

Statement for the record

Senate Committee on Foreign Relations

Subcommittee on Multilateral International Development, Multilateral Institutions, and  
International Economic, Energy and Environmental Policy

Testimony of João Talocchi

Program Director, Purpose Climate Lab

November 1<sup>st</sup>, 2017

**Introduction:**

Chairman Young, Ranking Member Merkley, Members of the Committee. Thank you for inviting me to testify on the important issue of energy access in emerging economies.

For the past 3 years I've directed campaigns at the Purpose Climate Lab, an initiative incubated by Purpose Campaigns and focused on accelerating the adoption of low carbon solutions through public engagement, communications and the coordination of collaborations among stakeholders. Working with a variety of stakeholders including social and environmental NGOs, local governments, the private sector, faith groups, celebrities and the UN, I have lead campaigns that mobilized and engaged more than three million people over the last two years and resulted in the adoption of renewable energy and clean transport policies. These campaigns simultaneously harness the reach and power of digital engagement platforms while fostering the deep connections created by innovative partnerships, offline activations and the influence of traditional media. The campaigns are developed using the best available knowledge, provided by scientific reports; technical reports developed by organizations specialized in the development and implementation of low carbon solutions and continuous interactions with multiple stakeholders collaborating towards similar goals.

Before Purpose, I held a variety of roles across at Greenpeace, including positions with the climate, energy and forest campaigns in the Brazil, International and United States offices. In addition to plan and implement multiple public campaigns, I worked with teams to commission a study that measured the hidden external cost of coal in South Africa and compared them to the potential for renewable energy investments. The results of this study<sup>1</sup> will be referenced in my testimony.<sup>2</sup>

I also directed the Amazonas State Climate Change Center, within the Sustainable Development Secretariat from the state of Amazonas, in Brazil. There, I lead the implementation of the state's climate change law, the development of the state's environmental services policies, supported pilot projects for renewable energy access in remote communities and created and the state's energy council.

---

1

<http://www.greenpeace.org/africa/Global/africa/publications/coal/FULL%20SCIENTIFIC%20PAPER%20139%20pages.pdf>  
All links provided as references were accessed on October 30<sup>th</sup>, 2017.

## Context:

Providing energy access to the 1.2 billion people around the world that lack access to electricity is a fundamental step to improve the social and economic conditions of these people, their countries and the world. No country has developed without access to reliable and affordable energy services.

How and when this done will have a direct impact over all of the 17 United Nations Sustainable Development Goals<sup>3</sup>. It is unreasonable to consider that its possible to eliminate poverty, improve nutrition, ensure quality education, empower women and promote sustained economic growth without energy.

It is also unreasonable to consider that its possible to ensure sustainable management of water, to make human settlements resilient, to protect ecosystems and to combat climate change if that energy is the result of exploring and burning fossil fuels. Especially, but not only because of fossil fuel's role in exacerbating the potential risks of climate change<sup>4</sup>, which is predicted to have severe negative impacts on food and water resources, ecosystems, economic growth, population dynamics and health, undermining and often reversing gains made through development.

One reason for this is fossil fuels have been around for decades, but have still failed to deliver energy to about one sixth of the world's population.

Another reason is the use of fossil fuels results in numerous negative externalities, such as long-term water pollution, the destruction of arable lands and crops, air pollution and climate change. I was part of the development of a scientific study in South Africa, entitled *The external cost of coal-fired power generation: the case of Kusile*. It showed that making consumers pay for the true cost of coal-fired electricity generation would add between 237% and 459% to the tariff.

Another key finding was that it would be possible to develop no less than 5 times the generation capacity of a specific proposed coal power plant, if only 30% of its external costs were used to fund renewable electricity generation. Despite these findings, this coal power plant, Kusile, is now under construction, with the support of 806 million dollars from the Export-Import Bank of the United States<sup>5</sup>. The potential for it to increase energy access to under served communities remains to be seen.

