BEYOND TICAD7

伸び行くアフリカの産業開発とUNIDOエネルギー部から見たビジネスチャンス

経済産業研究所BBLセミナー
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Hiroshi OISHI

Chief Technical Advisor

Climate Technology & Innovation Division, Department of Energy

United Nations Industrial Development Organization


SUSTAINABLE DEVELOPMENT GOALS
17 GOALS TO TRANSFORM OUR WORLD
1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
17 PARTNERSHIPS FOR THE GOALS
SUSTAINABLE DEVELOPMENT GOALS

UNIDO

- Established in 1966
- Specialized UN agency 170 Member States with 47 offices Worldwide
- Headquarters in Vienna, Austria

UNIDO's Mandate: Inclusive & Sustainable Industrial Development (ISID)

Thematic Areas:

- Creating shared prosperity
- Advancing economic competitiveness
- Safeguarding the environment

Achieving **equitable** & **sustainable** social, economic and environmental growth while mainstreaming women and youth.

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

UNIDO Energy Programme
THREE STRATEGIC PILLARS

Energy Systems and Infrastructure

EnMS and Energy System Optimization

Mini-Grids With Smart Demand Response

Urban and Rural Sustainable and Smart Energy Solutions (e.g. Smart Mobility)

Accelerators

Climate Technology and Innovation

Bringing interventions in entrepreneurship and enterprise support into coherent value added services across the value chain of eco-system innovation:

GCIP; LCET; PFAN

Single Technology Demonstrations (proof of concept and business model)

Climate Policy and Partnerships

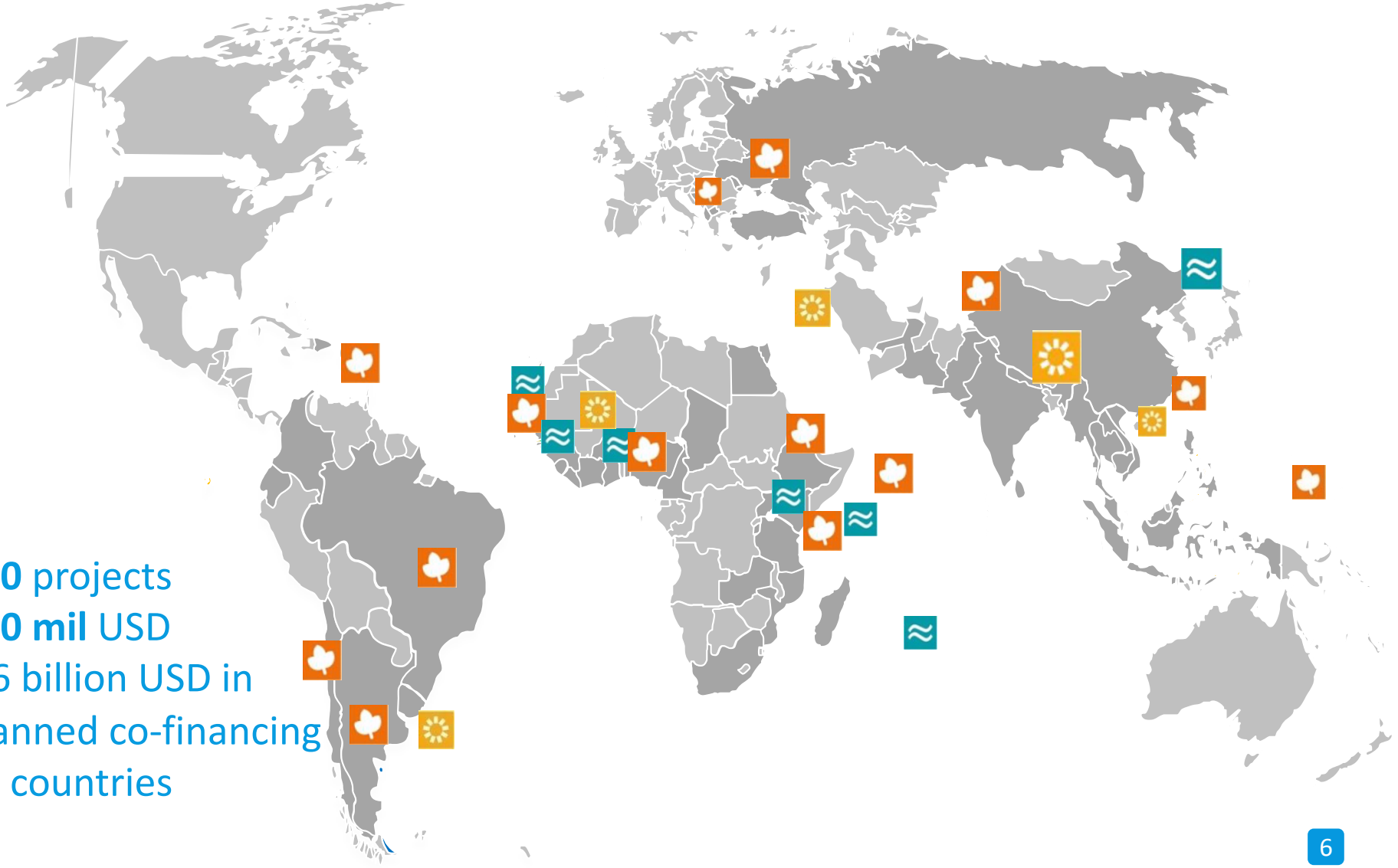
Policy engagement, and partnerships by consolidating efforts across : The Global Network of Regional Centers; CTCN

