Sustainable Development: Energy futures for All

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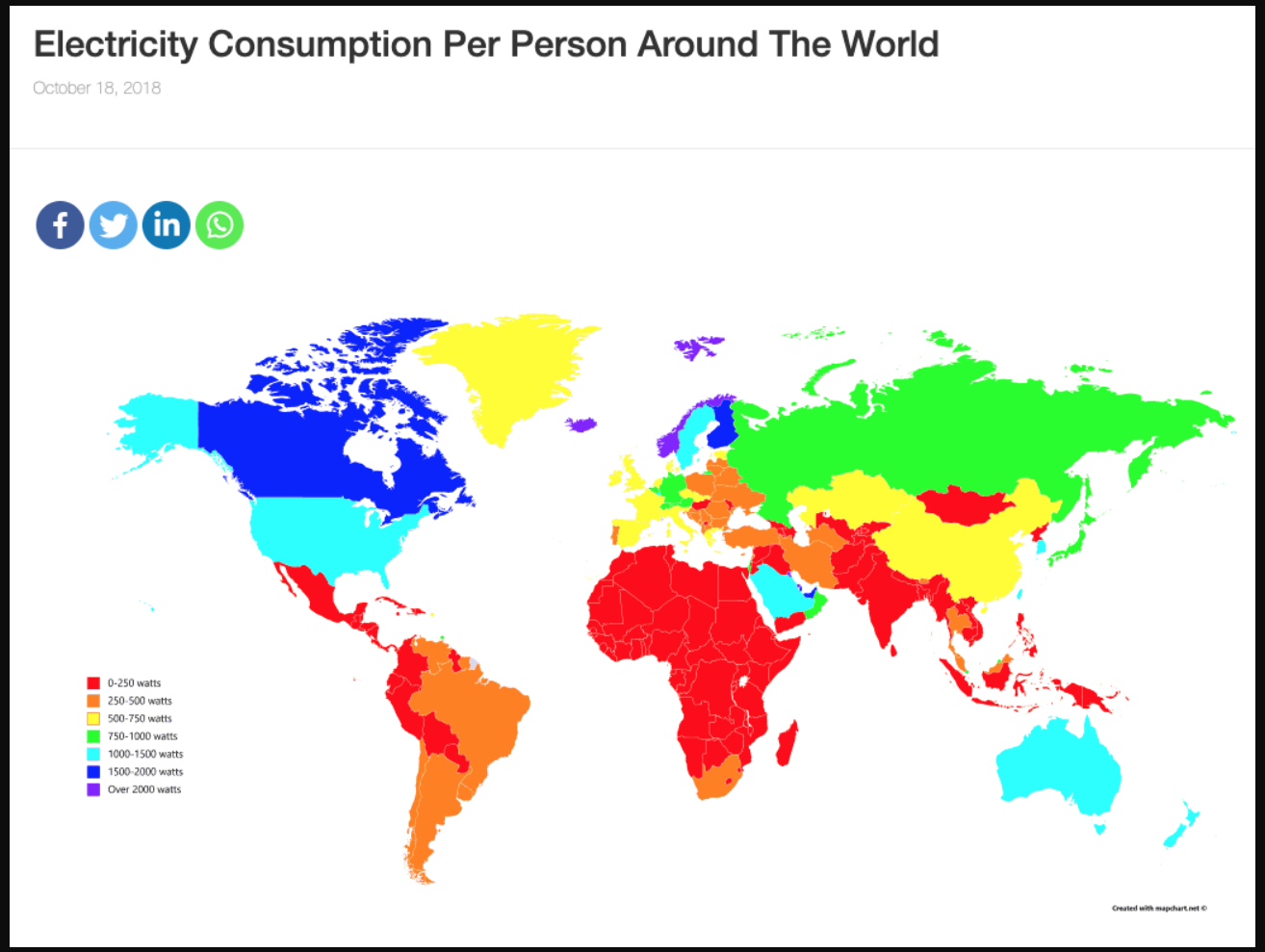


