Guidelines:

- This Request Submission Form should be completed by the organisation requesting technical assistance from the Climate Technology Centre & Network (CTCN) in collaboration with the National Designated Entity (NDE) of the country in question
- The Form must be signed by the NDE. Please see updated contact list of NDEs here: http://unfccc.int/ttclear/support/national-designated-entity.html
- The Form can be submitted as a Word file containing a digital signature or as a signed and scanned PDF file in combination with an un-signed Word file
- For requests submitted by multiple countries, all the NDEs of the respective countries shall sign identical Forms before official submission to the CTCN
- NDEs have the opportunity to submit CTCN requests in collaboration with National Designated Authorities (NDAs) for the Green Climate Fund (GCF) if targeting the GCF Readiness Programme.

Requesting country or countries:	Kenya
Request title:	Development of a SF_6 Phase-out Roadmap and Pilot Projects
NDE	Ms. Gaudensia Owino Senior Research Scientist Email: gaudie.aomo@gmail.com, gaudensia.owino@kirdi.go.ke Environment Sustainability & Climate Change Research Centre (ESCC-RC) Kenya Industrial Research and Development Institute (KIRDI) Popo Road off Mombasa Road South C, P.O. Box 30650-00100 Nairobi, Kenya **Office Tel:** +254 20 23 88 216 or +254 20 23 93 466 **Website:** www.kirdi.go.ke
Request Applicant:	State Department for Energy Kawi Complex, off Red Cross Road, P. O. Box 30582 – 00100 Nairobi Kenya **Office Tel No:** +254(0)20 4841000/6006014 Email: psenergy@energy.go.ke Website: www.energy.go.ke **Contact person:** Mr. Peter Rimba Maneno Senior Superintending Engineer Mobile: +254 721474835 Email: petermaneno2011@gmail.com

Climate objective:

- ☐ Adaptation to climate change
- ☒ Mitigation of climate change
- ☐ Combination of adaptation and mitigation of climate change

Geographical scope:

- ☐ Community level
- ☐ Sub-national
- ☒ National
- ☐ Multi-country

If the request is at a sub-national or multi-country level, please describe specific geographical areas (provinces, states, countries, regions, etc.).

Problem statement related to climate change (up to one page):

The Paris Agreement is a legally binding international treaty on climate change which was adopted by 196 Parties at COP 21 in Paris on 12 December 2015 and entered into force on 4 November 2016. Its goal is to limit global warming to well below 2, preferably to 1.5 degrees Celsius, compared to pre-industrial levels. This requires the transition to zero emission and environmentally friendly solutions. The use of electrical equipment containing sulfur hexafluoride (SF6) gas with a Global Warming Potential (GWP) of 25,200 is not compatible with the targets of the Paris Agreement.

Sulfur hexafluoride (SF6) is a potent greenhouse gas used as an insulating medium in electrical equipment like circuit breakers and switchgears. SF6 is currently the main insulation gas deployed in switchgears in Kenya. SF6 emissions in Kenya, as in other countries, are increasing rapidly with grid expansion and modernization. This is in particular relevant as Kenya has committed to 100% renewable energy by 2030 and plans to decarbonize its grid. However, there is low awareness of SF6 impacts and alternatives.

SF6 emissions aren't captured in Kenya's greenhouse gas (GHG) inventories and mitigation plans; baseline data on SF6 banks, quantities installed, and leakage rates is lacking. Piloting SF6-free equipment can avoid future emissions from new grid infrastructure and can make a case for large-scale deployment. SF6-free technologies for medium and high voltage applications are available from companies like Siemens AG, Siemens Energy, ABB, Schneider Electric, Nuventura etc. but aren't widely adopted in Kenya.

Past and on-going efforts to address the problem (up to half a page):

Kenya has set ambitious targets for decarbonizing the national energy sector, aiming to achieve 100 % renewable power by 2030. To reach this target, large scale grid infrastructure projects will be implemented in the coming years to connect new renewable energy sources to consumers. Emissions resulting from the use of SF6 in electricity grids have not been on the national monitor yet, and no SF6-free equipment has been installed so far.

Kenya has participated in the CTCN capacity building workshop on SF6 in July 2023 in Berlin, Germany. Following the expression of interest of the Ministry of Energy and Petroleum, a stakeholder workshop was organized in Nairobi to raise awareness on the topic of SF6 and discuss the potential technical assistance.

