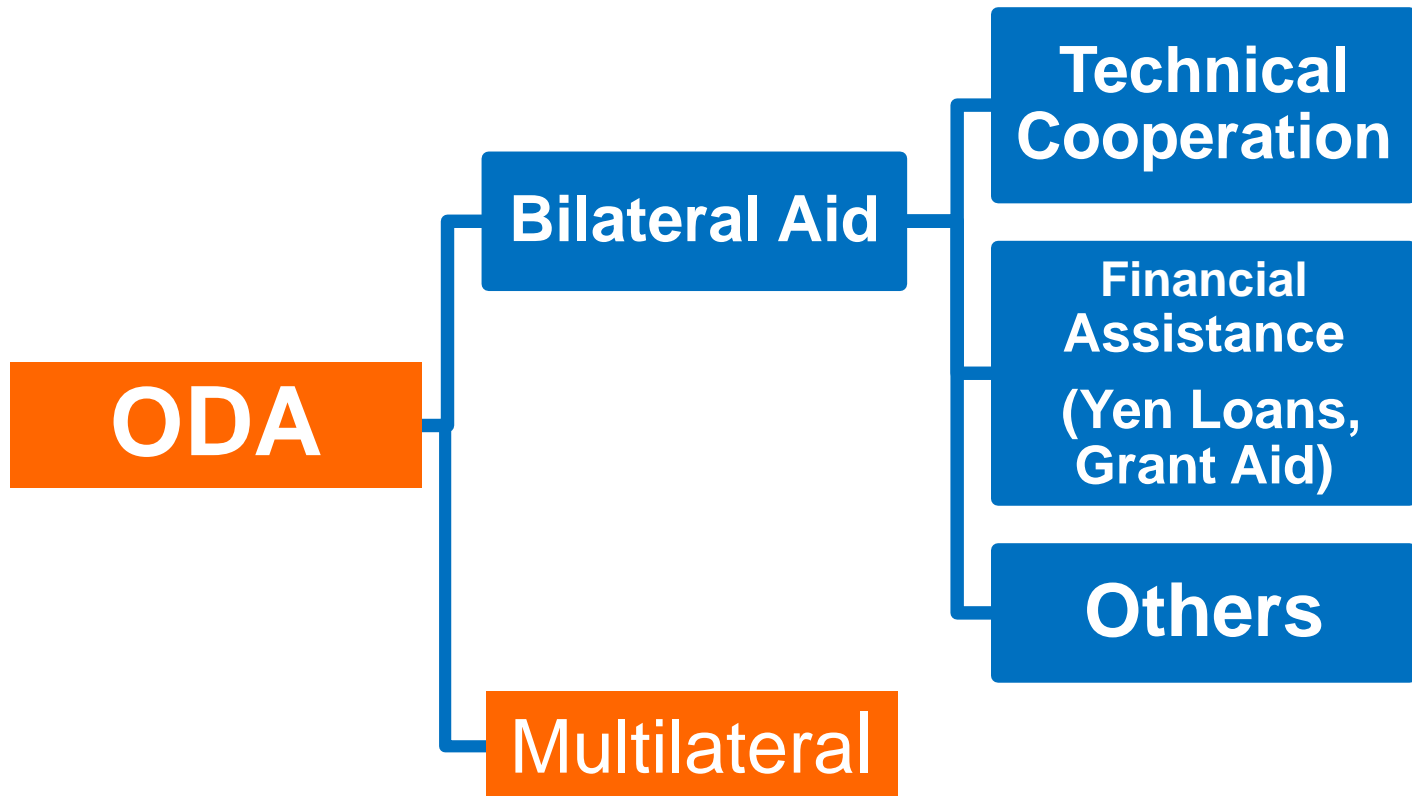


JICA's Support in African Energy Development

February 2019
Tokyo, Japan

Japan's Official Development Assistance (ODA)



JICA Overview

The Government of Japan's ODA Policy

(1) Development Cooperation Charter (Feb. 2015)

Objectives: Contributing to securing peace, stability and prosperity of the international community.

Priority Policies:

- “Quality growth” and poverty eradication through such growth
- Sharing universal values and realizing a peaceful and secure society
- Building a sustainable and resilient international community through efforts to address global challenges

(2) Japan Revitalization Strategy (2013)

(3) National Security Strategy (2013)

(4) Partnership for Quality Infrastructure (2015)

JICA's New Vision (2017-)

Mission

JICA, in accordance with the Development Cooperation Charter, will work on human security and quality growth.

Vision

Leading the world with trust

JICA, with its partners, will take the lead in forging bonds of trust across the world, aspiring for a free, peaceful and prosperous world where people can hope for a better future and explore their diverse potentials.

Actions

Commitment:

Commit ourselves with pride and passion to achieving our mission and vision.

Gemba:

Dive into the field ("gemba") and work together with the people.

Strategy:

Think and act strategically with broad and long-term perspectives.

Co-creation:

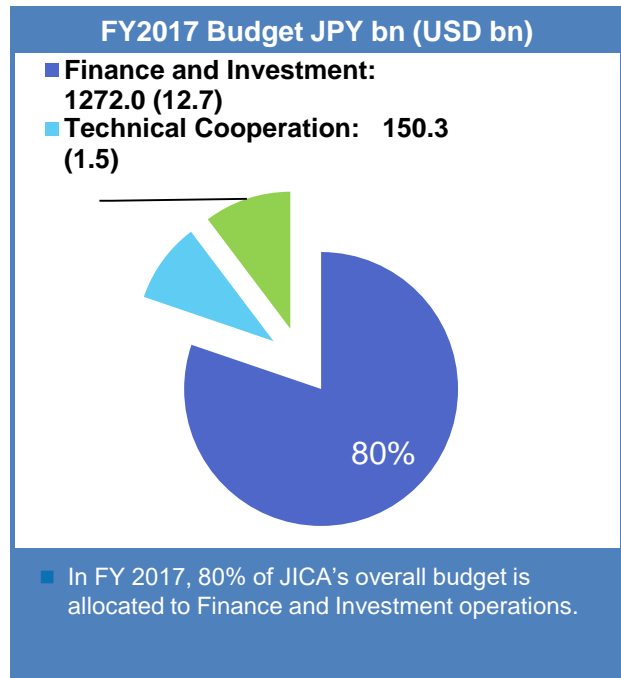
Bring together diverse wisdom and resources.