The convening role, EMGs and VEF

Partnerships with UN systems, UNFCCC, HLPF
Contributions to PCPs, research and policy dialogues

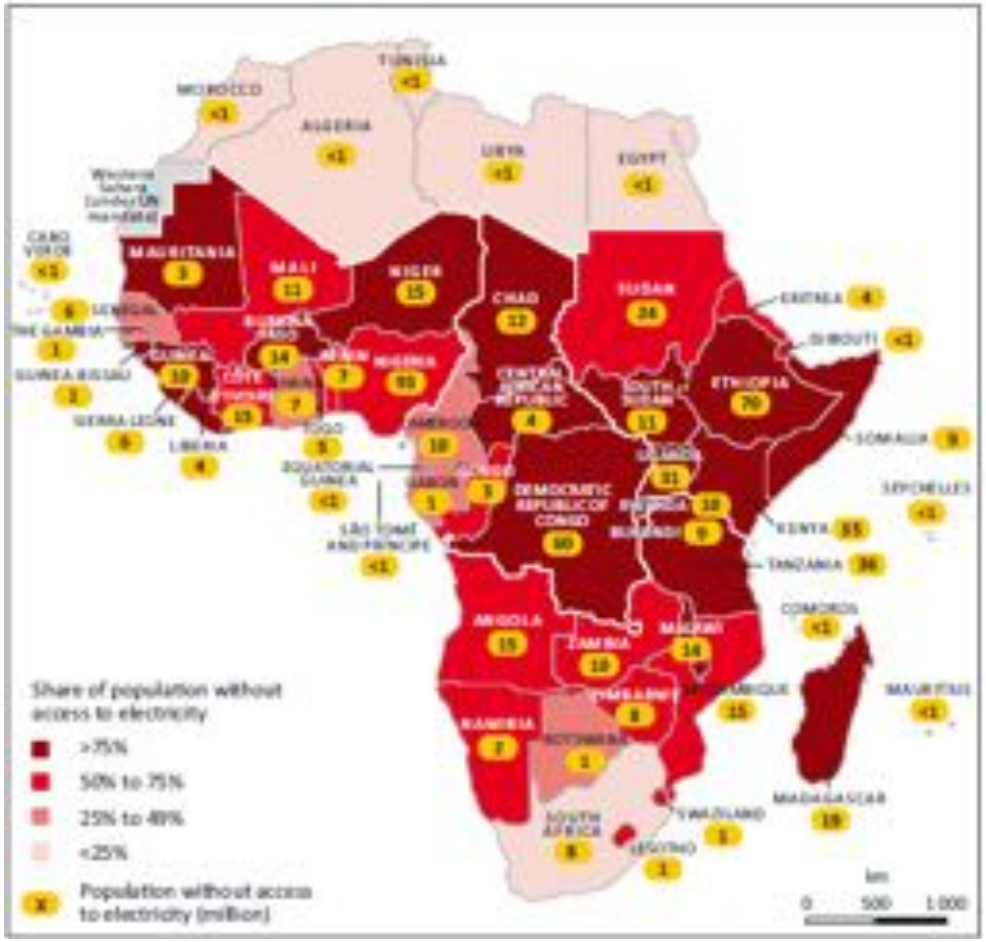
Multi-focal experimentations and innovations, Nexus, Cities