Specific technology[1] barriers (up to one page):

On the path to decarbonizing the electricity grid and phasing out SF6 at a national level, Kenya is confronted with challenges related to lack of awareness, unavailability of accurate SF6 baseline data, absence of policies and regulations, limitations in availability of alternative technologies, and constraints in financing. These challenges are further detailed below:

- **Decarbonization options**: Multiple SF6-free technology options are available for medium and high voltage applications, with some more mature and commercially viable than others which are still in the R&D stage. There is a lack of transparency on the technically and economically viable options considering the national context, grid expansion plans, and local availability of alternatives.
- **Standards and incentives**: Outdated or lack of standards, policies and incentives regarding SF6 usage, reporting and leakage, as well as procurement policies promoting SF6-free equipment led to continued SF6 emissions and lack of transparency.
- **Governance**: Absence of SF6 inventories, phase-out targets, actionable roadmaps, enabling policies, monitoring, verification, and enforcement mechanisms regarding SF6 usage and emissions data is impeding the transition away from SF6.
- **Financing**: The higher upfront costs of SF6-free equipment and related grid integration present an adoption constraint requiring innovative financing mechanisms and policy incentives.

Sectors:

Please indicate the main sectors related to the request:

☐ Coastal zones	☐ Early Warning and Environmental Assessment	☐ Human Health	☐ Infrastructure and Urban planning
☐ Marine and Fisheries	☐ Water	☐ Agriculture	☐ Carbon fixation
☒ Energy Efficiency	☐ Forestry	☒ Industry	☒ Renewable energy
☐ Transport	☐ Waste management		

Please add other relevant sectors:

[1] *"**any equipment, techniques, practical knowledge and skills** needed for reducing greenhouse gas emissions and adapting to climate change" (Special Report on Technology Transfer, IPCC, 2000)*

Cross-sectoral enablers and approaches:

Please indicate the main cross-sectoral enablers and approaches

☒ Communication and awareness	☒ Economics and financial decision-making	☒ Governance and planning	☐ Community based
☐ Disaster risk reduction	☐ Ecosystems and biodiversity	☐ Gender	

Technical assistance requested (up to one page):

Overall objective

The objective of this technical assistance is to develop a roadmap to phase out SF6 in new equipment installations and adopt SF6-free technologies aligned with Kenya's decarbonization goals.

Anticipated groups of activities to be performed by the technical assistance

1. **Establishment of an SF6 inventory**
- Collect data on SF6 equipment and banks from utilities
- Estimate SF6 quantities required for future grid expansions
- Project SF6 emissions under business-as-usual scenario
- Awareness programmes with industry, installation partners, etc.

2. **Development of an SF6 monitoring, reporting and verification system**
- Develop an SF6 MV&E system for tracking SF6 installations, banks, emissions and reductions
- Capacity building on inventory and MRV

3. **Evaluation of appropriate SF6-free equipment options**
- Identify viable technology alternatives for medium and high voltage segments
- Assess technical performance (technical feasibility), financial costs (financial feasibility) and local availability across options
- Prioritization of technology choices for pilot demonstrations

4. **Development of national SF6 phase-out roadmap and policy recommendations**
- Determine phase-out strategy with SF6 reduction targets
- Outline technology deployment plans and timelines
- Provide policy and regulatory recommendations based on international best practices
- Develop investment plans for enabling framework

5. **Capacity building on safe management of technologies using SF6**
- Develop a guideline on safe management practices for technologies using SF6
- Capacity building workshops with technicians

6. **Preparation of SF6-free technology pilots**
- Design pilot projects for prioritized technology options

- Update procurement guidelines for purchasing SF6-free equipment options
- Facilitate pilot financing and implementation

Anticipated products to be delivered by the technical assistance

- Accurate inventory of SF6 banks and future emission projections, as well as periodic reporting
- Increased understanding of viable SF6-free technology options
- Phase-out strategy with technology deployment plans and timelines
- Policy recommendations and investment plans for enabling framework
- Pilot projects demonstrating SF6-free technologies, possibly for medium and high voltage
- Local capacity built for safe management of existing technologies, as well as adoption and maintenance of new technologies

Expected timeframe:

12 months

Anticipated gender and other co-benefits from the technical assistance:

Adopting SF6-free technologies will reduce GHG emissions in Kenya which reduces the stress on the environment and biodiversity. Being one of the first African countries adopting SF6-free technologies will establish Kenya as a front-runner which will set the country up with an economic leadership role in that space. No direct gender benefits emerge from this technical assistance. However, capacity building workshops should target an equal share of female participants.

Key stakeholders:

Please list the stakeholders who will be involved in the implementation of the requested CTCN technical assistance and describe their role during the implementation (for example, government agencies and ministries, academic institutions and universities, private sector, community organizations, civil society, etc.).