Communities without access to electricity often approach it one of two ways. In most cases, they rely on diesel generators, which usually only operate for a limited number of hours a day. The costs of fuel and maintenance are often too high for communities<sup>6</sup>, unless the cost of diesel

---

3

[http://arabdevelopmentportal.com/sites/default/files/publication/902.the\\_2030\\_development\\_agenda\\_energy\\_access\\_a\\_key\\_stone.pdf](http://arabdevelopmentportal.com/sites/default/files/publication/902.the_2030_development_agenda_energy_access_a_key_stone.pdf)

<sup>4</sup> <http://insights.careinternational.org.uk/media/k2/attachments/SDGs-climate-change-Sept-2014.pdf>

<sup>5</sup> <https://www.exim.gov/what-we-do/project-structured-finance/transactions>

<sup>6</sup> <http://iopscience.iop.org/article/10.1088/1748-9326/6/3/034002/meta>

is highly subsidized. In the Brazilian Amazon, I've heard the communities complain about the smoke, the fluctuating costs, the storage problems, the supply chains and the noise that diesel generators create. The latter point is curious but important. When you are in a poorly lit community in the forest, silence is an important ally, as noises can indicate the presence of thieves, snakes, jaguars or other risks.

But for many communities, light comes from kerosene lamps. In this case, fires that burn entire houses and indoor air pollution are ever-present threats<sup>7</sup>. These lamps don't produce enough light for kids to study at night and the streets remain dark, which creates security problems. In India, for example, Kerosene is heavily subsidized<sup>8</sup>, with costs reaching U\$5.1 billion in financial year 2013/2014, although the government seems to be aiming to put an end to it<sup>9</sup>.

For the past 3 years, I've been directing projects throughout the Indian states of Uttar Pradesh and neighboring Bihar, with combined populations approaching the size of the U.S. These are states in a region that houses many of India's thermal power plants<sup>10</sup> and some of the world's most polluted cities in terms of air quality<sup>11</sup>, and where fewer than half of rural households have power connections<sup>12</sup>.

The lack of energy access for many in India is not only about building more power plants or access to fuel<sup>13</sup>. India is a power surplus nation with significant electric power generation capacity idling for want of demand<sup>14</sup>. The state-run coal mining company is the world's largest.

The problem is supplying rural homes with electricity from the grid isn't economical<sup>15</sup> at this point. It makes little economic sense to extend and maintain the grid for long distances, over rivers and across mountains, with costs at the tens of thousands of dollars per mile, just to sell under priced electricity to a few houses. On top of that, technical losses and power thefts make grid power even less attractive.

But the suggestion of extending the grid makes political sense<sup>16</sup>. In countries and regions where many people have no access to energy, political power and electrical power are closely linked<sup>17</sup>.

The promise of abundant, free or heavily subsidized electricity is a great way to secure votes<sup>18</sup>. Election after election, from local seats to the highest elected positions, candidates talk about

---

<sup>7</sup> [http://www.se4all.org/2015\\_05\\_18\\_un-report-outlines-ways-to-achieve-clean-sustainable-off-grid-lighting-for-africa](http://www.se4all.org/2015_05_18_un-report-outlines-ways-to-achieve-clean-sustainable-off-grid-lighting-for-africa)

<sup>8</sup> [https://www.iisd.org/GSI/sites/default/files/ffs\\_india\\_kerosene.pdf](https://www.iisd.org/GSI/sites/default/files/ffs_india_kerosene.pdf)

<sup>9</sup> <https://economictimes.indiatimes.com/industry/energy/oil-gas/after-diesel-and-lpg-government-to-now-end-subsidy-on-kerosene/articleshow/59888617.cms>

<sup>10</sup> [https://en.wikipedia.org/wiki/States\\_of\\_India\\_by\\_installed\\_power\\_capacity](https://en.wikipedia.org/wiki/States_of_India_by_installed_power_capacity)

<sup>11</sup> <https://secured-static.greenpeace.org/india/Global/india/Airpocalypse--Not-just-Delhi--Air-in-most-Indian-cities-hazardous--Greenpeace-report.pdf>

<sup>12</sup> <http://garv.gov.in/garv2/dashboard#3>

<sup>13</sup> <https://www.bloomberg.com/news/features/2017-01-24/living-in-the-dark-240-million-indians-have-no-electricity>

<sup>14</sup> [http://www.cea.nic.in/reports/others/planning/pdm/growth\\_2017.pdf](http://www.cea.nic.in/reports/others/planning/pdm/growth_2017.pdf)

<sup>15</sup> <https://www.bloomberg.com/news/features/2017-01-24/living-in-the-dark-240-million-indians-have-no-electricity>

