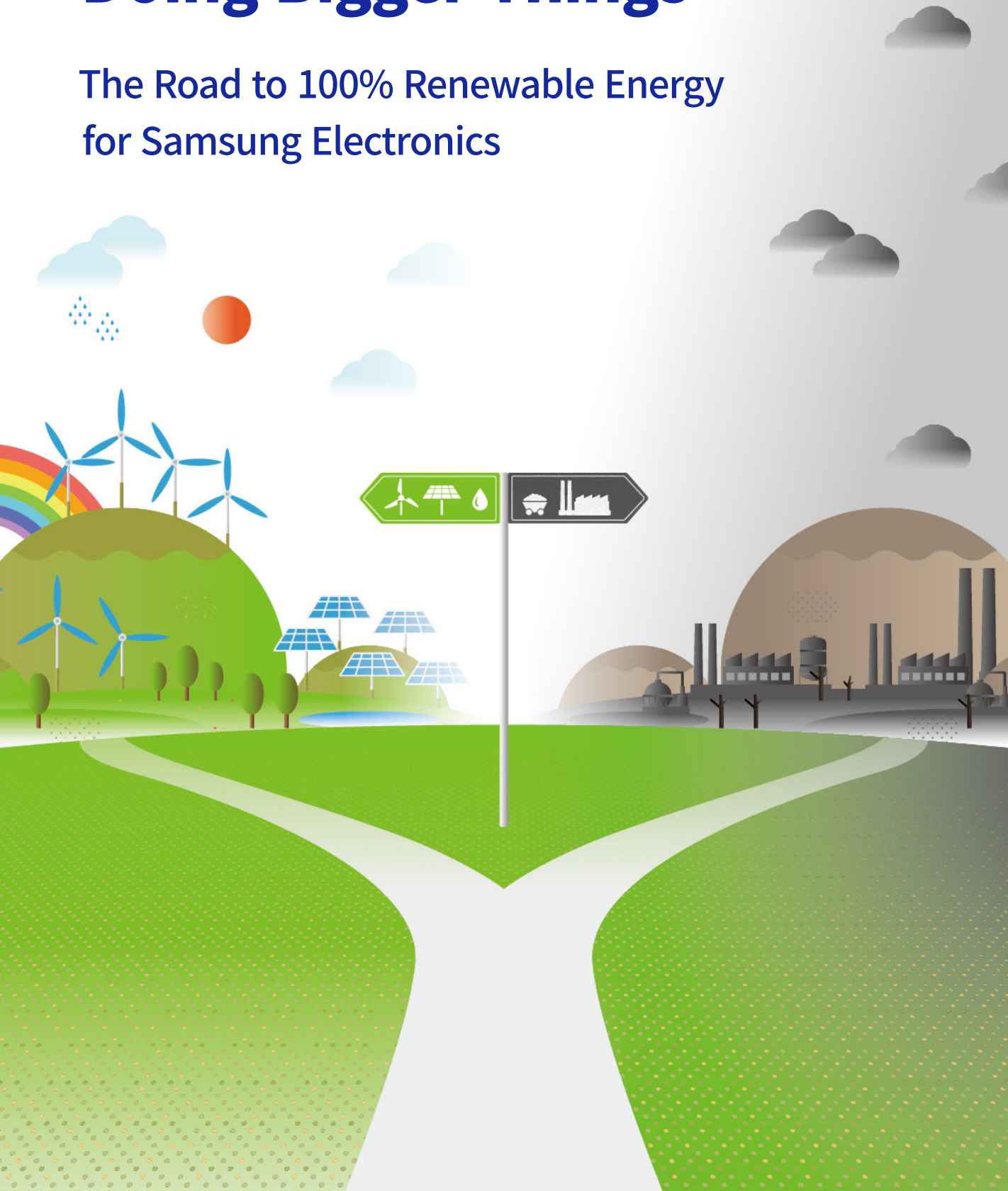


# Doing Bigger Things<sup>★</sup>

The Road to 100% Renewable Energy  
for Samsung Electronics





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# Executive Summary

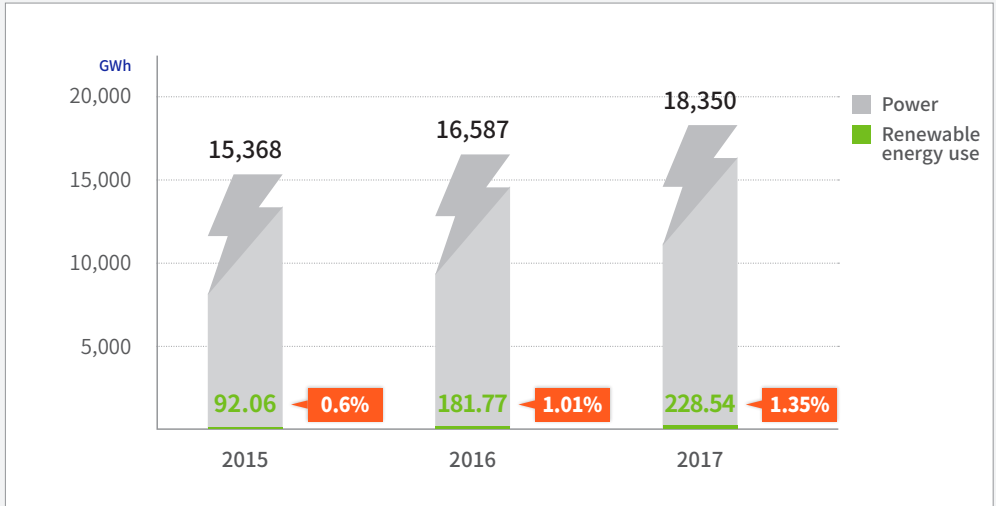
In October 2017 Greenpeace launched a global campaign demanding Samsung Electronics (below Samsung) commit to 100% renewable energy. On the 14th of June 2018, Samsung publicly announced a renewable energy strategy containing the following three key elements.<sup>1</sup>

- Samsung will source renewable energy for 100% of the energy used for all of its factories, office buildings, and operational facilities in the United States, Europe and China by 2020. The company will seek to further increase its use of renewable energy around the world in the medium to long-term.
- In South Korea, Samsung will install 42,000m<sup>2</sup> of solar panels in its Suwon facility and 21,000m<sup>2</sup> of solar panels and geothermal power generation in Pyeongtaek and Hwaseong facilities. It will also fully support the government's national strategic plan to increase the country's renewable energy use by 20% by 2030.
- Samsung will engage its partners across supply chain starting with its top 100 suppliers to set renewable energy targets, in partnership with CDP Supply Chain Program.