UNIDO Energy Portfolio

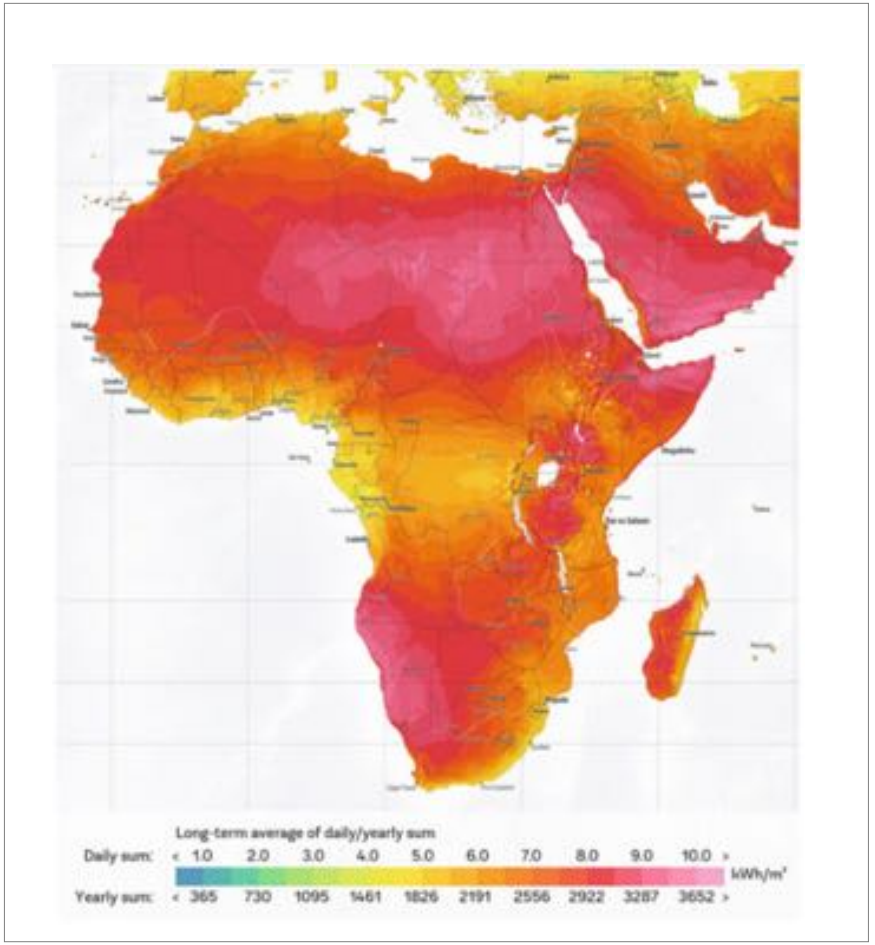


- **120** projects
- **300 mil** USD
- 1.6 billion USD in planned co-financing
- **60** countries

AFRICA Energy Situation



Source: IEA WEO 2014



Solar energy potential. Global horizontal irradiation. Source Global Solar Atlas, owned by the World Bank Group and provided by Solargis

Low Carbon Energy Programme in Africa

Rationale:

- Population growth
- Shift from agrarian Society to industrialization to accelerate economic growth
- Abundant renewable energy resources
- Need for quality Infrastructure to support growth
- Increase Industrial capacity for renewables in Africa
- Address global climate change agenda

JAPAN-UNIDO Energy Portfolio & SDGs

JAPAN-UNIDO Collaboration in Energy

LCET PROGRAMME
LOW CARBON LOW EMISSION CLEAN ENERGY
TECHNOLOGY TRANSFER PROGRAMME

GEOTHERMAL
PROGRAMME

From
the People of Japan

PV-powered water sanitation systems for Ethiopia

LCET PROGRAMME
LOW CARBON LOW EMISSION CLEAN ENERGY
TECHNOLOGY TRANSFER PROGRAMME

Promoting dissemination of Japanese low carbon technologies in developing countries to increase access to renewable energy for productive uses and job creation.

Countries targeted: **Ethiopia**, Kenya, Morocco

Demonstrating innovative advanced Micro-Hydropower, Solar Energy and Battery Energy Storage System Technologies

LCET PROGRAMME
LOW CARBON LOW EMISSION CLEAN ENERGY
TECHNOLOGY TRANSFER PROGRAMME

ETHIOPIA
ULH-MHP-PV Hybrid

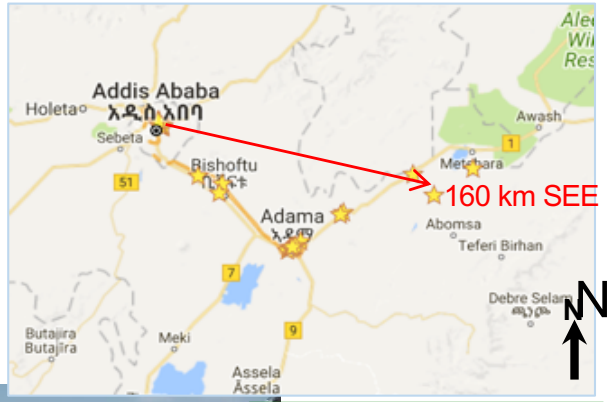
Operational Specs.:

Twin vertical turbine/generator system output 10kW with 12.7kW PV

Effective head 1.7m /discharge 2-5 cumecs (365 days)

400V 3-phase mini-grid distribution mini-grid to 4 distribution poles;
Productive use center
Household evacuation x2
School

Man hours x 2 operation & maintenance



Ukule Village, Fentale Irrigation Scheme, Regional State of Oromia

KENYA
ULH-MHP

Ultra-low head micro-hydropower

Operational Specs.:

Twin vertical turbine/generator system x 2 output 20kW

Effective head 1.7m /discharge 1-3 cumecs (365 days)

400V 3-phase mini-grid distribution pole at productive use center

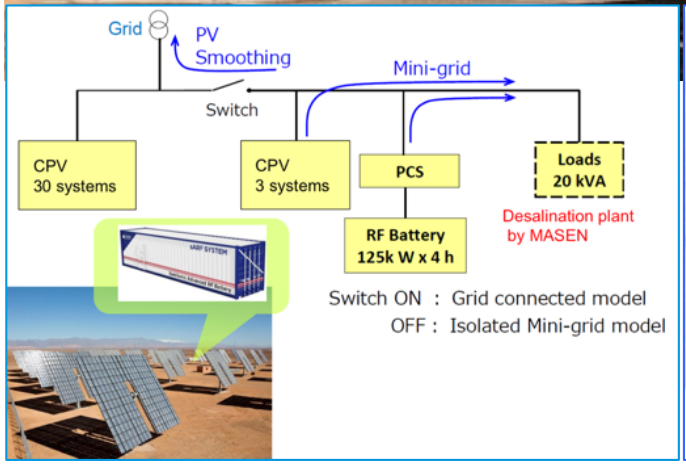
Man hours x 2 operation & maintenance

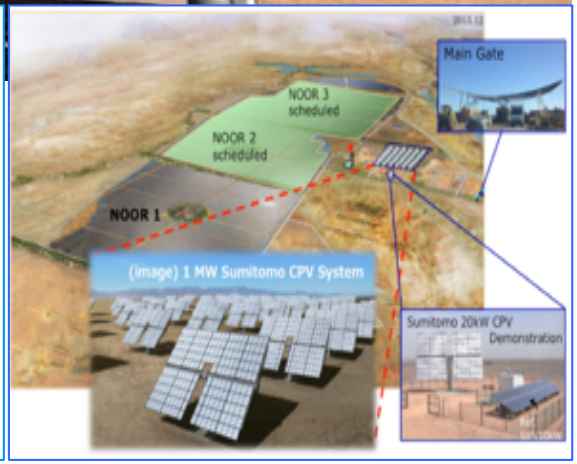
LCET PROGRAMME
LOW CARBON LOW EMISSION CLEAN ENERGY
TECHNOLOGY TRANSFER PROGRAMME

MOROCCO
BESS for Grid/Mini-grid

Operational Specs.

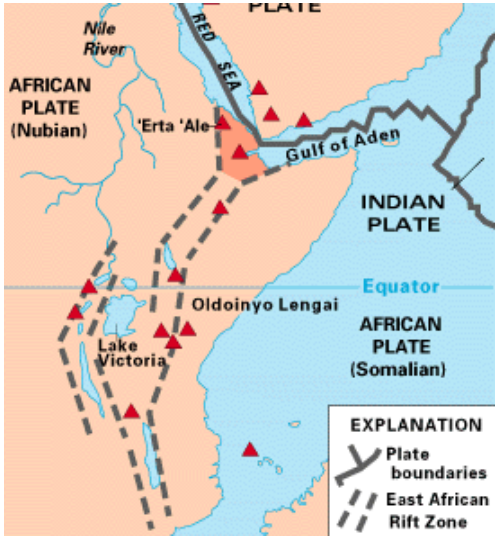
- Redox Flow Battery for stability of grids/quality increase of mini-grids
- 125kW/4hrs capacity
- Fits in FEU
- Maintenance free installation
- Sumitomo Electric - Leading Japan Technology provider

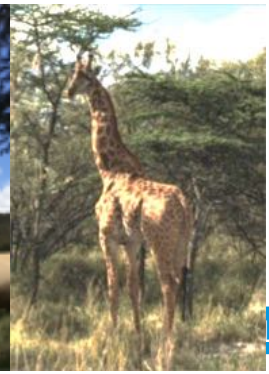




GEOTHERMAL PROGRAMME

Generating energy capacity from geothermal power generation and its related technologies for sustainable development in Africa

