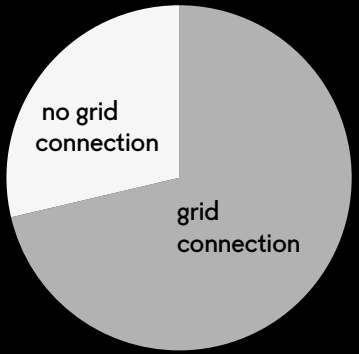
A2E

ACCESS TO ENERGY INSTITUTE

#StopGuessing

More than 20 million small fuel generators run daily in Nigeria alone to overcome power scarcity.

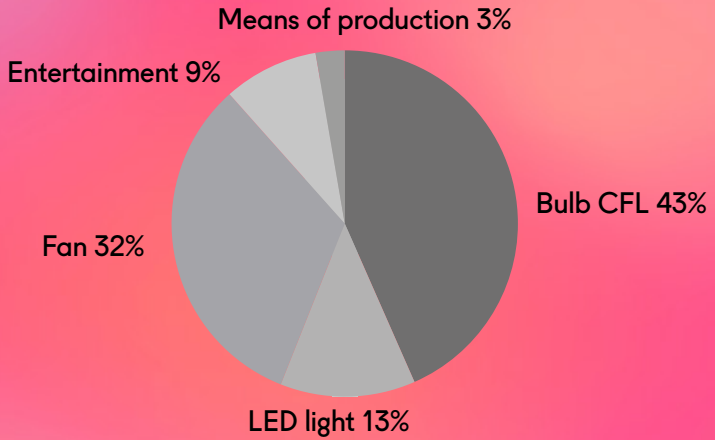


This is due to the fact that grid availability is low. According to the World Bank, in an average month, a business owner will not have power for 239 hours (out of 720 hours) in a month. Our own measurements over the last 4 months suggest grid outages are even more frequent.

Most solar solutions aimed at replacing small fuel generators are based on assumptions on what these generators actually do. We wanted to stop guessing and installed hundreds of smart meters to inform us about exactly what solar solution was needed to replace the generators and solve the problem of energy access.

HOW MUCH POWER DO CUSTOMERS NEED?

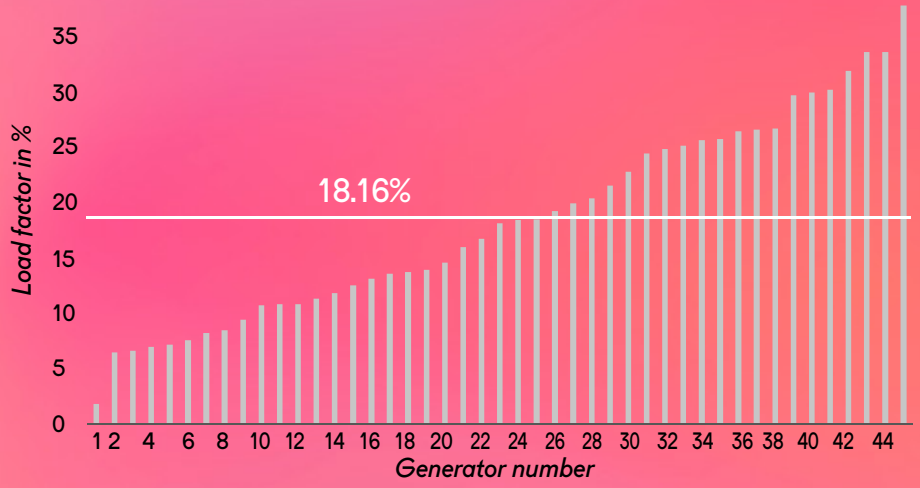
What data did the A2EI capture: To understand what generators are powering, we actually surveyed typical appliances found in a small shop or business.



Categories of power consumption, % of total load

FINDINGS: The need for power is relatively low (lights, fans, recharging mobile phones, TVs etc. are all relatively low in consumption with an average of 230W power needed per business). The use of a generator therefore seems overdimensioned, in particular, when taking into account the possible efficiency gains (25%) that could be reached by switching to better lights (LEDs).

GENERATORS ARE ABOUT 5 TIMES LARGER THAN NEEDED



Load of generators in % of maximum load and average

Data we gathered: We wanted to understand how much of the maximum power of generators was actually used and what the average load would be.

FINDINGS: Because of the low power need, we found out that less than a fifth of maximum power was needed (average of 18.16%). In other words, the average load of a generator is under 20%. Which shows generators are akin to using a sledgehammer to crack a nut.