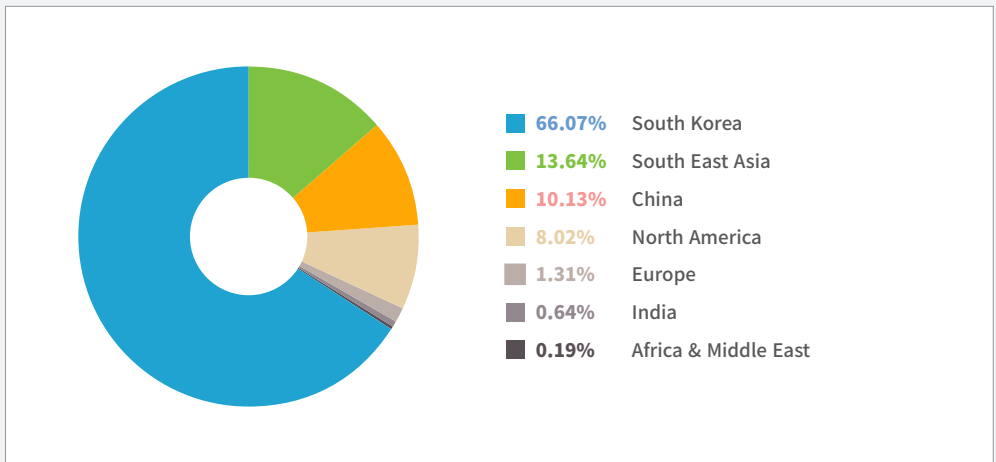
Greenpeace, and the thousands of people who called on Samsung to act, welcomed the company's response. This strategy represents Samsung's first steps towards increasing the amount of renewable energy it uses to power its operations. However, to what extent this new renewable energy strategy will finally put Samsung on the right pathway towards becoming a leader on climate change will depend on Samsung's level of ambition and the willingness of the company to reorient its rapid growth in order to prioritize access to new sources of renewable energy.

According to its 2018 Sustainability Report, Samsung operates 39 manufacturing facilities around the world and works with 2,436 suppliers.<sup>2</sup> In 2017, Samsung's electricity consumption increased by 11.2% compared to 2016 (from 16,587GWh to 18,450GWh). Though electricity from renewable sources also increased in 2017 (from 181GWh to 228GWh), due to the overall increase in electricity consumption, renewable energy still only accounted for only 1% of Samsung's energy mix.

» Samsung Electronics' renewable energy snapshot



» Samsung Electronics' 2016 regional energy consumption breakdown



The three regions included in the commitment (US, China and Europe) account for 19.5% of Samsung's energy consumption.<sup>3</sup> If Samsung were to fulfill its commitment of reaching 100% renewable energy in these three regions, it would increase its renewable energy consumption from the current figure of 1% to 20% by 2020.

However, to ensure Samsung becomes a true climate leader, the company needs to go beyond its 2020 near-term goal for these three regions and increase its use of renewable energy around the world in the medium to long-term. To do so, a plan to increase Samsung's use of renewable energy in South Korea and Vietnam is crucial as these two regions represent Samsung's largest energy footprint. In 2017, South Korea

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and Vietnam together accounted for 80% of Samsung's total energy consumption globally, 66% and 13.6% respectively.<sup>4</sup>

In order for Samsung to meet its 100% target in the US, EU, and China, and expand the commitment globally, it will require significant new investment and a clear decision from the company to procure electricity from new sources of renewable energy. Fortunately, many other leading companies have already paved a pathway for large-scale renewable energy procurement and have shown that choosing high-impact options to fulfill their 100% goal is not only good for their credibility, but it also makes long-term business sense.

Today, over 140 companies around the world have committed to 100% renewable energy<sup>5</sup>, and corporate purchases of renewable electricity have become one of the largest drivers of renewable energy. In 2017 alone corporate contracts sourced 465 TWh of renewable power, the equivalent of the annual electricity demand of France<sup>6</sup>. Given companies in the Commercial & Industrial sector account for about two-thirds of the world's end-use of electricity<sup>7</sup>, it is essential that powerful corporations like Samsung do their part to ensure, together, we can meet the critical climate objectives to limit global warming to less than 1.5 degree as set out in the 2015 Paris Agreement.

**This report will outline the steps Samsung should take to become a climate leader in five major regions: Firstly, the three regions (the United States, Europe and China) where Samsung has committed to 100% renewable energy and, secondly, the two (Vietnam and South Korea) where Samsung has a large, and rapidly growing, energy footprint.**

It will show how corporate renewable energy procurement is diversifying in these regions, and go on to outline what Samsung needs to do in order to implement a credible and ambitious renewable energy strategy globally. Among these five regions, some markets have a mature corporate procurement system while others currently have a less developed or non-existent system. The roadmap will propose additional actions Samsung can take in the areas where corporate procurement is not yet possible.



### **United States**

Electricity markets are primarily managed at the state or regional level. Several regions reflect a mature market with a number of options available for corporate renewable energy procurement, while other states continue to be dominated by monopoly utilities, and offer few options for renewables purchasing. The availability of renewable procurement options such as Power Purchase Agreements (PPA), utility green tariffs, or

on-site installation vary from one state to the next. It is important to note that leading US companies like Apple, Facebook, and Google have moved away from buying so-called unbundled Renewable Energy Certificates (RECs) as it does not contribute to new renewable energy capacity.



### **Europe (Poland, Slovakia, Hungary)**

National-level conditions for renewable energy and its availability differ strongly between the three countries where Samsung has manufacturing facilities: Poland, Slovakia and Hungary. Samsung, in its search for renewable power supply, should therefore focus on purchasing locally or self-producing renewable energy as much as possible in order to support further development of national renewable energy supply in these countries.



### **China**

Options for corporate procurement are currently increasing beyond on-site installation. Pilots for direct purchase from a distributed generation market are expected to launch soon in certain areas, including Guangdong and Jiangsu, where Samsung's production lines are located. Furthermore, Samsung can also choose direct investment in utility-scale renewables, as Apple is currently doing in China.



### **South Korea**

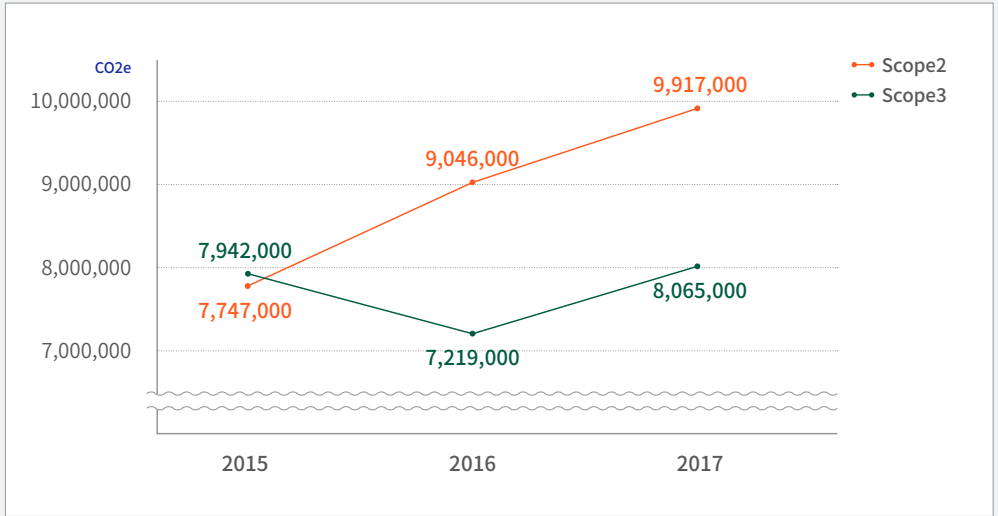
As corporate procurement options are not yet available in South Korea, Samsung should continue to maximize on-site installation and look for ways to directly invest in renewable energy projects, as well as advocating for favorable policies. In July, the amendment proposal for the Electric Utility Act and Act on The Promotion of The Development, Use and Diffusion of New And Renewable Energy (hereinafter "New and Renewable Energy Act"), that would allow the purchase of renewable electricity from electric utility South Korea Electric Power Corporation (KEPCO), was submitted to the national assembly. Samsung should voice its support for this policy as it would facilitate its transition to being powered by renewable energy in South Korea.



