CEPREC

Empowering Africa's energy transition through knowledge and skill development

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THE UNIVERSITY OF WARWICK

CHATHAM HOUSE

Tshwane University of Technology
We empower people

University of Nigeria Nsukka

UNIVERSITY OF LAGOS
IN DEED AND IN TRUTH

CIRCULAR ECONOMY POWERED RENEWABLE ENERGY CENTRE
CEPREC

KCRC
Kigali Collaborative Research Centre

UNAM
UNIVERSITY OF NAMIBIA

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Strathmore
UNIVERSITY

THE UNIVERSITY of SIERRA LEONE

Funded by

UK Research and Innovation

UKaid
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AYRTON FUND

CEPREC

From Westminster to Windhoek—building bridges for a sustainable energy future.

About us

The Circular Economy Powered Renewable Energy Centre (CEPREC) is a Pan-African, multisectoral Research Centre of Excellence dedicated to advancing Africa's energy transition. By bringing together government, industry, and academia, CEPREC drives interdisciplinary collaboration to develop cutting-edge knowledge and skills that leverage circular economy principles, to support Africa's energy transition.

CEPREC is funded by the UK Government's Ayrton Fund, a £1 billion initiative supporting clean energy research and innovation

Vision

To be the leading research centre driving new knowledge, innovation, skills empowerment, and policy development that leverages circular economy principles to enable Africa's transition to a resilient, inclusive, and sustainable energy future.

Mission

CEPREC is committed to driving the circular economy in renewable energy across Africa. Through groundbreaking research, strategic partnerships, and capacity building. We aim to repurpose technology, inspire sustainable practices, and develop skilled leaders who will advance energy access, economic growth, and environmental stewardship across the continent.

CEPREC

Empowering Africa's Energy Transition by:

Creating New Knowledge
Leveraging the circular economy to drive clean energy innovation.

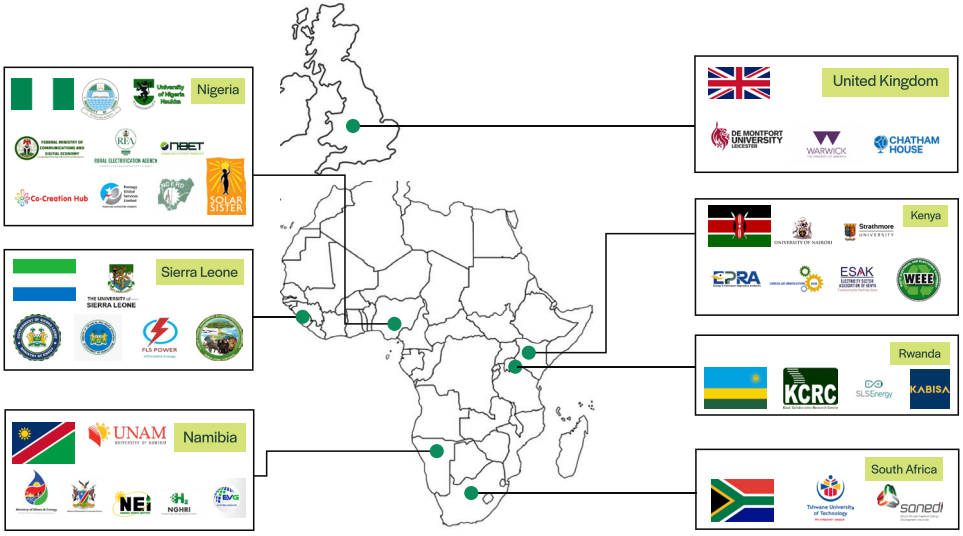
Building Capacity
Training the next generation of energy leaders across Africa.

Influencing Policy Development
Shaping sustainable energy policies for long-term impact.

Our Approach

Triple Helix Model

At CEPREC, we believe the key to advancing Africa's energy transition lies in collaboration. Our Triple Helix model approach unites academia, industry, and government to drive innovation and real-world impact in renewable energy.