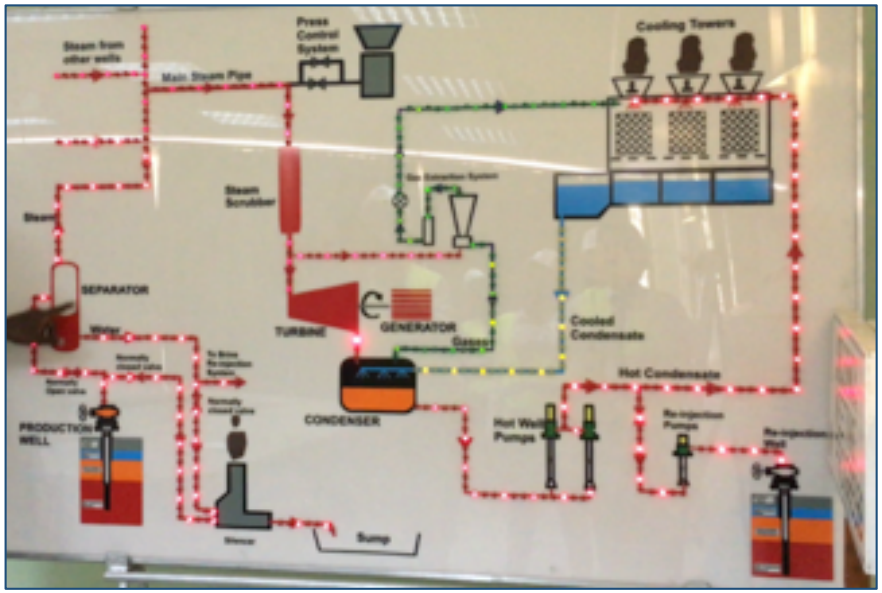




GEOTHERMAL PROGRAMME

O&M Process Enhancement Project with IoT

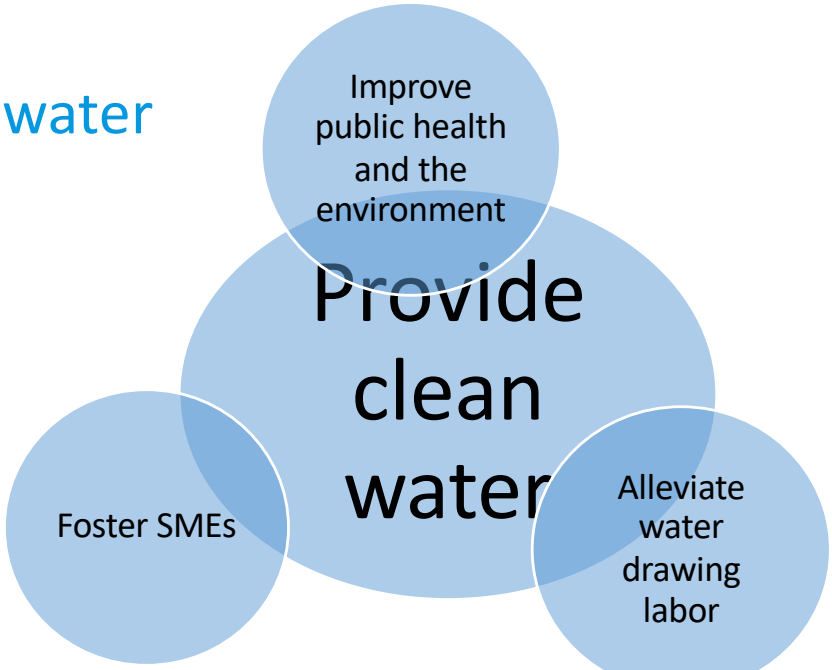
- Target existing geothermal power plant
- Collaboration with JICA
- Deploy IoT technology to access, transfer and analyse big data
- Closer real-time local operator-Japanese expert linkage attained for shorter/controlled downtime