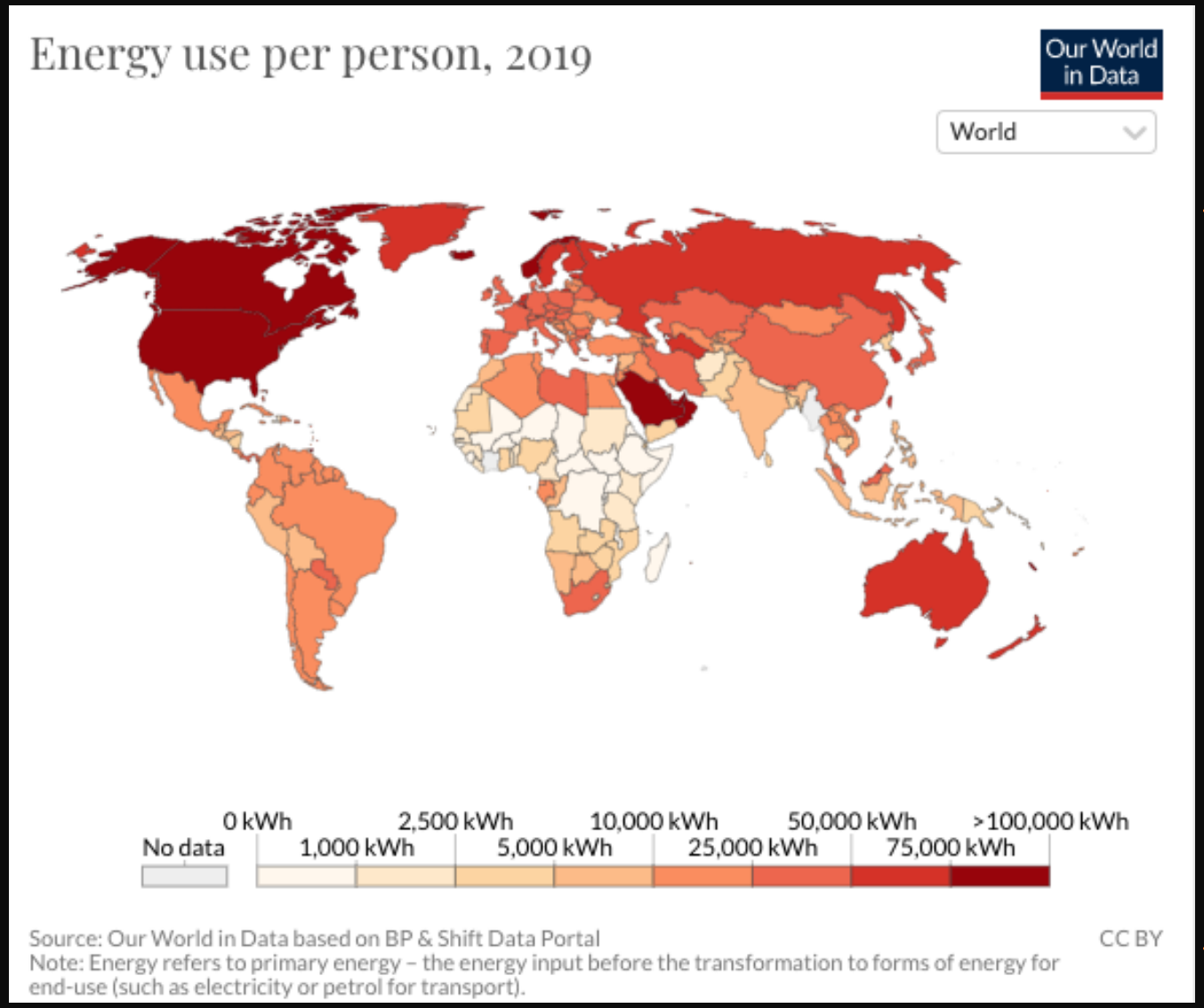
How Much Energy does the Average Person Consume?

Having access to the electricity and other forms of energy needed for cooking, heating and lighting is something many of us take for granted.