Innovation:

Innovate to bring about unprecedented impacts

JICA's Operations:

Three main schemes of operations



Finance and Investment

(ODA Loans and Private-sector Investment Finance)

- **JICA provides ODA Loans with concessional conditions** (similar to development finance provided by Multilateral Development Banks, etc.) for developing countries to finance investment for development.



Delhi Mass Rapid Transport System Project in India

Technical Cooperation

- By sharing Japan's technologies and expertise, **technical cooperation aims to foster the human resources** who will lead economic and social development in developing countries.



Assistance in agricultural production in Uganda

Grant Aid

- **Assistance in the form of grants with no repayment obligations** to provide the goods and services necessary for economic and social development in developing countries.



Rural water supply in Ethiopia

Exchange rate: USD/JPY = 100

Fiscal year runs from April to March next year.

96 Overseas Offices located worldwide



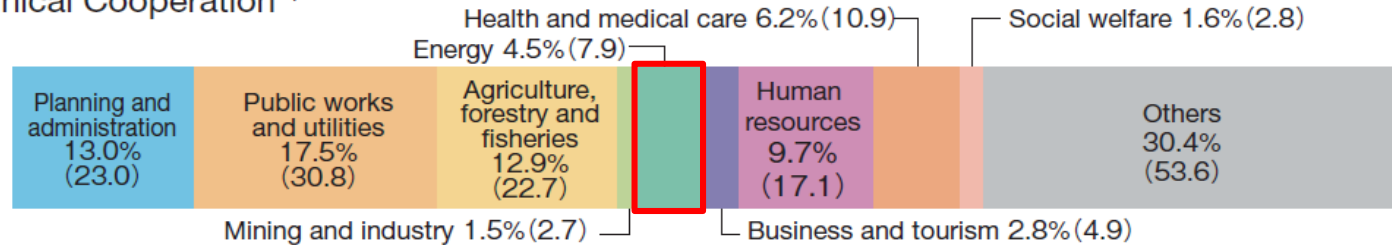
JICA's Cooperation in Energy sector

Distribution by Sector

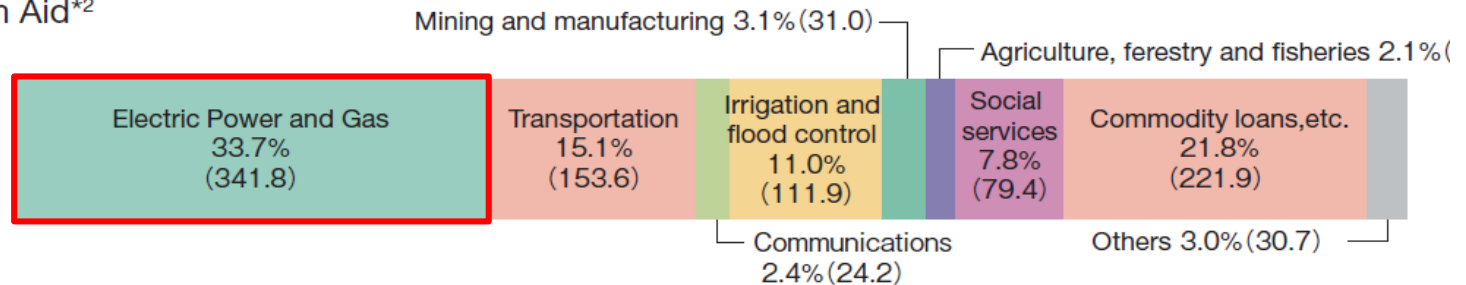
(Unit: %, ¥ billion)

※ JICA, JFY 2014

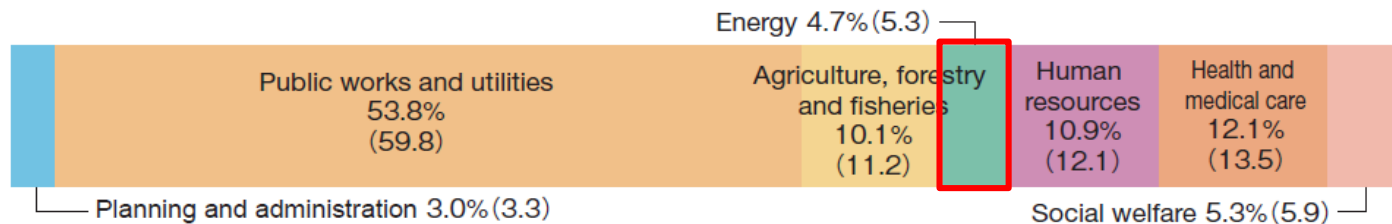
Technical Cooperation*1



Loan Aid*2



Grant Aid*3



*1 Expenses that also include expenses required for dispatching volunteers and emergency aid groups.

*2 Total commitment Amounts of ODA Loan and Private-Sector Investment Finance.

*3 Amount of concluded Grant Agreements. However, for projects running over several fiscal years, the maximum amount allowed for each fiscal year is counted for that fiscal year.

JICA's Main Policy of Cooperation in Energy Sector

“3 L” Policy

- **Low-Cost**

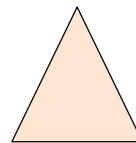
Reduction of the total cost, not just limited to the initial investment but also the life cycle cost and external diseconomies. The policy also contributes to utilizing commercial investments under an appropriate development plan.

- **Low-Carbon**

Realization of low carbon emissions by utilizing excellent technologies, introducing such low-carbon power sources as highly efficient thermal, hydro, geothermal, and other sources of renewable energy, reducing loss from power grids, and promoting energy conservation.

