Unlocking Beneficial Electrification: The Voice of End Users

Benefits, barriers and strategies for further acceleration

April 2021
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Message from the Global Sustainable Electricity Partnership

The Global Sustainable Electricity Partnership (GSEP; www.globalelectricity.org) is a CEO-led alliance of the world’s largest electricity companies committed to leading the transformation of the global electricity industry and the energy transition through accelerated clean energy electrification. Electricity can bring great environmental, economic, and social benefits to businesses and communities in developing and developed countries.

Our collective expertise in power systems and electricity technologies is unparalleled. GSEP members regularly share their experience and knowledge from generating and delivering around 25% of all electricity consumed worldwide, of which 70% has no direct carbon emissions. Our ideas and experiences are available in reports and white papers on our website. We hold annual regional electrification dialogues with stakeholders to exchange and inspire new pathways to assist these efforts. GSEP’s learning and training programs provide student scholarships and virtual training sessions on new technology.

To GSEP CEOs, beneficial electrification is not just the production and delivery of clean, affordable, resilient, and reliable electricity. We’re already on track to reduce our own carbon emissions to help achieve national and international goals, and some of our members already generate clean energy. For us, beneficial electrification refers to furthering strong economic growth, community, and social advancement so no member of society is left behind; improving environmental conditions to address climate change and other challenges; developing and deploying advanced innovative technologies to help customers; creating effective partnerships; and informing and supporting public policies. Our companies are already working in partnership with end users and other stakeholders along the whole value chain to accelerate the pace of electrification in the transport, buildings, and industry sectors.

But we are not satisfied with the slow pace of global beneficial electrification knowing that there is an urgent need to simultaneously address climate change, ensure social equity, and improve economic productivity around the world. Even though the energy transition from fossil-fuel-based to zero-carbon energy is well underway and electrification is vital for this shift, we need help creating a level playing field for all fuels through well-targeted and well-designed policies.

We commissioned this independent study to gain an in-depth understanding of the conditions and actions that electricity end users from ten different countries – our customers in the transport, buildings, and industry sectors – require in order to accelerate electrification and unlock its social, economic, and environmental benefits.

This pioneering study gives end users the floor and sheds new light on electrification, namely with regard to end users’ expectations of their energy suppliers. Indeed, a strong majority of respondents from the three sectors identified us, electric utilities, as their partner of choice to help them switch from fossil fuels to low-carbon electricity, reduce...
their carbon footprint, and capture the full benefits of electrification. For many of these end users, they’re feeling the pull for further electrification from their customers too.

We take this responsibility very seriously and we’re ready to play this role. We convened a globally broadcasted virtual meeting – Unlocking Beneficial Electrification – on May 26, 2021, with policy makers, technology developers, energy suppliers, end users, and other stakeholders to discuss how to electrify more of their businesses. The recorded sessions are accessible at no charge on GSEP’s website.

Electric utilities cannot be successful without new partnerships that facilitate solutions for end users’ challenges. By collaborating with stakeholders, especially our customers and government entities, it will be possible for low-carbon, affordable, resilient, and reliable electricity to be the lifeline of a modern, decarbonized global community and the backbone of digital and connected cities in the future.

We are deeply grateful to all the participants in the study who provided us with invaluable insights from their own industry perspective. We hope that energy suppliers, governments, technology developers, and other stakeholders that have an essential role to play in the energy transition will join our efforts.

If you are interested in providing feedback about this report and have ideas that can speed up beneficial electrification, please write to the GSEP general secretariat at communications@globalelectricity.org.

Thank you.
Introduction
Introduction

Context

Electrification can provide significant economic, environmental, and social benefits. These benefits have been important drivers behind a gradual increase in the role of electricity in the energy mix across many countries over the past years and decades. In recent years, electrification has received further emphasis, as it is one of the key levers that can bring about decarbonization.

However, electrification of the global economy is progressing only slowly, and the pace of change remains far from required pathways to meet the Paris Agreement. The current share of electricity in the energy consumption mix is 32% for buildings, 28% for industry, and 1% for transport. Globally, electricity represents 19% of the energy consumption mix, growing from 16% at the start of the century. Decarbonization pathways require the share of electricity in the energy mix to grow substantially. A range of barriers, mostly related to a lack of adequate incentives, are hindering further and faster uptake. Going forward, addressing these barriers can help accelerate the rate of electrification and capture more of the associated benefits. This is particularly relevant in the context of increasingly ambitious decarbonization efforts by governments, businesses, and individual consumers. To realize this transition, it is important to understand and address specific considerations and requirements from end users, as they are key decision makers in adopting electricity-based solutions.

The current study brings forward, for the first time, the voice of over 100 electricity end users spread over 10 countries. Through in-depth interviews, conducted across end-user segments and regions, specific examples and success stories were collected, providing direct insights on the pace of electrification around the world and on underlying drivers and barriers. These interviews were conducted independently in order to obtain the full and unbiased perspectives of end users. This report reflects the points of view and experiences of electricity end users and builds a perspective on initiatives that would help unlock the path towards a more sustainable future.

This effort was conducted by the Global Sustainable Electricity Partnership (GSEP) as part of its ambitious work program to accelerate beneficial electrification under the chairmanship of its member company American Electric Power (AEP) for the 2020/2021 period. GSEP is a CEO-led alliance of major global electricity companies that has been committed to electrification and sustainable electricity development worldwide since 1992. It promotes cleaner generation, energy efficiency, and electrification to reach global development and climate goals. Around 25% of all electricity consumed worldwide is produced and transmitted by GSEP members, 70% of which is generated without producing any direct carbon emissions.
This report fits in a tradition where, in the past five years, GSEP has led extensive work on the topic of electrification, resulting in several reports that provide a perspective for industry participants on the future of electricity, the conditions that must be met to achieve a greater uptake, the positive impacts it has on society, and what sustainable electrification partnerships look like along the power value chain. Examples include:

— GSEP, “New electricity frontiers: Harnessing the role of low-carbon electricity uses in a digital era,” May 2018
— GSEP, “Buildings the electrification alliance: Bridging along and across value chains,” 2020

With many parts of the world embarking on paths towards rapid decarbonization, electrification is expected to receive further traction. More than 50% of CO₂ emissions worldwide come from countries with net-zero ambitions in place, and we are therefore likely to see governments further specifying emissions-reduction plans. Electrification is expected to play an important role: energy outlooks consistently show that electrification rates and emissions reductions go hand in hand, alongside other important decarbonization levers such as a decarbonization of power supply, a ramp-up of other low-carbon energy sources and enhancements in energy efficiency.³

Electricity companies have a key role to play to further accelerate electrification. Using the insights from this survey, we build a consolidated view on what it takes to drive electrification across sectors. This brings to bear that end users see utilities as the more important partner in their electrification journey. This aligns with GSEP’s commitment to help accelerate electrification, as manifested in the above-mentioned reports.

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² E.g., Eurelectric shows in a 95% decarbonization scenario that electricity needs to contribute 60% to total final energy consumption by 2050, Decarbonisation pathways, European economy, EU electrification and decarbonisation scenario modelling, https://www.eurelectric.org/decarbonisation-pathways/.
Electrification has a broad range of benefits

Electricity end users see decarbonization as the most important advantage, among a range of benefits associated with electrification. Over 100 participants in a survey of electricity end users across sectors and from 10 countries mention decarbonization as a key upside, which requires that power is indeed generated with low-carbon sources. However, even when the electricity grid continues to rely on fossil fuels as a key energy source, companies recognize the broader range of environmental benefits that electrification offers, particularly noise reduction and a decrease in urban fine particle emissions.

Electricity end users also highlight performance benefits associated with electrification, such as a better driving experience with electric vehicles (EVs) and greater accuracy and efficiency in industrial processes that result from the combination of new technologies and intelligent systems. Cost advantages are recognized as well in some applications, and these range from lower cost of ownership in buildings and transport to lower maintenance costs of equipment to increased efficiency.

Electrification can also have several societal benefits. The main social advancement brought about by the switch to electricity is an improvement in local environmental conditions like reduced pollution in urban communities or those close to industrial sites. In addition, electrification has labor market upsides such as improved working conditions and a greater motivation on the part of employees. Some electricity end users also recognize the contribution of electrification to gender equality, since new technologies and processes open the door to new profiles and attract women to traditionally male occupations.

Interviews with over 100 end users reveal inspiring success stories that illustrate the various upsides of electrification. These interviews also show how advantages have already been demonstrated across countries, how electrification can be accelerated in each sector, and how electrification has had a positive impact on end users, energy companies, and society.

Despite recent momentum, overall electrification rates remain low

Over the past five years, users in the transport and buildings sectors in particular have experienced an increase in electrification rates due to various trends such as the maturing of EV technology. In specific countries, public policies have supported adoption, such as those promoting building electrification in Canada over the last decades.

However, electrification of the global economy is progressing only slowly despite the benefits associated with electrification. Greater acceleration is required in order to meet the targets set out in the Paris Agreement in 2015 and for global warming to remain below 1.5°C. Among the main barriers holding electrification back across sectors, end users highlight an unfavorable near-term economic case in some applications compared to alternatives, especially for specific uses such as high-heat industrial processes and insufficient technology maturity.
For the coming years, we expect an active pull for further electrification from customers and end users, which is experienced by respondents across sectors. For example, in Canada, tenants are beginning to demand greater energy efficiency and customers are willing to pay more for green buildings. This customer pull appears to be more of a driving force in some countries such as Canada and Italy than in others like Russia or Morocco.

In the long run, shifts related to the COVID-19 pandemic are expected to trigger further electrification. While, in the short term, companies may prioritize other business areas more directly affected by the current crisis, electricity end users hold the view that COVID-19 will, in the long run, likely further drive electrification, as a result of a shift in values and because of stimulus packages. Recovery packages are expected to bring further acceleration, especially in building and industrial sectors, through green stimulus measures that often target activities bringing local employment upsides or support to new technology development.