UK –electricity consumption (Jan 2020) 431KWh/month/person

OR

14KWh/day

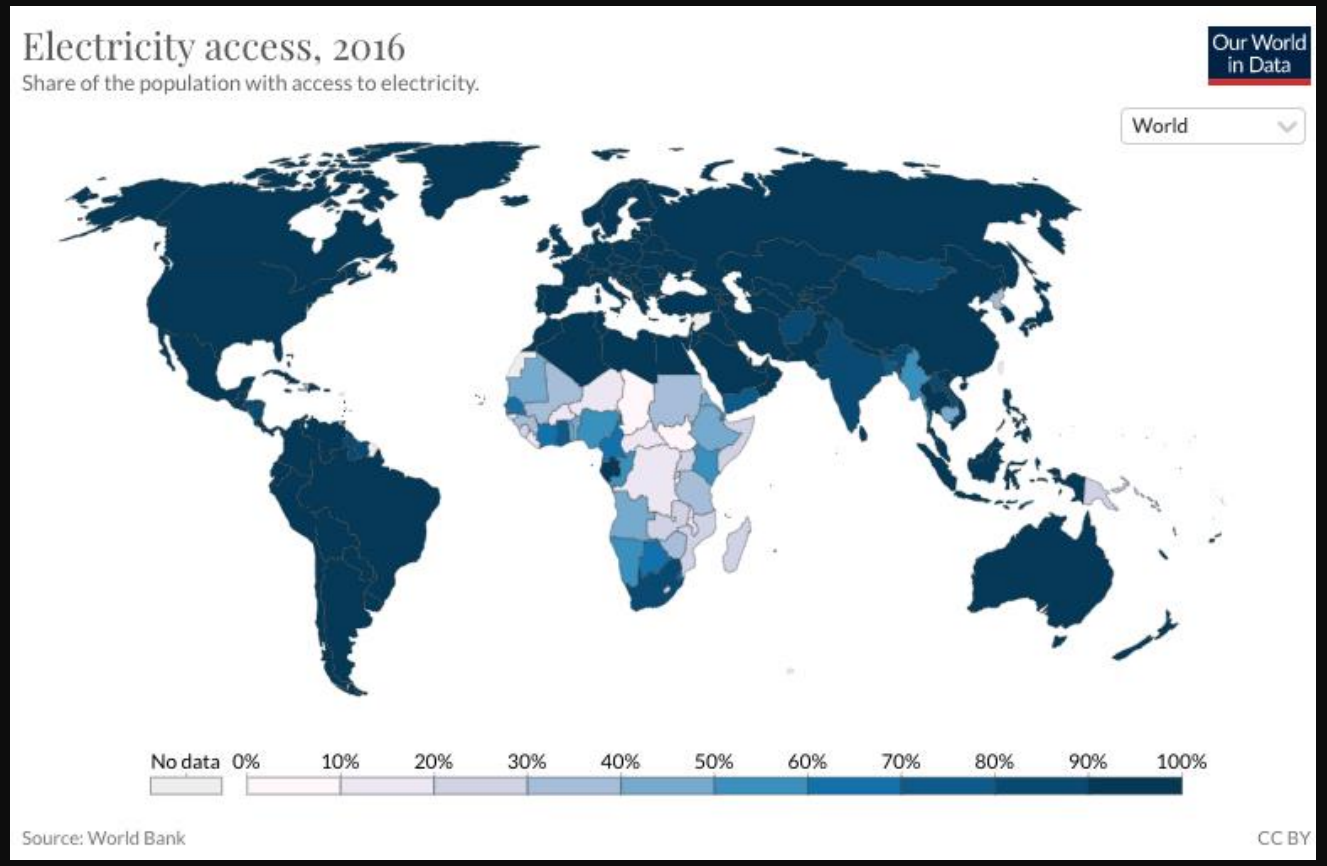


How Much Energy does the Average Person Consume?

Per capita energy consumption varies more than 10-fold across the world.

Per capita electricity consumption varies more than 100-fold across the world.