### **Vietnam**

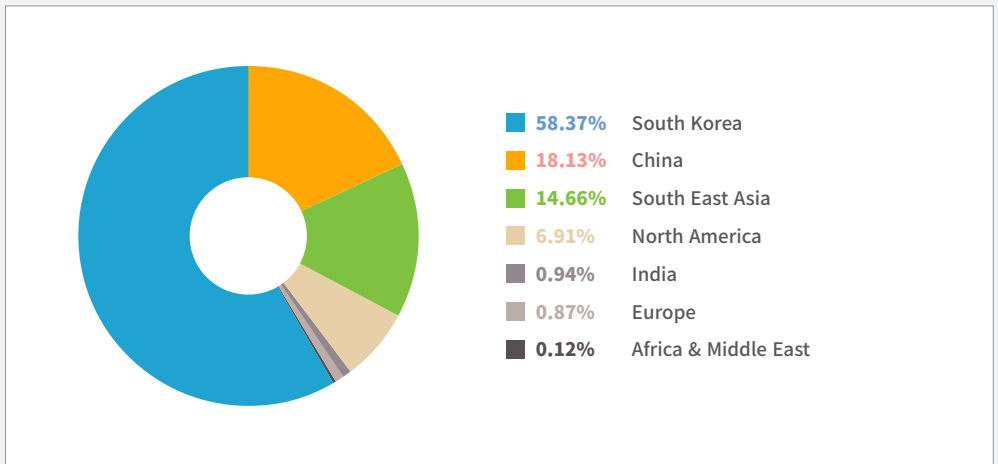
Corporate renewable energy procurement in Vietnam is in its infancy. So far, on-site installation of rooftop solar PV has been the only available option. However, a policy to enable the Direct Power Purchase Agreements (DPPAs) pilot program for corporate contracting of renewable energy supply from private RE generators is being formalized and will potentially go into effect in the first quarter of 2019 or sooner. If Samsung is to expand its current 100% renewable electricity commitment in Vietnam, the DPPA mechanism will be an integral tool to utilize.

» Samsung Electronics' scope 2\* and scope 3\*\* emissions



From Samsung's 2018 Sustainability report

» Samsung Electronics' regional scope 2 emissions breakdown



From Samsung's 2018 Sustainability report

\* Scope 2 emissions are from purchased or acquired electricity, steam, heat and cooling.

\*\* Scope 3 emissions are from the value chain of the company.

# Key Strategy Elements

If Samsung is serious about becoming a corporate leader on climate change and renewable energy, it should include the following elements in the implementation of its strategy.

<b>Goal</b>	Samsung should expand its near term 100% renewable energy target in the US, EU, China and include all of its global operations and supply chain.
<b>Scope</b>	While the company should initially focus on its own operations, its commitment to renewable energy must also include its supply chain.
<b>Transparency</b>	Samsung should provide clear public reporting of its global operations, with region specific details of electricity demand and creation of new renewable energy supply.
<b>Procurement Principles</b>	<p>The company should choose the most impactful ways that would increase the amount of renewable energy and weaken the demand for fossil fuels in each country. This principle needs to be set in its corporate renewable energy policy.<sup>8</sup> Fundamental procurement principles are as follows:</p> <ul style="list-style-type: none"><li>» <b>Local</b> Renewable energy supply is located on the same grid as the company's electricity demand, taking responsibility for the additional electricity demand its growth is creating, and displacing dirty energy generation with renewable sources of electricity generation.</li><li>» <b>Additional</b> Renewable energy is new and "additional," going beyond what would have occurred with existing national or state policy targets or mandatory requirements for utilities to increase renewable energy production.</li><li>» <b>Renewables advocacy</b> The company advocates for change with energy utilities, regulators or elected officials, pushing for policies to increase the supply of renewable energy on the grid in locations where the company has operations and major suppliers.</li></ul>



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**Questions all companies should be asking themselves in the pursuit of meaningful climate action**

- ✓ Is the company's level of ambition consistent with the decarbonization of the electricity sector needed to stay within 1.5 degrees total temperature change?
- ✓ Has the company established a corporate renewable energy policy and prioritized procurement methods that would replace fossil fuel sources with renewable energy?
- ✓ Does the company show clear support for policies that align with the level of ambition set out in the Paris Agreement to limit global warming to less than 1.5 degrees, and speak out against those policies that would further increase emissions?

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# Powering key production bases with renewable energy - US, Europe, China, South Korea, Vietnam

In order to meet the Paris Agreement's aims to limit average global temperature rise to well below 2 degrees, and pursue a 1.5 degrees goal, we will need to see a dramatic reduction in global greenhouse gas (GHG) emissions and a rapid transition to 100% renewable energy. If we are to limit warming to 1.5 degrees, GHG emissions need to fall rapidly after 2020. Among other things, this requires a dramatic acceleration in the uptake of renewable energy, a massive increase in energy efficiency and the phasing out of fossil fuels well before 2050.

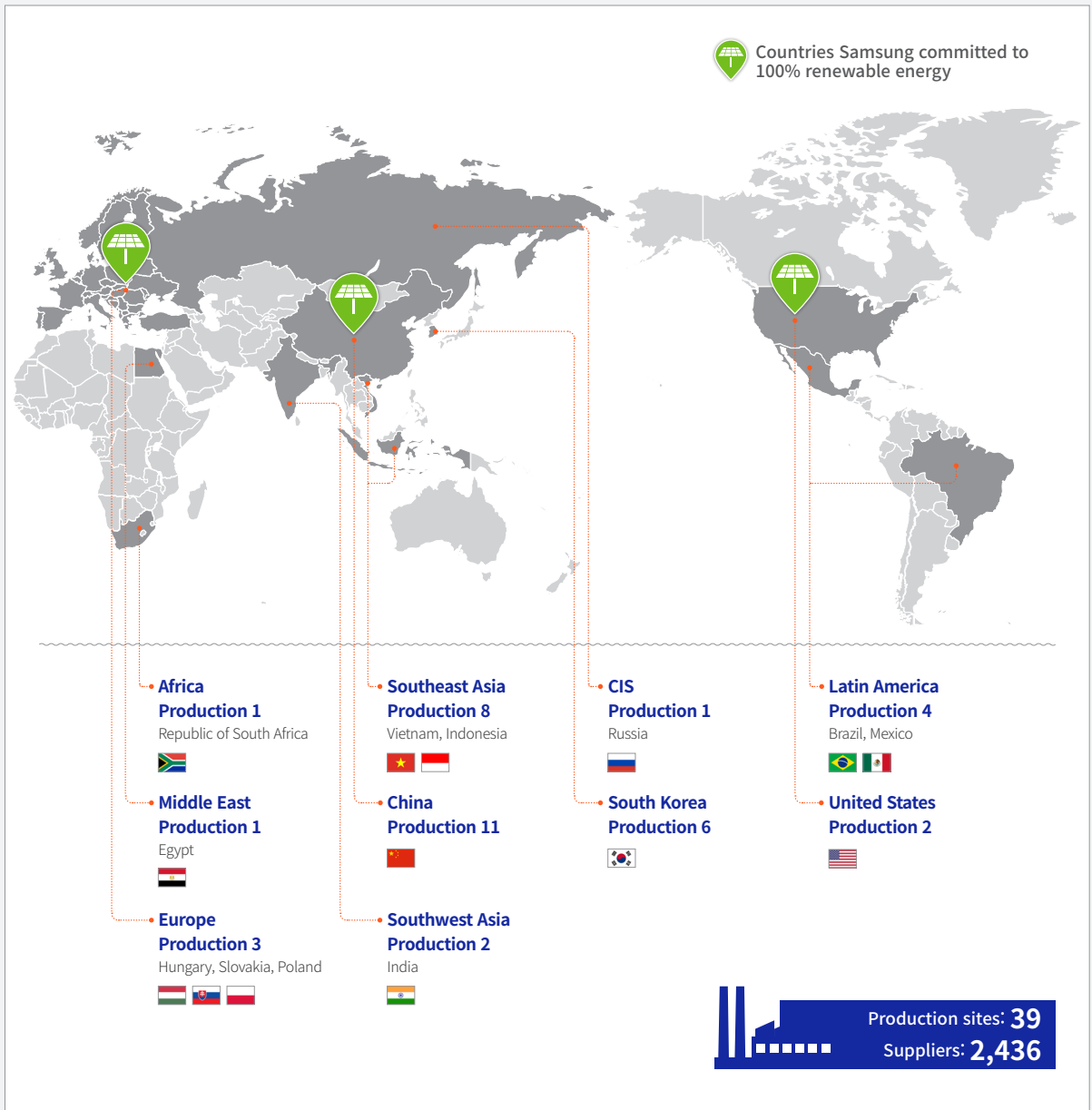
Given its size and influence, Samsung could play an important role in ensuring we meet the 1.5 degrees goal. The company operates 39 manufacturing facilities around the world and counts 2,436 partners in its global supply chain. In 2017, Samsung's electricity consumption increased by 11.2% compared to 2016, from 16,587GWh to 18,450GWh. This major increase was mainly due to its expansion in South Korea, which now accounts for about 66% of Samsung's total energy consumption. After South Korea, Southeast Asia is now the second largest region for Samsung's energy use, followed by China. Together, the United States, Europe and China account for 19.5% of the company's total energy consumption.

