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ome of Elizabeth Nyeko's earliest memories are of civil war. In Uganda, bedding down outdoors in case the family home was bombed, she would seek sanctuary in the night sky, gazing at satellites, and wondering where their energy came from.

At the age of five, Nyeko became a refugee, but her passion for energy has survived all the upheavals. Today, she is on a mission to help her homeland with a plan for affordable, reliable, low-carbon electricity.

According to the World Bank, over 11 per cent of the world's population do not have access to electricity. Mini-grids – small-scale, self-sufficient networks – are slowly democratising the utilities landscape, helping communities not served by the main grid.

In 2012, when studying medicine at the University of Oxford, Nyeko set up a biomass-powered mini-grid in Uganda with her brother, Peter. Their company, Mandulis Energy, converted agricultural byproducts such as rice husks into a gas used to drive turbines and generate electricity.

However, as Nyeko admits, "each time you set up a mini-grid, you have to start from scratch. Every one is bespoke, created for a set number of households." This means that, although positioned as affordable

solutions, the current generation of mini-grids devour time, expertise and money. Such grids can also be unbalanced: a neighbour turning on a power-hungry device such as a water heater can impact electrical supply to nearby houses.

In 2017, Nyeko launched Modularity Grid, a London-based startup that harnesses machine learning to track and predict consumption and, in the event of a shortage, prioritise critical users such as hospitals.

"With Modularity Grid, you can easily change the amount of energy delivered to each user, or the number of households linked to the mini-grid," says Nyeko.

"This essentially creates a modular, plug-and-play system that can be scaled up or down as needed."

Suppliers will no longer have to oversize mini-grids or overspend on batteries. And technicians will be able to assemble mini-grids within a day, making it easier to roll them out in rural areas – bringing the goal of power for everyone, for less, much nearer.

After Uganda, Nyeko has plans for expansion in sub-Saharan Africa, south-east Asia – and into industries ranging from aeroplanes to electric cars. She recently worked on a satellite project with Airbus, taking her back to her childhood, marvelling at the cosmos. It feels, she laughs, as if her life was written in the stars. **Delle Chan** modularitygrid.com

Scaling up mini energy

Elizabeth Nyeko is rethinking grids to provide affordable, low-carbon electricity to the country she fled as a child



Right: Elizabeth Nyeko believes mini-grids will democratise utilities in the developing world