**Electrification can be further accelerated through targeted initiatives**

Utilities are seen as the main partner to help increase the degree of electrification across sectors given the know-how they are uniquely positioned to offer. Electricity end users provide multiple examples of collaboration programs that have proven successful, such as partnerships, often outside of the regular business of an energy provider, to work on common objectives like the deployment of EV infrastructure.

Respondents particularly mention improvements in the economics of electric solutions as the key to further electrification, especially in regions where conventional fossil-fuel-based alternatives are cheaper. In line with this, acceleration of electrification needs well-targeted policies and regulations, which can include a revision of fossil fuel subsidies in some regions, or the introduction of carbon taxes. Simplifying the permitting processes for expanding charging infrastructure stands out as another key. Finally, measures like increasing awareness and information, both in the general public and at the point of sale, are expected to have a lot of potential.

Based on the interviews with over 100 electricity end users, and taking into account the main barriers and keys identified above, we see a broad range of examples of initiatives that can help accelerate electrification (see next section).
Eight potential actions for energy sector stakeholders based on discussions with over 100 electricity end users

When synthesizing the findings from across the interviews, eight initiatives that end users identified as helpful for accelerating electrification stand out. These can be structured into three categories: increase the supply of decarbonized and reliable electricity, raise awareness among policy makers and end consumers, and enhance the value proposition for customers.

Increase supply of decarbonized and reliable electricity

1. Accelerate the decarbonization of electricity supply...

   ... to drive electrification by end users
   Net-zero carbon ambitions are gaining traction and will be a powerful force for change. A lower carbon intensity of grids across regions will encourage end users to bolster electrification as part of these transition plans, as long as costs remain affordable and the grid reliable.

   Illustrative quotes from survey respondents:

   “Many companies in Canada see electrification as a key element of their net-zero carbon footprint plans, which are a core part of their Environmental, Social and Governance (ESG) missions – this makes sense because there is a decarbonized grid in most of Canada.”
   – Building owner, Canada

   “Decarbonizing the energy mix is part of the company strategy.”
   – Electric components manufacturer, Italy

   “In France electrification is a massive lever of decarbonization, reinforced by the fact that electricity has already very low carbon intensity due to high share of nuclear.”
   – Real estate company, France

2. Ensure the reliability of grids...

   ... to reassure end users that electrification is low risk
   A reliable energy supply is vital to customers and companies. Ensuring the reliability of grids will reassure end users and drive greater uptake.

   “We need to ensure continuity of service. We don’t recommend going 100% electric yet because of potential disruptions. The reliability of the grid is key.”
   – Building owner, Chile

   “Reliability of the electrical grid and the ability to serve peak demand are needs – there are fears that with everyone using all electricity, the grid can’t handle the peak load.”
   – Public pension plan real estate investor, Canada

   “In a country with frequent natural disasters and having faced a series of large-scale typhoon power outages in 2019, people prefer to have dual sources of energy in case one is down.”
   – Building company, Japan
Raise awareness among policy makers and end consumers

3

Encourage supportive policies and regulations ... 

... to stimulate the uptake of electrified solutions
Without well-designed and cost-effective electrification policies and regulations, electrification is often not yet possible as a positive business case. Introducing supportive measures and incentives will help enable and accelerate the transition.

“The key incentive for electrification is to be able to build a relevant business case [when] gas is still much cheaper. Taxes and subsidies are therefore watched closely to aid decision making.”
– Heavy industry company, France

“We have commitments to electrification due to relevant policies. [...] Due to the government regulations, electrification is almost compulsory.”
– Industry company, China

“The CO₂ price evolution and ecotax (e.g., carbon tax at border) instead of subsidies act as key levers to boost sustainable electrification.”
– Heavy industry company, Italy

4

Simplify permitting and administrative processes ... 

... to smoothen the transition for end users
Bureaucratic processes often slow down electrification developments. Clear standards and streamlined processes could speed up transition plans.

“We need clear standards and permitting processes to install EV chargers – right now it’s handled case by case and it is very slow.”
– Private sector fleet owner, Canada

“The main barriers to infrastructure deployment are the administrative procedures, which can take up to nine months.”
– Fleet owner, Spain

“We have no plans so far to transition to EV production as it will involve significant changes to the process as well as the need of implementation of an ecosystem to support the new technology.”
– Automotive manufacturer, Morocco
5
Increase customer awareness about the benefits of electrification ...

... and help to position it as a key lever to enhance ESG
There is little awareness and information among companies, customers, governments, and society around electrification, its benefits, and successful electrification initiatives. Generating a fact base and showcasing examples will stimulate a more advanced debate about the ESG value that electrification provides.

“Customer awareness and education is going to be fundamental. Today it is a gap and we don’t even know how to communicate it to the end consumer in a way they will understand and get interested (influencing the buying decision)!”
– Building owner, U.S.

“Increased customer consciousness about decarbonization and ESG ratings [is important to] guarantee a sustainability momentum, especially for a big player.”
– Electric components manufacturing, Italy

“Electrification has to be seen as core to our ESG mission and provide significant marketing value [...]. Net-zero carbon footprint is a powerful marketing message.”
– Private sector fleet owner, Canada

Enhance the value proposition for customers

6
Collaborate with end users ...

... by sharing know-how and expertise on key electrification initiatives (e.g., energy efficiency, the rollout of charging infrastructure)
Stakeholders that are critical to the electrification transition often lack the relevant knowledge and experience. Engaging and training them is vital for the initiatives to be successful.

“Enel opened the door [to electric mobility] in Chile. They helped with the technical aspects, they took care of the infrastructure, they helped with the chargers and with the sale of electricity. They allowed us to reduce the number of errors and to not reinvent the wheel.”
– Fleet owner, Chile

“[Our relationship with the utility] has helped us to identify energy efficiency needs through energy audits as well as to execute energy efficiency projects. I am the only person in our energy team, and I appreciate having utilities as support when making decisions.”
– Building owner, U.S.

“Today our company has more than 200 charging points for EVs in 60 car parks in 25 cities, in a service offered jointly with Endesa.”
– Parking lot owner, Spain
... by tailoring propositions and/or offering storage options

Current peak and demand pricing is a key barrier for electrification for some end users in certain countries. To help overcome this hurdle, offering tailored agreements that provide sufficient clarity and certainty can help. Similarly, providing storage solutions and demand-side response options can address the challenges around peak demand and pricing as described by end users.

“When you pay by kWh or when you pay more for peak power, electricity gets very expensive for buildings or vehicles – we need support to adjust pricing or add storage.”

– Institutional building owner, Canada

“We need to solve the biggest issue in Chile, which is peak time, when rates triple. We could solve it through storage, but batteries are expensive.”

– Fleet owner, Chile

“The company invested in fuel cells – the main driver behind this addition was for resiliency (energy storage, backup power).”

– Building owner, U.S.

... to enable lower user costs over lifetime

Companies are often deterred by the high up-front costs associated with electrification. By helping end users find options to finance initial capex, utilities may stimulate greater investments in electricity.

“When it is clear that electrified heating (or cooking) is better and more affordable (opex-wise), capex is often the issue.”

– Buildings player, France

“For most businesses, it is cost-prohibitive to change their heating systems or transport if the current equipment is not at end of life.”

– Buildings player, Canada

“Although companies and governments say environmental awareness is important, at the end of the day decisions are made based on cost and profitability. So until the investment makes economic sense, EVs won’t pick up.”

– Automotive manufacturer, Chile
Perceived benefits of electrification and success stories
Perceived benefits of electrification and success stories

Electrification offers a range of potential benefits. Shifting from fossil-fuel-based technologies to electricity can bring advantages that span a wide spectrum of socio-economic and environmental dimensions, as discussed in GSEP’s recent landmark report “New electricity frontiers: Harnessing the role of low-carbon electricity uses in a digital era.” Interviews with over 100 end users reveal inspiring perspectives that illustrate some of the various upsides. Electricity end users believe that electrification primarily brings them environmental and economic benefits. They especially call out the potential of electrification in helping them reduce their carbon and local pollution footprints. Additionally, they appreciate the positive impacts that electrification can have on their bottom line (see Figure 1).

Decarbonization and other environmental benefits

Decarbonization of the energy mix stands out as the most important perceived benefit of electrification, with two-thirds of survey respondents considering it one of the top three benefits. Decarbonization is an essential ESG lever for many companies and a shift to electricity is often an important option to achieve it, provided electricity is low carbon⁴. The growing trend of measuring and targeting scope 2 emissions⁵ underscores the ESG value and lower risks associated with low-carbon electrification. The importance of electrification as a decarbonization lever⁶ is emphasized by multiple survey participants across several countries; as an example of what we hear from respondents on this upside, a real estate professional mentions that “In France, electrification is a massive lever of decarbonization, reinforced by the fact that electricity has already very low carbon intensity due to high share of nuclear.”

Figure 1: Expected benefits of electrification

As you consider electrification, where do you expect to gain the most benefit?
Please rank from 1-9, percentage of companies that assign a high benefit score (score of 1, 2, or 3)

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Percentage of Companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decarbonization/environmental impact</td>
<td>67</td>
</tr>
<tr>
<td>Cost impact on company and/or customers</td>
<td>52</td>
</tr>
<tr>
<td>Better proposition for clients/employees/communities</td>
<td>50</td>
</tr>
<tr>
<td>Lower energy costs</td>
<td>49</td>
</tr>
<tr>
<td>Other environmental impact</td>
<td>49</td>
</tr>
<tr>
<td>Lower costs of ownership outside of energy costs</td>
<td>35</td>
</tr>
<tr>
<td>Tax advantages</td>
<td>21</td>
</tr>
<tr>
<td>Better work environment for your employees</td>
<td>21</td>
</tr>
<tr>
<td>Improved well-being of community you serve and reduced inequalities</td>
<td>21</td>
</tr>
<tr>
<td>Other</td>
<td>10</td>
</tr>
</tbody>
</table>

⁴ Today, electricity generation is in many cases still based on fossil fuels; therefore, for electrification to contribute to decarbonization, a continued shift to low-carbon power generation is required in parallel.
⁵ Indirect greenhouse gas emissions associated with the purchase of electricity, steam, heat, or cooling.
⁶ Electrification is a key decarbonization option alongside other levers such as a decarbonization of power supply, a ramp-up of other low-carbon energy sources, and enhancements in energy efficiency.
⁷ Energy costs refer to variable fuel costs. Ownership costs include up-front investment, maintenance costs, insurance costs, and cost efficiencies.
While decarbonization is the most salient upside, electrification is perceived to offer a wider range of positive environmental impacts. Even when the electricity grid continues to rely on fossil fuels as a key energy source, electrification improves environmental performance in a variety of other ways. For example, there are significant positive externalities such as a reduction in noise and an improvement of air quality in urban areas. We hear this especially from end users in the transport sector. As one fleet owner in Chile mentions, "Electric technology provides important environment improvements in buses, from lower gas emissions and particulate matter, to less noise (within and outside of the bus)." A Chinese building contractor states that "Diesel pile drivers are noisy and used to cause a lot of complaints. By using the electrified drivers, it's beneficial to both the workers and surrounding residents."

