



Perspectives on the Energy Transition

By Alex Boyd

*A balanced and constructive dialogue to foster
cooperation, collaboration and forward progress.*



Specialist Consultants
to the Electricity Industry
pscconsulting.com

Table of contents

Introduction	<u>3</u>
The path to a healthy environment	<u>7</u>
The need for fossil fuel support	<u>10</u>
Opportunities within the complexity and simplicity	<u>13</u>
Slowing down is not an option	<u>17</u>
Visualizing a post-transition world	<u>21</u>
The government’s role	<u>27</u>
Continue the dialogue	<u>33</u>
About the author	<u>35</u>

Introduction

This *Perspectives on the Energy Transition eBook* is for you if you can relate to any of the following statements:

- You're unsure about the aggressive nature of the energy transition strategy.
- You wonder what all the energy transition controversy is about.
- You sit doggedly on one side of the energy transition aisle.

There are many biases and misconceptions surrounding the energy transition. This eBook takes you on a journey that discusses some of the underrepresented facts and conclusions reached to address the tension often accompanied by energy transition conversations. Instead of shying away from this tension, we should lean in and have the conversations needed to understand all viewpoints, learn from each other, anticipate issues, and resolve problems.

This eBook aims to make room for a more balanced and constructive dialogue where cooperation, collaboration, and forward progress prevail.

This eBook is an abridged version of the six-part series available on the PSC website.

The dialogue begins with three foundational questions:

1

What is the energy transition?

The energy transition is about a transformational shift away from fossil-based sources to zero-carbon sources by the second half of this century, intending to reduce energy-related CO₂ emissions to mitigate climate change and limit global temperature to within 1.5° of pre-industrial levels.

2

What's driving the energy transition, and why is it so important?

Beyond the urgency of climate change, the need for the global energy transition is emphasized by energy security concerns, high fossil fuel prices, pollution-causing disease, and the conservation of our natural resources. Technology is powering the energy transition, supported by a societal shift towards a sustainable future and facilitated by renewables and electrification. The energy transition represents transformative change across the entire value chain, from generation to consumption. Switching from one energy source to another takes a long time, so part of the importance is the sheer urgency of getting started and creating the necessary momentum to scale up.

3

How does the energy transition impact me?

The energy transition is not a theory – it is happening now. The energy mix is changing, with renewables outpacing fossil fuels and new technologies taking hold. The benefits of the energy transition mainly affect the environment, but our economy and society also share positive outcomes. As energy consumers, we should be informed to make the best choices toward a just transition. To that end, this eBook functions as a conversation starter.

A woman in a dark business suit stands in profile, looking upwards and to the left. She is in a dimly lit room with a large digital display wall in front of her. The display shows various data visualizations, including line graphs and tables of numbers. The overall color scheme is dark blue and black, with the light from the screens illuminating the scene. The woman has her arms crossed and a thoughtful expression.

So, what are
we looking at?



A speedy energy transition provides environmental and societal health benefits.



Fossil fuels will play a vital part in the stable energy mix over the next decade and beyond.



The intermittent nature and complexity of renewables offer opportunities for optimization.



We must accelerate efforts to build infrastructure, policies, and momentum to achieve ambitious 2050 net-zero goals.



Visualizing a post-transition world is a tool to help bring about change.



Government has a role to play in the energy transition to provide leadership, reduce negative impact, and help get us on the fast track to success.



The path to a healthy environment

Climate change is one of modern society's most extensive worldwide crises, and energy transition has a significant role in combating it.

Because efforts have been so focused on climate change, the numerous benefits of a speedy transition in environmental and societal health are often overlooked.

How do we enhance our focus to include addressing societal and environmental health?

We must first understand the current issues affecting us before taking advantage of the opportunities for a healthier environment.

The toll on our health

Environmental pollution and burning fossil fuels are taking a toll on our health. The World Health Organization (WHO) estimates that [99% of the global population](#) is exposed to air pollution levels that put them at increased risk for heart disease, stroke, chronic obstructive pulmonary disease, cancer, and pneumonia.

Additional data on environmental pollution and its effects paint an even more sobering picture.

“The global energy industry must work together to reduce emissions and pollution and address these issues affecting our health.”



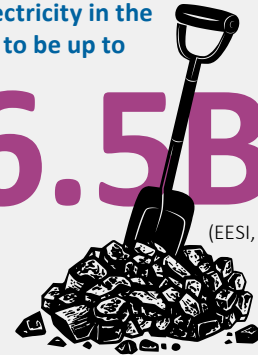
of the global population is estimated to be exposed to air pollution levels that puts them at increased risk for diseases including heart disease, stroke, chronic obstructive pulmonary disease, cancer, and pneumonia

(World Health Organization, WHO)

The annual cost of the health impacts of fossil fuel-generated electricity in the United States is estimated to be up to

\$886.5B

(EESI, 2021)



**6.7M
PEOPLE**

DIED

prematurely from indoor and outdoor air pollution in 2019.

(Global Burden of Disease, GBD, 2021)

350K
**PREMATURE
DEATHS**

in the United States were attributed to fossil fuel-related air in 2018.

