the Microsoft Cloud, our energy requirements will grow around the world even as we work to further improve energy efficiency. At the same time, Microsoft has some of the world's most ambitious climate commitments, including our commitment to be carbon negative by 2030. Electricity supply is a critical piece of our plan to meet our carbon negative ambition. Most of our operational carbon emissions come from electricity (our Scope 2 emissions). This is why we have specifically committed to procuring enough renewable energy to cover 100 percent of our electricity use by 2025, meaning that we will have power purchase agreements (PPAs) for green energy contracted for 100 percent of carbon-emitting electricity consumed by our datacenters, buildings, and campuses. Our Scope 3 (indirect) emissions are also significantly affected by the electricity grids that serve our supply and value chains, and so we must take action to advance renewable energy across broad geographic regions.

We have made progress on our renewable energy commitments, quickly becoming one of the largest purchasers of renewable energy in the world and driving change in the markets where we have operations. We negotiate our PPAs to have a positive impact on the grid, in terms of both energy and environmental justice. Our investments and actions have been, by design, the steps of a first mover to help broaden market availability of clean energy resources.

While we are focused on meeting our own commitments, we also see an urgent need to update policies to enable access to clean energy for all electricity users. In 2021, we identified our long-term vision that on all the world's grids, 100 percent of the electrons, 100 percent of the time, will be generated from zero-carbon resources. To successfully achieve this scale of global grid decarbonization—while ensuring reliable, resilient, adaptable, and affordable electricity access for all—industry, governments, corporations, and the public will all need to support the necessary changes to electricity generation and delivery.

This paper outlines three pillars (each with three accompanying principles) that will guide our policy advocacy in support of an expanded, robust, reliable, and carbon-free grid: (1) accelerate the transition to clean electricity generation; (2) modernize and improve grid infrastructure; and (3) enable an equitable energy future.





## Accelerate the transition to clean electricity generation

For electricity sector carbon emissions to decline overall, growth in clean electricity generation must *significantly exceed* growth in electricity demand. When you consider that the lead times for many energy projects can be years or even decades, the world is not moving fast enough to enable a net-zero economy by 2050. Notably, fossil fuels still produce [61 percent of electricity in the United States](#), [nearly 70 percent in the Asia Pacific region](#), and significant portions on other grids in the world. To expand carbon-free supply to power our growing operations and local grids around the world, we will support policies that (1) promote a diverse zero-carbon energy mix for a reliable, resilient, and flexible grid, (2) drive updates to electricity market design and price signals to expand participation, and (3) encourage R&D investments to deliver the clean energy technologies of the future.

- **Promote a diverse zero-carbon energy mix for a reliable, resilient, and flexible grid**

To ensure a reliable electricity supply that is resilient to the impacts of weather events, cyber intrusions, fuel shortages, and geopolitical unrest, a decarbonized grid requires a diverse energy mix, which could include wind, solar, hydropower, nuclear, and green hydrogen. Furthermore, it must be able to respond flexibly to changes in supply and demand—for example, using storage technology to dispatch zero-carbon electricity on demand on grids with a high level of variable renewable energy. The necessary policies will expand electricity markets for everyone and incentivize energy efficiency and the addition of diverse, reliable clean energy to the grid. The most suitable policy design—regulatory caps, clean energy standards, tax incentives, subsidies, and/or public procurement—may vary greatly between countries.

- **Drive updates to electricity market design and price signals to expand participation**

Electricity markets have remained largely unchanged even as renewable energy generation has ramped up, fossil fuel retirements have increased, and new uses of the grid that were unimagined a century ago have become mainstream (such as expansion of wind and solar energy, an increase in distributed and smaller generators, and an increasingly electrified transportation system). As the makeup of the grid changes, operators need to expand participation to include additional energy resources, different types of technologies, and different economic players. Markets need to value the different attributes of electricity generation (such as flexibility, reliability, and carbon intensity) more effectively through updates to market design and the integration of more transparent, targeted price signals. Public policies that expand, regionalize, or create new markets to buy and sell electricity can advance zero-carbon diversity and integration while encouraging competition and lower costs for consumers.

- **Encourage R&D investments to deliver the clean energy technologies of the future**

Today's technologies cannot deliver 100 percent zero-carbon electricity in a reliable or cost-effective way everywhere. The electricity sector needs to advance research and development (R&D) to unlock the potential of new generation resources, energy storage, and grid-enhancing technology. At Microsoft, we support R&D through our \$1 billion Climate Innovation Fund and our partnership with Breakthrough Energy Catalyst, each of which focuses on technology development in critical areas like long-duration energy storage and green hydrogen. We will support policies designed to drive the development of zero-carbon energy technologies and help them move to market. These may include sustained funding, grants, and loan guarantees to facilitate the demonstration and deployment of new technologies.