ALREADY RELATIVELY SMALL SOLAR SYSTEMS CAN ACTUALLY REPLACE GENERATORS

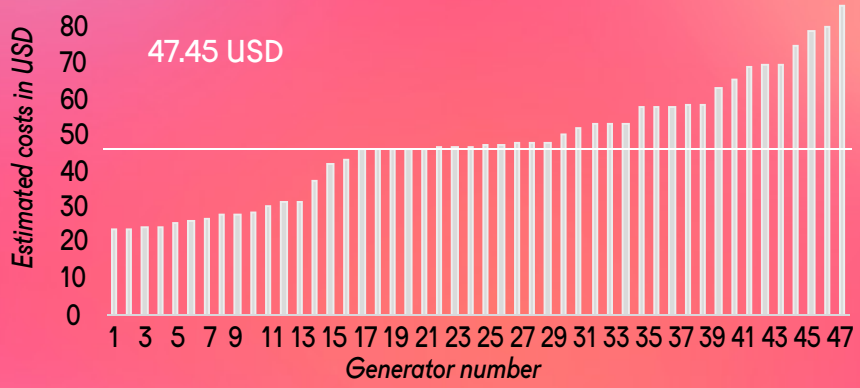
	Average apparent power consumption				Average apparent power consumption with 25% power saving		
Power ≤	Numbers	Total	%	Power ≤	Number	Total	%
100	1	5	1,00	100	4	4	4
150	0	5	9,26	150	10	14	25,93
200	9	14	25,93	200	12	26	48,15
250	11	25	46,30	250	11	37	68,52
300	9	34	62,96	300	6	43	79,63
350	7	41	75,93	350	2	45	83,33
400	2	43	79,63	400	4	49	90,74
450	2	45	83,33	450	0	49	90,74
500	1	46	85,19	500	1	50	92,59
550	3	49	90,74	550	1	51	94,44
600	0	49	90,74	600	2	53	98,15
650	1	50	92,59	650	1	54	100,00
700	1	51	94,44	700	0	54	100,00
750	1	52	96,30	750	0	54	100,00
800	1	53	98,15	800	0	54	100,00
850	1	54	100,00	850	0	54	100,00

What data did A2EI capture: We wanted to understand how many % of generators could be replaced with different sizes of solar generators.

Left: Distribution of power needs based on generator data

FINDINGS: As shown in the left table above, a solar system providing as little as 350W would already replace more than 75% of generators. With 700W, the percentage augments to 94%. In a scenario with more efficient appliances saving 25% of power, these percentages are increased (see right table).

FUEL GENERATORS ARE NOT ONLY DIRTY AND LOUD BUT ALSO EXPENSIVE

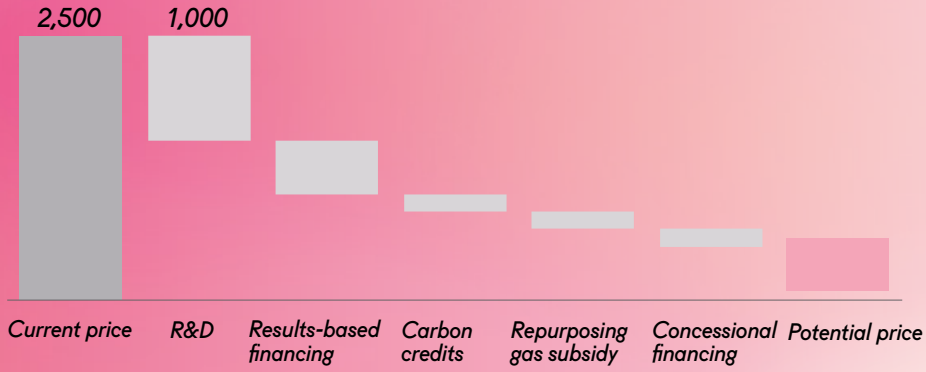


Monthly costs in USD of running a generator

What data did we capture: We wanted to know how many liters of fuel and how much money users were spending on powering their generator over the 2 year lifespan of the generator (not including maintenance and purchase price of the generator).

FINDINGS: On average, customers are spending over 47 USD per month, just for fuel. Over a period of 2 years, this amounts to over 1,100 USD.

Stop guessing & analyzing data has already allowed the A2EI to lower the cost of a solar generator by over 40%.



Costs (USD) of solar generators based on A2EI data collection and evaluation

Our credo is that data is the key: The proof alone that generators were running at less than 20% of their maximum load led to a potential drop in the cost for a substituting solar generator of already 40%. In a scenario where some result based finance, carbon credits etc. can be used for financing as well as some further efficiency gains realised (e.g. LEDs), a solar revolution in Nigeria becomes a realistic future.

Next data projects at the A2EI:

- Expand data gathering and "STOP GUESSING" approach to other sectors, e.g. the e-cooking sector. We are developing sensor solutions that will describe in real time how e-cooking devices (e.g. pressure cookers) are used. This will allow to exactly describe power needs and associated costs.
- Data collection for productive use appliances, in particular in the smallholder agricultural space. Which productive use appliances are used when, how long, how often in a year? What does the use of appliances cost? This information is the basis to understanding how the use of productive use appliances could positively be impacting the income of farmers.
- Minigrid data collection: Minigrids are usually seeing better profitability when power demand increases. The above data collection exercises for productive use appliances and e-cooking solutions may well become the unlocking factors for a future profitability.

STAY TUNED AND SIGN UP FOR OUR DATA: WWW.A2EI.ORG/DATA

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