If Samsung fulfills its current commitment to go 100% renewable energy by 2020 in the United States, Europe, and China, the company would increase its renewable energy consumption from 1% to about 20% in less than three years. However, if Samsung is serious about helping tackle climate change, it is of utmost importance that the company meets its commitment with meaningful action - prioritizing procurement options that truly replace fossil fuels with renewable energy, as opposed to approaches that undercut the development of new renewable energy sources while allowing companies to claim they are green.

Samsung has shown it is willing to take action for a renewably powered future and now has a huge opportunity to do the right thing, show leadership and be serious in its response to climate change. With this commitment and its short term renewable energy goals Samsung has taken the important first steps but the company has the power and the potential to "Do Bigger Things", as it's popular advertising campaign promotes. Samsung needs to expand its ambition to the other parts of its global operations,

especially in South Korea and Vietnam, not only by directly contributing to renewable energy growth but by also showing clear support for policies that align with the Paris Agreement’s ambition to limit warming to 1.5 degrees and speaking out against those policies that would further increase emissions.

» Samsung Electronics’ 2017 worldwide production



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## United States

With access to corporate renewable energy deals growing in the United States, many leading companies like Google, Apple and Microsoft have demonstrated that corporate leadership can play a major role in driving renewable energy investment - choosing meaningful procurement options and moving away from purchasing unbundled RECs. However, energy policy differs state by state, especially when it comes to how well utilities accommodate corporate clean energy procurement.<sup>9</sup> Mainly in states which are dominated by monopoly utilities, some pioneering corporations are actively lobbying utilities and policymakers to allow the purchasing of renewable energy at scale, either from the utility or from other service providers who are able to deliver a 100% supply of renewable energy.<sup>10</sup>

According to Samsung's 2017 CDP report, the company consumed 1,689 GWh of energy in North America. Samsung has two production facilities in the United States, and one facility in Tijuana, Mexico. The two US facilities are a semiconductor plant based in Austin, Texas and a consumer electronics (e.g., washing machines etc.) plant in South Carolina.

Texas was ranked among the top five states for companies wishing to procure renewable energy for their operations.<sup>11</sup> Texas produces more non-hydroelectric renewable energy generation than any other state in the U.S., and most of this comes from wind-power generation, making up one-fourth of the US total in 2016.<sup>12</sup> Texas is the one place where Samsung is actively seeking to procure clean energy. As one of the largest customers of Austin Power, in 2016, Samsung Austin Semiconductor (SAS) had a contract with Austin Energy and has been obtaining 33 GWh of wind-power electricity per month which is supported by energy attribute certificates under the 'Green Choice' program<sup>13</sup>.

Samsung faces a more challenging context for its new appliance factory in South Carolina as corporations cannot yet purchase renewable electricity directly in the state due to the fact that it is divided into monopolized electric utility service territories. Faced with a similar challenge in neighboring North Carolina in 2012, Apple, Facebook, and Google worked together to advance policy changes that would open up the utility market. They were ultimately successful in creating a renewable energy tariff for large customers, but Apple also invested directly in new renewable energy infrastructure nearby to its data center.

It is important that Samsung chooses to source renewable electricity separately in South Carolina, rather than buying a significant amount of wind-power electricity in

Texas and claiming that this amount covers the factory located in South Carolina. The US electricity grid is split into regional grids with limited interconnections therefore contracting renewable energy in deregulated markets like Texas does nothing to counter the demand for coal and other dirty sources of electricity in states like South Carolina, where Samsung’s other facility is based. This principle should apply to Samsung’s non-manufacturing facilities in the U.S..

Lastly, in 2016, Samsung also purchased 80 GWh of Green-e certified RECs. However, the company does not disclose further details around Green-e certified RECs, such as the type of renewable content, location of purchase, and year of generation.

Samsung should not rely on the large purchases of unbundled RECs and claim it has deployed new and additional source of renewable energy. In the United States, Renewable Energy Certificates (RECs) are established for compliance with state-level renewable portfolio standards, as well as for voluntary markets and are widely used across all industry sectors and company sizes in the country. It was estimated that unbundled and bundled REC transactions reached 95 TWh in 2016<sup>14</sup>, with unbundled certificates totalling 52 TWh.<sup>15</sup> However, in 2016, REC prices in the US voluntary market continued to decline to an average of \$0.36/MWh or \$0.00036 cents a kWh.<sup>16</sup> The minimal revenue generated from the sale of RECs at this price does little to drive additional renewables capacity, or displace demand for fossil fuel and is therefore not a credible option.

Texas	
Meaningful options	<ul style="list-style-type: none"> <li>• On-site renewable energy installation</li> <li>• Power Purchase Agreements (PPAs) with third party</li> <li>• Direct investment in new renewable energy projects</li> <li>• Utility green energy tariff</li> </ul>
Best renewable practices by corporates	<ul style="list-style-type: none"> <li>• In 2013, Microsoft’s PPA with the Keechi wind farm which is located on the same electric grid that powers its San Antonio data center in Texas<sup>17</sup></li> </ul>
Action points for Samsung Electronics	<ul style="list-style-type: none"> <li>• As well as purchasing renewable electricity from Austin Power, prioritize procurement deals that add new renewable energy at scale and avoid the purchase of unbundled RECs.</li> </ul>
South Carolina	
Meaningful options	<ul style="list-style-type: none"> <li>• On-site renewable energy installation</li> <li>• Direct investment in new renewable energy projects</li> </ul>

Best renewable practices by corporates	<ul style="list-style-type: none"> <li>• Samsung can be a pioneer of opening up the state's utility market.</li> </ul>
Action points for Samsung Electronics	<ul style="list-style-type: none"> <li>• Make direct investment in renewable energy projects near its manufacturing facility</li> <li>• Policy advocacy to open up the utility market and create a renewable energy tariff or equivalent for large customers</li> </ul>

## Europe (Poland, Slovakia, Hungary)

European countries continue to account for the bulk of corporate sourcing and are already home to a large number of companies actively procuring renewables. Northern European countries are the best placed if corporates are looking for a large amount of renewable procurement, such as geothermal or wind. However, there is some disparity in renewable energy sourcing in Europe as central and eastern European countries still rely heavily on fossil fuels or nuclear power as a major energy source with limited retail choices for renewable electricity.