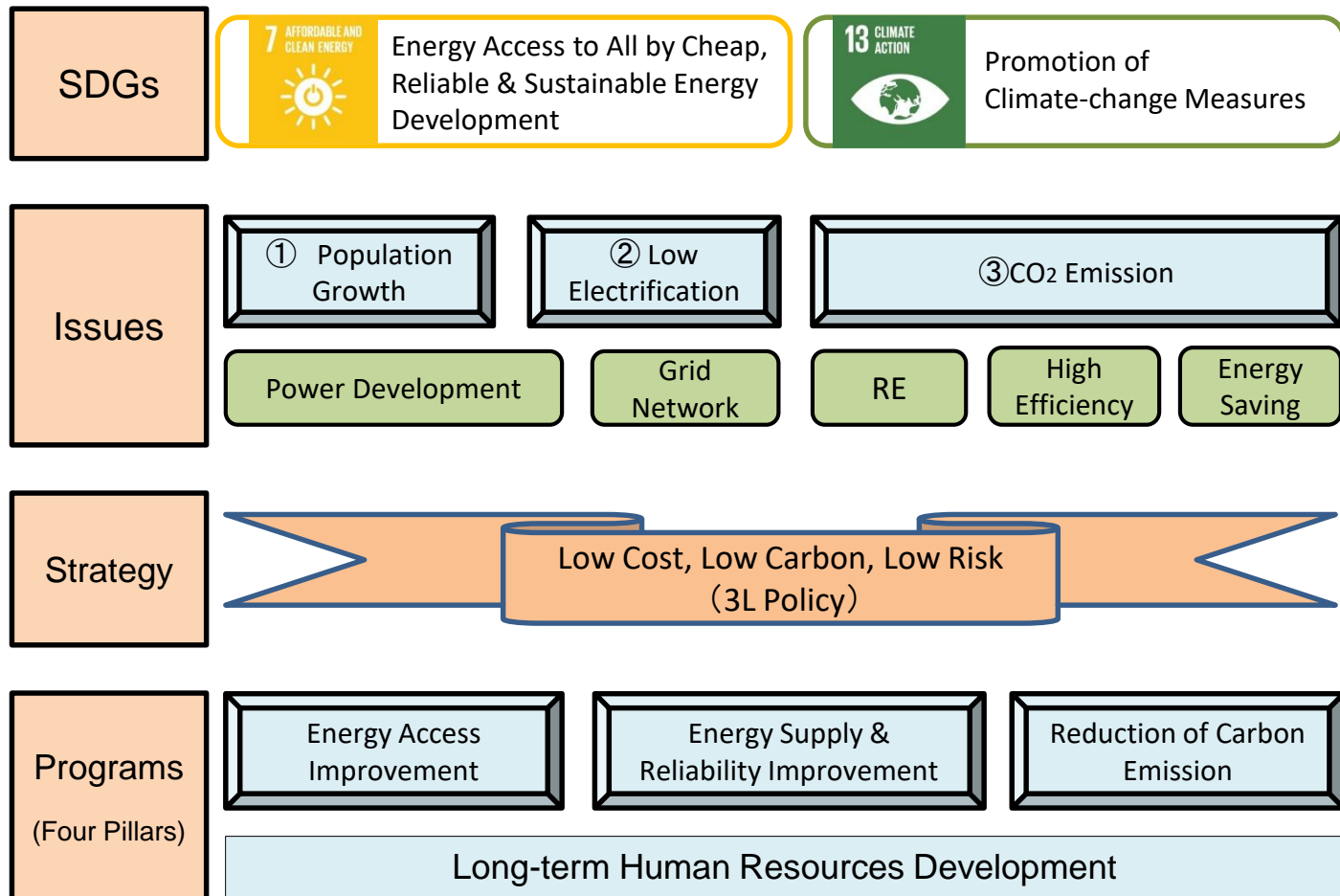
- **Low Risk**

Stable securing of the primary energy, realizing the best mix of energy and ensuring power system stabilization