<sup>16</sup> <http://www.sciencedirect.com/science/article/pii/S0047272715000547>

<sup>17</sup> [http://webmeets.com/files/papers/res/2014/556/election\\_cycles\\_100913.pdf](http://webmeets.com/files/papers/res/2014/556/election_cycles_100913.pdf)

<sup>18</sup> [http://www-personal.umich.edu/~brianmin/MinGolden\\_line\\_loss\\_2013.pdf](http://www-personal.umich.edu/~brianmin/MinGolden_line_loss_2013.pdf)

how they will be the ones that will finally bring power to these communities<sup>19</sup>. This could be positive if it resulted in the electrification of poorer rural households and communities that are usually forgotten after election cycles. But despite progress, rates of electrification in the countries with the largest populations currently without electricity are barely, if at all, keeping pace with population growth<sup>20</sup>.

Repeated again and again, the promise of abundant free or cheap power, which national grids can theoretically deliver, becomes a dream. It's no surprise that many villagers, especially older ones, will resist the suggestion of paying for some electricity from local renewable systems. But the constant power cuts from the grid, especially to rural villages, as part of load shedding<sup>21</sup> and the falling cost of and advances in standalone renewable generation are making individuals optimistic about the potential for the technology to provide a solution for rural electrification.

On top of asking only for what has been promised, this demand for grid electricity is also grounded in negative past experiences with renewables. In previous decades, many governments have tried to electrify houses and communities using off-grid renewable energy, with varying levels of success.

In many places, solar systems were installed, with no cost to the consumers, but also no maintenance and support offered by the government. The lifetime of those systems was only as long as its first malfunction. I've seen solar panels from the 80s serving as chicken coops' doors in the Brazilian Amazon.

I want to stress that this does not mean decentralized renewable energy systems are not a solution. They are the best solution to will deliver energy access to remote and rural communities in the short term.

### **Decentralized renewable energy solutions as the best solution for energy access.**

Decentralized renewable energy systems, especially those with storage capacity, can provide electricity for lighting, communications and productive activities. These technologies - solar, wind, hydro, biomass or biogas – can operate in multiple configurations – from individual and home systems to local mini-grids or as a complement to centralized energy generation systems. They are resilient and independent, relying on locally available fuels<sup>22</sup> that are many times free – the sun, wind and water – and don't depend on supply chains or power lines that can be disrupted by various factors, as conflict or natural disasters.

After Hurricane Maria destroyed the power grid in Puerto Rico, Elon Musk from Tesla offered to rebuild the country's grid with solar power and battery storage, as has been done in smaller islands, as Kauai and the American Samoa. It can happen in Puerto Rico because there is no "scalability limit"<sup>23</sup>, as he put it.

---

<sup>19</sup> [https://www.ethz.ch/content/dam/ethz/special-interest/gess/cis/cis-dam/Research/Working\\_Papers/WP\\_2014/2014\\_WP83\\_Jaeger\\_Michaelowa.pdf](https://www.ethz.ch/content/dam/ethz/special-interest/gess/cis/cis-dam/Research/Working_Papers/WP_2014/2014_WP83_Jaeger_Michaelowa.pdf)

<sup>20</sup> <https://www.pwc.com/gx/en/energy-utilities-mining/pdf/electricity-beyond-grid.pdf>

<sup>21</sup> <http://documents.worldbank.org/curated/en/125911498758273922/text/WPS8131.txt>

<sup>22</sup> <https://www.pwc.com/gx/en/energy-utilities-mining/pdf/electricity-beyond-grid.pdf>

<sup>23</sup> <https://twitter.com/elonmusk/status/915939199718531072>

This is a key feature of decentralized renewable solutions, as solar power. Because they are scalable, it's possible to reach communities in weeks instead of years, and to do that in economical terms, offering enough power at a price that they can afford and that makes business sense for all involved<sup>24</sup>. This can put an end to the "all or nothing" approach based on grid connections and creates entry-level power. Simple solutions such as solar lanterns or solar home systems form the basis of an energy ladder in which individuals and communities have the option to scale up as income and technological development allows.