Another way in which electrification benefits the environment is through greater equipment and process efficiency. Electrical equipment is easier to switch on and off and, since electrification processes are often coupled with more advanced technologies, monitoring tends to be more accurate, often leading to opportunities for reduced energy consumption. As a European flavor manufacturer puts it, "The second most important benefit of electrification is about saving energy when not used instead of having boilers running idle to ensure process stability." An industrial player in Spain shares a similar upside, saying that new electrified technologies allow for more accurate monitoring and lower energy consumption: "With respect to heating and cooling processes, we are able to better monitor temperatures, and hence energy consumption is improved."

### Electrification offers a range of potential benefits. Shifting from fossil-fuel-based technologies to electricity can bring advantages that span a wide spectrum of socio-economic and environmental dimensions

While decarbonization is the most salient upside, electrification is perceived to offer a wider range of positive environmental impacts. Even when the electricity grid continues to rely on fossil fuels as a key energy source, electrification improves environmental performance in a variety of other ways. For example, there are significant positive externalities such as a reduction in noise and an improvement of air quality in urban areas. We hear this especially from end users in the transport sector. As one fleet owner in Chile mentions, "Electric technology provides important environment improvements in buses, from lower gas emissions and particulate matter, to less noise (within and outside of the bus)." A Chinese building contractor states that "Diesel pile drivers are noisy and used to cause a lot of complaints. By using the electrified drivers, it's beneficial to both the workers and surrounding residents."

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### Higher performance

In addition to the environmental benefits that electrification brings, some end users emphasize the performance and user experience advantages that electrified solutions can provide compared to alternative technologies. For instance, EVs or electrical appliances are said to provide a better user experience. This is especially salient for sectors where

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**Figure 2: Expected benefits of electrification by sector**

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Transport</th>
<th>Buildings</th>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decarbonization/Environmental impacts</td>
<td>71</td>
<td>69</td>
<td>63</td>
</tr>
<tr>
<td>Lower energy costs</td>
<td>46</td>
<td>48</td>
<td>57</td>
</tr>
<tr>
<td>Other environmental impact</td>
<td>75</td>
<td>41</td>
<td>43</td>
</tr>
<tr>
<td>Lower costs of ownership outside of energy</td>
<td>46</td>
<td>59</td>
<td>45</td>
</tr>
<tr>
<td>costs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Better value proposition for your customers</td>
<td>46</td>
<td>28</td>
<td>35</td>
</tr>
</tbody>
</table>

As you consider electrification, where do you expect to gain the most benefit?

Please rank from 1-9, percentage of companies that assign a high benefit score (score of 1, 2, or 3)
those benefits directly affect the end user, such as in transport (see Figure 2). Some end users interviewed highlight this benefit: For example, a respondent from Canada mentions the value of electric trucks staying cooler than diesel trucks in the summer months. Similarly, one automotive manufacturer in France explains that “The driving experience with EVs is much more pleasant due to noise reduction and the ease of acceleration.” A Chilean automotive manufacturer states that users realize some of these performance benefits once they try the new solution: “The perks of electric buses (better technology, lower costs of maintenance, better driving experience, less noise, etc.) make operators and end users like EVs once they try them.” Although this upside is hard to quantify, several survey participants recognized its value.

In industrial sectors, performance benefits highlighted by interviewees have to do with process improvements and greater accuracy that result from the combination of new technologies and intelligent systems. For example, an industrial player from Spain highlights a wide range of performance enhancements that electrification brings to the business, including an increase in real-time monitoring capabilities, preventive maintenance and quicker identification of incidents, and better coordination on switching machines on and off. A manufacturing company from Japan underwrites the better performance of electrified processes and explains, “In our heat treatment process, electricity-based heating enables more precise and stable temperature management compared to gas based.”

**“In our heat treatment process, electricity-based heating enables more precise and stable temperature management compared to gas based”**

**Lower costs**

For some end users, electrification brings about lower costs – whether energy costs, other costs of ownership, or savings through improved efficiency. Half of the survey respondents experience some cost savings and highlight them as a key driver for their electrification ambitions.

Location and the type of process to be electrified dictates where using electricity as a fuel is cost-effective. For instance, fossil fuels are hard to compete with on an economic basis for processes such as high-heat industrial processes. As a general manager of an industrial company in Chile points out, “Cost control is central to our operations. […] Electrifying the furnace does not make economic sense, because using carbon coke is cheaper.” However, electrifying less energy-intensive activities like heating smaller spaces, EVs, or moving parts and equipment within a factory can make economic sense, especially in countries where electricity is cheaper than fossil fuel alternatives. In Canada, e.g., as one end user explains, “The buildings sector is highly electrified due to the low price of electricity in Quebec and decades of provincial policy promoting building electrification, particularly in single-family residences.” The local context ultimately dictates whether the economic case is favorable. Using electricity as a fuel seems to offer cost savings in China, for example. A Chinese automotive manufacturer states that “The fuel cost of electric vehicles is 60% lower than gasoline cars.” Similarly, an industrial company in China mentions that “Money saved from energy cost can be invested in technology development, thus increasing company’s competitiveness.”

Electrification leads to other cost savings across use cases and countries, such as the lower maintenance and other associated savings from electrified equipment. This aspect of electrification appeals to and is highlighted by several end users. An automotive manufacturer in Chile mentions the lower maintenance and operational costs of EVs: “Transport companies are realizing that EVs bring important operational cost savings as well.” In the buildings sector, electrification provides important cost savings as a result of relying on less varied fuel infrastructure and simplifying building design. As a building contractor in Japan explains, “For high-rise residential housing design, [electrification] and eliminating the gas pipelines and related equipment will simplify the overall design and lower the design/construction costs.”

Additionally, electrification can lower costs through increased process and equipment efficiency. This upside of electricity appears to be especially key for industrial players due to the high level of competition, but this benefit is also recognized by end users across...
other sectors, such as in buildings, where the savings that automated equipment offer can be significant. As one real estate company in China states, “The property company wishes to improve efficiency and reduce expenditure by replacing manual operation with electrification.” Relately, electrification can also provide indirect cost savings by allowing for an increased utilization of equipment. As a manager of a bus fleet company in Chile explains, “[We] benefitted from lower maintenance costs and ~100% utilization of buses, versus the 85% utilization we had with diesel buses to avoid pollution fines.”

**Better value proposition**

Finally, electrification can provide an enhanced positioning and branding value, which can be of critical importance for some companies that are struggling to compete. This takes different forms. On the one hand, electrifying can give an image of innovation and progressive company culture. As a fleet owner in Spain mentions, “By offering a new service to our clients, the penetration of the electric vehicle can become key in the positioning of our company. [...] Customers recognize us as being innovative and pioneering in the introduction of new technologies.” On the other hand, identifying with environmentally friendly products and processes can give companies an edge, as a Moroccan survey respondent states, “We judge that electrification is a major element that allowed us to have a green label. [...] Our green label allows us to compete with bigger companies as our value proposition is also environmentally friendly.”

**Regional differences in the perception of benefits**

The benefits associated with electrification depend on the local context, as Figure 3 shows. This is most obvious for decarbonization as a benefit. There are large differences between countries depending on the extent to which electricity is carbon free, and it is therefore not

![Figure 3: Key benefits by country](image)

**As you consider electrification, where do you expect to gain the most benefit?**

Please rank from 1-9, percentage of companies that assign a high benefit score (score of 1, 2, or 3)
surprising that the perception of decarbonization as a benefit also differs between countries.

In countries with a low-carbon power grid, end users perceive decarbonization as the key benefit of electrification. In France, where the grid is 93% carbon free, all interviewees perceive decarbonization as a key benefit. Canada, and especially Quebec, has a low-carbon grid as well, which is reflected in the above-average focus on decarbonization by Quebec interviewees. This may also have to do with the fact that both countries are advanced economies where governments and companies have a strong decarbonization agenda. In this context it is not surprising that environmental considerations are considered a priority. How forward-looking a country is also affects the perceived decarbonization benefits. In Japan, e.g., even though the electricity grid is heavily dependent on fossil fuels, companies expect the grid to become less carbon-intensive in the future and therefore already recognize the decarbonization benefits of electrification. This contrasts with countries where the power generation mix is more reliant on fossil fuels, such as in Russia and other countries. Understandably, in these latter regions, fewer end users surveyed recognize the decarbonization benefits of electrification.