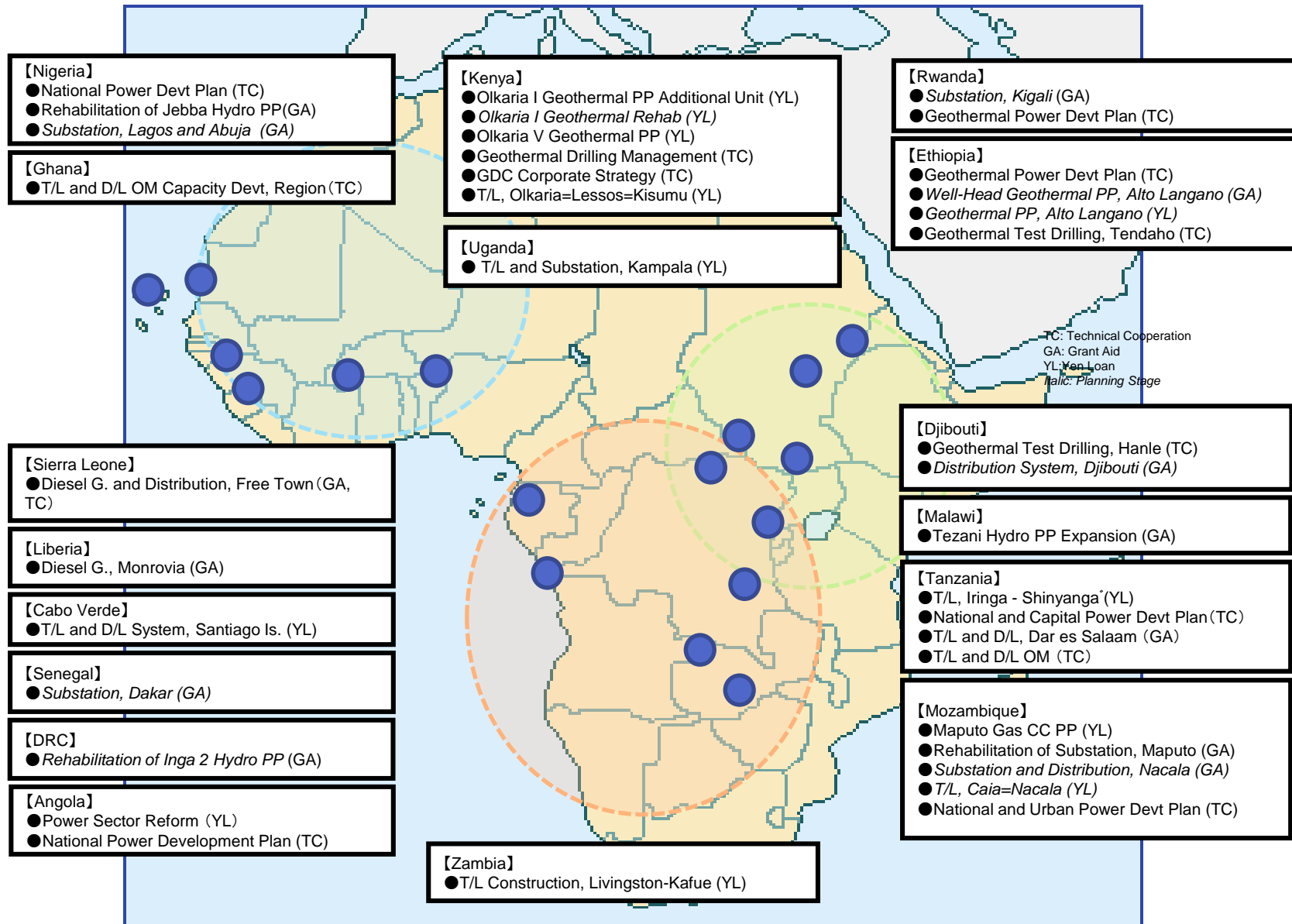


Features of JICA's Cooperation in Energy Sector

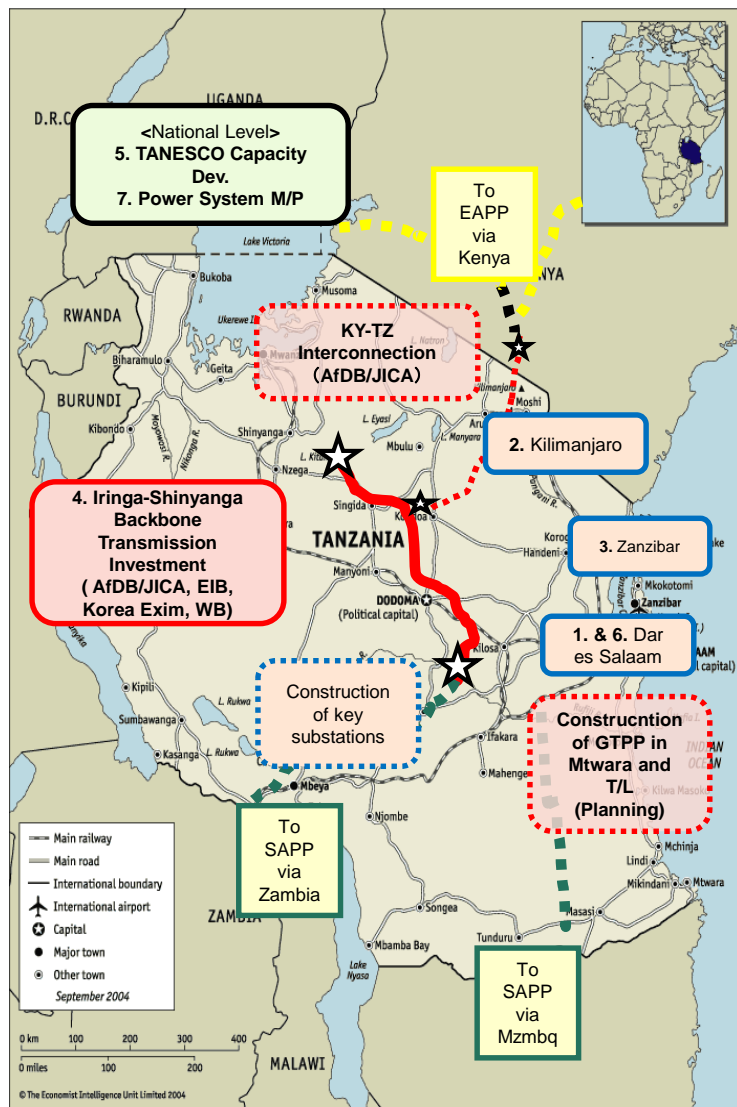
- Supporting **Large-Scale Development** with advanced technology.
- Develop Energy from the early stage, which is the **risk-taking part**.
- Utilizing **Japan's experience and technology** to address global issues.



Recent Energy Development Projects by JICA



Power Pool Development: Tanzania



Sector's Challenge

- (1) Rapid increase of power demand caused by economic development
- (2) Fluctuation of Power Voltage and unanticipated blackouts
- (3) Energy Security (rely on hydro for about 60%)
- (4) Lack of proper maintenance for transmission and distribution facility
- (5) TANESCO's financial situation

<Loan Aid>

To strengthen the regional transmission network and stabilize the power supply in the East Africa Region

<Grant Aid>

To strengthen the distribution network in urban areas in order to rapid increase in power demand

<Technical Cooperation>

- To support MEM and TANESCO to formulate mid-long term investment plan
- To strengthen TANESCO's capacity to maintain and maximize the existing electric facilities

<Japan's new assistance: reviewing of draft Gas Utilization Master Plan >

To review the Gas Utilization M/P including strategic plan of domestic gas industry development including the Gas Thermal Generation, human resource development plan and review of institutional frame work and regulation

PROJECT	Status	Scheme	Cost
1. The Project for Reinforcement of Transmission and Distribution Facilities in Oyster Bay Substation (2008-2010)	Completed	GA	23.3
2. The Project for Rehabilitation of Substation and Transmission Line in Kilimanjaro region (2011-2013)	Completed	GA	25
3. The Project for the Reinforcement of Power Distribution in Zanzibar Island (2011-2013)	Completed	GA	30
4. Iringa - Shinyanga Backbone Transmission Investment Project (2010-2015)	On-Going	LA	60.48
5. The Project for Capacity Development of Efficient Distribution and Transmission Systems (2009-2016)	On-Going	TCP	10.6
6. The Project of Rehabilitation of Substations and Construction of New Lines in Dar es Salaam (2014-2016)	On-Going	GA	44.15
7. The Project for Formulation of Power System Master Plan in Dar es Salaam and Review of the Power System Master Plan (2014-2016)	On-Going	TCP	3.2

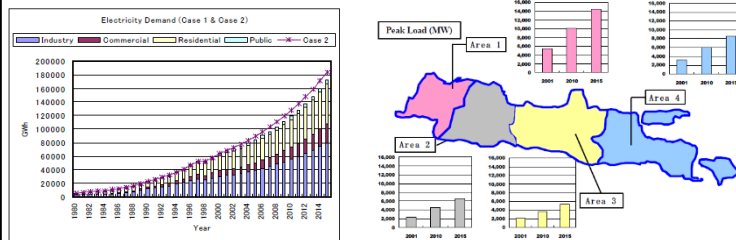
Note: "Kenya – Tanzania Power Interconnection Project (co-finance with AfDB)" is under consideration

GA: Grant Aid, LA: Loan Aid, TCP: Technical Cooperation Project

JICA's Support for Master Plan Formulation: Example

Demand Forecast:

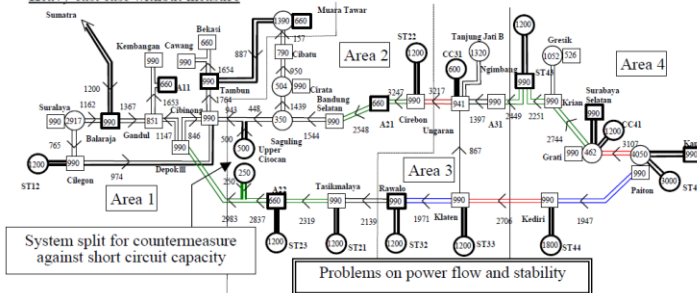
- forecasted short to mid/long term power demand
- identified the risk of the power deficit expected in the near future