In particular, the conditions and accessibility of renewable energy in the three European countries where Samsung has its manufacturing facilities, Poland, Slovakia, and Hungary, differ strongly. Samsung, in its search for renewable power supply in these countries, needs to focus on purchasing locally or producing its own renewable electricity as much as possible as this would support the further development of national renewable energy supplies here.

In Central and Eastern Europe Samsung produces consumer electronics. It has washing machine production lines in Poland while it produces television sets and display panels in Slovakia and Hungary. According to Samsung's 2017 CDP report, in 2016, Samsung used 275 GWh of energy in Poland, Slovakia and Hungary combined. It is difficult to know how much electricity the company uses in each of these countries since Samsung does not disclose region-specific electricity consumption.

Samsung claims that it has purchased 51 GWh<sup>18</sup> of electricity via green procurement schemes from suppliers or utilities in these three countries. Samsung reports it has purchased bio-energy in Poland, Slovakia, and Hungary and hydroelectric power in Slovakia, however, it does not disclose whether this includes large-scale hydroelectric power plants or the source of the bio-energy.<sup>19</sup> Therefore, it is difficult to assess the impact of this procurement since the company does not specify the type of renewable

energy or the year of its generation. Depending on what sources of renewable energy the company procured and will procure, the impact Samsung can bring to these markets will make a huge difference.

Furthermore, Samsung should avoid relying on large purchases of Guarantees of Origin (GOs) and claim it has deployed new and additional source of renewable energy. In Europe an energy attribute system known as Guarantees of Origin (GOs)<sup>20</sup> is widely used. The market for GOs, bundled and unbundled, was estimated at 300 TWh in 2016.<sup>21</sup> However, since GOs can be traded among most EU states even where no grid connections exists, the market is flooded with surplus and cheap GOs from, for example, unsustainable Norwegian hydropower. Most EU utilities, taking advantage of such a trend, purchase low price GOs to greenwash their fossil fuel centered energy mix and sell it to its corporate customers as ‘green power.’ Purchasing GOs does not actually increase new renewable energy.

## Poland

Poland is one of the most coal-dependent countries in the EU and the current government has not proactively supported renewable energy, despite the fact that the country has very strong potential for wind power. If Samsung plans to take a meaningful action, it should follow IKEA’s example: in 2015 IKEA announced that the company is using 100% renewable energy for all of its operations in Poland using local wind farm investments and wood waste biomass for heat.<sup>22</sup> Samsung must choose a procurement method which contributes to the replacement of fossil fuels with renewable energy in the grid by accelerating, where possible, new investments in local wind or solar power.

Poland	
Meaningful options	<ul style="list-style-type: none"> <li>• On-site renewable energy installation</li> <li>• Direct investment in new renewable energy projects</li> <li>• Utility green energy tariff</li> </ul>
Best renewable practices by corporates	<ul style="list-style-type: none"> <li>• In 2015, IKEA acquired a total of six wind farms: the equivalent of producing 473 GWh of electricity annually.<sup>23</sup></li> </ul>
Action points for Samsung Electronics	<ul style="list-style-type: none"> <li>• Sign a contract with a local wind farm.</li> <li>• Make direct investment in new renewable energy projects</li> <li>• Maximize on-site renewable energy installation at its operating sites</li> <li>• Advocate for legislation changes in the area of Renewable Energy Sources(RES), especially onshore wind power, the development of which has been significantly hindered by the current government.</li> </ul>

## Slovakia

Slovakia's energy supply has been based around developing additional nuclear capacity. Currently, nuclear power represents 57% of the country's total electricity generation, coal makes up 12% and renewables make up 25% which, on paper, looks promising. Unfortunately, the majority of this renewable energy generation is supplied by old, unsustainable ("big") hydro, and an additional percentage comes from waste incineration, neither of which are generally considered as renewable energy in international terms. As such legislative pitfalls exist in the definition of renewable energy, Samsung must be cautious about its sources of renewable energy and ensure it meets its commitment with meaningful renewable energy sources.

Wind power is underdeveloped, but for a good reason - most significant wind potential areas overlap with protected natural areas. Therefore, in Slovakia the greatest solution for Samsung's renewable energy supply lies in investing in, and self-producing from, solar. Smaller-scale producers of solar power exist and most are associated with the Slovak Association of Photovoltaic Industry (SAPI), despite the fact that 69% of the country's power supply is dominated by the Slovak Energy Company (partly state-owned). Samsung should identify localized solar supply through SAPI while investing in solar projects for its own consumption. Though there are a few strong corporate leaders in Slovakia in the area of renewable supply, none of them are from the electronics sector. Samsung therefore could, by default, position itself as an industry champion.

Slovakia	
Meaningful options	<ul style="list-style-type: none"><li>• On-site renewable energy installation</li><li>• Direct investment in new renewable energy projects</li><li>• Utility green energy tariff</li></ul>
Best renewable practices by corporates	<ul style="list-style-type: none"><li>• Samsung can be a pioneer.</li></ul>
Action points for Samsung Electronics	<ul style="list-style-type: none"><li>• Identify localized solar supply through the Slovak Association of Photovoltaic Industry (SAPI)</li><li>• Connect with local communities on topics of location and the size of PV installation</li><li>• Invest in own PV power production and negotiate the administrative burden associated with installation, grid connection and the option of sales</li></ul>



## Hungary

As is the case in Slovakia, Hungary is currently focussing the development of its energy supply on nuclear power, which could constitute as much as 80% of Hungary's demand in the future, whereas renewable energy supply still remains underdeveloped. Up to now the development of renewables has been slow and mostly focused on biomass. With regards to wind power, despite the fact that Hungary's national renewable action plan states that an additional 420 MW could be installed to the grid without any issues, wind currently represents only 330 MW. Private investments in renewable energy have also been made difficult through arbitrary administrative barriers.

Meanwhile, installed PV capacity is increasing, and Hungary's new energy secretary recently stated that a national target of 3,000 to 4,000 MW of solar PV installation by 2022 could be set. Therefore, Samsung could have a good opportunity to invest in solar projects in Hungary as part of its renewable energy strategy.

Hungary	
Meaningful options	<ul style="list-style-type: none"><li>• On-site renewable energy installation</li><li>• Direct investment in new renewable energy projects</li><li>• Utility green energy tariff</li></ul>
Best renewable practices by corporates	<ul style="list-style-type: none"><li>• Samsung can be a pioneer.</li></ul>
Action points for Samsung Electronics	<ul style="list-style-type: none"><li>• Maximize on-site renewable energy installation at its operating sites</li><li>• Make direct investment in new renewable energy projects</li><li>• Explore the possibility of working with local farmers to use agricultural biomass waste in the in the region of the Samsung Jászfényszaru factory.</li></ul>

## China

China has become the most significant driver of renewable energy investment globally and the Chinese energy market is currently undergoing substantial reform, meaning that more procurement mechanisms are opening up beyond on-site installation. Furthermore, global tech companies like Apple are adopting various renewable energy procurement mechanisms to either clean up their operations by self-generating renewable energy; or to clean up their supply chain.