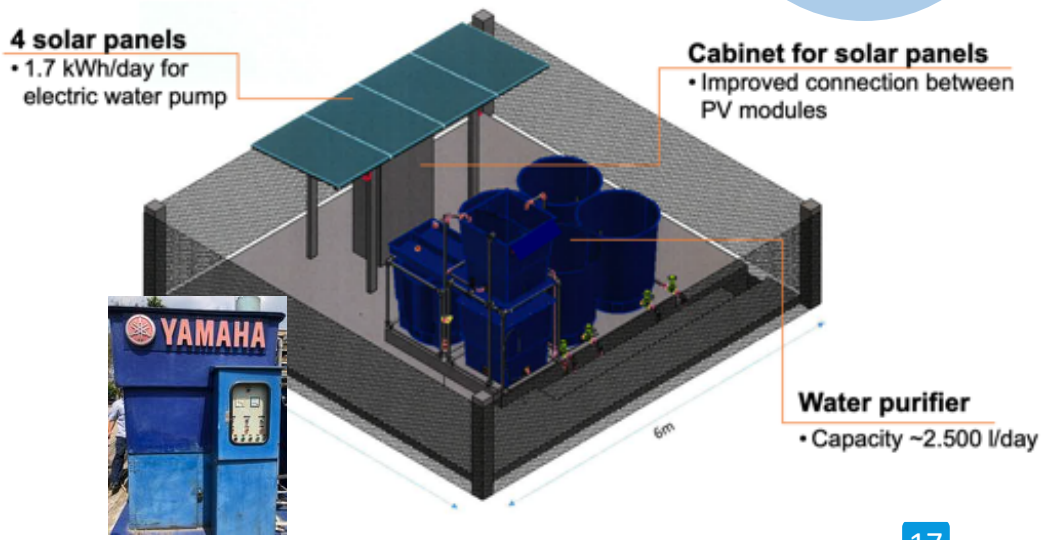


From
the People of Japan

PV-powered water sanitation systems
for Ethiopia

Improving public health by solar-powered water sanitation systems in Ethiopia





Tokyo International Conference for African Development


TICAD
NAIROBI 2016

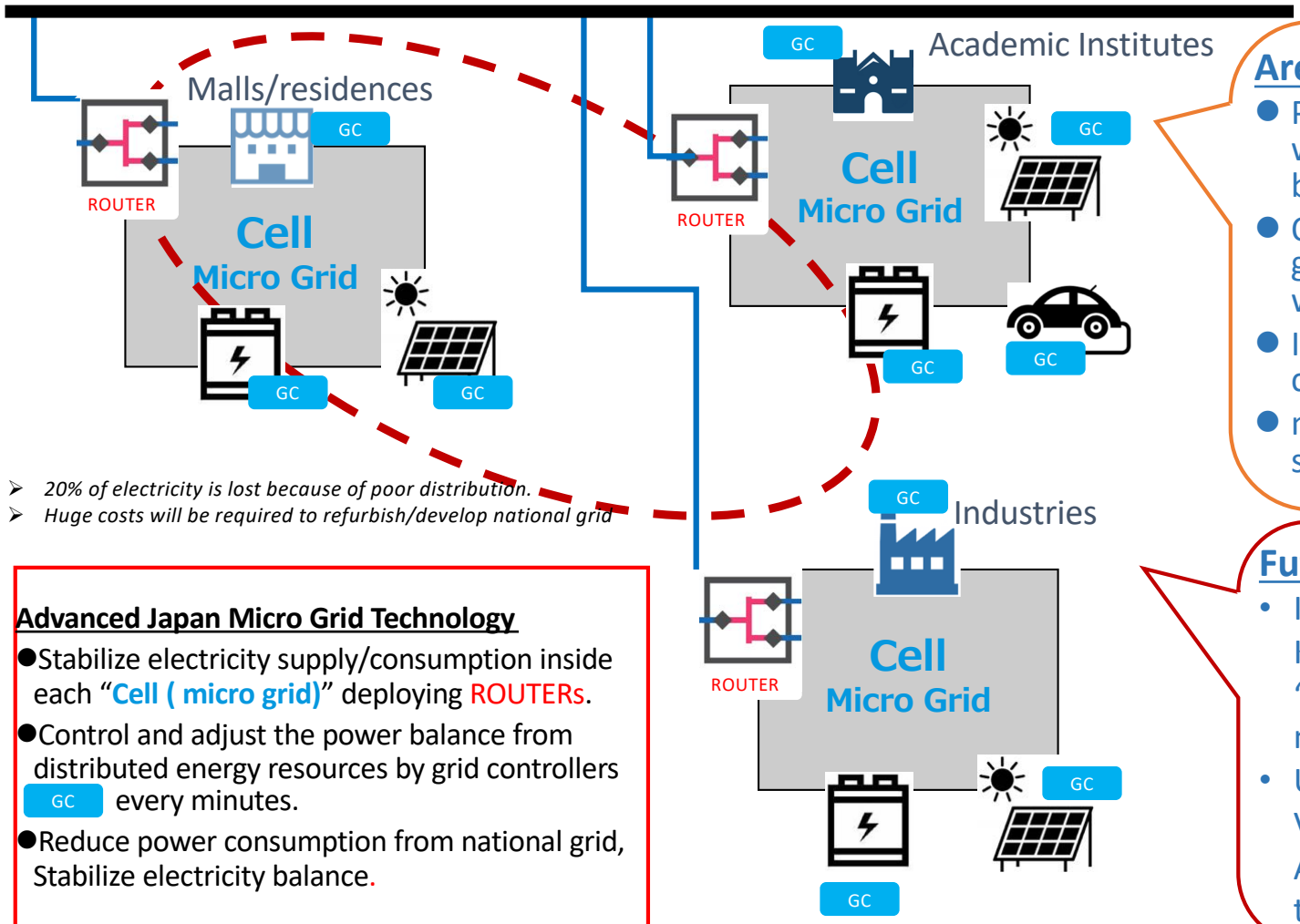
TICAD7 Side Event
“Powering African Innovation”

Mini-Grids	Geothermal	Hydrogen

Result of FS “Advanced mini-grid system at KIC – Rwanda”

Micro grid in Africa with JAPAN solution

For National Grid vulnerable and resistance toward renewable energy



- *20% of electricity is lost because of poor distribution.*
- *Huge costs will be required to refurbish/develop national grid*

Advanced Japan Micro Grid Technology

- Stabilize electricity supply/consumption inside each "**Cell (micro grid)**" deploying ROUTERs.
- Control and adjust the power balance from distributed energy resources by grid controllers GC every minutes.
- Reduce power consumption from national grid, Stabilize electricity balance.