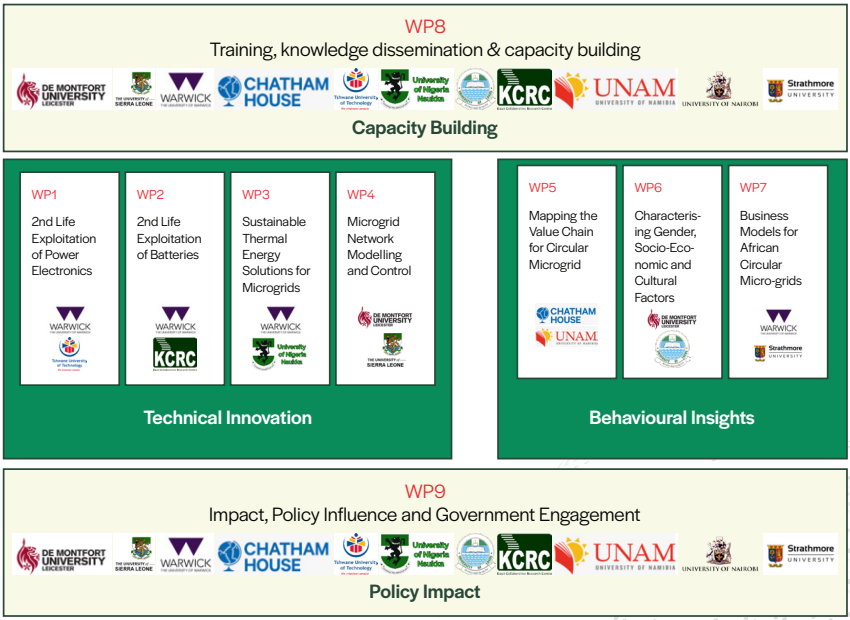
Pan-African

At CEPREC, we recognize that Africa's energy challenges vary by region, economy, and infrastructure. That's why we have strategically partnered with six diverse countries, spanning East, West, and Southern Africa to develop scalable, inclusive, and locally adapted clean energy solutions.

Our Approach

Interdisciplinary

At CEPREC, we combine engineering, policy, business, Economics and social sciences to develop circular energy solutions that work.



United Nations

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

Take urgent action to combat climate change and its impacts

Ensure sustainable consumption and production patterns

Technical Innovation

Pioneering solutions to repurpose end-of-life materials for microgrids. WP1-4

Behavioural Insights

Understanding consumer behaviour to drive adoption. WP5-7

Capacity Building

Strengthening local expertise with knowledge and skills. WP8

Policy Impact

Informing and supporting policies for sustainable energy access WP9

Global Dialogue for Local Impact: CEPREC at Chatham House

CEPREC kicked off with a high-level multisectoral roundtable at Chatham House, London— bringing together international stakeholders to accelerate Africa's energy transition.

Highlights included:

- Dialogue with High Commissioners from partner countries
- Insights from FCDO, African Development Bank, Acumen, and IRENA
- Engaging conversations on finance, circularity, capacity building, and policy gaps

CEPREC at Chatham House: Shaping global conversations for local energy solutions.

> CEPREC is not just a research centre—it's a movement grounded in partnerships, policy, and practical change ”

CEPREC

Powering Progress:
The Circular Microgrid Concept

The Energy Access Challenge in Africa

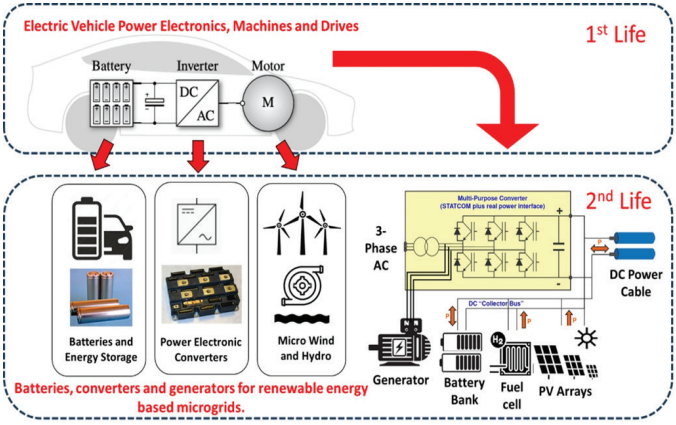
Across sub-Saharan Africa, over 50% of people lack access to reliable electricity. In rural areas, access can fall below 10%. This lack of energy infrastructure limits opportunities for healthcare, education, livelihoods, and economic growth.