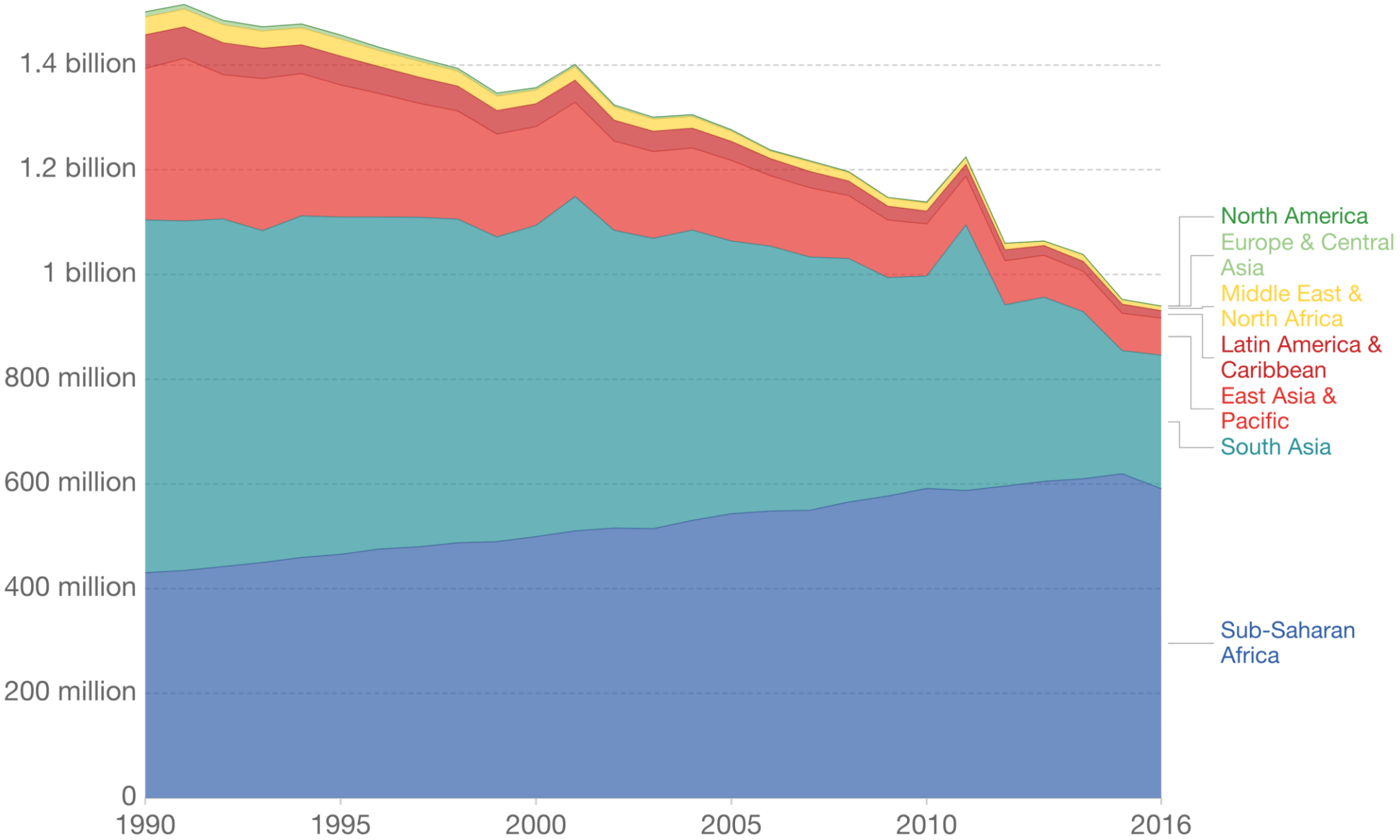
How Much Energy does the Average Person Consume?



940 million (13% of the world) do not have access to electricity.

3 billion (40% of the world) do not have access to clean fuels for cooking. This comes at a high health cost for indoor air pollution.

Number of people without access to electricity



Source: OWID based on World Bank, Sustainable Energy for All (SE4ALL), & UNWPP

OurWorldInData.org/energy-access • CC BY

Who Has or Not Access to Electricity?

- 13% of the world do not have access to electricity; almost a billion people
- 7 million displaced people in camps have access to electricity for less than 4 hours a day.
- Poverty levels rising worldwide in 2020 will make basic electricity services unaffordable for more than 100 million people with grid electricity connections.
- Around 4 million people per year die as a result from exposure to indoor air pollution.
- Covid-19 pandemic brought more disruption to the energy sector than any other event in recent history.

(International Energy Agency (IEA), 2020; Lehne et al, 2016; Our World in data, 2020)

UN Sustainable Development Goal 7 (2015 - 2030)

Ensure access to affordable, reliable, sustainable and modern energy for all

Energy access is strongly related to income: poorer households are more likely to lack access.