In 2016, Samsung consumed 2,133 GWh of energy in China and the country is home to

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Samsung's largest production lines outside of South Korea, operating 11 manufacturing and assembly plants producing everything from semiconductors to smartphones. Samsung's primary production sites are located in Suzhou, Xi'an, Tianjin, and the city of Huizhou<sup>24</sup>. In its Suzhou and Xi'an factories Samsung produces semiconductors, display panels, and NAND flash memory chips, meanwhile its factories in Tianjin and Huizhou manufacture Samsung's smartphones. The company also has a display panel factory in Dongguan. Despite Samsung reducing its production capacity in its Tianjin and Huizhou factories, China remains the company's third largest smartphone production base, shipping 20% of its global smartphone units in 2017.

As in the USA, corporate renewable energy procurement in China also varies by province and region. Amongst the available corporate procurement options, on-site installation and equity investment in new off-site projects are the most accessible and high-impact options in all provinces. For example, Apple is investing in projects that will generate over 485 MW of renewable energy capacity across six provinces in China. There are also options to buy unbundled RECs through a domestic RECs pilot scheme that was launched in July 2017. Though the current prices are high enough to generate meaningful revenues for project developers, there is still some uncertainty about whether these unbundled RECs will actually lead to new additional capacity.

Other options are still emerging and therefore only available in certain provinces. One of them is PPA (power purchase agreements, aka direct power purchase 电力直接交易). This allows corporates to directly procure from utility-scale renewables through provincial and inter-provincial electricity markets. The Chinese PPA is however different from the US model - it is usually more short-term, such as a one-time deal, monthly or annual power purchase; however, multi-year contracts are still uncommon. Renewable energy PPA remains more common in northwestern provinces, such as Xinjiang and Gansu. However, with special approval from local governments, this can also be done in other provinces, as Apple and its suppliers have shown. For example, Lens Technology, Apple's glass supplier, has reportedly signed a PPA with a wind farm in Hunan Province; another supplier, Golden Arrow, is exploring a similar option in Jiangsu province.<sup>25</sup> Another Apple supplier, Mega Precision (based in Dongguan, Guangdong) is considering entering into a cost competitive PPA with China's largest biomass plant, located in Guangdong Province.<sup>26</sup> Samsung could apply a similar strategy for its facilities located in Suzhou City, Jiangsu Province and Huizhou city and Dongguan city, Guangdong Province.

Another option, distributed generation market (分布式市场化交易) is currently in a pilot stage and should be available soon. This option would allow distributed wind and

solar generators to sell electricity directly to their neighboring electricity consumers. Pilot projects in 13 different cities and provinces are currently awaiting approval from the NEA (National Energy Administration). Government statements indicate that it is likely some pilots will roll out in the provinces of Guangdong<sup>27</sup> and Jiangsu<sup>28</sup>. Samsung should check with both provincial governments for details and participate in these schemes if they become available. This would be a groundbreaking deal as it would not only be local and additional, but it would also support a decentralized energy system.

Although these newly emerging market mechanisms and pilots are only available in certain provinces right now, they are strongly aligned with the direction of the power market reform and so we can expect them to scale up in the next few years.

China	
Meaningful options	<ul style="list-style-type: none"> <li>• Onsite installation for self consumption</li> <li>• Direct investment</li> <li>• PPA in some provinces*</li> <li>• Distributed Generation market available soon in some provinces</li> </ul>
Best renewable practices by corporates	<ul style="list-style-type: none"> <li>• Onsite: Commercial and industrial rooftop solar for self consumption reached 8 GW in China by end of 2017.<sup>23</sup></li> <li>• Direct investment:               <ul style="list-style-type: none"> <li>- Apple made one of the largest foreign corporate investments in RE in China: over 485 MW of solar and wind capacity across six provinces.</li> <li>- In July 2018, Apple launched a \$300 million “China Clean Energy Fund” with 10 suppliers to produce 1 GW of renewable energy.</li> </ul> </li> <li>• PPA               <ul style="list-style-type: none"> <li>- Mega Precision is considering entering into PPA with China’s largest biomass plant in Guangdong Province.</li> <li>- Golden Arrow is exploring direct power purchase of RE in Jiangsu Province.</li> </ul> </li> </ul>
Action points for Samsung Electronics	<ul style="list-style-type: none"> <li>• Maximize on-site PV installation at its operating sites.</li> <li>• Prioritize direct purchase from Distributed Generation Market or PPA option starting with Guangdong and Jiangsu.</li> <li>• Make direct investment in renewable energy projects near Samsung’s facilities.</li> <li>• Policy advocacy to open up the utility market and create a renewable energy tariff, or equivalent, for large customers.</li> </ul>

\* PPA: Various forms of PPA exists and differs by countries. The most common type of PPA in China is also known as RE bilaterals or direct power purchase. Companies sign a contract with renewable energy generators through the provisional and inter-provincial electricity markets to purchase power. The contracts could be one-time deal, monthly or annual power purchase; however, multi-year contracts are still uncommon which is the main difference from the US form of PPA. There are also cases that third-party developers install on-site distributed solar and sign a 20-year physical PPA with the off-taker, which is common in the U.S.

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## South Korea

South Korea is at a crossroad for its renewable energy transition. In 2017, the government announced a target to increase renewable energy to 20% by 2030 and to phase out coal and nuclear power plants gradually. The announcement drew a lot international attention, as South Korea is the world's 7th largest emitter of carbon dioxide and historically its power generation mix has been heavily dominated by coal-fired and nuclear power plants. According to 2018 Electric Power Statistics, South Korea generated 43% of its electricity from coal and around 27% from nuclear reactors while renewables only met 2% of power demand.<sup>30</sup>

Fundamental to the success of South Korea's energy transition will be the support of the private sector. Industry alone consumes about 57% of the country's total national power. Within this context, Samsung's recent announcement, entailing its full support for the government's national strategic plan has sent an important signal, showing the industry's need for, and willingness to support, renewable electricity.

In 2016, Samsung consumed 10,939 GWh of electricity in South Korea, accounting for 66% of its total global electricity consumption. If analysed according to energy consumption, Samsung consumed 13,909 GWh in 2016 which also accounts for 66% of the company's total global energy consumption<sup>31</sup>. This is about three times more than its combined energy consumption in the US, EU, and China. The company operates six manufacturing facilities in South Korea - three semiconductor production lines and one display panel production line all based in Gyeonggi-do Province, and two of its mobile phone production lines based in Gyeongsangbuk-do Province. Though the share of its mobile phone production in South Korea is decreasing, more investment in the company's semiconductor business is the key factor that explains Samsung's rapid electricity consumption and emission growth in the country.

Unfortunately, there are currently no corporate renewable energy procurement mechanisms available in South Korea, other than installing renewable electricity generation on-site for self-consumption. Electricity can only be purchased from monopoly utility, Korea Electric Power Corporation (KEPCO). While Samsung's announcement to install 42,000m<sup>2</sup> of solar panels at its Suwon facility and 21,000m<sup>2</sup> of solar panels and geothermal power generation at its Pyeongtaek and Hwaseong facilities is a meaningful start, harvested renewable energy from on-site PV would only account for a small share compared to its overall power consumption in South Korea.