Stakeholders	Role to support the implementation of the technical assistance
KIRDI (National Designated Entity)	Project coordination support, stakeholder engagement facilitation, introduction to industrial companies, feedback on deliverables
Ministry of Energy and Petroleum (Request Applicant)	Project coordination support, stakeholder engagement facilitation, energy data provision, feedback on deliverables, custodian of SF6 phase-out roadmap and policy recommendations, recipient of capacity building
Kenya Electricity Transmission Company (KETRACO)	Infrastructure data provision, feedback on deliverables, pilot project partner, recipient of capacity building
Kenya Power and Lighting Company (KPLC)	Infrastructure data provision, feedback on deliverables, pilot project partner, recipient of capacity building

Rural Electrification and Renewable Energy Corporation (REREC)	Infrastructure data provision, feedback on deliverables, pilot project partner, recipient of capacity building
National Environmental Management Agency (NEMA)	Feedback on deliverables
Equipment installation and maintenance providers	Information provision on installation and maintenance, recipient of capacity building
Industrial companies	Infrastructure data provision, pilot project partner, recipient of capacity building

Alignment with national priorities (up to 2000 characters including spaces):

Please describe how the technical assistance is consistent with national climate priorities such as: Nationally Determined Contribution, national development plans, poverty reduction plans, technology needs assessments, Low Emission Development Strategies, Nationally Appropriate Mitigation Actions, Technology Action Plans, National Adaptation Plans, sectorial strategies and plans, etc.

Reference document (please include date of document)	**Extract** (please include chapter, page number, etc.).
Nationally Determined Contribution (NDC)	Kenya's updated NDCs prioritize the following mitigation actions: - Increasing of renewables in the electricity generation mix of the national grid - Enhancement of energy and resource efficiency across the different sectors Link: https://unfccc.int/sites/default/files/NDC/2022-06/Kenya%27s%20First%20%20NDC%20%28updated%20version%29.pdf
Technology Needs Assessment	The 2013 TNA on mitigation prioritized renewable energy technologies, including solar home systems and solar dryers. Link: https://tech-action.unepccc.org/wp-content/uploads/sites/2/2013/12/technologyneedsassessmentreport-mitigation-kenya-13.pdf
Accelerated Partnership for Renewables in Africa (APRA)	Kenya has the ambition to achieve 100% renewable power by 2030 and to fuel the green industries of the future by 2040. Link: https://www.irena.org/News/pressreleases/2023/Sep/Kenya-Spearheads-Landmark-Renewable-Energy-Initiative-at-Africa-Climate-Summit#:~:text=At%20the%20launch%20event%2C%20President,make%20this%20ambition%20a%20reality.

Development of the request (up to 2000 characters including spaces):

The request has resulted from the prior participation of the Ministry of Energy and Petroleum in the CTCN capacity building workshop on SF6 phase-out in July 2023 in Berlin, Germany. Following the expression of interest of the Ministry of Energy and Petroleum, a stakeholder workshop was organized in Nairobi to raise awareness on the topic of SF6 and discuss the potential technical assistance. The workshop was attended by key stakeholders, including MoEP, KIRDI, KETRACO, KPLC, CTCN and the NDE Germany.

This request has been jointly developed by the above stakeholders.

Background documents and other information relevant for the request:

SF6 Capacity Building Workshop in Berlin: https://www.ctc-n.org/calendar/events/sf6-free-technologies-net-zero-energy-systems-learning-event

OPTIONAL: Linkages to Green Climate Fund Readiness and Preparatory Support

The CTCN is collaborating with the GCF in order to facilitate access to environmentally sound technologies that address climate change and its effects, including through the provision of readiness and preparatory support delivered directly to countries through their GCF NDA. These actions are in line with the guidance of the GCF Board (Decision B.14/02) and the UNFCCC, particularly paragraphs 4 and 7 of 14/CP.22 that addresses Linkages between the Technology and the Financial Mechanisms[2].

The CTCN is therefore implementing some of its technical assistance using GCF readiness funds accessed via the country's NDA. Any application for GCF support, including the amount of support provided, is subject to the terms and conditions of the GCF and should be developed in conjunction with the NDA.

Please indicate whether this request has been identified as preliminarily eligible by the NDA to be considered for readiness support from the GCF.

☐ Initial engagement: The GCF NDA of the requesting country has been engaged in the design of this request and the NDA will be involved in the further process leading to an official agreement for accessing GCF readiness support.

☐ Advanced engagement (preferred): The GCF NDA of the requesting country has been directly involved in the design of this request and is a co-signer of this request, the signature indicating provisional agreement to use readiness national funds to support the implementation of the technical assistance.

[2] Please see: https://unfccc.int/files/meetings/marrakech_nov_2016/application/pdf/auv_cop22_i8b_tm_fm.pdf

CTCN Technical Assistance
Request Submission Form

NDA name: Peter Odhengo

Date: 2nd October, 2023

Signature:

Monitoring and impact of the assistance:

By signing this request, I affirm that processes are in place in the country to monitor and evaluate the technical assistance provided by the CTCN. I understand that these processes will be explicitly identified in the CTCN Response Plan and that they will be used in the country to monitor the implementation of the technical assistance following standard CTCN procedures.
I understand that, after the completion of the requested assistance, I shall support CTCN efforts to measure the success and effects of the support provided, including its short, medium and long-term impacts in the country.

Signature:

NDE name: Gaudensia Owino

Date: 2nd October, 2023

Signature:

THE COMPLETED FORM SHALL BE SENT TO THE CTCN@UNEP.ORG

The CTCN is available to answer all questions and provide guidance on the application process.