The conventional model—expanding national grids—is expensive, slow, and often impractical for remote areas. New solutions are needed.

CEPREC's Solution: Circular Microgrids

- At CEPREC, we are pioneering circular microgrids—small, decentralised energy systems powered by renewable sources and built using repurposed technology.

  Instead of relying on expensive, imported components, we give second life to batteries, motors, and inverters recovered from electric vehicles and other sources. These are tested, refurbished, and integrated into microgrids that supply affordable, reliable, and sustainable energy.



How Circular Microgrids Work

1 Second-Life Technology

We repurpose:

- EV Batteries for local energy storage
- Converters & Inverters for energy regulation
- Electric Motors for microgeneration systems

This reduces costs and diverts e-waste from landfills.

CEPREC

Powering Progress: The Circular Microgrid Concept

2 Clean Energy Generation

Circular microgrids use solar, wind, hydro, and even thermal energy systems, integrated with second-life components.

3 Localised Distribution

Power is delivered directly to homes, schools, clinics, and small businesses, offering independence from unstable national grids.

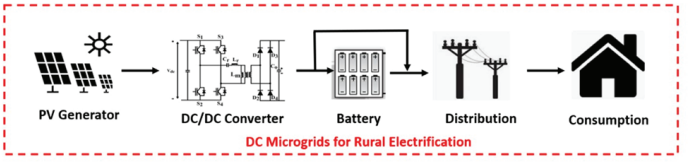
4 Smart Controls

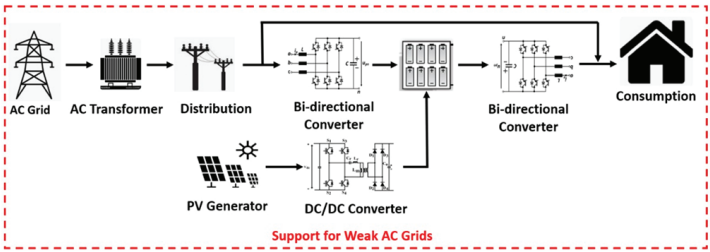
Advanced control systems optimise generation, storage, and usage to maximise efficiency and reliability.

Scalable Solutions for Africa's Needs

CEPREC is deploying three key types of circular microgrids:

- Off-Grid Microgrids
  Designed for rural communities with no grid access using solar PV and repurposed batteries for affordable, standalone systems.
- Grid-Connected Microgrids
  Operate alongside the national grid, improving reliability and providing backup during outages.
- Interconnected Community Microgrids
  Clustered microgrids that support local economies, improve energy sharing, and strengthen resilience.





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Our Impact

CEPREC

1 Lower Energy Costs for Communities

By repurposing end-of-life electric vehicle (EV) components into Distributed Renewable Energy Systems, CEPREC is:

- Reducing the cost of power generation and storage
- Bringing reliable electricity to underserved and off-grid communities
- Supporting affordable energy access for homes, schools, and businesses

2 Tackling E-Waste Through Circular Solutions

CEPREC's approach prevents waste and promotes reuse by:

- Giving batteries, inverters, and motors a productive second life
- Reducing environmental and health risks linked to unmanaged e-waste
- Supporting local repair, recycling, and remanufacturing ecosystems

Our Impact

3 Building Skills & Local Capacity

We're committed to empowering Africans to lead Africa's energy future:

- Training engineers, researchers, and technicians in Distributed Renewable Energy Systems
- Strengthening institutional capacity in universities and innovation hubs
- Creating jobs in energy, electronics reuse, and circular economy sectors

4 Influencing Policy & Driving Systemic Change

CEPREC works closely with governments, regulators, and international bodies to:

- Develop enabling policies that promote Distributed Renewable Energy Systems
- Align financing, regulation, and technology with local realities
- Support long-term adoption and integration of sustainable energy systems

Our Impact

5 Promoting Inclusive Development

Our work is centred on people and equity:

- Designing solutions that benefit women, youth, and marginalised groups
- Supporting energy access for income-generating and community activities
- Ensuring that every intervention reflects social, economic, and cultural contexts

Our People

Prof. Muyiwa Oyinlola

Director CEPREC/ Professor of Innovation for Sustainable Development at De Montfort University

Prof. Layi Alatise

Deputy Director CEPREC/ Royal Society Industry Fellow in Electrical Engineering at the University of Warwick.