(Environment and Energy Study Institute, EESI, 2021)

50B
METRIC TONS



of GHGs emitted globally every year

Numerous scientific studies have linked particulate matter to premature death in people with:



heart or lung disease

(EESI, 2021)



aggravated asthma



increased respiratory symptoms

The health benefits of renewables

The growing use of renewable energy sources and mandates focused on electrification and decarbonization are driving the current energy transition:

- Global renewable energy consumption increased from [8.7% \(2006\) to 11.2% \(2019\)](#).
- The [Paris Agreement](#) is working to limit global warming levels and reduce greenhouse gas emissions.
- In 2021, the US established a new target to achieve [80% carbon-free electricity by 2030](#).

The data also reveals the health advantages of renewables. In 2021, a team of environmental researchers projected that improvements to air quality and health, per unit of CO2 reduced and renewable energy deployed, would exceed the costs by approximately one-third.

What about the environmental advantages afforded by electric vehicles (EVs)?

Full EVs have no tailpipe emissions.

What about the emissions associated with generating electricity to charge EVs (aka “upstream emissions”)?

The EPA states that [EVs typically have a smaller carbon footprint than gasoline cars](#), even when accounting for the electricity used for charging.

As more renewables are used to generate electricity to charge EVs, the associated emissions could be even lower—an evolution not possible with internal combustion engine vehicles.

Reducing the use of fossil fuels in transportation and electricity generation will result in cleaner skies, fresher air, access to clean energy, and better overall health—specifically for those exposed to higher levels of air pollution and those who are least able to afford to mitigate its effects.

Addressing carbon is just the beginning

Our carbon-based energy economy presents substantial challenges. Carbon capture must be part of the climate-change solution, even though it doesn’t facilitate pollution reduction

or the health advantages of not burning fossil fuels.

Energy transition goals offer positive but challenging outcomes. Lowering carbon emissions and improving health makes it a more compelling solution than the current narrative suggests.





The need for fossil fuel support

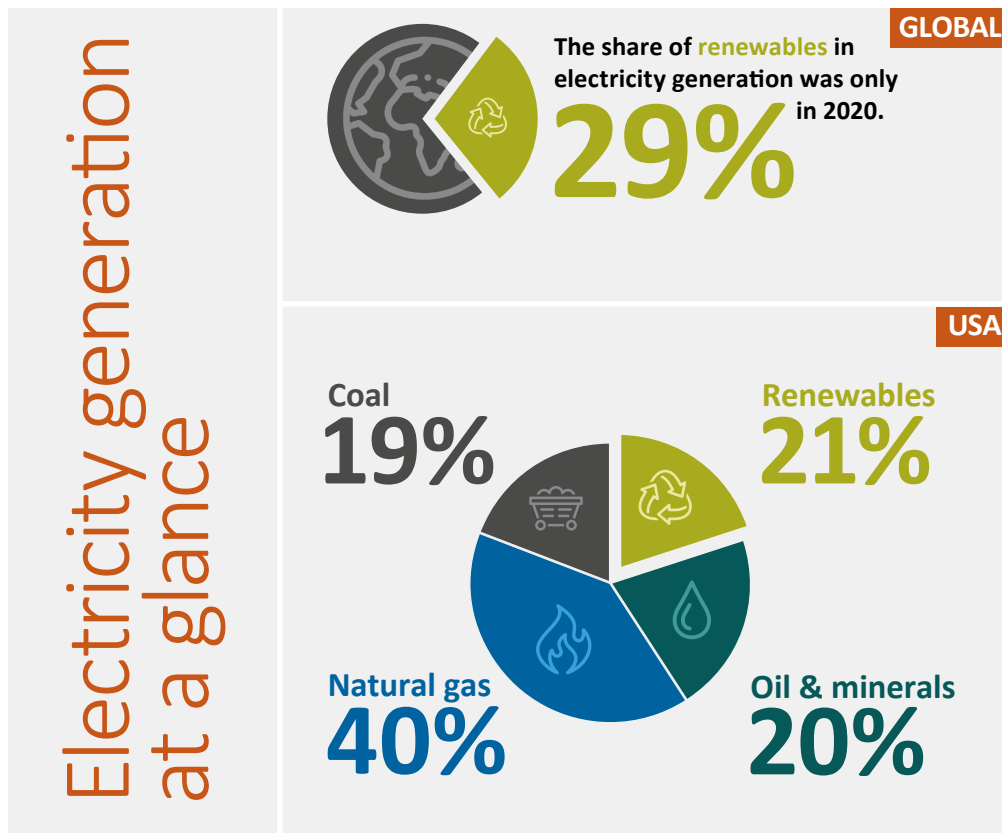
One of the most polarizing issues with the energy transition is the relationship between the fossil fuel industry and emerging renewable alternatives.

Fossil fuels have been at the core of global economies for more than 150 years, responding to evolving industry and consumer demand. Encouraging a “full-on, immediate” energy transition ignores the role fossil fuels still play in ensuring that the process doesn’t end catastrophically.

So, how do we minimize this polarization?

Stakeholders on both sides of the energy aisle must develop strategies and infrastructure together to ensure a smoother transition toward renewable energy sources.

The [share of renewables in global electricity generation](#) was only 29% (2020). In the US, it was only 21%, with coal at 19% and natural gas at 40%.



Either/or vs. both/and

The current energy transition approach is either/or: We either continue to embrace our fossil fuel energy system or make a complete shift to renewables.

This approach is flawed because it assumes there is only one option to resolve a situation (if X is true, Y must be false). It can also encourage extremism, creating a counterproductive environment to achieve workable solutions.