The perception of other benefits, such as other environmental impacts like reduced noise or local pollution, reflects the local context as well. In countries with local pollution issues, such as Chile, Spain, or France, the importance of other environmental impacts like reduced local pollution stands out. For example, a Chilean bus manufacturer comments on the improvement of local conditions: “[Electrification] improves the quality of life of households and communities in mining communities and in city transit routes.”
Social advancements for communities, employees, and the local environment

Reduction of environmental impact on surrounding areas

Apart from direct benefits to companies, electrification can also bring about many socio-economic advancements that impact a wide variety of stakeholders. Examples range from employees enjoying improved job conditions to larger communities (e.g., those neighboring industrial facilities) benefiting from better air quality. Among these impacts, the improvements in local environmental conditions and quality of life stand out, as the responses from the survey reflect (see Figure 4). The improvement of quality of life through reduced noise and cleaner air has indeed been identified in prior studies as a key advantage of electrification. In conversations with interviewees, we validated the upside of lower noise, which can have broader advantages such as health benefits through reduced stress and sleep disturbances. This is especially important for companies active in the transport sector; in the words of a bus distributor and manufacturer in Chile, “Having less noise is quite relevant in some cases, such as when buses are used to transport miners who get picked up at dawn. The impact on mining communities is significant.” Several other respondents also raise improved air conditions as a key benefit. In the U.S., one interviewee says, “Electrification of our large truck fleet will help reduce the noise and air pollution in local communities. Some communities have upwards of 100 trucks pass through every day.”

Figure 4: Contribution of electrification to social advancements

Have these electrification initiatives contributed to the social advancements mentioned below? Please select all options that are relevant, percentage of companies that selected each social advancement

<table>
<thead>
<tr>
<th>Social and community impacts</th>
<th>Increased access</th>
<th>Job improvement</th>
<th>Reduced impact on the environment</th>
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<td>Job creation</td>
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<tr>
<td>Ensuring access to better transportation options</td>
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<td></td>
</tr>
<tr>
<td>Contribution to gender equality, diversity, and inclusion</td>
<td></td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Improved quality of life for vulnerable communities</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Redirecting funds from energy savings to vulnerable communities</td>
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<td></td>
</tr>
<tr>
<td>Other</td>
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<td>4</td>
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</tr>
</tbody>
</table>

Labor market upsides

Electrification can also have positive effects on job environment and conditions and employee satisfaction. As Figure 4 shows, this is the second most-cited social benefit by survey respondents. One automotive manufacturer from Chile reflects on this benefit: "Electric mobility generates better employment: it is more technical and requires greater skills and education. [...] We are working with different institutions to make training and upskilling sessions more widely available."

Electrification creates an improved work environment in two different ways. First, embarking on an electrification transition can increase the motivation and commitment of employees to the company. As one electric components respondent in Italy mentions, “Sustainable electrification allows [us] to obtain multiple benefits for the company and for stakeholders: [e.g.,] to improve [the] work environment because employees are proud to work in a company that aims for energy sustainability.” Second, electrification can create a better physical environment for employees. For example, industrial companies using fossil-fuel-based equipment in Morocco agree that the noises and emissions create hard work conditions for technicians and operators: “The maintenance of oil-fired boilers requires a lot of effort, given the accumulation of residues on the walls and the need to schedule interventions at greater frequencies and in difficult and dirty conditions.” One of them describes the improvement from electrified solutions as follows: “We used to have three power generators [...] based on fuel; they created fumes and noises that our technicians couldn’t bear in the long term; we replaced them, and the conditions of the maintenance teams are way better in terms of working conditions.”

Different perspectives on job creation

Electrification may also lead to job creation. The impact on labor markets is multifaceted, since electrification and associated shifts in energy systems will create jobs in some parts of the economy but may also displace jobs in other sectors (e.g., as a result of lower EV maintenance requirements or the absence of petrol stations). Several respondents recognized both aspects. As one respondent in the U.S. says, the transition to clean energy can catalyze new opportunities and benefit new segments of the population: “I’ve seen a new interest from utilities to care for vulnerable communities during COVID-19 and an increase in attention to racial justice and creating opportunities in the communities the utilities serve. I think the transition to electrification can create some new, stable jobs for people who have traditionally been shut out of these types of middle-class sustaining careers in the past.” In Spain, an industry player believes that electrification, by reducing costs through the use of renewables, will enable the company to grow more and hence create more employment: “Since the use of renewables is less costly, the company can grow and in turn employ more people.” Others voice concerns about potential job losses, like one respondent in Spain: “The general belief is that the national automotive industry will suffer greatly with higher penetration of EVs leading to huge job losses.”

Electrification opens the door to entirely new business branches and digital services (e.g., installation of smart home equipment) and new, more advanced technologies. It allows for more flexibility and demand-side response mechanisms as well, which trigger the economy and employment. In Morocco, e.g., an end user saw an opportunity to create jobs indirectly through electrification by engaging

“Sustainable electrification allows [us] to obtain multiple benefits for the company and for stakeholders: [e.g.,] to improve [the] work environment because employees are proud to work in a company that aims for energy sustainability”
companies and operators for the upgrade of equipment to new technologies. As the Moroccan interviewee explains, “We have engaged several companies that we didn’t work with before to establish plans for the deployment of energy generation/efficiency solutions for our retail site. This led to employment of several local technicians in the design and the installation of the equipment in our sites. I think more efforts in that field will definitely bring more demand for labor.”

Another important societal benefit from electrification mentioned by interviewees is the contribution to advances such as a more diverse labor force. Some end users that participated in the survey emphasize this upside. For example, some industry and transport respondents mention that new technologies are opening the door to new job profiles, and the workforce becomes more diverse as a result. In France, an automotive manufacturer respondent says, “Since EV is a new technology it opens up access to new entrants/new profiles for fulfilling the jobs.” Interviewees highlight that it is easier to learn how to drive a bus or truck or operate machinery if it is electric. It also requires less use of force. These factors are lowering the barriers for new entrants into the profession, in sectors that traditionally have male occupations. As a fleet owner in Chile points out, “Electric buses are smoother and easier to drive. People that are new to the profession and have never driven buses before – such as many women – find it easier to learn.”
Success stories

The experiences of end users provide examples of how electrification can be accelerated in each sector and the positive impact it has on end users and society.

Highly visible lighthouse programs to demystify electric mobility, Chile

"We have promoted and demystified electric mobility."

In 2016, a Chilean bus fleet owner entered into a collaboration with the local electric distribution company to electrify the city’s bus fleet and deploy charging infrastructure that would be used for buses. The program rolled out widely in 2018.

Throughout the program, citizens rode on electric buses and observed buses charging at stations.

This had the effect of shifting the public’s view of electric mobility as something complicated and futuristic to something part of everyday life. The buses were the seed that is now growing into more widespread electrification of mobility in Santiago.

Innovative program to reach carbon neutrality in heavy industry, Morocco

"The coverage of electricity needs from clean or renewable sources has reached 86% thanks to several actions undertaken by the group."

A Moroccan phosphates and fertilizer producer in a sector with high energy demand implemented an innovative and ambitious program to reduce its carbon footprint and diversify its energy mix.

It launched several initiatives, including the development of cogeneration capacity (used to recover thermal energy released during production and convert it into electricity), the installment of wind and solar power, and several efficiency measures. This resulted in a lower energy demand and higher share of clean electricity in the energy mix.

Due to the continuous efforts, 88% of the energy needs of the company now come from clean or renewable energy, and it produces 25% of Morocco’s carbon-free electricity. Its goal is even more ambitious: By 2030 it aims to be fully carbon neutral on scope 1 and 2 emissions. As one of the main players in the industry sector, this company’s efforts are contributing to Morocco’s aim of producing 52% of its electricity from renewable and clean sources by 2030.
A future-proof service fleet, Canada

In January 2020 a Canadian telecom company announced that it would switch its entire vehicle fleet, which consists of >1,000 cars and light trucks, over to electric in the coming years. This is expected to eventually reduce the company’s greenhouse gas emissions by more than 50%.

Given the limited availability of the type of electric light trucks that most employees use in their daily work, the company worked with a local company to convert a few of them until OEM manufacturers make this type of vehicle available on the market. This not only speeds up the process, but also supports the local economy. Another benefit is the extended service life of the vehicles.

Seventy electric vehicles are already on the road and this number is quickly increasing. Combined with the company’s investments in new and existing charging infrastructure, its fleet will be ready for the future.

A noise-optimization program for the entire community, China

“Since we replaced diesel pile drivers, complaints from surrounding residents have reduced greatly. It’s also beneficial to our workers.”

During a commercial real estate development process in China, a building contractor replaced diesel pile drivers with hydraulic static pile drivers. This not only improved the working environment of the workers but reduced the negative impact on the surrounding residents (hydraulic pile drivers produce significantly more noise compared to diesel pile drivers). Through the program, both surrounding residents and the company benefited from the electrification process.

The company achieved higher employee satisfaction and a better reputation with little economic sacrifice. Aside from the fact that they were less impacted by the construction, the residents also gained a greater awareness of the well-being that electrification can bring.
Momentum across countries and sectors
Globally, the share of electricity in the energy consumption mix has grown steadily over the last 30 years. Between 1990 and 2018, electricity gained approximately six percentage points in the energy mix, moving from 13% to 19% of energy consumption.\(^9\) When asked about the current state of electrification, end users who participated in our survey indeed observed positive progress, especially in the transport and buildings sector. High electrification rates\(^10\) (beyond 50%) are observed in the buildings sector, whereas in the transport sector, where EV technology has started to scale up only recently, electrification rates are low but quickly increasing. Customer demand appears to be a driving force for electrification, especially in B2C sectors. In addition, end users expect further growth in electrification on the back of COVID-19 via green stimulus packages and a shift in values and priorities.

Customer demand appears to be a driving force for electrification, especially in B2C sectors

Yet electrification is happening only gradually, and most countries see slow growth in the share of power in the overall energy mix, which has remained significantly behind the rate of change that would need to be seen to meet increasingly ambitious decarbonization targets. The pace of electrification varies significantly by region. For example, in China, the last decade saw a strong increase of eight percentage points in electrification rates, whereas Europe saw very modest growth, and Russia and the U.S. saw stagnation and even decline.\(^11\)

Existing momentum is mostly coming from the transport sector, where rapid technological developments have made the total cost of ownership (TCO) of EVs cost-competitive with alternatives. Nonetheless, approximately half of transport interviewees expect the EV share of their fleets or portfolios to be limited to 30% or lower in the next five to ten years. In the industrial segment, respondents generally do not recognize progress in electrification compared to the situation five years ago, with only 7% of respondents saying their electricity ratio has increased in that period. In buildings, substantially increasing electrification does not appear to be top of mind, even though some tenants demand greater electrification in the context of green building preferences. As a building contractor in China states, “My clients mention electrification sometimes, but it’s a ‘nice to have,’ not a must.” In the absence of a clear trigger, electrification seems to increase only gradually.