Communities can use the new source of energy to keep small businesses open late, store products in refrigerators and use communications and banking services, for example. Decentralized renewable energy is being used for irrigation, grinding, milling, husking, drying, smocking, expelling oils<sup>25</sup>, powering tools and so on. It increases the efficiency of economic activity and thus income. In turn, people can afford more electricity. It also allows kids to study after dark, providing billions of additional hours of study. Schools can have lights, fans, communication and refrigerators and stay open late. In the Brazilian Amazon, a local school started to offer adult education at night, after the community was connected to a solar micro grid.

These benefits could be created by any source of electricity, but because decentralized renewable energy, including storage capacity, can be deployed in a very short time, they become much more immediate, tangible and logical. On top of eliminating the costs of fuels, being, scalable and resilient, renewable energy powered systems also improve health through the displacement of indoor air pollution, produce no or low noise levels and reduce greenhouse gas emissions.

The problem with attempts for renewable energy from past decades were not technology based. It was the price – it was still too expensive - and the approach.

On costs - in India, an average small solar home system, that can provide power for a few lights, radio and charge phones, is priced below US\$65<sup>26</sup>. If micro-financed, it can simply replace the costs of kerosene. And the Indian solar photovoltaic power tariff has fallen to US\$ 3.8¢ per KWh in May 2017<sup>27</sup>, which is lower than any other type of new power generation in the country. Those prices will only continue to fall<sup>28</sup>.

On approach - governments should not be responsible for maintaining and operating distributed renewable energy systems in remote areas. Instead, they need to create enabling environments for small and medium local enterprises, which can build deep rural distribution networks and customer trust. Distributed renewable energy for energy access needs to be a business.

---

<sup>24</sup> <https://www.theclimategroup.org/sites/default/files/archive/files/The-business-case-for-offgrid-energy-in-India.pdf>

<sup>25</sup> <http://www.worldfuturecouncil.org/wp-content/uploads/2017/10/100-RE-for-Tansania-EXECUTIVE-SUMMARY.pdf>

<sup>26</sup> <https://www.theclimategroup.org/sites/default/files/archive/files/The-business-case-for-offgrid-energy-in-India.pdf>

<sup>27</sup> <https://economictimes.indiatimes.com/industry/energy/power/solar-power-tariff-drops-to-historic-low-at-rs-2-44-per-unit/articleshow/58649942.cms>

<sup>28</sup> <http://www.worldbank.org/en/news/immersive-story/2017/06/29/solar-powers-india-s-clean-energy-revolution>

A market led approach means that final consumers will have to pay for electricity, but it also forces providers to guarantee its supply, which means they'll service the systems when they stop working. In addition, it opens up a lot of room for innovation and collaboration.

This enabling environment requires policy stability and clarity. For example, because there is little clarity on where the grid is going next in India, many businesses in the space are afraid to install a solar system in a community, just to have that community connected to the grid in a year or two. Government's are addressing this by creating "exit policies" where they would either buy the electricity through the new grid, or purchase the entire system<sup>29</sup>. Policies that specify minimum technical standards will help remove cheap but ineffective products from the market and improve competition. Finally, tenders that allow smaller and new players to become empaneled and serve communities as part of government programs can also play a role<sup>30</sup>.

When I supported the installation of a solar micro-grid in a community in the Amazon in 2012, we quickly realized the need for social innovation, as some of the women bought electric hair straighteners and blow-dryers that demanded too much power and caused the system to shut down. There was a community meeting where a local protocol was created, setting rules that limited the times when people could use certain appliances. This kind of innovation is still used in communities today, although technology can now help solve the problem, with smart meters and pay-as-you-go systems<sup>31</sup> – where people buy energy in advance, similar to putting credits on your phone, available.

Pay-as-you-go innovations and remote controlled smart meters will also reduce the risk and burden of collecting payments on a regular basis, which in many cases is done through regular visits to the communities. This is a real risk and has real impacts on the capacity of enterprises, especially new ones, to operate. Banks and other financial institutions are wary of their business models, based on high up-front costs and slim profit margins. Access to finance and affordable capital are some of the main challenges faced by companies trying to offer distributed renewable energy solutions. International investment from multilateral institutions, developed and developing countries play a key role in supporting energy access, though efforts need to be scaled up<sup>32</sup>. National governments can also be a significant source of finance for electricity by drawing from their own budgets and facilitating private investments. Innovation and market diversification is a real need of the sector and companies are filling those gaps<sup>33</sup>.