As we transition to renewables, **the only realistic scenario is both/and.**

Just because we're on the path toward integrating more renewables doesn't mean we aren't aware of or grateful for the vital role fossil fuels have played in ensuring decades of secure, reliable energy supplies.

And even though today fossil fuels are still [64% of our total global energy](#), we know this isn't going to last.

Indeed, oil and gas companies are plowing money into clean alternatives to fossil fuels and are already emerging as strong contenders in post-transition utility models.

The energy transition path is unknown and will be complicated; the only certainty is that all options have a role. The objective is to avoid villainizing and foster active collaboration. Making mutual choices today will inform the transition's appearance tomorrow.



“Fossil fuels will still play a vital role during this multi-decade transition.”

There is no overnight solution

Achieving 2050 net zero includes fossil fuels as a vital part of the stable energy mix for the next decade and beyond. So, moving to renewables must be thoughtful and strategic.

This transition works only if new infrastructure and grid connections are built. Much of our current infrastructure still has significant value, so it isn't realistic to expect owners to abandon existing assets—unless they're no longer economically viable.

The renewables industry must also be strategic about the location of infrastructure and jobs. For example, many currently employed by the fossil fuels industry may have reasonable concerns for their livelihood. This key demographic will actively oppose the energy transition if proactive steps aren't taken to include them on this journey. Retraining programs are imperative to offset potential job losses, particularly with the current expertise shortage in every industry.

We can't just “switch off” fossil fuels

A shift of this magnitude takes time and requires thoughtful and strategic planning to support and create an industry ecosystem in which it can thrive. The foundation of this planning is cooperation and collaboration between the renewables sector and fossil fuels stakeholders.

Fossil fuels will still play a vital role during this multi-decade transition. We have a long way to go, and our best strategy will be an “all-fuels-on-deck” approach with teamwork rather than conflict.



Opportunities within the complexity and simplicity

Renewable power deployment must expand faster to reach the milestones in the [Net Zero Emissions by 2050 Scenario](#).

The energy transition presents many opportunities to be more creative with reaching this target. Some of these opportunities are borne from complexity, some from simplicity.

So, is complexity the problem and simplicity the answer?

Unfortunately, it's not that straightforward, but let's see how there are opportunities within both.



Fossil fuels vs. Renewables

The infrastructure required to process and burn fossil fuels is complex and substantial. But the inherent simplicity in fossil fuel electricity generation is that the technology and infrastructure exist and are well understood. This foundation has supported managing the electricity supply without needing to control demand significantly.

Renewables offer a much simpler path between the energy source and the electricity produced. They also bring various new technologies, such as storage and distributed energy resources (DERs), that solve problems and create efficiencies. However, these new technologies can make systems more complex, and the relatively recent emergence of renewables can make it challenging to compete in a marketplace historically rooted in fossil fuels.

The elephant in the room

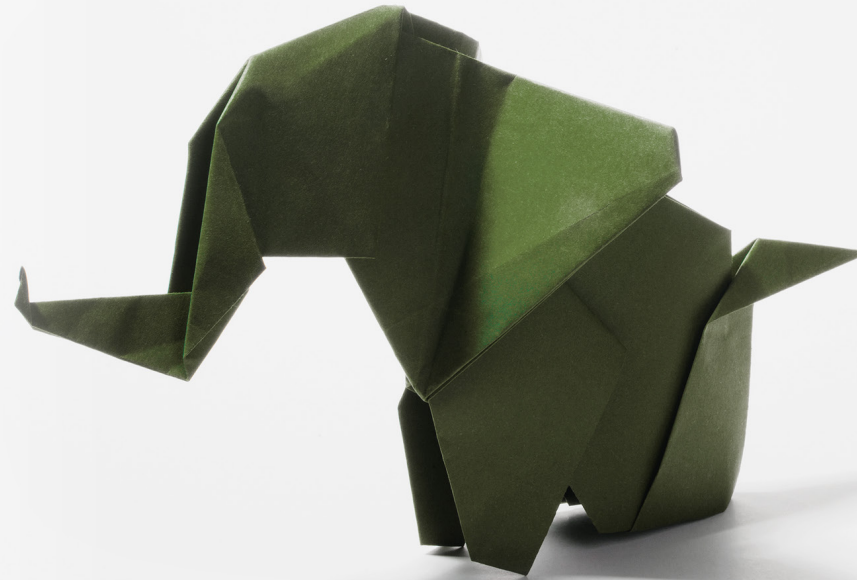
Some consider renewables to be “complex” due to their intermittent nature (i.e., the wind doesn’t always blow, and the sun isn’t always shining). Others believe that because distributed renewables are often small and behind the meter, it can be difficult for grid operators to track and complicate load forecasting.

Rejecting renewables because they are “too difficult” is unacceptable. Societies have faced many complicated things but did them anyway. In the process, we’ve improved and learned. We’ve discovered and invented technologies, communities, and systems that would not exist had we given up because they were difficult.

Addressing renewable intermittency

Solving the challenge of renewable intermittency provides opportunities for optimizations to include microgrids, demand-side management, storage, grid-forming technology, and co-location of renewable assets.

Microgrids – Systems that can separate from the grid (island) and operate independently to quickly respond and provide service to the grid to balance supply and demand.



Demand-side management – Strategically optimizing the times when electricity is used to reflect generation availability. It can shift flexible demand to times of high renewable production, such as charging EVs when solar production is high and reducing during peak hours.

Storage – Storing excess renewable power (or buying and storing when prices are cheap) to use when renewables are temporarily low, which is another form of flexible demand.