Network Development Planning:

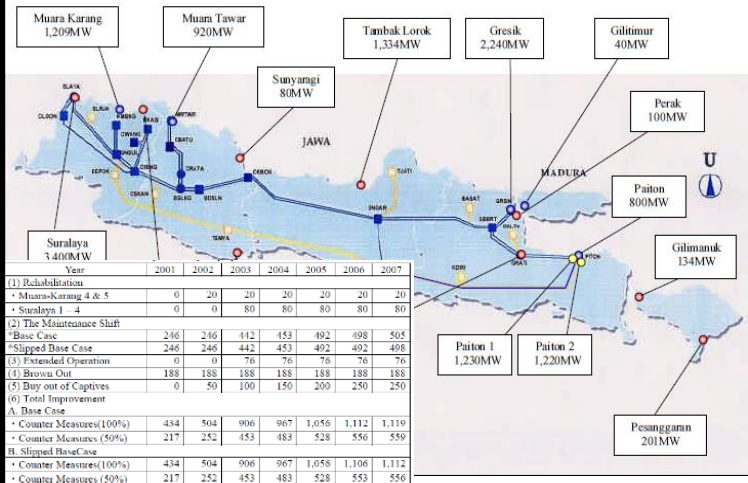
- identified bottlenecks of network by power flow analysis
- formulated an optimal transmission development plan with power supply stability

Heavy-east case without measure



Power Development Planning:

- formulated an emergency power development plan
- formulated an optimal power development plan for the mid/long term, based on effective use of primary energy, and least cost investment.

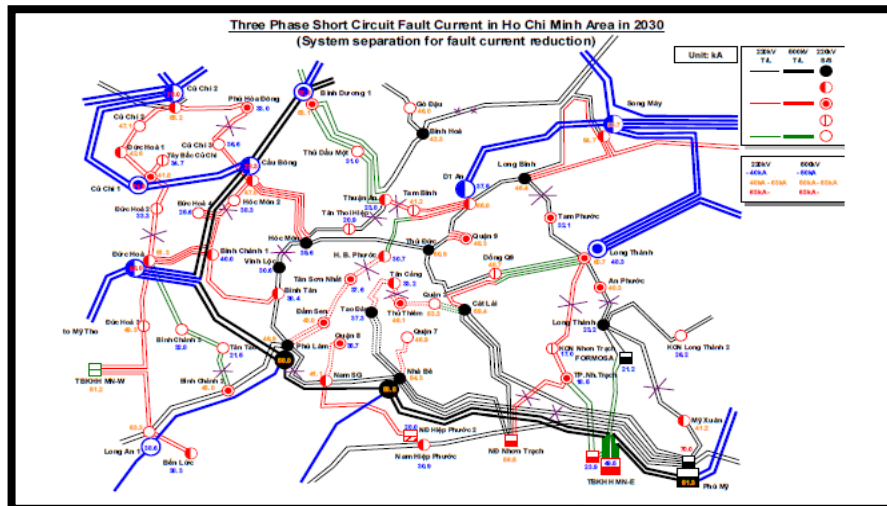


Institutional and Capacity Development

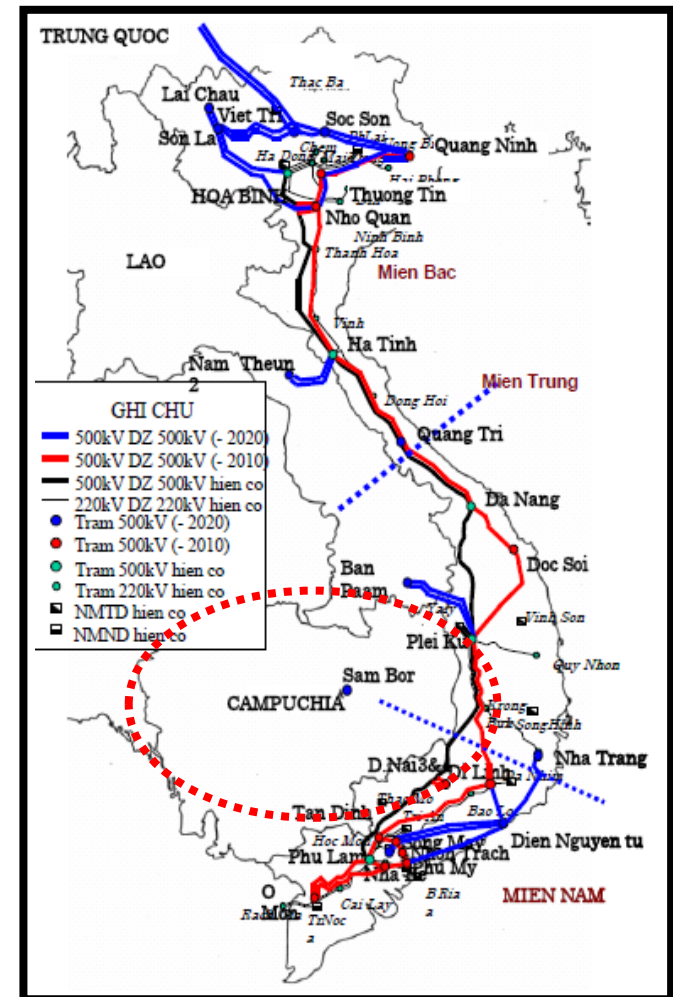
- examined organizational & institutional development for the implementation of the master plan.
- conducted capacity development programs on power development planning, system operation, etc.

JICA's Support for Master Plan Formulation: Example

- Supported formulation of Power Development Plan in Vietnam
- Support includes “examination of primary energy mix”, “demand forecast”, “power generation planning”, and “power system planning”, etc.
- Capacity development programs, such as demand forecast and system analysis were conducted.
- Detailed examination on the Network development in Southern Area.