Areas of Possible Intervention

- PoC project for "On grid Micro Grid with renewable energy and batteries" in Kigali innovation city.
- Optimize/localize advanced Japan grid technology in collaboration with local technology Co.
- In addition to new batteries, consider EV storage.
- micro grid technology installed to stabilize national grid.

Future plan -introducing VPP-

- Integrate multiple micro grids in Kigali Innovation City, introduce a "VPP " function to stabilize the national grid.
- Utilize "AI and Big data" to operate VPP, and develop a " model of African Micro Grid with Japan technology".

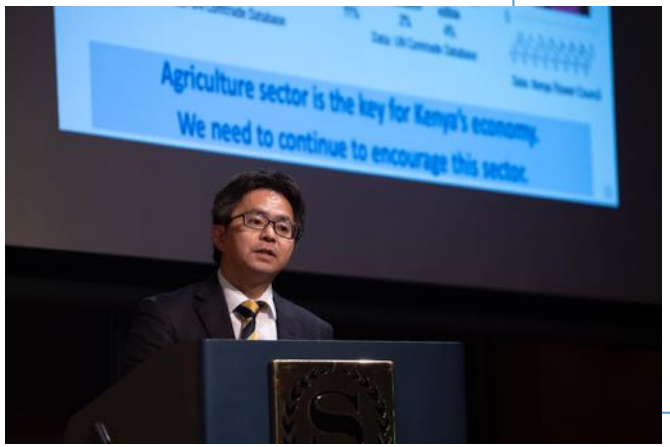
Result of FS “Study on Application of Hydrogen Fuel Combined with Geothermal Power in East Africa – Kenya”

Powering African Innovations

Session 2:

Hydrogen applications in geothermal energy generation

Scene Setting
Hydrogen applications in geothermal energy generation
- Kenya’s Case -



August 29, 2019
Dr. Akiteru Maruta
maruta@technova.co.jp
Technova Inc

Technova | Inc.

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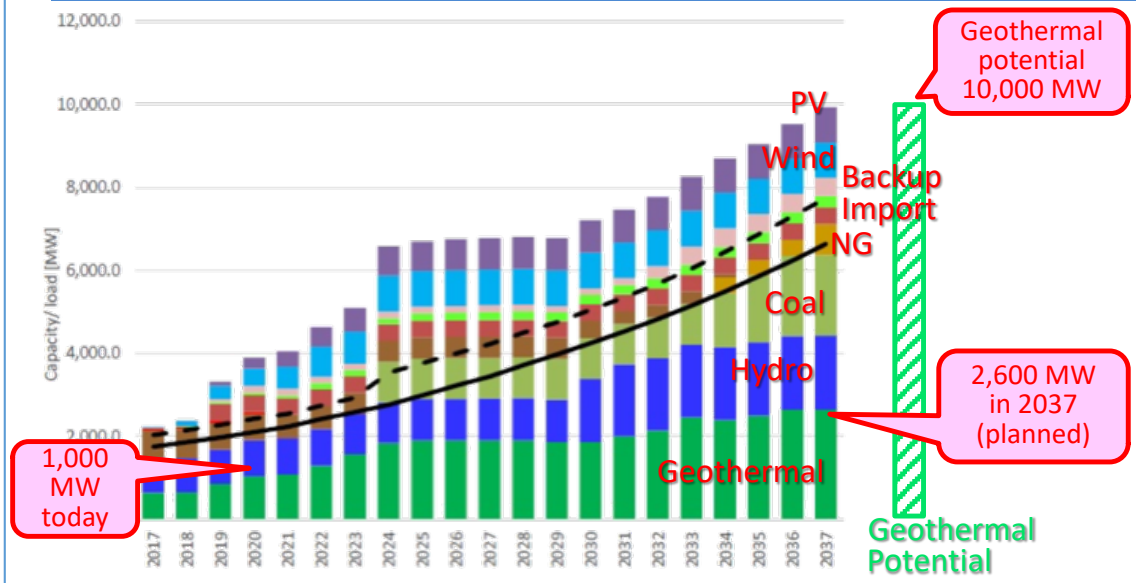
Resource 2: Large Potential on Geothermal