Grid-forming technology (virtual synchronous generation) – Mimics the inertia services traditionally provided by

spinning mass synchronous condensers, typically baseload fossil fuel plants, to stabilize the grid.

Co-location of renewable assets – Addresses intermittency in locations where the generation profile of solar and wind are complementary.

Moving to green electricity offers many benefits, but an adequate infrastructure is required to prepare the grid for the widespread use of fossil fuel alternatives: electric car charging stations, transmission lines to carry electricity from new wind and solar farms, and retrofits in existing buildings.

With hard work comes great results

The long-term benefits of building solutions that address these opportunities will be significant. And although renewables might create complexity, investing in these types of solutions offer better outcomes—furthering our migration toward net zero and greatly outweighing the human, environmental, and political costs of fossil fuel dependence.

The power system will also increase in complexity with the transition to renewables. Today, we no longer need a “simple” power system (bulk generation, then bulk transmission to major loads).

We can meet our needs by embracing complexity, carefully planning, and utilizing advanced technologies to build a more modern infrastructure to support the energy transition to renewables.



Slowing down is not an option

The [Paris Agreement](#) is committed to achieving a 45% reduction in emissions by 2030 and reaching net zero by 2050.

Critics of this “rapid action push” ask: **“With 2050 so far away, why do we need to rush when it might cause economic distress in the interim?”**

It’s tempting to assume we have plenty of time to solve the issues confronting us with more than three decades still to go.

Are we on track?

The first decade of the thirty-year target period for net zero is focused on electricity generation transition. With prices plummeting on renewable energy technologies (e.g., wind turbines, solar panels, batteries), the global economy is getting cleaner, faster.

To [hit the established targets](#), 50% of global electricity must come from low- and zero-emissions sources by 2025 and rise to 90% by 2035. The pace of deploying from these sources must accelerate from where we are today to meet these milestones.

We are making progress; so, we can't slow down or even stay at our current speed. We must accelerate.

And not only that, **we must increase our rate of acceleration!**



The hurdles

There are significant economic, technological, and political hurdles in a transition of this magnitude that encourage acceleration.



Economic factors

A [McKinsey Sustainability article](#) asserts that reaching net zero by 2050 will require a significant increase in spending. Globally, there would need to be \$9.2 trillion in annual average expenditure on physical assets for energy and land-use systems. That's \$3.5 trillion more than we spend today.

The often-overlooked costs are the ones that could be avoided by transitioning more quickly. For example, consider the economic cost of Superstorm Sandy, which cost New York \$70 billion. Because the cost of renewables is decreasing concurrently with the development of other technologies, it follows that the faster we transition, the faster the cost will decrease. In fact, an [Oxford University study](#) recently found that a rapid energy transition will likely result in trillions of net savings.



Limited CCS adoption

Existing models for achieving net zero by 2050 assume that carbon capture and storage (CCS) is a big part of the story. However, it's difficult to determine CCS's viability for the following reasons:

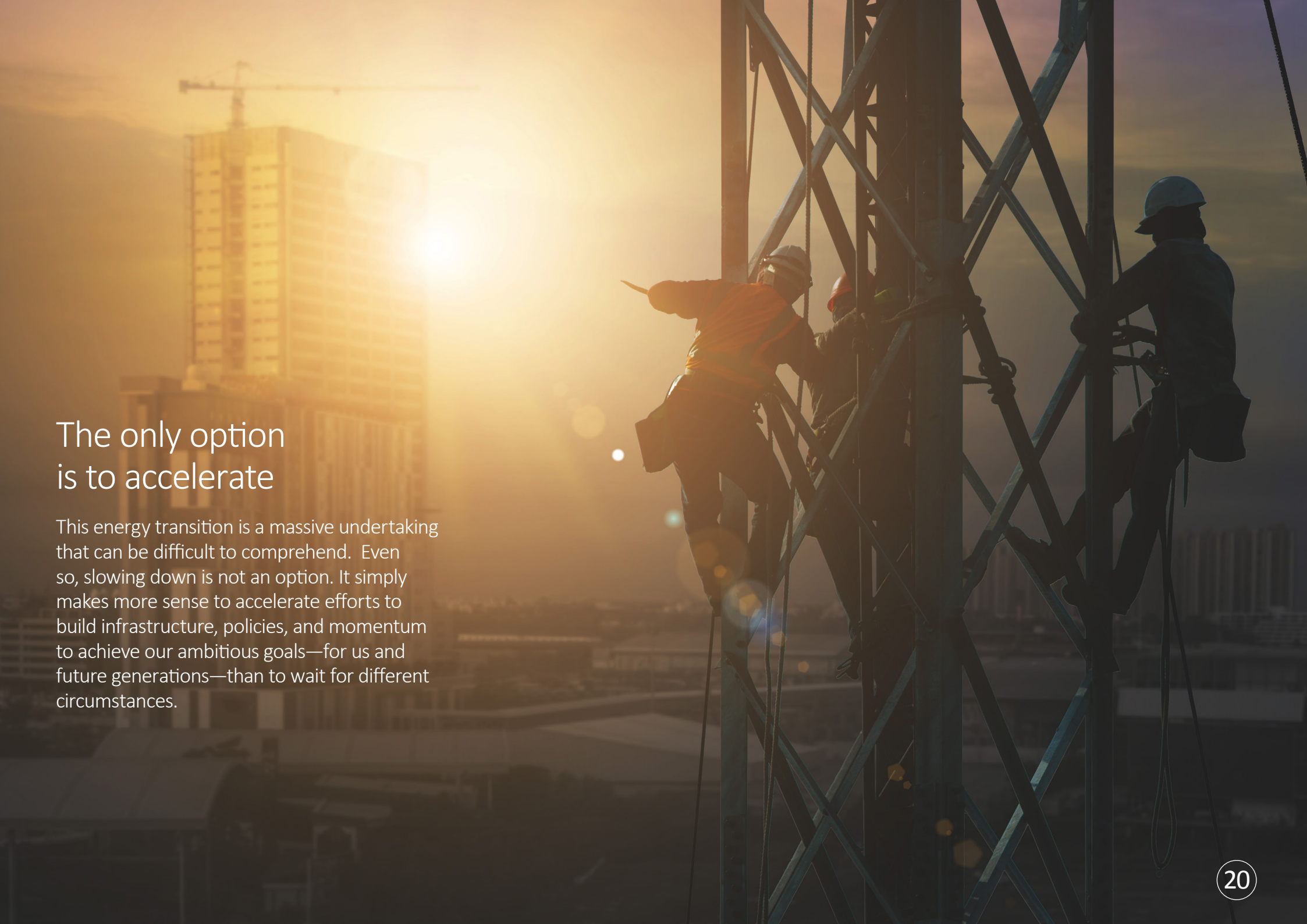
- It is only being used in a handful of locations.
- CCS hasn't been proven to be commercially attractive.
- It requires a significant percentage of the electricity generated (a considerable part of the increased costs, widening the differential between primary and final energy).