Prof. Giuliana Battisti

Deputy Director (Social Sciences)/ Professor of Economics of Innovation at the University of Warwick.

Prof Selma Lendelvo

Head CEPREC, Namibia/ Professor of Environmental and Natural Resources Management at the University of Namibia.

Prof. Shanwen Tao

WP2 Lead – Second-Life Exploitation of Batteries/ Professor of Chemical Engineering at the University of Warwick.

Prof Kelleh Mansary

Head CEPREC Sierra Leone/ Professor of Energy Engineering at the University of Sierra Leone.

Prof Izael Pereira Da Silva

WP2, WP8 & WP9 Contributor/ Renewable Energy Professor at Strathmore University with extensive experience in solar microgrids.

Prof Howard Njoku

Co-lead- WP3/ Professor of Mechanical Engineering at the University of Nigeria, with a background in thermal management systems.

Dr Ester Hamatwi

CEPREC Namibia/ Early-Career Researcher at the University of Namibia with a focus on renewable energy and microgrid design.

Dr Vijay Pakka

WP4 Lead – Microgrid Network Modelling & Control/ Senior Lecturer in Smart Grids and Machine Learning at De Montfort University.

Our People

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Dr Emmanouil Tyllianakis

WP6 Lead – Modelling of Consumer Behaviour/ Lecturer in Economics for Sustainable Development at De Montfort University.

Dr Udochukwu Bola Akuru

Head CEPREC South Africa/ Senior Lecturer in Electrical Machines at Tshwane University of Technology, South Africa.

Dr Jose-Ortiz Gonzalez

WP1 Contributor/ Associate Professor in Power Electronics at the University of Warwick.

Dr Anna Muchandigona

WP7 Contributor/ Lecturer in Economics at Tshwane University of Technology, with a background in business model innovation.

Dr Patrick Schroder

WP5 Lead – Circular Economy & Value Chain Mapping/ Senior Research Fellow at Chatham House with expertise in circular economy and international policy

Dr Chris Vandome

WP9 Lead – Policy Influence & Government Engagement/ Senior Research Fellow at Chatham House, focusing on African political systems.

Dr Jack Barrie

WP5 & WP9 Contributor/ Senior Research Fellow at Chatham House with experience in policy analysis and sustainable development.

Dr Victor Odumuyiwa

Head CEPREC Nigeria/ Associate Professor at the University of Lagos with expertise in pro-environmental behaviour

Dr Folakemi Ajayi

WP7 Contributor - Energy Economics & Finance/ Lecturer in Economics at the University of Lagos.

Dr Obiageli Christiana Okoye

WP6 Contributor - Sociologist/ Lecturer in Sociology at the University of Lagos, specialising in social dynamics in energy adoption.

Our People

Dr Osita Omeje

WP4 Contributor/ Senior Lecturer in Power Electronics at the University of Lagos.

Dr Stan Shire

WP3 Lead – Sustainable Thermal Energy Solutions/ Reader in Mechanical Engineering.

Dr Patrick Walker

WP6 Contributor/ Lecturer in Sociology at the University of Sierra Leone, with research on environmental perceptions.

Dr Barry Rawn

Head CEPREC Rwanda/ Associate Professor in Electrical Engineering at Kigali Collaborative Research Centre, Rwanda.

Dr William Murithi

Head CEPREC Kenya/ Expert in entrepreneurship and business model innovation at Strathmore University.

Dr Nitika Bhalla

Project Manager, CEPREC/ De Montfort University, Leicester

Dr Peter Kimani

WP3 Contributor/ Early-career researcher in thermo-fluids and energy engineering at the University of Nairobi.

Dr Abi Okoya

Head of Strategic Partnerships, CEPREC

Prof Sarath Tennakoon

(WP2 lead and Emeritus Professor of Power Electronic Systems Kigali Collaborative Research Centre)

Dr. Churchill Saoke

(WP2 Contributor and Director, Strathmore Energy Research Centre (SERC))

Contact Us

Join us in empowering Africa's sustainable energy future.

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