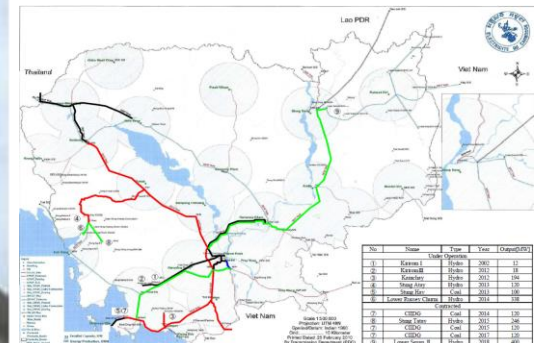
System Dev't Plan in Ho-Chi-Minh City formulated with JICA's Support)



System Dev't Plan in Vietnam formulated with JICA's Support

CD in Power Sector: CD for OM of TL and DL

Coupled with the financial supports to the power system development (power station, T/L, D/L), JICA has offered capacity development programs in 1) operation and management of transmission facilities, and 2) operation of central dispatch center.



CD in Power Sector (beyond the Grid)

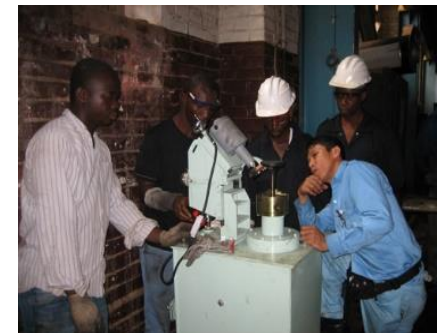
CD for Rural Electrification: BRIGHT Project, JKUAT, Kenya

- CD for R&D (PV, batteries w/o lead, wind, etc)
- Education & training for rural electrification with RE



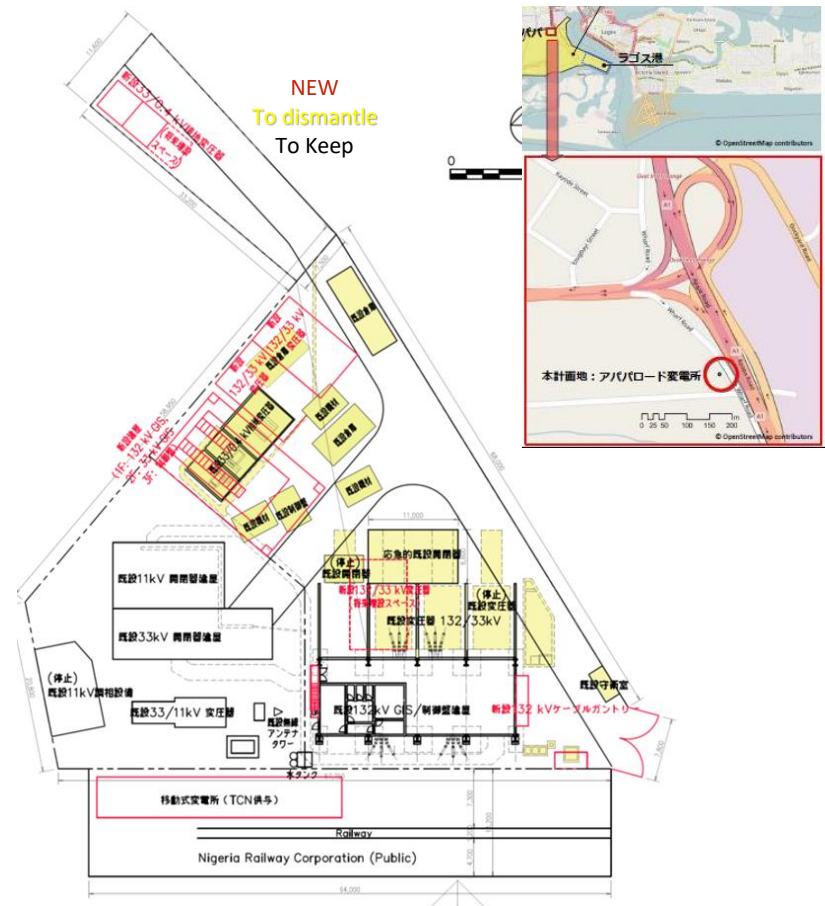
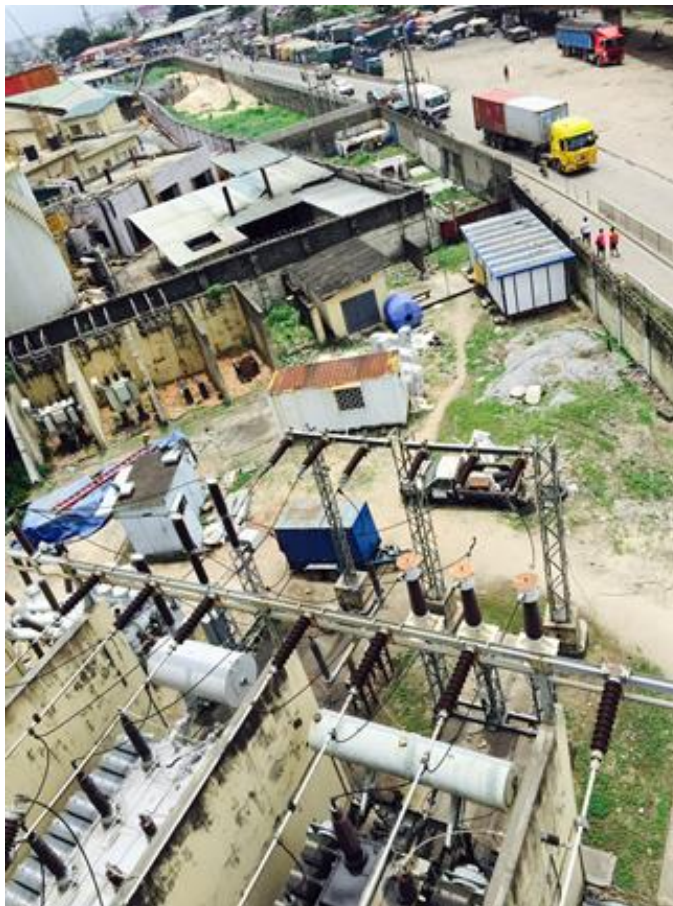
CD for Maintaining Power Supply Facilities, Sierra Leone

- CD of OM of diesel generators and substations
- Coordination with plant construction



Reconstruction of S/S in Nigeria

- To introduce reliable S/G (GIS)
- To Increase capacity of transformer
- Demolition / Construction of a key substation with narrow space

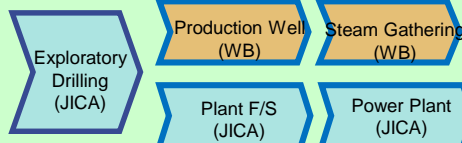


Geothermal development in Africa

Ethiopia

Formulating M/P on development of geothermal energy (T/C, 2013-15)

Geothermal power project in Alto Langan (Loan, Under consideration)