Political issues

Many politicians are reluctant to support or invest in long-term climate strategies that may not tangibly and immediately benefit their constituents. Some are not convinced of the economics, fearing costs are too high even though we have decades of consistent behavior of technology learning curves which include price reduction trends. We're already seeing these trends playing out with renewable technology.

Others still are worried about going against corporations who have a vested interest in slowing the transition. And while we look to technological advancements to move the transition forward, the human element embedded in our politics and behavior is a fundamental key.

A photograph of construction workers on a steel structure at sunset. The sun is low on the horizon, creating a warm, golden glow. In the background, a tall building under construction is visible, with a crane on top. The workers are silhouetted against the bright light, and their shadows are cast on the steel beams. The overall mood is one of industriousness and progress.

The only option is to accelerate

This energy transition is a massive undertaking that can be difficult to comprehend. Even so, slowing down is not an option. It simply makes more sense to accelerate efforts to build infrastructure, policies, and momentum to achieve our ambitious goals—for us and future generations—than to wait for different circumstances.



Visualizing a post-transition world

From the pandemic and politics to wars and the climate crisis, the world can feel overwhelming. It's easier to tune out all the bad news when we should really be paying attention.

The energy transition is one area where we need to take notice. Any large-scale change can be tough, but the transition from fossil fuels to renewables represents a seismic shift away from a standard that's been in place for generations. Although this kind of transformation comes with significant upfront challenges, short-term difficulties will result in long-term benefits.

A wire basket overflowing with a large stack of papers and documents, with a white card in front of it. The background is a gradient of light green to yellow.

How can we stay
focused on what
we must accomplish
between now
and 2050?

Visualization.



Focus on the positive

Visualizing the positive results of something challenging prevents us from hyper-focusing on the negatives (e.g., it's hard, it's costly, it's going to take years) and allows us a glimpse of the positives (i.e., cleaner air, energy equity, increased quality of life) we'll reap in the future. Focusing on the positive also prepares us to challenge the status quo and work diligently to bring the desired change to fruition.

Let's peek into our post-transition world to see what a typical morning routine might look like.



Flash forward to a post-transition world

You wake up early to start your day.

It's a chilly winter morning, but since your utility switched to renewables, you confidently turn the thermostat and switch the lights on (rolling blackouts are a thing of the past). And not only is the electricity renewable, but you're also moving heat from one place to another using a heat pump, the most efficient way to heat spaces.

You meander into the kitchen to fill the espresso machine with water directly out of the tap. Water quality and availability have

now dramatically improved; there's no need for extra filtration.

Your teenagers (yes, you have kids now!) are up and dressed, cooking their breakfast on your electric stovetop since gas appliances were discarded years ago. Your induction cooktop creates the heat exactly where it's needed, in the base of the pan. And because drought events have been curtailed, food production has increased, and you have a robust variety of produce to offer your family.

Meanwhile, you're reading the news on your device, and articles about energy security are scarce. Countries have reduced their reliance on oil, gas, and coal imports and are using local, renewable resources instead.

You shuttle the kids to their respective schools in your EV, grateful that all vehicles on the road are now EVs. No more respiratory issues and the traffic noise has declined. Perhaps you live in the city and your kids walk to school. They're no longer breathing toxic exhaust fumes.

As you progress to work, you see a friend walking her dog at a community park where there was once an industrial site that spewed pollutants into the air. At work, you observe the real-time display in the lobby that tracks the amount of electrical and thermal energy used in the building. The amount equals the renewable energy generated on-site via solar panels, making it a net-zero space.

Tomorrow starts today

With the move to renewables, we'll see a substantial positive impact in our homes, businesses, services, public spaces, and the supply chain.



Energy will become renewable, abundant, and affordable.