## Modernize and improve grid infrastructure

Grid management of today and tomorrow must be more dynamic as larger volumes of renewable energy (often located in rural areas) and distributed resources are deployed and carbon-emitting energy sources are retired. We see this firsthand as we look to expand delivery of carbon-free energy to power our growing operations in countries around the world. As zero-carbon resources are added to the grid at an accelerated pace, the network of wires that will deliver that electricity to homes and businesses must also significantly expand. Microsoft will support policies that (1) prioritize and resource transmission planning and siting to expand energy delivery, (2) simplify the permitting process to expedite clean energy grid interconnections, and (3) use digital technology to manage, optimize, and protect the grid.

- **Prioritize and resource transmission planning and siting to expand energy delivery**

Transmission lines often cover long distances that can cross many national, regional, and local jurisdictions. The planning process for siting and building new transmission lines should include affected people across jurisdictions and grid regions. We will support policies that remove roadblocks to these planning processes and create opportunities for competition for new transmission corridors to help control costs for consumers and accelerate the clean energy transition.

- **Simplify the permitting process to expedite clean energy grid interconnections**

Taking a new clean energy project from initial plans to construction and interconnection is a multiyear, resource-intensive process requiring overlapping layers of permitting applications and undefined approval timelines. Public policies that streamline the permitting process will help empower and provide certainty for project developers while strengthening the grid.

- **Use digital technology to manage, optimize, and protect the grid**

Advanced capabilities like AI can speed the pace of transition, help effectively integrate new technologies on the grid, and enhance the cybersecurity of critical power sector infrastructure. Policies that promote a transparent, standardized approach to electricity data will help enhance operational performance and increase data availability and transparency. This will in turn allow for better accounting of real-time carbon emissions to show where the biggest carbon reduction potential lies and inform clean energy development decisions.



## **Enable an equitable energy future**

The clean energy transition needs a new strategy for community engagement that ensures participation and self-determination for those that have been historically affected by carbon-intensive energy development and those that stand to benefit from a clean energy transition. We will support policies that (1) foster an equitable transition by supporting and amplifying the voice of affected communities, (2) design energy development for an equitable start, and (3) implement measures to keep electricity costs affordable and equitable.

- **Foster an equitable transition by supporting and amplifying the voice of affected communities**

As the grid is decarbonized, it is essential that there be consistent and proactive engagement with the communities that have borne the burden of the energy decisions of the past (such as poor air quality or other environmental factors). A key part of this engagement is ensuring that these communities can shape and share the benefits of the clean energy future through inclusive decision making and workforce education and training. Some may argue that the need to rapidly expand the grid conflicts with the ability to amplify the voice of affected communities. We see it differently. An intentional approach to redesigning permitting processes can do both and thereby accelerate the consideration of both environmental and environmental justice issues.

- **Design energy development for an equitable start**

There is an opportunity to apply new zero-carbon energy best practices in countries that are building out their grids for the first time. Universal electrification in these areas will require scaling affordable clean energy solutions through government and private investment, regulatory frameworks, and efficient permitting and planning mechanisms that include robust engagement with the communities and stakeholders affected by energy development.

- **Implement measures to keep electricity costs affordable and equitable**

In the transition to a decarbonized grid, the costs for building the infrastructure, taking clean energy projects through the required permitting processes, and energy efficiency upgrades should be shared equitably to keep costs affordable for rate payers. A more efficient process for

project development will help control costs and enable more clean energy projects to be added to the grid. And a more diverse grid mix will help to insulate ratepayer energy bills from fluctuations in commodity prices and ensure more reliable access to clean energy.

## Conclusion

The world needs to build a robust, reliable, and carbon-free electric grid system. This is an enormous challenge that cannot be solved by one company or industry alone—it will take a collaborative effort supported by government policies and resources to encourage the rapid deployment of clean energy. At Microsoft, we will use our voice to support policies that accelerate the transition to clean electricity generation, modernize and improve grid infrastructure, and enable an equitable energy future with the end goal of building a grid that delivers carbon-free energy for all.

# Appendix: Electricity policy principles at a glance



## Accelerate the transition to clean electricity generation

- Promote a diverse zero-carbon energy mix for a reliable, resilient, and flexible grid
- Drive updates to electricity market design and price signals to expand participation
- Encourage R&D investments to deliver the clean energy technologies of the future



## Modernize and improve grid infrastructure

- Prioritize and resource transmission planning and siting to expand energy delivery
- Simplify the permitting process to expedite clean energy grid interconnections
- Use digital technology to manage, optimize, and protect the grid



## Enable an equitable energy future

- Foster an equitable transition by supporting and amplifying the voice of affected communities
- Design energy development for an equitable start
- Implement measures to keep electricity costs affordable and equitable