For example, many companies are looking to develop strong relationships with banks and micro-finance institutions in order to ensure access to finance for the consumer, who can decide to pay for systems upfront, on installments or as they go. Companies are also aware that while the consumers of today are concerned with lighting and mobile charging, the consumers of tomorrow will want more fans, TVs and other appliances, and are diversifying their portfolios and offerings.

---

<sup>29</sup> <http://upneda.org.in/?q=policies>

<sup>30</sup> [http://www.smartpowerindia.org/documents/SmartPowerIndia\\_magazine\\_July\\_2016.pdf](http://www.smartpowerindia.org/documents/SmartPowerIndia_magazine_July_2016.pdf)

<sup>31</sup> <https://www.technologyreview.com/s/425038/pay-as-you-go-solar/>

<sup>32</sup> [https://climatepolicyinitiative.org/wp-content/uploads/2017/09/2017\\_SEforALL\\_FR2\\_ES.pdf](https://climatepolicyinitiative.org/wp-content/uploads/2017/09/2017_SEforALL_FR2_ES.pdf)

<sup>33</sup> <https://www.climatefinancelab.org/project/loans4sme/>

Distributed renewable energy solutions are also a source of employment and income generation for people in these remote areas<sup>34</sup>. When I supported the installation of solar microgrids in Amazon communities, the company involved trained two of the villagers to perform regular maintenance and fix simple problems. These villagers were then engaged in the installation of other systems. Where companies operate in large, remote areas, this will be the most economical way of offering after sales support and a great opportunity to build trust with local consumers and strengthen the local economy.

On a larger scale, the work done by hundreds of groups – from civil society, academia, business and government – to develop and promote renewable energy around the world is producing very positive results. Grid connected renewable energy already represents the majority of investments in new electricity generation capacity, especially in the countries with the largest populations without energy access<sup>35</sup>. This is very positive. It creates economies of scale, reduces costs, consolidates new players and creates jobs. It also facilitates policy development and proves that renewable energy is a real source of electricity.

### **The Purpose Climate Lab work on energy access**

The large potential and multiple benefits of distributed renewable energy solutions for energy access are the core reason why the Purpose Climate Lab has promoted it as a solution and worked to close some of the gaps that remain ahead of implementation, especially in India but also in Kenya.

This work has been focused on creating awareness that renewable technologies are not too expensive, too high tech or too limiting for rural communities, in order to reduce communities' initial resistance and increase demand. Another objective is to secure stable and clear policies to allow market players to fulfill their potential. This work is happening through broad communication campaigns, the engagement with hundreds of local, national and international organizations and local government agencies<sup>36</sup>. One of our approaches is to facilitate partnerships between micro-financial institutions, service and technology providers and local governments to accelerate the adoption of what we call “smokeless villages”, where energy for cooking and electricity will come from clean sources.

### **Conclusion**

While government efforts are expected to increase grid connectivity, in India and in other countries where large populations still have no access to energy, progress has been slow and the number of underserved households is expected to decline by only a few percentage points over the next few years.

Governments must decide if they want to keep their rural and remote communities waiting for the promise of grid connected power that will take decades to be fulfilled or to provide readily available, affordable, real electricity from decentralized renewable solutions. These are not

---

<sup>34</sup> [https://www.irena.org/DocumentDownloads/CaseStudies/CaseStudies\\_Laos.pdf](https://www.irena.org/DocumentDownloads/CaseStudies/CaseStudies_Laos.pdf)

<sup>35</sup> [https://climatepolicyinitiative.org/wp-content/uploads/2017/09/2017\\_SEforALL\\_FR2\\_ES.pdf](https://climatepolicyinitiative.org/wp-content/uploads/2017/09/2017_SEforALL_FR2_ES.pdf)

<sup>36</sup> <https://readymag.com/u91696908/838122/>

trade-offs, as decentralized renewable energy solutions can be integrated to complement centralized energy generation systems.

If these governments opt for prioritizing the extension of the grid, the trend of focusing on new renewable energy generation capacity must be continued. Financial and economic indicators, as well as the imperative to mitigate climate change, reduce air and water pollution and create new jobs mean this is the natural path forward. But the smarter option is to create the conditions for markets to deliver energy access through decentralized renewable energy, which can happen in the short term. The benefits of jobs, reduced air and water pollution and climate change emissions, resiliency, increased school performance and opportunities for social and economic development cannot be ignored or delayed.