Among the main barriers holding electrification back across sectors, end users highlight an unfavorable near-term economic case for electrification, which is often explained by electricity costs that are too high compared to alternatives, especially for specific uses such as high-heat industrial processes. In this context, respondents identify government-driven interventions as effective levers for accelerating change, including targeted regulations to level the playing field with other fuels and policies to accurately incorporate the cost of carbon into the market price. Addressing other obstacles such as the lack of widely available charging infrastructure is particularly important for transport to pick up.

Growing momentum in transport

Electrification rates in transport are rising faster than in other sectors due to the recent scale-up of technology and increasingly favorable economics of EVs. In total, 90% of companies surveyed indicate that they have started to electrify their fleet. As one automotive manufacturer in France states, “The market share around 10% demonstrates that the market has picked up.” This uptake is also explained by the decreasing cost of EV batteries. While the up-front costs and lack of infrastructure for EVs deter some users, companies have noticed that customers are starting to think in terms of TCO, which is already on par with internal combustion engine (ICE) vehicles in an increasing number of regions. Additionally, companies perceive an increased enthusiasm about the upsides of EVs, such as smoother and more silent driving, more advanced technology in the car, and lower costs of maintenance. As an automotive manufacturer in Chile mentions, “Our greatest success has been to show

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\(^10\) The share of electricity in the total energy consumption.

\(^11\) Between 2010 and 2018, the share of electricity in total final energy consumption developed from 20% to 22% in Europe, from 18% to 25% in China, from 14% to 13% in Russia, and from 22% to 21% in the U.S. IEA data and statistics, 2010 and 2018, [www.iea.org](http://www.iea.org).
Respondents identify government-driven interventions as effective levers for accelerating change, including targeted regulations to level the playing field with other fuels and policies to accurately incorporate the cost of carbon into the market price.

End users expect the current momentum to continue and to expand to more regions, but further acceleration is needed. The majority of transport companies expect an increase in the share of EVs in their sales/fleet over the next five to ten years, fueled by companies’ desire to innovate and enhance positioning. As a Spanish parking lot owner puts it, “[By] offering a new service to our clients, the penetration of the electric vehicle can become a relevant key in the positioning of our company.” However, few end users expect the transition to be imminent or to happen at full scale—with only a third of respondents predicting the share to increase to more than 50% in the next five to ten years. The lack of public infrastructure is perceived to be the main barrier to faster EV uptake. Some companies are relying on some temporary work-arounds, such as several Spanish fleet companies that depend on private infrastructure (e.g., charging at own depots/stations), or temporary recharging stations in cities. But this has its limits. End users across countries indicate that public infrastructure is vital to further scale up transport electrification.

Tame progress in buildings

The pace of electrification in buildings varies by region. Factors like costs, regulation, power generation mix, and type of building affect the momentum in each country. In some countries we heard from respondents that small-scale buildings, such as residential buildings, are getting electrified faster than big buildings, while the opposite is true for other regions. For instance, in the U.S., respondents mentioned low electrification momentum in activities that involve heating large spaces. A building company from the U.S. explains it as follows: “One of the company’s main goals is to keep the thermal index (temperature for employees) at 96%. This can be hard to achieve given we have large bay doors opening and closing (letting in cold/warm air). Electrified heating will not be able to heat these areas nearly as fast as natural gas.” We heard from respondents that ultimately the degree of electrification in buildings depends on the economics case. A building company from the U.S. emphasizes this point: “When building a new building, we will source energy from whatever is readily available. If there is access to abundant cheap natural gas, that is what they will rely on.” In countries like the U.S., where gas prices are low, electricity is often a less cost-effective alternative. Standards and policies are another important factor to explain varying levels of electrification. Canada, e.g., has highly electrified buildings due to low prices and decades of policies pushing in this direction.

Stagnation in industry

In the industrial sector, electrification appears to be stagnant: 80% of companies indicate that their electrification rate is similar to five years ago. Although it varies greatly by subsector and company, electrification in the industry appears to run against feasibility and abatement cost barriers more quickly than in other sectors.

The decision not to electrify certain processes is often based on technical considerations. As a food manufacturing company in France puts it, “Our carbon is mainly linked to steam production. Electrifying it does not make any sense.” Similarly, a chemicals company in the U.S. states, “Chemicals/manufacturing processes are highly reliant on steam. 85% of our power consumption is generated by on-site CHP generation. I don’t see that changing. We are a steam company, not a power company.” Technical constraints may lead to a negative economic case for electrification. As a Moroccan industry company explains, “I actually want to transform the only part of my process that is not electrified, but the cost of electricity doesn’t make it a viable solution, as it has a direct impact on total final product cost. If I had a lower cost of electricity, I wouldn’t hesitate to invest.” The industrial subsectors more dependent on heating
processes face greater obstacles in driving electrification given the availability of more cost-efficient alternatives sometimes supported by subsidies or favorable regulation. An industrial player in France highlights that “The price competition between gas and electricity remains a key factor for electrification.”

Partly for these reasons, industrial companies often prioritize increasing efficiency and green energy over further electrification to fulfill their environmental agenda. As an industrial company in France points out, “We went from 34% electricity in 2015 to 36% in 2020; however, in the same period the percentage of renewable electricity usage went from 40% to 75% and we have optimized the usage of electricity through efficiency.”

The absence of regulations on, e.g., the cost of carbon or other aspects that put value on positive externalities from electrification partly explains why the momentum in buildings and industry is more contained.

**Regional differences in electrification momentum**

Differences in the momentum between countries can partially be explained by policies and regulations. For instance, in countries like China, policy and government mandates stand out as the biggest factor determining electrification decisions. Based on the responses of end users, there seems to be a growing momentum in half of the countries. A sector that stands out is the buildings sector in Quebec, Canada. It made big progress from where it stood five years ago, partly due to the ambitious environmental regulations Quebec has for buildings:

60% of building owners and contractors interviewed in this region indicate that their electrification ratio increased over the last five years. In Chile, a focus on noise and local air pollution created momentum in the transport sector, and 50% of transport companies expect that the share of EVs in their fleet will increase to over 50% in the coming five to ten years. Decreased electrification rates in some countries are mainly driven by costs and a lack of financial incentives. Nearly 10% of end users indicate that their electrification rate decreased over the last five years, whereby costs are the main driver. A Moroccan industrial company says, “I am clearly aware that, if we reduce our usage of fossil fuels, this can be beneficial from the environmental standpoint, but from the cost side, electrification will only drive our product cost up, as the current electricity supply cost per kWh is rather high.”
Customer demand as a pull for electrification

Shifts in consumer preferences can create a further pull for electrification. Various socio-economic trends are creating a favorable economic and societal context for electrification, and citizens and end consumers, especially younger generations, appear to be increasingly concerned about sustainability and resilience. 60% of companies indicate that electrification is a topic of interest for their customers. Companies expect this to increase in the coming years, as the behavioral patterns of younger generations tend to be more aligned with electrification. In Spain, e.g., the survey indicates younger customers are increasingly pushing for alternative mobility models such as shared mobility services, which tend to be electric. A building contractor and developer in Canada is already experiencing a significant pull: “For many building rentals, energy efficiency is dictated by tenants. More and more, customers are willing to pay more for ‘green’ buildings.”

Electrification is especially of interest to customers if it contributes to their decarbonization roadmaps. A real estate company in France explains that “Building electrification is key for our clients’ CO₂ emission trajectory.” In Canada, a manager at an institution with both fleet and buildings puts it as follows: “We and others are beginning to say carbon neutrality from offsets isn’t enough – we will actually reduce at the source.” Other factors like branding, image, or general consciousness may increase customer interest as well. In the words of one transport respondent in Chile, “It is mainly corporate and public fleet companies that are interested because they want to differentiate themselves and contribute.”

Differences in customer demand across sectors

In B2C sectors, or those sectors where electrification directly affects the user experience, customer pull is most significant. As Figure 5 shows, customers appear to be more of a driving force in the buildings sector (more than 50% of respondents say electrification is an important topic for their customers). Our conversations with end users validate this trend. In Canada, e.g., we hear that customers have begun to pay more for green buildings. In general, respondents perceive that tenants not only value greater energy efficiency but also more advanced technologies coupled with electrification (such as automated or smart solutions). As one buildings contractor in France says, “[Electrification] will become a key criteria of energy performance and thus of asset performance.” Tenants also value the increased safety that electrification brings. In Japan, e.g., although tenants hesitate going 100% electric (given the risk of outages due to typhoons and floods), they highly value the greater safety associated with electrical appliances, especially in the case of high-rise apartments: “Older people who fear fire incidents in high-rise apartments accept all electric apartments.”

Figure 5: Level of customer pull for electrification

How much pull do you get from your customers and/or end users for electrification?

Percentage of total companies in each sector that selected each option\(^\text{12}\)

- Critical topic for customers and prerequisite for choice of product/supplier
- Important topic for customers and criteria for choice of product/supplier
- One of various topics of interest to be discussed with customers
- Other
- Never discussed

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<th>Important</th>
<th>Other</th>
<th>Never discussed</th>
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</table>

\(^{12}\) Percentages may not add up to 100% due to rounding.
Companies active in B2B sectors perceive less pull from customers, but policies and regulations and increased awareness do sometimes trigger the topic. A manager in an industrial company in China mentions, "We have commitments to electrification due to relevant policies. [...] Due to the government regulations, electrification is almost compulsory." An Italian manufacturer of electric components also perceives a pull from its customers and states, "Increased customer consciousness about decarbonization and ESG ratings [is important to] [...] guarantee a sustainability momentum, especially for a big player."