Alternative forms of energy

Encourage a marketplace for renewable energy suppliers

Improve access to energy to provide greater opportunities for learning, safer communities and reinforce socio-economic stability

Sustainable Development Goals: Cross Cutting Themes

GOAL 5: Gender Equality: Energy solutions that recognise not only unequal practices for women as service users but provide opportunities for women to be designers of energy schemes and suppliers of energy services.

GOAL 8: Decent Work and Economic Growth: Advocate for the salience of skills development that can respond to limitations of camp-based refugees' right to work and freely move between camps and host communities.

GOAL 10: Reduced Inequality: Energy interventions that seek integration and the sharing of benefits between refugees and host communities.

GOAL 11: Sustainable Cities and Communities: Refugees as 'prosumers': both users and suppliers of energy

Our Energy Future is Renewables

- Renewables have a crucial role in addressing complex challenges— made even more pressing by inequality in resources, globalisation, climate change, and population issues
- Renewable energy can also reinforce inequality
- Approaches to engineering challenges should influence and improve the life cycle, supply chain, and social justice implications of renewable energy technologies.

The Need for Socially Just and Inclusive Energy Systems

- Energy systems power and empower societies
- But do issues around social justice undermine engineering priorities?

- Transitions to new energy systems that could be a fairer, more equal way to use and supply energy.
- But are engineering solutions that centre around sustainability and social justice 'too difficult to implement'?

‘Leaving No-one Behind’

The UN’s Clean Energy Challenge (2019) aims for all refugee settlements to access reliable, sustainable and modern energy by 2030.

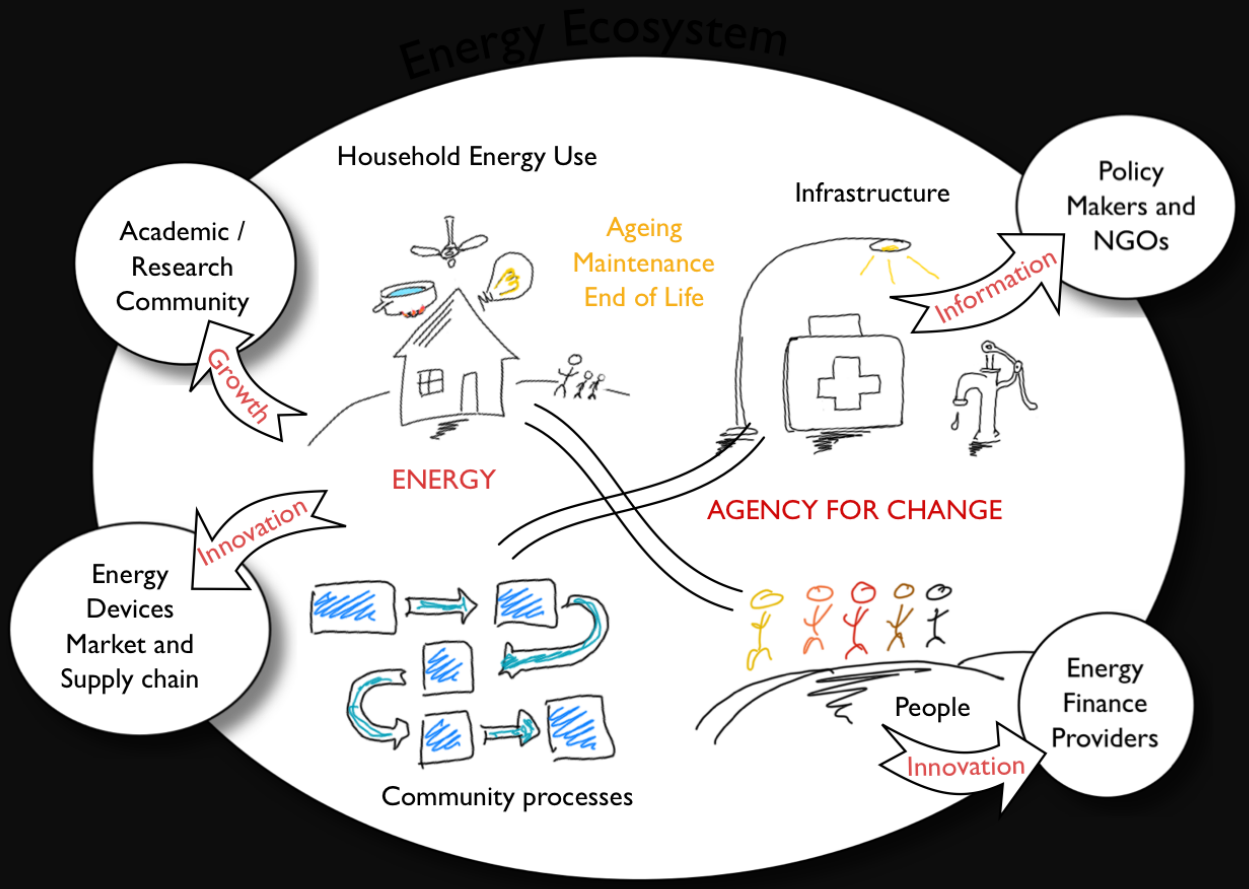
- To achieve this goal, engineering and humanitarian responses will need appropriate, creative approaches, tools, skills and new technologies to deliver improved energy solutions in the displacement setting.
- Energy solutions that emerge from conversations with communities, engineers, suppliers and other energy stakeholders, rather than imposed top down, are more likely to address succeed in engagement and uptake of renewable energy interventions