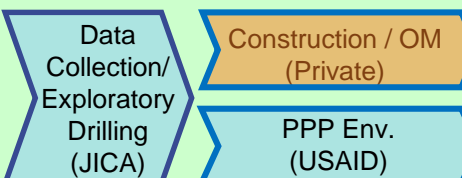
Rwanda

Preparation of Electricity Development Plan for Sustainable Geothermal Energy Development (T/C, 2013-15)

Data Collection Surveys

Djibouti, Kenya, Ethiopia, Djibouti, Malawi, Mozambique, Rwanda, Tanzania, Uganda, Zambia

Geothermal power project in Djibouti (Possible Option)



Kenya

Capacity strengthening for geothermal development project (T/C) (2013-17)

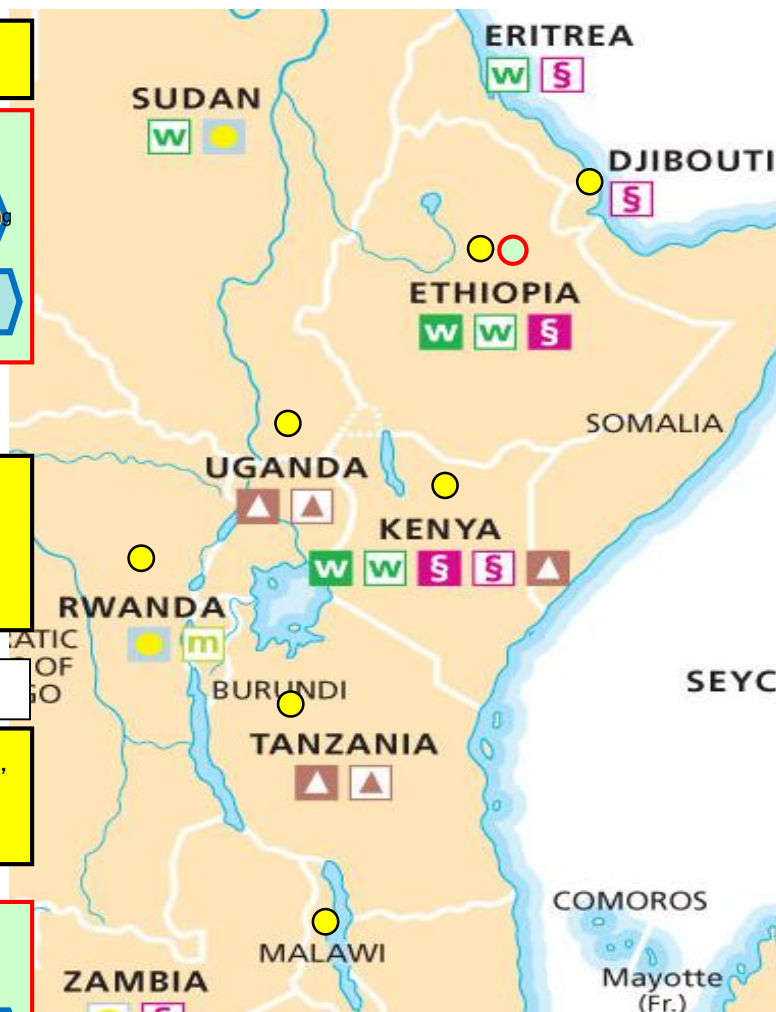
Reviewing GDC's geothermal development strategy (T/C)(2014-16)

Olkaria I unit 4 and 5 geothermal power project (Loan, signed 2009)

Olkaria V power plant (140MW) (Loan, signed 2016)



Olkaria I 4 & 5



Leg.

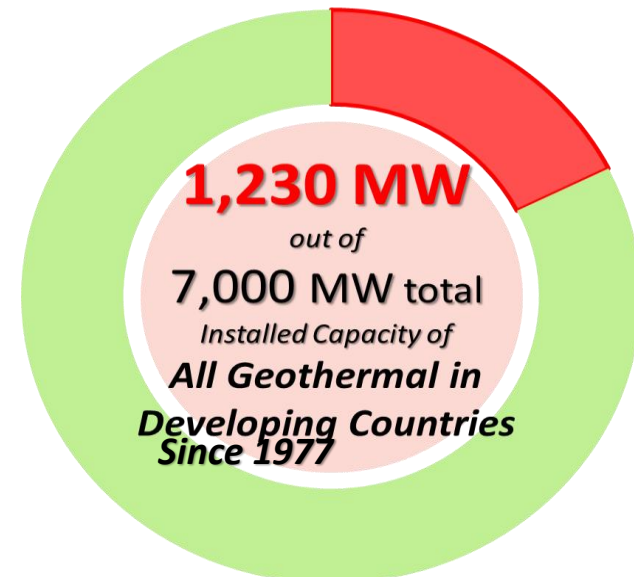
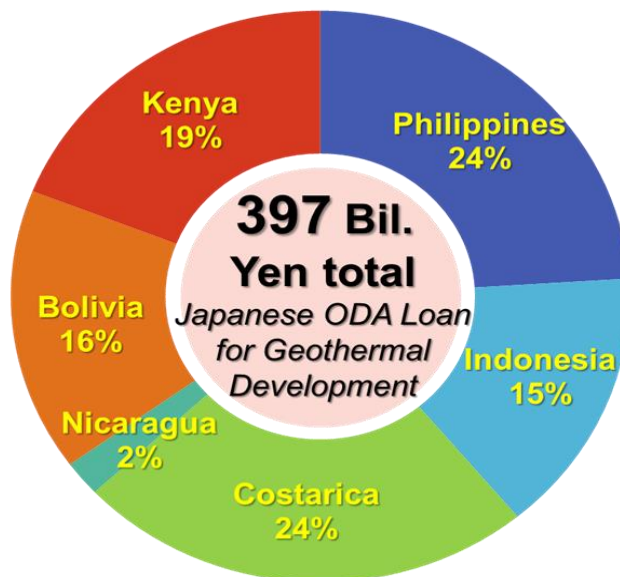
Yellow circle : Project completion or in progress

Red circle : Project under consideration

(T/C) : Technical cooperation

Share of Japanese ODA Loans for Geothermal Development since 1977

- **397 Billion Yen** total ODA Loan^{*1}
- **1,230 MW** installed capacity
 ／ Out of 7,000 MW total capacity of Geothermal of All Developing Countries constructed after 1977^{*2}



*1) Additional to this number, JICA has recently signed 10 Bil. Yen Loan for rehabilitation of Kenya Olkaria I in March 2018.