No need to ration or avoid energy use

No more rolling blackouts during extreme weather

Most energy needs met by unobtrusive infrastructure

Electricity infrastructure is affordable to build and maintain

Energy equity has been addressed

Clean energy is affordable for all



Cities will be cleaner and quality of life will soar

EVs eliminated most toxic emissions, resulting in cleaner air

Coal-fired plants no longer belch pollutants into the air

Climate-driven natural disasters are mitigated

Population is healthier and happier

Measurable reductions in respiratory illness

Reduced noise pollution



Businesses will operate more cost-effectively

Renewable energy sources reduced business overhead costs

Acquiring raw materials and products is less expensive

Heat pumps create more useful space heating compared to the amount of energy needed to produce the heat



Our natural environment will become healthier

Sea level has been reduced

The frequency and intensity of heatwaves, heavy rainfall, and droughts have been lowered

Wildfires have been mitigated significantly

Less destruction to land and less pollution in the air


Natural ecosystems and the animals that live in them are no longer at risk of extinction



Wholesome foods will become more plentiful and available

Droughts that affect food production are less frequent

Water quality and availability is improved

A woman and a child are silhouetted against a bright sunset. The woman is on the left, with her arms raised, and the child is on the right, also with arms raised. In the background, several wind turbines are visible against the orange and yellow sky. The sun is low on the horizon, creating a strong lens flare effect.

Visualizing a net-zero
world enables us
to better understand
the transformative
outcomes we can reach.

It gives us the momentum we need
to work to attain them.

And the good news:
much of this is very achievable.



The government's role

A step change is needed to achieve net-zero ambitions to preserve the environment, expand energy security, strengthen economies, promote energy equity, and protect global health.

This change (the energy transition) requires collaboration across all stakeholders: utilities, regulators, governments, consumers, businesses, industry, academia, and others—recognizing that one entity doesn't hold the reigns.

So, what role should the government play in the energy transition?

The government has various roles to play in the energy transition, but it starts with leadership.

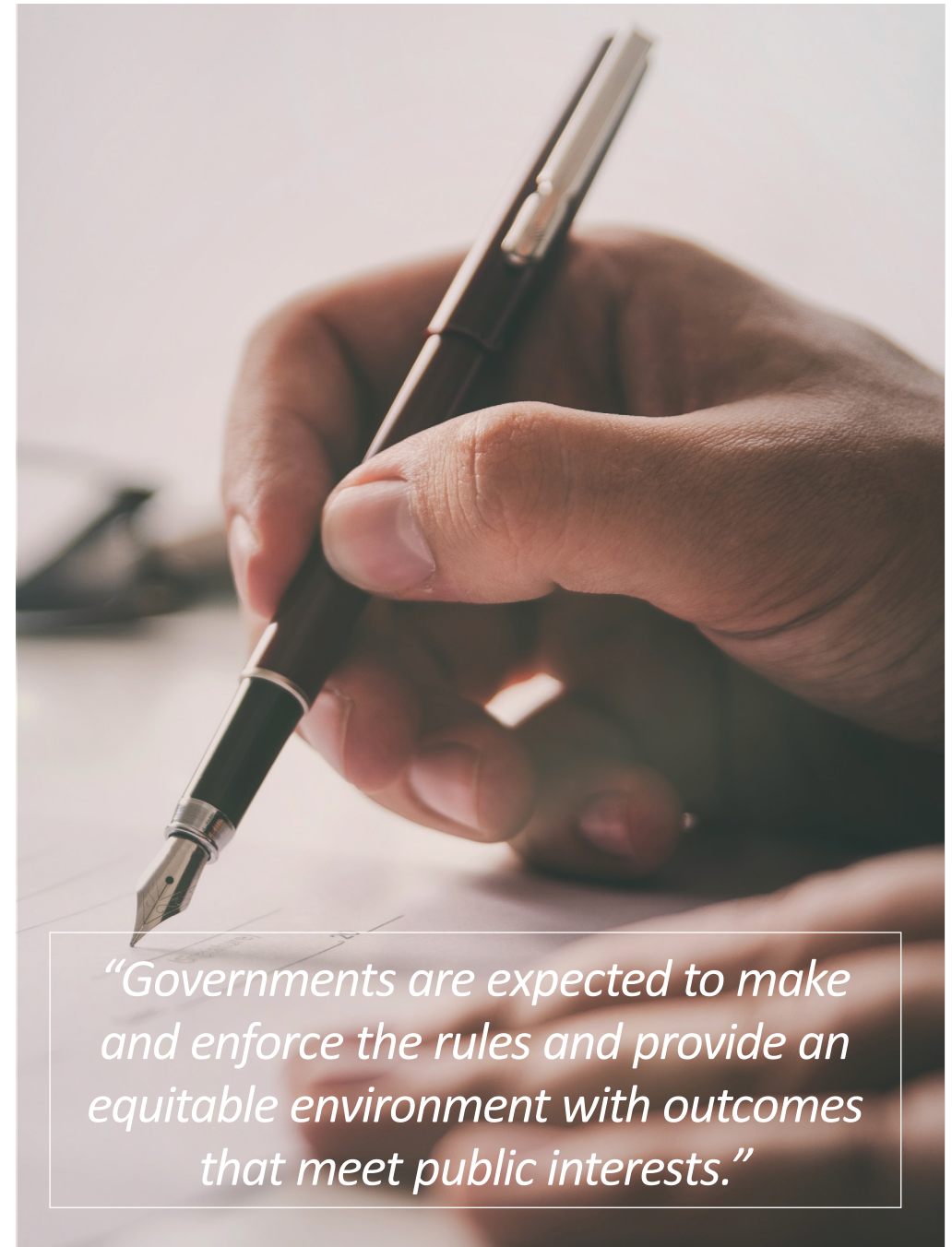
Provide leadership

As the energy transition progresses, government should safeguard the public welfare and provide leadership by:

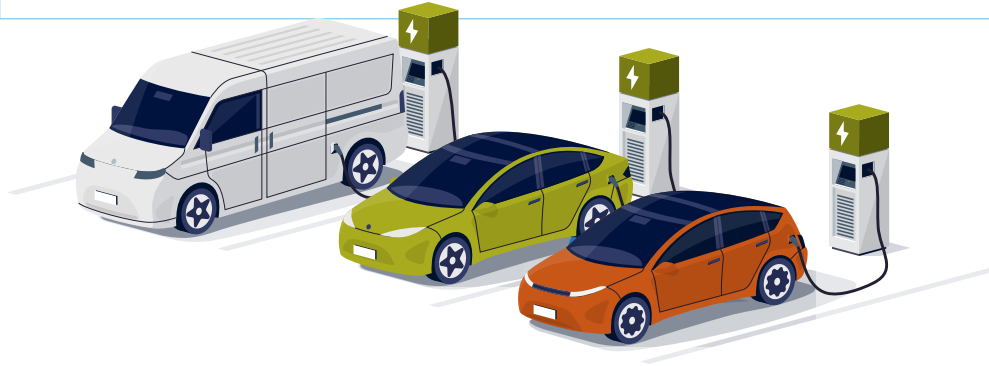
- Forming, implementing, and enforcing sustainable energy policies
- Setting long-term energy transition goals now to give all stakeholders time to adapt and kick-starting action to minimize disruption
- Incentivizing the market with subsidies and financing opportunities to, in part, drive the learning curve and encourage renewable energy development
- Investing in long-term commitments via funding energy research and development, and offering public land for clean energy projects
- Aligning the various players who haven't been on the same team historically (lack of collaboration is an energy transition deal-breaker)

Enact energy legislation and regulation

Governments are expected to make and enforce the rules and provide an equitable environment with outcomes that meet public interests (e.g., supporting long-term planning, permitting, and building critical infrastructure). Many governments are also duty-bound to provide rules and regulations to support renewable technologies development and remove investment barriers—an approach that promotes a balanced, predictable market to create public-private partnerships and implement policy objectives.



“The latest statistical data and real-time analysis confirm our initial estimates for 2020 energy demand and CO2 emissions while providing insights into how economic activity and energy use are rebounding in countries around the world.”



Accelerating EV transition

Governments are already contributing to ambitious policy portfolios to accelerate the EV transition.

Stricter CO2 emissions

In 2025 and 2030, the EU will set [stricter CO2 emissions regulations](#) for cars and vans.

New energy vehicles

[China's NEV mandate](#) promotes NEVs and provides additional compliance flexibility to the existing fuel consumption regulation.

Zero-emission vehicle

[California's ZEV mandate](#) controls smog-causing pollutants and greenhouse emissions of passenger vehicles.



Carbon pricing mechanisms

Another high-profile role of governments is carbon pricing, used to shift the burden of unhealthy emissions damage back onto those who are responsible and can help reduce it. Achieving this decarbonization incentive requires innovation, research, and policy support and starts by setting forward-looking transition goals for the industry. There are 40 countries already using carbon pricing mechanisms, and many more with implementation plans.

Set longer-term goals

Historically, major transitions involved disruption and damage; the energy transition is no different. Governments can minimize the negative impact and motivate stakeholders to manage their priorities (in the context of an ongoing roadmap) by setting longer-term deadlines and giving adequate time to prepare and enact change. For example, California's ZEV mandate provides the industry and the public with 13 years' notice to prepare, including steps to minimize risk.





Continue investing

Government has a long history of investing in energy. For example, the US federal government has invested in energy for over 100 years. Many major dam projects were originally built by government agencies (i.e., the US Army Corps of Engineers and the US Bureau of Reclamation) for water storage, delivery requirements, navigation, and flood control. These structures were also used for hydroelectricity production and remain essential renewable energy resources throughout the country today.

Providing financial incentives

Governments provide financial incentives through grants, loans, rebates, tax credits, and other avenues to encourage renewable energy development. According to the IEA, clean energy investment growth has accelerated to 12% since 2020. Spending has been bolstered by financial support from governments and the rise of sustainable financing, especially in advanced economies. Renewables, grids, and storage now account for over 80% of total power sector investment. [Spending on solar PV, batteries, and EVs](#) is now growing at rates consistent with reaching global net-zero emissions by 2050.

Investing in nuclear power

Although the general reaction to nuclear power slants negative, it's one of the safest and cleanest forms of electricity generation. An [IEA report](#) noted that nuclear power avoided about 66 Gt of CO₂ emissions globally over the past 50 years by reducing the need for fossil fuels to create energy. Nuclear power has resulted in [fewer deaths per unit of electricity](#) than any other type of energy, including wind and solar.

Many countries recognize nuclear power's role in reducing CO₂ emissions, but the high capital costs and the complex nature of nuclear power plants present a challenge for most private enterprises. Expanding nuclear power programs will require substantial and sustained government support.