Humanitarian Engineering and Energy for Displacement (HEED)

An interdisciplinary team based at Coventry University, in partnership with the international development charity, Practical Action, and Scene Connect.

The project worked with Congolese refugees in three camps in Rwanda (Gihembe, Kigeme, and Nyabiheke) and IDPs in Nepal to understand energy usage in refugee camps and settlements.

HEED's overarching mission was to understand the energy needs *and* aspirations of forcibly displaced people to improve access to safe, sustainable and affordable energy services.



Project Aims

- **Instrumental:** In what ways is **HEED** influencing policy, practice or service provision in the delivery of energy to displaced people?
- **Conceptual:** How is **HEED** contributing to a greater understanding of issues and reframing debates in the field of humanitarian energy and engineering?
- **Capacity building:** To what extent is the **HEED** project developing technical and personal skill- sets that increase self-reliance, self-determination and autonomy?

Energy as a Service, not only a System

- Framing energy as a service could create an ecosystem, which encompasses market-based approaches, energy generation, energy use, and community engagement to build capacity and capability of displaced communities.
- Constructing energy access as a service, as well as a system, challenges unequal power structures between institutions and displaced communities, as displaced people are seen as service users, rather than dependents.

What can we learn as Engineers?

- The implementation of safe, renewable and affordable energy into refugee camps and internally displaced encampments means re-thinking the way that energy systems are designed, maintained and owned to build the capacity and resilience of communities.
- Adopt a long- term approach in energy planning that focuses on addressing the rights of refugees and other displaced populations.
- Explored options for shared community assets and energy needs and aspirations of displaced people

What can we learn as Engineers?

- Solving increasingly complex and interconnected sustainability challenges requires working in multi-disciplinary teams, across geographical boundaries, and with greater inclusivity of communities.
- The domains of research, practice and policy are not discrete categories but are interconnected by complex social interactions with multiple actors.
- Projects that are impactful are usually those that communicate directly with communities on an ongoing basis and engage shared aims, concerns, and outcomes.

‘Be the Change’

- Conceptualising, constructing and implementing clean, sustainable, scalable, affordable energy systems is a space that engineers need to fill.

Why?

People who see work more about personal fulfilment and helping others, rather than only as a source of income or status-related, are more likely to report higher job satisfaction levels (Hearst et al. 2016).

Energy engineering projects enrich personal and professional development – the work is instrumental in building self-reliance, increases opportunities for self-determination and improves life chances for communities and future generations

How can we create a more inclusive way of working?

By bringing about....