Regional differences in the pull from customers

Customer pull takes different forms depending on the region. In some countries, like Canada (where over 75% of companies surveyed say electrification is discussed with their customers), electrification can be considered an effective way to align with or anticipate policies and regulations and is often also seen as a way to bolster the company’s positioning. An electric bus manufacturer from Canada explains the position of its customers as follows: "For many [of our customers], there are impending emissions decreases to be mandated upon them by governments, and for others, they see the writing on the wall of electrification of mobility coming sooner rather than later and are committing to do the work of making that happen today. With the impacts of climate change growing, and disproportionately impacting low-income families and people of color, commercial bus fleets and transit operators who are traditionally CO₂-heavy emitters recognize their need to play a role providing clean, quiet, sustainable, accessible mobility."

Meanwhile, over 75% of the companies interviewed in the U.S. and Morocco indicate that they never discuss electrification with their customers. In the U.S., electrification is less often considered a key lever to decarbonization, which points to the necessity to offer low-carbon electricity. In Morocco it is driven to a large extent by low public awareness on the benefits of electrification. As a Moroccan automotive manufacturer states, "We generally don’t get traction from consumers on energy solutions, but our own consciousness about the subject drove the company to build our plant following the latest environmental standards, which allowed us to have everything electrified. I don’t think our consumers are interested if we have 50% of the process electrified or not." Cultural circumstances seem to influence the level of pull from customers as well. For example, the Chinese tradition of cooking with gas negatively affects the willingness of customers to switch to electric stoves.

Further acceleration through stimulus packages

End users we surveyed expect the COVID-19 crisis and related recovery packages to bring acceleration, especially in buildings and industrial sectors, through green stimulus packages that often target activities that have local employment upsides (see Figure 6).

In the short run, COVID-19 is expected to decelerate electrification efforts; as companies prioritize business areas more directly affected by the pandemic, consumer demand goes down, and international supply chains are impacted. In the words of a respondent from the U.S., "Projects have been pulled back and slowed down, rolled into 2021." In the words of an industrial respondent in Japan, "Some of the electrification investment has been frozen due to the sudden demand decrease caused by COVID." Meanwhile, a Canadian consumer goods manufacturer explains the supply chain disruptions they are experiencing: "We had trucks on order, but when the pandemic hit, the company delayed delivery." Moroccan companies indicate that their investment budgets have already been impacted. As a steel manufacturer puts it, "Changing the fusion furnace can lead to significant reduction of atmospheric emissions, but with the current crisis, will companies allow spending budgets [on this] over more urgent topics like safety or productivity?" But even if there is deceleration, electrification does not disappear into the background entirely. A French automotive manufacturer explains that "During the COVID crisis there was no ‘going back’ on climate change; it remains a priority."

In the long run COVID-19 is expected to help increase electrification, both as a result of a shift in values and because of the stimulus packages that are expected to be green. As one respondent from the U.S. explains, "Values-wise, I think the pandemic should lead to an acceleration of all sorts of environmental protections because COVID-19 is a prime example of what happens when we don’t act as good stewards of our environment."

In our survey, we perceived this optimism in the buildings and industry sectors in particular. Half of the companies we surveyed in those sectors expect COVID-19 to lead to an acceleration in electrification. Building companies (particularly in countries with a prominent sustainability agenda) expect an acceleration due to green-targeted stimulus efforts for crisis recovery, which prioritize local employment. Remote working and the additional time spent at home
may also drive increased investment in houses, which may boost uptake of more electrified home equipment. In the words of a buildings equipment company employee in France, “[COVID-19] recovery plans will be green and electricity is the only solution to get there.” For industry, green stimulus plans tend to come in parallel to stronger decarbonization targets, which may enhance electrification. For transport, COVID-19 is expected to have less of an added impact given that there was already strong momentum in electrification before the pandemic.

Differences in expected impact between countries

When asked about the expected impact of COVID-19-related measures, survey respondents reveal notable differences between countries. For example, companies from countries and regions with a prominent sustainability agenda and significant economic stimulus packages, like the EU and Canada, expect the most positive impact from COVID-19 on electrification. France and Italy especially stand out: 70% of respondents from these countries expect that COVID-19 will accelerate electrification. As an oil company from Italy explains, this expectation is driven by announced green-targeted stimulus efforts: “The COVID-19 EU reaction with proposed relaunch plans, which include sustainability, will give a boost to sustainable electrification.” In Morocco, the expected impact of COVID-19 varies by the end user’s size, nature, and sector. Several large industrial companies experience no effect given there were no supply disruptions of any type of fuel. Others, like a steel manufacturer, point at potential cost effects: “All will depend on the energy cost; if the electrification will lead to cost reduction at scale with more usage of renewables, then the trend will accelerate.”
Main hurdles holding electrification back

Companies describe a range of challenges and barriers that prevent them from further increasing electrification, including issues like lack of customer awareness, unfavorable regulation, or technology inadequacies. End users mention economic barriers as a main hurdle; over two-thirds of companies interviewed mention an unfavorable economic case as one of the main obstacles preventing them from scaling up electrification (see Figure 7).

As highlighted in the discussion around benefits, economic considerations are among the most important factors for end users. This explains why cost upsides such as the savings from increased productivity or favorable cost of ownership are of great appeal to end users; but it also implies that any cost disadvantages associated with electrification are top of mind for end users. Based on today’s technologies and price regimes, electrification often does not come with a positive business case, which explains why the transition is happening only gradually and why the current uptake falls short of what would be required to fulfill decarbonization ambitions.

Customer preferences and lack of awareness

As one of the main underlying factors behind the unfavorable economic case for electrification, end users identify the cost of electricity itself. Using electricity as a fuel is often too costly compared to other fuels, especially for industrial use cases such as high-temperature heating processes or heating large building spaces. One industrial player in Morocco says, “The current cost of electrical energy does not encourage investment towards electrification.” In the U.S., we hear a similar concern from one buildings interviewee: “With falling gas prices and increased electricity prices, the building where we electrified heating is the most expensive [...] during the winter. Currently, there are much cheaper and money-saving alternatives that allow us to meet our goals.” An equipment manufacturer in France echoes the same competitiveness issue: “It is difficult to engage a switch to electricity in some geographies where gas is and should remain competitive in the long term, e.g., in Russia.” In some regions, end users say electricity becomes especially expensive during peak hours. As a fleet owner in Chile explains, “That electricity is a cheaper fuel is not entirely true. It is true that generally the cost is lower, but additional charges during peak hours in winter make electricity more expensive than diesel.”

Cost and competitiveness barriers are often exacerbated by country-level tax policies that favor other fuels. As one equipment manufacturer in France mentions, “Taxes on electricity are also an issue for overall cost competitiveness.” Thus, the need for more favorable regulation is often mentioned in the context of building the economic case for electrification. As one player in the U.S. says, “I’m hopeful there will be tax incentives to help offset costs.”

Figure 7: Obstacles preventing further electrification

Which obstacles could prevent you from scaling up your electrification initiatives and capturing the maximum benefits? Percentage of companies that selected each barrier

<table>
<thead>
<tr>
<th>Economic barriers</th>
<th>Tech/infrastructure barriers</th>
<th>Regulatory barriers</th>
<th>Stakeholder barriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unfavorable economic case</td>
<td>68</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technology limitations</td>
<td>51</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of infrastructure</td>
<td>41</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unfavorable regulation</td>
<td>33</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Customer preferences and lack of awareness</td>
<td>27</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supply chain constraints</td>
<td>17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raw material constraints</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative social impact at household and community level</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employee preferences</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Unfavorable economics are a more salient obstacle in buildings and industry than in transport (see Figure 8): End users surveyed in the transport sector are often a bit more optimistic about the decreasing cost of batteries and the EV support that drive prospects of EV TCO becoming on par with ICEs. As one transport player in China puts it, “I’m quite confident in the future for electric vehicles.” However, the economic prospects for buildings and industrial electrification are considered less promising. As an industrial player in France says, “The price of electricity is a real question mark in a lot of geographies where we are implemented.” In buildings, a U.S. end user states, “Natural gas heating electrification from a cost perspective will probably never happen.” Unless the cost of electricity becomes competitive vis-à-vis other fuels across uses and regions, which often depends on a country-specific electricity mix and tax and subsidy regimes, it will be hard to make a widespread case for electrification.

Other obstacles often cited by end users are related to technological limitations, lack of infrastructure, and lack of awareness. End users mention a variety of technological limits, which tend to be very specific to subsectors or concrete end uses. For example, end users describe that there is currently no viable path to directly electrify cement production, steam production, or long-distance freight transport. As a food manufacturing company in France states, “Electrifying [steam production] does not make any sense.” One fleet owner in China explains that, currently, long-distance freight transport is nearly impossible: “Electric trucks can only transport small cargo. [...] If the goods exceed certain limits, electric trucks cannot do the job.” Infrastructure hurdles primarily affect transport and industry companies, where roughly 70% and 35% of companies surveyed mentioned a lack of infrastructure as an obstacle, respectively. A heavy industrial company in France specifies some of these network issues: “The lack of infrastructure is especially a problem in emerging countries where the electricity network is limited and where it is difficult to be connected to it.” This barrier often has to do with the long administrative procedures associated with rolling out new charging infrastructure and with the time it takes to get connected. For example, a packaging company in France mentions that “The lack of infrastructure can be an issue even in France. The time to be connected can be very long, up to four years.” Finally, end users also mention how lack of information and awareness of electrification are preventing the transition from gaining greater speed. As a fleet owner in Spain mentions, “One of the biggest barriers by far [is] misinformation by other players and the general public about EVs,” and “The general public has the idea that right now EVs are a niche segment just for rich people to have as their second car.” This end user also explains that there is “Skepticism about the potential emissions reduction by EVs compared to constant emissions improvements of ICEs.” We hear of similar hurdles in Chile and France, where end users say that customers are often unfamiliar with or have a wrong perception of the upsides of electrified solutions, such as convenience and savings benefits. In Chile, e.g., we hear from transport respondents that driving electrification required debunking myths and addressing concerns that the electric technology might not work well.