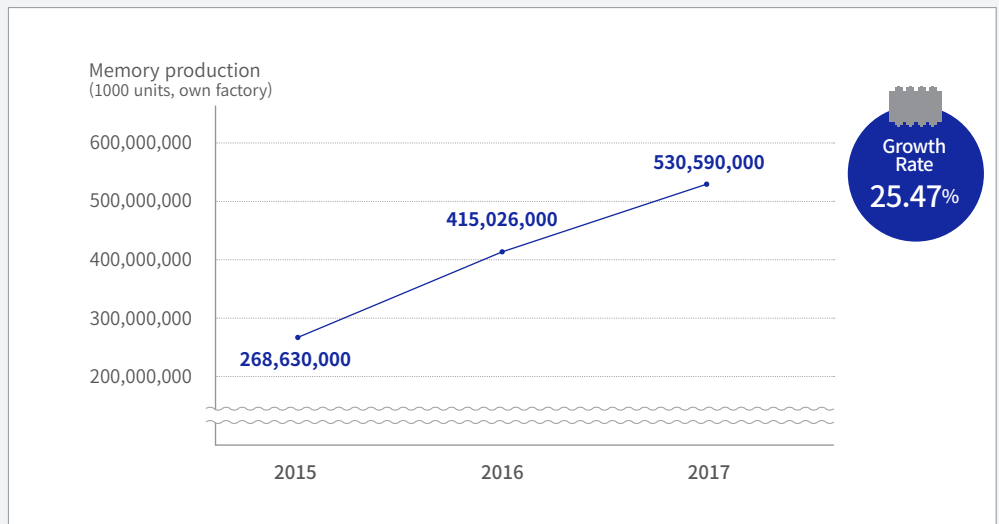
For Samsung to expand its current 100% renewable electricity commitment in

South Korea, policy which enables the purchase of renewable electricity at scale from the utility company or from other renewable energy generators must be in place. Fortunately, there has been an upsurge of interest in such policies within the government as more corporates recognize the importance of renewable energy use for their core competitiveness in the global market. However, the current government has so far shown little willingness to consider this as an opportunity to reform the current power market.

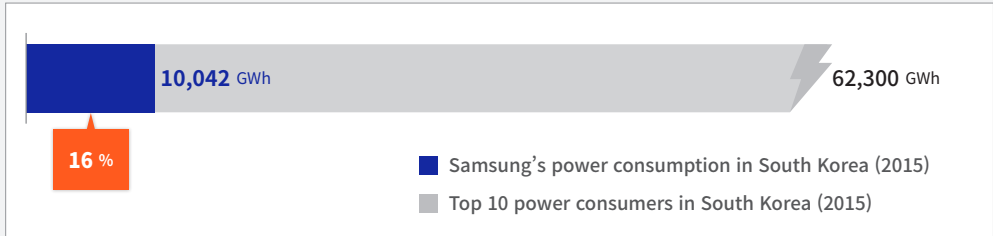
In June 2018, an amendment proposal for the Electric Utility Act and New and Renewable Energy Act that would allow the purchase of renewable electricity from KEPCO was submitted to the national assembly<sup>32</sup>. If this amendment is passed, a form of utility green tariff could be introduced. As this mechanism would not require any, or only a minimal change, to the current power market, it would be one of the easiest ways to open up a renewable purchasing mechanism in South Korea.

Samsung should speak up and demand that the utility company, KEPCO, offers a program that would give it access to renewable electricity. Furthermore, when such a program is introduced, the company should become the first customer to purchase a large amount of renewable electricity. By taking such actions, Samsung could show the corporate demand for renewable electricity and help accelerate the opening up of more impactful renewable energy procurement mechanisms in South Korea.

#### » Samsung Electronics' semiconductor unit shipments growth



» Samsung Electronics' power consumption among Korea's top 10 power consumers



South Korea	
Meaningful options	<ul style="list-style-type: none"> <li>On-site renewable energy installation</li> <li>Similar Utility Green tariff mechanisms were proposed in June 2018</li> </ul>
Best renewable practices by corporates	<ul style="list-style-type: none"> <li>Some on-site PV installation by companies.</li> <li>Samsung can be a pioneer.</li> </ul>
Action points for Samsung Electronics	<ul style="list-style-type: none"> <li>Maximize on-site installation at its operating sites</li> <li>Policy advocacy to open up the utility market and create a renewable energy tariff, or equivalent, for large customers.</li> </ul>

Taiwan

**Taiwan sets renewable energy mandate for Taiwan's top electricity consumers  
Will TSMC set a higher goal for renewable energy than Samsung?**

Since the launch of its Energy Transition Program in 2016 Taiwan, under President Tsai-Yingwen's administration, has set ambitious renewable energy goals. These include an interim milestone to achieve 20% renewable energy in Taiwan's energy mix, reduce coal to 30% and complete the phasing out of nuclear by 2025.

In January 2017, Taiwan also amended the Electricity Act to open up renewable energy generation and retailing. This made it possible for big electricity consumers, such as corporates, to procure renewable energy directly from renewable energy project developers through PPAs (Power Purchase Agreements) or other measures, including direct purchase from the developer (on-site or near-site), renewable energy aggregator, and renewable energy tariffs.

In 2018, the government will encourage corporate players to speed up the development of renewable energy capacity. The ongoing amendment of Renewable Energy Development Act will make it mandatory for companies to use a certain proportion of renewable energy in their total electricity consumption\*. The amendment is expected to be finalized and announced no later than the end of 2018.

This decision may trigger a major breakthrough in corporate renewable energy procurement in East Asian markets, notably for the IT sector, as Taiwan has long been one of the world's leading manufacturing centers. It is also where a number of Samsung's rivals, such as semiconductor manufacturing giant TSMC, are headquartered.

\* Draft amendment of Renewable Energy Development Act, Article 12:

(The amendment is currently under development, therefore, it is not yet provided officially in English. The following is from a direct translation of the amendment.)

Electricity users who have contracts (with utility Tai-Power) where capacity achieved a certain amount, are obligated to install renewable energy generation facility or energy storage facility at certain capacity, or procure a certain amount of renewable electricity with certification or credits. Users that fit into this category but fail to deliver will pay a certain fee to the competent authority for renewable energy development.

## Vietnam

According to the Global Climate Risk Index, four of the world's ten countries most affected by climate change are located in Southeast Asia: Myanmar, the Philippines, Thailand, and Vietnam.<sup>33</sup> In 2015, the Vietnamese government adopted its Renewable Energy Development Strategy 2016-2030 with the vision towards 2050. This strategy aimed to increase power production from renewable energy from 35% in 2015 to 43% in 2050.<sup>34</sup> In 2016, to take more progressive climate change action, Vietnam, as a member of the Climate Vulnerable Forum(CVF), has pledged to use 100% renewable energy by 2050.<sup>35</sup>

Unfortunately, despite these efforts, coal power plants still play a central role in the country's energy mix due to the growing electricity demand from the industrial sector. To change this trajectory, the private sector's willingness to support Vietnam's energy transition is critical, as commercial and industrial companies consume more than 60% of Vietnam's electricity.<sup>36</sup>

In 2016, Samsung consumed 2,872 GWh of energy in Southeast Asia from seven manufacturing factories in Vietnam and one in Indonesia<sup>37</sup>. Samsung today remains the largest foreign investor in Vietnam turning the country into its largest smartphone production base. In 2016, exports from Samsung Electronics' factories in Vietnam totaled \$54 billion which accounts for around a quarter of the country's total export revenue of \$214 billion.<sup>38</sup> In 2017, Samsung produced almost 45% of its global smartphone units in the country<sup>39</sup>. The major smartphone production lines in Vietnam are located in Bắc Ninh province and Thái Nguyên province, while the company also operates a home appliance(e.g., TVs) production factory in Hồ Chí Minh City.