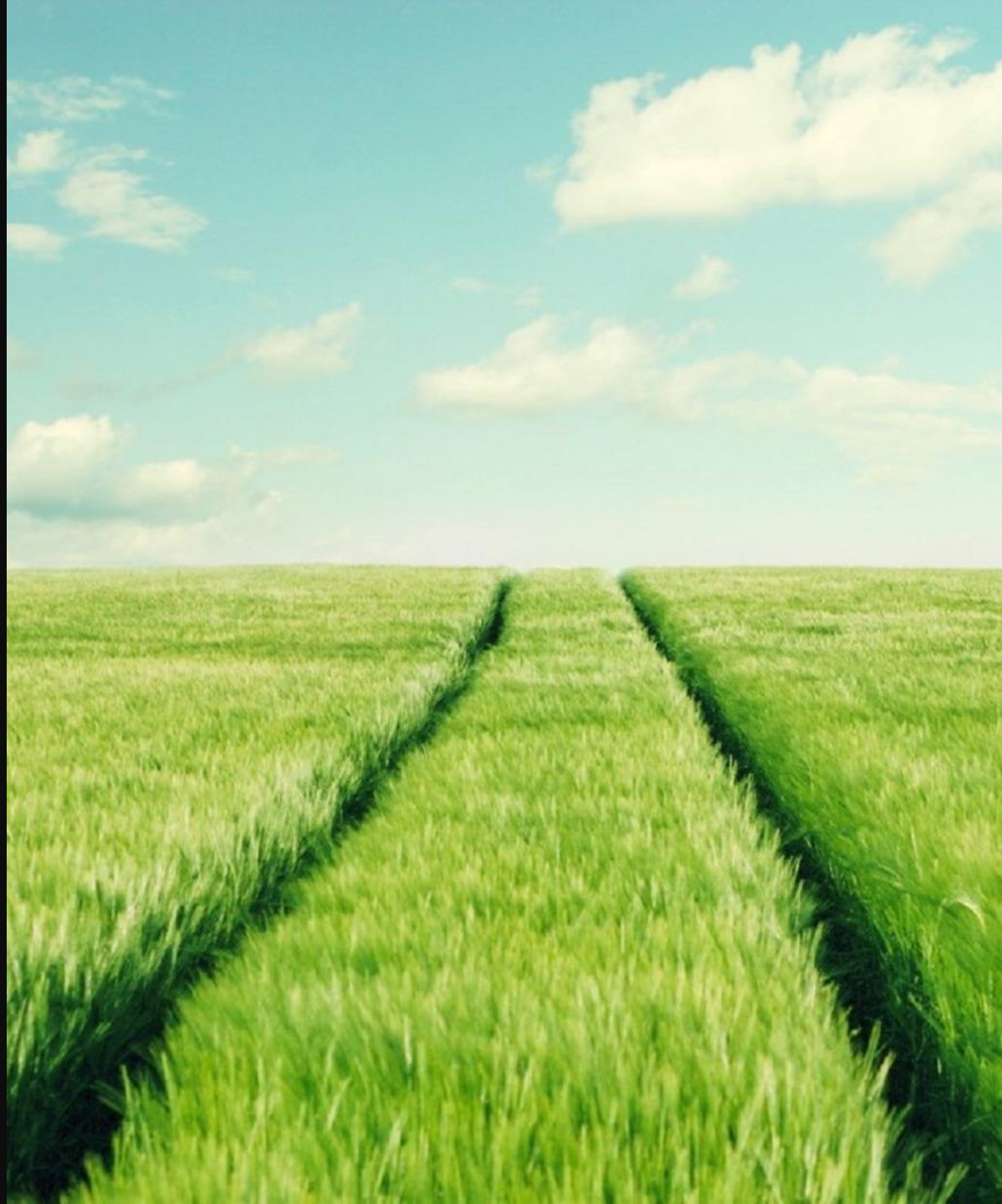
- New ways to conceptualise and implement community co-designed renewable energy systems that meet displaced populations' needs for cooking, lighting and power?

- Insights into alternative energy models, using new technologies to improve energy efficiency, social cohesion and economic growth?

Bright Future?

What are our best chances of providing universal energy access and eliminating energy poverty?

- Interdisciplinary, transdisciplinary, and sociotechnical approaches.
- Greater awareness of structural inequality and the impact on people's lives (i.e. gender, race, disability, class, sexuality).
- Recognising engineers have a pivotal role in combating tropes around renewable energy, advocate for new ways of approaching energy poverty, and creatively respond to solutions.



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- Web link
- HEED Refugee project Resources