End users also mention how lack of information and awareness of electrification are preventing the transition from gaining greater speed.
Drivers of greater acceleration
Drivers of greater acceleration

Our survey provides several insightful perspectives on initiatives that can help further accelerate electrification. Key factors that are brought forward include the importance of decarbonizing electricity grids, the introduction/reinforcement of supportive policies, and an increased focus on public and corporate awareness to show the value of electrification for ESG agendas. End users indicate that they cannot make this happen by themselves. Utilities are important to support with expertise and risk sharing, among other things, while governments have a key role to play by introducing policies and regulations that help to accelerate the transition and accurately incorporate the cost of carbon.

The essential role of utilities and other stakeholders

End users across sectors consider utilities to be the main partner to help them in their energy shift (see Figure 9). Given the clear trend of decarbonization around the world – and recognizing that electrification plays a critical role in that transition – more and more end users are experiencing the need to understand and shape how they can further electrify. Our survey shows that utilities are seen as the key partners to help them do so. For instance, a Chilean bus manufacturer and distributor highlights the potential of these collaborations: “We see many joint ventures with Enel in the future.” This finding from the survey confirms the importance of multi-stakeholder initiatives, as described in GSEP’s recent report, “Building the electrification alliance: Bridging along and across value chains.” This study highlights examples of multi-stakeholder collaborations that GSEP members are currently

End users indicate that they cannot make this happen by themselves

Figure 9: Main entities that companies rely on to electrify processes

**On which entities/players would you rely to help you capture the benefits from your energy shift?**

Percentage of companies that selected each partner

<table>
<thead>
<tr>
<th>Energy providers</th>
<th>Governments</th>
<th>External suppliers</th>
<th>Internal/peer/consulting knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy provider</td>
<td>76</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equipment supplier</td>
<td>57</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal capabilities</td>
<td>45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government entity</td>
<td>39</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consultancy firm</td>
<td>26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peer</td>
<td>22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trade association</td>
<td>19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research academy</td>
<td>19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Building contractors</td>
<td>16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Architects</td>
<td>16</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
part of, including the offering of residential energy storage systems to provide balancing services and participating in a joint venture with multiple automotive manufacturers to offer ultra-fast charging stations.13

Three types of engagement from utilities surfaced from the survey among end users as being important for developing and deploying electrification efforts:

— Close involvement of the utility and its know-how and technical expertise helps reduce costs, reach faster deployment of electrified solutions, and decrease errors in the process. As one fleet owner in Chile puts it: “Enel has been more than relevant in helping us push this opportunity forward. Enel opened the door [to electric mobility] in Chile. They helped with the technical aspects, they took care of the infrastructure [...]. They allowed us to reduce the number of errors and to not reinvent the wheel.” In the U.S., we heard from end users that their relationships with utilities are crucial. For example, a large U.S. retailer mentions, “We find it incredibly important to have relationships with utilities [...]. Living animals are in our retail store 24/7, and power is vital to the well-being of those animals. During outage events, our partnerships with utilities have proven to be vital.” End users also highlight that utilities in the U.S. act as thought partners and help guide them through energy-related issues such as energy efficiency initiatives. As a building owner in the U.S. explains, “[Our relationship with the utility] has helped us to identify energy efficiency needs through energy audits as well as to execute energy efficiency projects. I am the only person in our energy team, and I appreciate having utilities as support when making decisions.”

“We find it incredibly important to have relationships with utilities”

— Utilities share risk with companies on new endeavors and help with the financing. Companies perceive that utilities are a good partner to share the risk, responsibility, and financing with when embarking on innovative projects that might fall outside of their regular business. As a fleet owner in Spain mentions, “We have worked [with a local utility] on a number of projects [...]. They have helped with financing, providing related mobility services and continuing to take risks with us on innovation.” Similarly, a French food company says, “Utilities have a key role to play in helping us improve the energy efficiency of our industrial electrical devices, e.g., through supporting the financing of equipment replacement.”

— Utilities facilitate the energy transition by offering tailored solutions and propositions that help accelerate electrification. The experiences of respondents show that these arrangements with utilities can take many forms. Some end users mention that it is important for them to work closely with the local utility to reach corporate rate structures that support the transition. This is especially true for cases where scarcity pricing is holding electrification back because end users cannot afford the charges, which often increase disproportionately with additional demand. As a fleet owner in Chile mentions, “Additional charges during peak hours in winter make electricity more expensive than diesel.” Similarly, one industrial company in Chile states that “It would be very helpful to discuss corporate rate agreements. [...] We need to negotiate with utilities to improve our competitiveness.” For other end users, it is important to negotiate power purchase agreements that cater to their green power objectives. Given the rising importance of sustainability across sectors, companies are paying particular attention to the sources of their electricity supply. Utilities are perceived to have a unique opportunity to partner with companies and cater to this demand via special agreements. A real estate company in France mentions, “We are very interested in green corporate power purchasing agreements, enabling us to buy on the very long term. It would also help us financ[e] the renewable electricity production capacities. However, today we don’t find a lot of actors willing to engage.”

A wider set of partners is required for a successful electrification transition. Companies in the transport sector, and to a lesser extent those in the industry sector, rely on governments as another key partner (see Figure 10). Incentive plans and decarbonization policies play a vital role in the electrification of these sectors, while the government also has a role in public debate. A Japanese company explains that “Japan’s prime minister’s announcement on carbon neutrality has ignited a discussion on the importance of decarbonization and the necessity to go away from fossil fuels.” All sectors look to equipment suppliers for support. In the words of a food manufacturing company in France, “Equipment providers could help us through

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innovation by bringing new products [that are] cheaper and easier to use.” Additionally, some companies rely on peers and consultancy firms. As a building owner in the U.S. explains, “We would talk to peers for input, but we rely more heavily on energy consulting firms that have already been assisting with our other ongoing strategies.” Sometimes collaborations with more unexpected partners are successful as well. An example is a Chilean fleet owner that works closely with a university to train and upskill bus drivers on the use of the more technical electric buses.

Regional differences in the importance of partners

In most countries, utilities are considered to be the most important partner for electrification. As Figure 11 shows, all respondents from France, Spain, and Canada emphasize the importance of collaborating with utilities to further drive electrification efforts. According to an industry player from France, “Utilities have a role to play by incentivizing and supporting industrials.” A buildings company from the U.S. adds that “A lot of education [by utilities] is needed in this space to make the change.”

There are notable differences between countries with regard to the additional stakeholders that companies rely on. In China, for example, the government is the key partner according to over 60% of companies. In Japan, 67% of building owners point out the importance of contractors. While companies in a majority of the countries rely on one or two partners, companies from Canada and the U.S. state the importance of a broader range of stakeholders like peers, trade associations, consultancies, and academia. A retailer from the U.S. confirms this: “Generally we would reach out to national key accounts programs at utilities, then peers and trade associations as a first step, and layer in the guidance from our building designers next.”
On which entities/players would you rely to help you capture the benefits from your energy shift?
Percentage of companies that chose “energy provider”

<table>
<thead>
<tr>
<th>Country</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>100</td>
</tr>
<tr>
<td>Spain</td>
<td>100</td>
</tr>
<tr>
<td>Canada</td>
<td>100</td>
</tr>
<tr>
<td>U.S.</td>
<td>86</td>
</tr>
<tr>
<td>Chile</td>
<td>86</td>
</tr>
<tr>
<td>Italy</td>
<td>83</td>
</tr>
<tr>
<td>Morocco</td>
<td>62</td>
</tr>
<tr>
<td>China</td>
<td>54</td>
</tr>
<tr>
<td>Japan</td>
<td>50</td>
</tr>
<tr>
<td>Russia</td>
<td>17</td>
</tr>
</tbody>
</table>

Average: 76%

Keys to unlocking electrification

When asked about measures that can help tackle some of the main barriers to and further accelerate electrification, end users mention a broad range of factors, from improvements in the economics of electric solutions to well-targeted policies and regulations, easier permitting processes, and expansions in infrastructure. These perceptions are in line with the key enablers identified by GSEP in its recent study, “Building the electrification alliance: Bridging along and across value chains” – flexible regulatory frameworks, greater clarity and alignment on plans for charging infrastructure, and public policies addressing the change of paradigm, particularly in sectors such as transport.14

Making the economics work

To incentivize companies to electrify, it is vital to make the economics work for them. End users across sectors find it particularly important to improve the competitiveness of electricity as a fuel and to secure subsidies and other incentives (see Figure 12). As a heavy industry player in France points out, “The key incentive for electrification is to be able to build a relevant business case [while] gas is still much cheaper. Taxes and subsidies are therefore watched closely to aid decision making.”

According to end users, building an attractive economic case for electrification involves, among other things, addressing the challenges related to peak demand and associated charges that deter end users from further fuel switching. As a fleet owner in Chile explains, “We need to solve the biggest issue in Chile, which is peak time, when rates triple. We could solve it though storage, but batteries are expensive.” Similarily, an institutional building owner in Canada says, “When you pay by kW or when you pay more for peak power, electricity gets very expensive for buildings or vehicles – we need support to adjust pricing, or add storage.” In order to unlock electrification, utilities need to take into account that charging more for incremental power often acts as a barrier for further electrification of activities. The end-user survey illustrates the need to tailor the electricity charging model such that it balances different trade-offs: balancing the grid and ensuring its reliability, while also providing an effective price signal to drive long-term behavior and

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accelerate electrification. An example of flexible pricing arrangements comes from China, where time-varying pricing is promoting electrification in space heating.