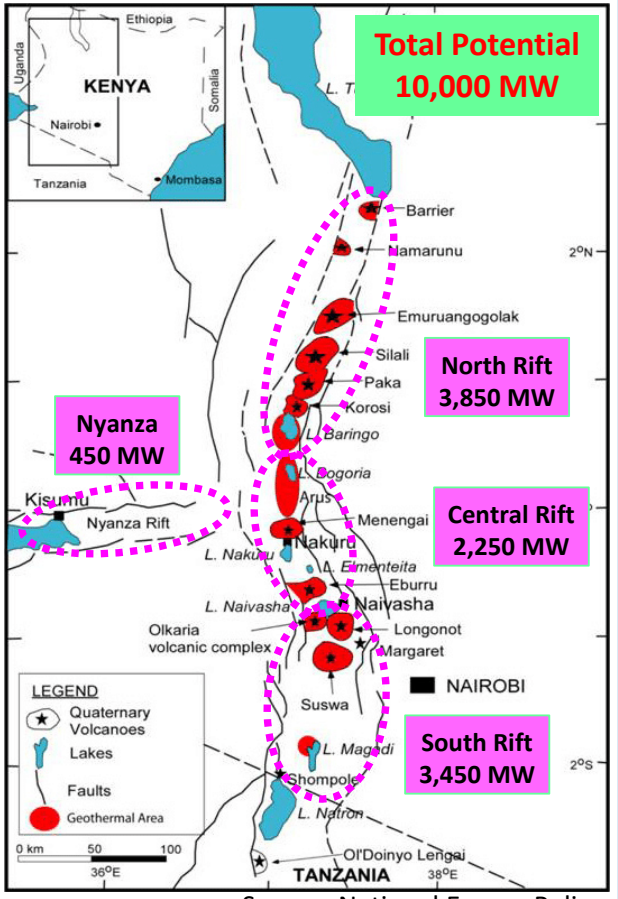
- In 2018, Kenya has the capacity of 2,712 MW, with the peak demand of 1,802 MW. Kenya has excess capacity even today.
- Kenya has large potential for geothermal power, 10,000 MW in total, which is higher than expected peak demand in 2037.

Future Capacity and Peak Demand Toward 2037



Data: "Update Least Cost Power Development Plan; Study Period: 2017-2037, June 2018"

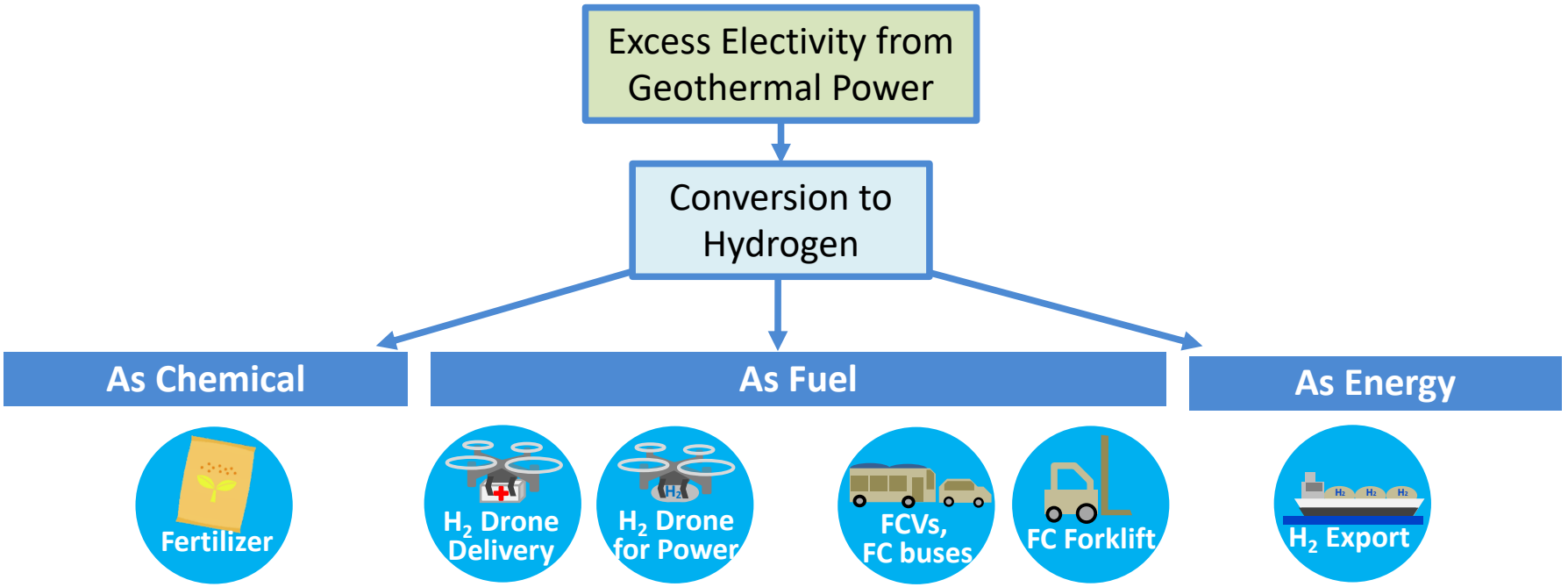
Geothermal Potential



Source: National Energy Policy

Kenya has large potential for geothermal energy.

Summary: Hydrogen Production from Geothermal



Fertilizers

Good and immediate needs

Drone

- Parcel delivery
- Off-grid service

Good and immediate needs

Mobility

- FCVs
- FC Buses
- FC Forklifts

Future?

Hydrogen Export

Future?

Thank you

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