Align stakeholders

Governments in 39 countries have made climate emergency declarations; many more value sustainable growth. Aligning stakeholders behind a shared plan can be elusive, but many are motivated and support the energy transition, for example:

- [Deloitte's 2022 CxO Sustainability Report](#) indicates that businesses are responding to the climate crisis with net-zero commitments and actions.
- The power sector is leading the effort to decarbonize electricity production by transitioning from burning fossil fuels to renewables. In 2021, clean electricity sources generated [38% of the world's electricity](#), more than coal (36%).
- Automotive companies are setting long-term goals to end ICE vehicle production, counter to the short-termism often associated with public companies.
- Big oil and gas companies (e.g., Shell, Total) are adopting clean-energy strategies and investing in renewable energy generation and related businesses.
- A [2022 Pew Research Center survey](#) found that 69% of US adults prioritize developing alternative energy sources (i.e., wind and solar) over expanding the production of oil, coal, and natural gas.

The government's role in the energy transition is to provide overall leadership, a complete approach, and certainty for investors. Governments can also facilitate getting us on the fast track to success, reducing a negative impact, and upending the status quo.



Continue the dialogue

In any major transformation, there are varying points of view.

We need diversity of thought.

My ambition is to encourage a continuous and open dialogue about the energy transition. We also need to acknowledge all sides before ratifying the way forward. Creative differences foster growth; I believe we can find an equitable pathway by listening to each other's concerns.

This eBook is my way of initiating a few challenging conversations about the energy transition. I welcome feedback because I'm convinced that respectful debate stimulates ideas and leads to new strategies for growth and innovation.

I'm optimistic about our collective future. Working together, we can achieve great things beyond what any of us believe is capable.

– Alex Boyd, PSC CEO

“The secret of change is to focus all of our energy not on fighting the old, but on building the new.”

– Socrates

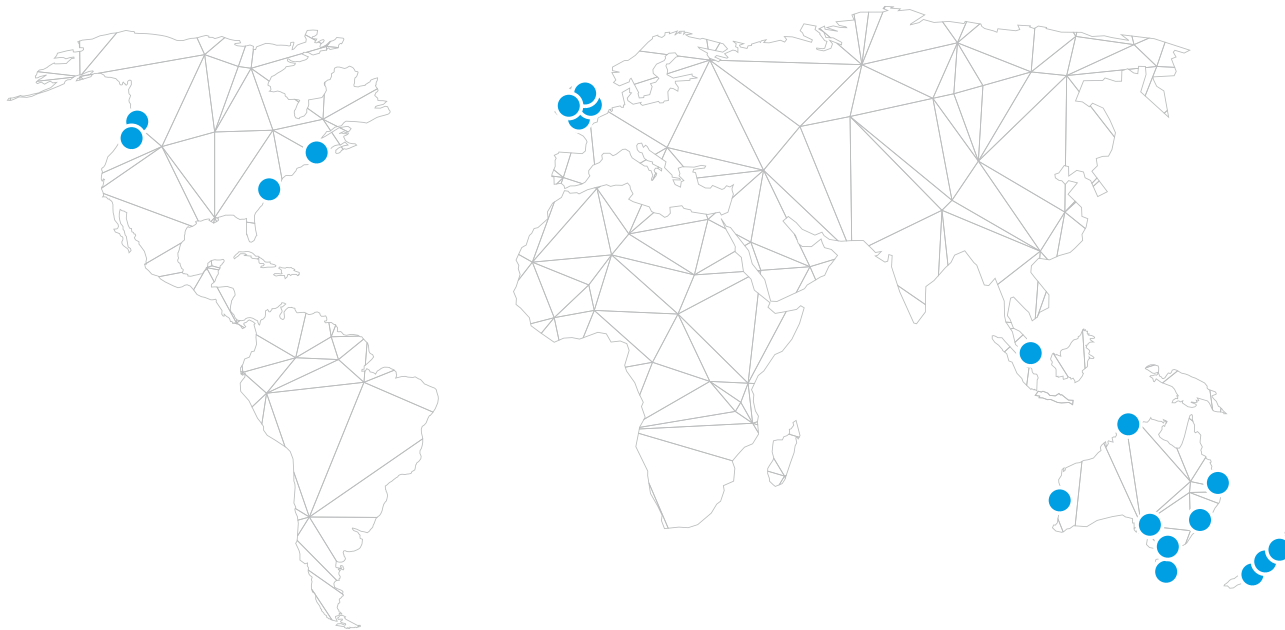




About the author

Alex Boyd is the President and CEO of PSC where he has led teams since 2007. He is passionate about PSC's vision to empower people to transform the energy industry so that, together, we will power a sustainable world. He lives with his wife and son in Kirkland, WA, in the United States.

19 locations for a worldwide presence



At PSC, we're helping power a more sustainable world. Our global team of electricity experts has been tackling the thorniest problems for some of the most prominent industry players for over 25 years. By empowering people to make a difference and do the right thing, we help our clients and employees innovate and thrive in a rapidly changing industry.

pscconsulting.com



**Specialist Consultants
to the Electricity Industry**
pscconsulting.com

New Zealand
Wellington
+64 4 232 7680

Australia
Fortitude Valley, QLD
+61 1300 933 632

North America
Kirkland, WA
+1 425 822 8489

Europe
Warwick, UK
+44 1926 675 851

Asia
Singapore
+65 (800) 616 3283