The important role of governments

Well-targeted policies and regulations have an important role to play in accelerating the transition by leveling the playing field between electricity and other fuels. As GSEP’s recent report, “New electricity frontiers,” puts forward, various public policy measures can enable the electrification transition. For instance, given that tax policies often implicitly favor gas over electricity, governments can play a role by revising these policies and aligning them with broader decarbonization policies. In this light, end users mention that hard mandates or caps, reporting requirements, and carbon taxes can all incentivize a change in patterns. An equipment manufacturer in France mentions, “Mandates or regulations to decarbonize are powerful drivers of change, particularly for real-estate owners.” In multiple jurisdictions, there are developments in these types of measures, especially in the manufacturing and industrial sectors. As an industrial company in China mentions, “Electrification is almost compulsory for an industry like ours.” In other jurisdictions, end users hope more action in this space will drive change. A heavy industry company in Italy says, “Continued greater incentive to develop electrification would be desirable.” Companies in regions where policies are perceived as favorable are optimistic about the pace and prospects of electrification for the coming years. In Japan, for example, an industrial player mentions, “We need to report emissions and comply with local standards, which favor electrification.” And in Italy, a heavy industry company echoes the influence these measures will have: “The CO₂ price evolution and ecotax (e.g., carbon tax at the border) instead of subsidies act as key leverage to boost sustainable electrification.”

The absence of favorable regulation hinders electrification in multiple jurisdictions. Some end users point to sectors or activities where they would like to see more government support. An industrial company in China mentions, “Government incentives

Figure 12: Main drivers for electrification

Which factors would have the most effect on your decision to electrify? Please rate from 1 to 5 (1 has no effect and 5 has the greatest effect on your decision to electrify), average score per company
could significantly decrease energy costs." A bus manufacturer and distributor in Chile points out, "[EVs] don’t have regulatory/fiscal advantages vis-à-vis diesel. There’s no added support." In Spain there is some public support, such as subsidies for EVs, but a transport company explains that more is needed: “For EV infrastructure, transitional incentives, e.g., lower access tariffs, could speed up the process.”

Other ways in which governments can help boost electrification include the establishment of clear standards and simpler administrative procedures to aid electrification or favor electric products. As we hear from survey respondents, these measures become particularly relevant for the rollout of charging infrastructure, which is holding electrification back across countries. Transport companies experience underdevelopment in the charging network and administrative hurdles to expanding existing capacity. The path to more widely available infrastructure to accelerate the transition involves setting clear standards and making permitting processes easier and faster. One Moroccan company explains the bottleneck: “Even if we are able to bring in equipment running on electricity, we will still need to have charging infrastructure deployed across the country in order to be able to deliver to all locations currently covered.” A respondent in Spain raises a similar issue: “The main barriers to infrastructure deployment are the administrative procedures, which can take up to nine months.”

Among respondents that suggest possible solutions, we hear from a fleet owner in Canada that what is needed are “clear standards and permitting processes to install EV chargers – right now it’s handled case by case and it is very slow.” A fleet operator in Spain suggests establishing a "one-stop shop" platform for dealing with all administrative procedures related to EVs and EV infrastructure (e.g., subsidies, taxes, licenses, permits, bona fide information). An example of implementing faster and easier processes comes from China, where the Three-Zero and Three Savings services provided by SGCC removed various administrative procedures (e.g., the on-site application process) in order to decrease the time and investment needed for electrification.

Soft policy nudges, such as circulation permits that give preferential treatment for EVs, can also serve as a key driver for electrification. As a transport player in Chile highlights, “If governments provide concrete benefits for end users, there will be more demand, and therefore more players will bring electrified solutions. Some examples of benefits that governments could offer are: a green label to identify EVs so that they can access exclusive driving lanes, lower taxes, or different tariffs on toll roads. These advantages could greatly increase the level of demand.”

Other ways to unlock electrification

Other drivers, such as generating awareness about electrification and its benefits and positioning electrification as a core ESG component, could also generate greater momentum. Lack of awareness is an important blocker across regions. In the U.S., we hear from a buildings company that “Customer awareness and education is going to be fundamental; today, it is a gap and we don’t even know how to communicate it to the end consumer in a way they understand and that gets them interested (influencing the buying decision).” Companies are therefore outspoken about the need to increase the quality of information available on electrification and to more clearly convey its ESG value. For instance, an automotive manufacturer in France mentions, "We need to demonstrate to our clients that with EV, they won’t lose in convenience [or] offer variety." In Chile, we hear from a fleet owner that “Public awareness on the benefits of EVs needs to be improved.” Several end users mentioned cases where these kinds of initiatives are already driving change. An automotive manufacturer in Chile says, “The greatest success has been to debunk myths and to prove that the technology works. We are getting transport companies to realize that not everything needs to be diesel. They realize EVs are easier to drive and manage, with an important cost saving as well.” Similarly, a buildings player in the U.S. claims that “Pressure from investors to see ESG metrics is the largest source of motivation for electrification and sustainability initiatives.”

“Pressure from investors to see ESG metrics is the largest source of motivation for electrification and sustainability initiatives”

Regional differences in unlocking electrification

In a majority of countries, economic factors are the most important driver of electrification. In particular, companies from Chile, Japan, Morocco, and the U.S. stress the importance of economics, whereby the cost of electricity compared to other energy sources is mentioned most often. According to a Chilean bus manufacturer and distributor, “Companies do not make major decisions based on environmental awareness but based on cost.”
Raising awareness and providing information is particularly key for electrification in Morocco, Chile, Italy, and Spain. In these countries, interviewees mention there is little awareness among companies or society about the benefits of electrification. There are notable differences between countries. In Chile, demystifying electric solutions such as EVs receives emphasis in our interviews. Companies in Spain specify that increasing the level of information at the point of sale is key, as sales people currently lack preparation and often cannot respond to questions about the performance of EVs or address potential fears regarding charging infrastructure. In Morocco, the interaction between companies and communities to convey how electrification can strengthen the whole ecosystem is missing. As an industrial company in Morocco explains, “By favoring electrification, we reduce our atmospheric emissions, which will definitely have a positive impact on communities. But we don’t currently track [this impact] or engage [with communities] about it.” All of this means that there is significant potential to unlock electrification by increasing awareness, but that doing so will take different forms.

The importance of other factors to unlock electrification differs by country. In France, progressive company culture and regulatory changes in particular are seen as the most important factors, and companies see positive developments in both areas. Technological developments are seen as the main driver in China and are expected to make long-distance and large-scale freight transport with EVs more attractive in the future. One Chinese fleet owner cites the challenge that currently, "electric trucks can only transport small cargo."
A unique position for utilities to catalyze the transition
As conversations with end users highlight, electrification has a range of advantages for companies across sectors as well as for wider society – from decarbonization to cost savings and process efficiencies, better working conditions, and reduced environmental impact (e.g., noise and pollution).

In light of these benefits, many survey participants anticipate further uptake of electricity, be it due to market or regulatory forces. Some companies are driven by customer expectations around decarbonization and have set internal goals to reduce their carbon footprints. Others have established transition plans to comply with existing government mandates or anticipate measures that governments might impose to meet the Paris Agreement. This is increasingly relevant, as a growing number of countries are increasing their ambition level, and more than 50% of global emissions today comes from countries that have net-zero emission commitments in place. While the level of ambition is increasing, the survey illustrates that many end users across sectors perceive the transition towards a more sustainable economy as a challenging task: they face significant hurdles, and the speed of change is slower than required. They therefore rely on a variety of stakeholders to enable the transition.

Energy providers have a pivotal role to play: the survey shows that they are seen as the main partner by a wide margin for helping realize and accelerate electrification. As an alliance of utilities that produces approximately a quarter of the electricity consumed worldwide (68% of which is low carbon), GSEP understands its unique position for catalyzing the transition and helping end users to meet their goals in a cost-effective way. As the recent report, "New electricity frontiers," points out, GSEP members are ready to take the lead – partnering with other players to overcome barriers and speed up changes of processes and equipment, and to bring key technologies to market that will help economies decarbonize.

There are several examples of partnerships that can provide an illustration of successful collaborations. As another recent study, "Building the electrification alliance", points out, GSEP members primarily act through partnerships that promote clean systems across sectors and address barriers hampering the scaling of available and competitive technologies.

For example, in the buildings sector, energy service providers encourage the adoption of more efficient technologies and the integration of digitized solutions and demand-response capabilities. By collaborating with technology developers and providers, engineering and construction firms, and appliance manufacturers, utilities work to enhance new solutions and appliances (heat pumps, building-integrated photovoltaics, home automation, home battery storage, and innovative advanced technologies from start-up companies) and the associated services for customers. They also tackle some of the main obstacles in the sector by helping to simplify permitting and offering expertise to renovators, for example.

As these recent examples show, there is significant space for utilities, and GSEP members in particular, to not only help end users capture the benefits of electrification but also help them chart their path forward.

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Appendix
GSEP has recently conducted a global study on accelerating beneficial electrification, the main component of GSEP’s work program.

The study gathers more than 115 end users and trade associations from the transportation, buildings, and industry sectors worldwide.

Through one-on-one interviews with key electricity end users and players, the study has identified: the main barriers hindering electrification across sectors; factors that are building momentum in electrification rates; actions that can be taken to accelerate direct electrification in each sector of activity; and regulatory, public policy, technical, customer relation, company culture, and financial aspects that influence electrification decisions and make the energy transition easier.

The survey used five different types of questionnaire to better match the different sector contexts. Within the transport sector, questionnaires were tailored to automotive manufacturers and fleet owners. For buildings, one type of survey was used for building owners and another for building contractors. A fifth type of questionnaire was used for industrial players.

The survey used five different types of questionnaire to better match the different sector contexts. Within the transport sector, questionnaires were tailored to automotive manufacturers and fleet owners. For buildings, one type of survey was used for building owners and another for building contractors. A fifth type of questionnaire was used for industrial players.

Figure 13: Respondents by country and sector

Respondents by country and end-use sector

<table>
<thead>
<tr>
<th>Country</th>
<th>Transport 30 companies</th>
<th>Buildings 34 companies</th>
<th>Industry 51 companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>24</td>
<td>6</td>
<td>13</td>
</tr>
<tr>
<td>China</td>
<td>13</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>France</td>
<td>13</td>
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18 Includes 1 interview of which only qualitative insights have been incorporated
19 Includes 3 interviews of which only qualitative insights have been incorporated
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