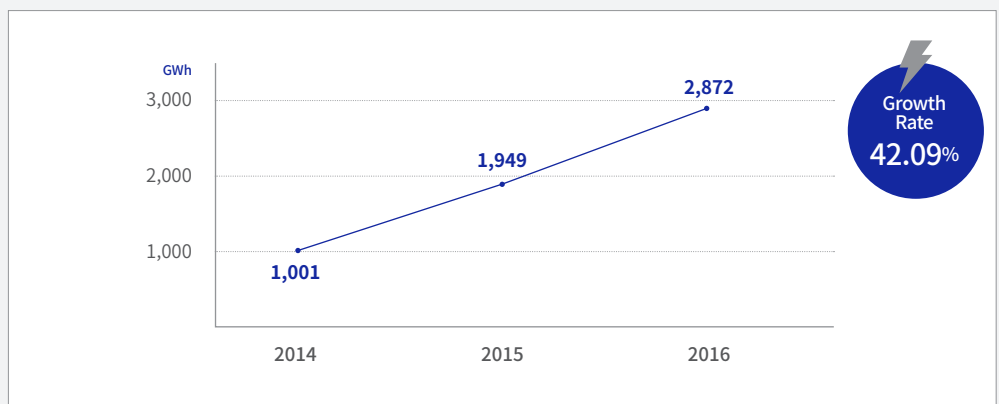
Samsung can play a crucial role in accelerating Vietnam’s energy transition by choosing more renewable sources to power its facilities and support the policies currently under development. Fortunately, there are tangible, visible solutions that Samsung can already engage in.

As is the case in South Korea, corporate renewable energy procurement in Vietnam is in its infant stage. So far, onsite installation of rooftop solar PV has been the only available option. However, the policy to enable the Direct Power Purchase Agreements (DPPAs) pilot program for corporate contracting of renewable energy supply from private RE generators is currently being formalized by the Ministry of Industry and Trade(MOIT) and will potentially go into effect in the first quarter of 2019 or sooner<sup>40</sup>.

Joining the DPPA pilot program, which will allow corporate industrial energy users to negotiate and sign PPAs with private renewable energy generators, would enable Samsung to procure more significant amount of renewable energy beyond the electricity harvested from rooftop solar PV installations at its factories. If Samsung is to expand its current 100% renewable electricity commitment to also cover its growing footprint in Vietnam, the DPPA mechanism will be an important tool to utilize.

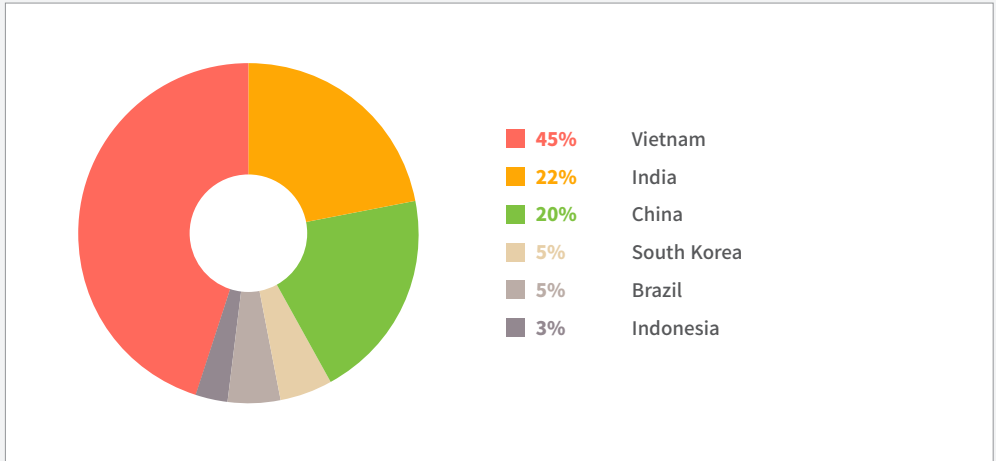
As a first public-facing action, Samsung can add its name alongside other corporates to the DPPA Declaration<sup>41</sup>, a non-binding document that voices the private sector’s collective support for improved corporate RE options in Vietnam. The Declaration was first signed and presented to the Government of Vietnam in November 2017 and has continued to grow with more corporate signatories throughout 2018.

#### » Samsung Electronics’ energy consumption in South East Asia





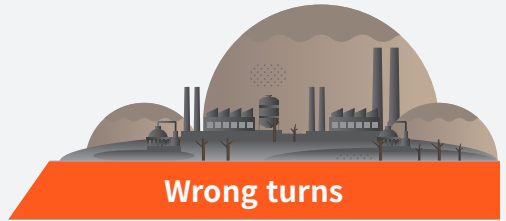
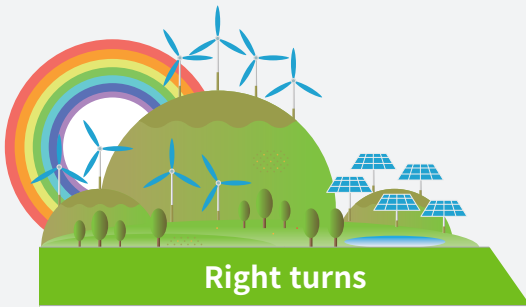
» Samsung Electronics' smartphone production bases



From Eugene Research (2018/10) - footnote 39

Vietnam	
Meaningful options	<ul style="list-style-type: none"> <li>• On-site renewable energy installation</li> <li>• DPPA pilot program under development. Pilot program may start in Q1 2019, but PPA negotiation with RE generators beginning in Q4 2018.</li> </ul>
Best renewable practices by corporates	<ul style="list-style-type: none"> <li>• Some on-site PV installation by companies.</li> <li>• Samsung can be a pioneer in opening up renewable energy deals</li> </ul>
Action points for Samsung Electronics	<ul style="list-style-type: none"> <li>• Maximize on-site PV installation at its operating sites.</li> <li>• Engage and join the DPPA pilot program.</li> </ul>

# Conclusion: Samsung, Do Bigger Things



Right turns		Wrong turns
<p>Increase your level of ambition by setting a company-wide target of 100% renewable energy, including your supply chain.</p>	 <b>Commitment</b>	<p>Stick to your 2018 announcement with no plans to support the Paris Agreement's 1.5 degree goal.</p>
<p>Establish a corporate renewable energy policy that prioritizes renewable energy projects that are local and additional.</p>		<p>Adopt no principles or standards to inform your renewable energy procurement.</p>
<p>Provide clear and transparent reporting of your electricity consumption for each facility.</p>	 <b>Transparency</b>	<p>Give no location specific information, just broad energy data.</p>
<p>Provide clear and transparent reporting on the types of renewable energy, renewable energy usage, procurement methods and project locations.</p>		<p>Overstate your transition to renewables by signing a large renewable energy procurement deal in one location and claiming that the company is 100% renewably powered across entire countries or regions.</p>
<p>Make all information easily accessible to the public via your website or annual sustainability report.</p>		<p>Make broad claims but don't report any details to back-up these claims.</p>
<p>Select the most credible and highest impact procurement option from the local grid where you operate.</p>	 <b>Performance</b>	<p>Rely on the cheapest but least impactful method - purchase of unbundled RECs, GOs, or equivalent (e.g. I-RECs.)</p>
<p>Work with supply chain so that you can deploy renewable energy and reduce GHG.</p>		<p>No assistance to ensure progress in supply chain.</p>
<p>Advocate regional and national policies that align with the Paris Agreement's 1.5 degrees ambition and aims for an urgent renewable energy transition (e.g. RE access, RE targets).</p>	 <b>Advocacy</b>	<p>No follow-up actions on your public commitment.</p>





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