*2) UDI World Electric Power Plants Database, 2017

JICA's Cooperation in Geothermal Development

1. Plant construction (ODA loan, Grant Aid)

- To finance the production well and plant construction with concessional loans (from 0.01% interest, 40 yr. repayment, 10 yr. grace period)

2. Exploration (Resource survey and test drilling)

- Ethiopia, Djibouti, Nicaragua, Ecuador

3. Development policy and plan

- To promote optimal development technically and economically

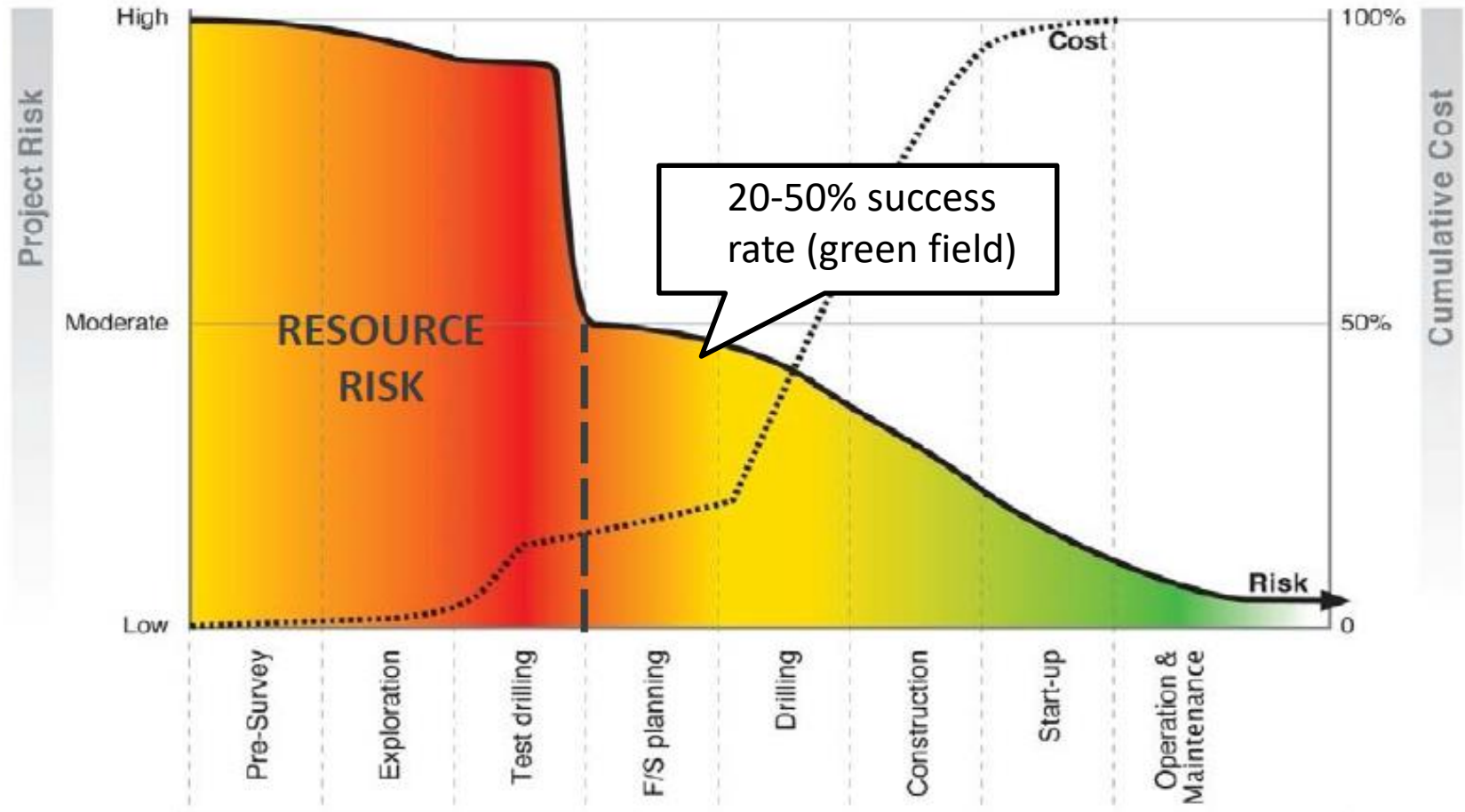
4. Human resources development

- To increase the success rate through capacity strengthening. On-going projects in Kenya and Indonesia. Comprehensive training program in Japan

5. Promotion of research and development

- To increase the exploration accuracy and to reduce the cost with the advancement of technology. On-going projects in El Salvador and Indonesia

Addressing Resource development risks



Source: ESMAP 2012

Kenya, Olkaria I Unit 4&5



Loans: Total of 350MW in constructed or committed (L/A signed amount: 75.5 bil Yen)

- Olkaria I Unit 4, 5 (140MW. Completed 2015)
- Olkaria I Unit 6 (70MW. Planned completion 2021)
- Olkaria V Unit 1, 2 (140MW. Planned completion 2020)
- Olkaria I Unit 1, 2, 3 Rehab (planned)

Policy advice

- Kenya: PPP Advisor for the Energy Sector (2017-2019)
 - Advise Ministry of Energy and Petroleum (MoEP) and energy related agencies (ERC, KPLC, KETRACO, KENGEN, GDC, and REA) to promote IPP/PPP
- Ethiopia: Advisor for Geothermal Development (2016-2018)
 - Advise Ministry of Water, Irrigation, and Electricity (MoWIE) and energy related agencies (EEP, EEA, GSE) on promotion of geothermal

Private Sector Investment and Finance (non-sovereign) up to FY2016

Commitment amounts of Private Sector Investment and Finance (JPY billion)

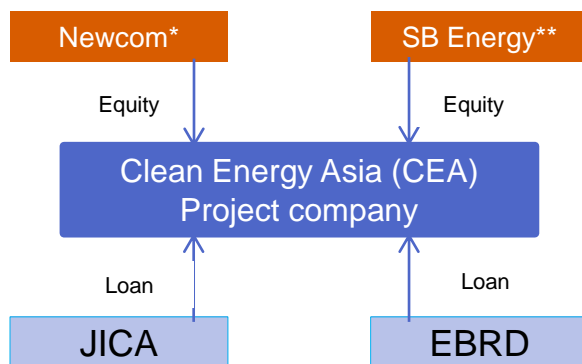
- FY2016 recorded the largest commitment to individual projects.
- Tsetsii Wind Farm project in Mongolia was the first USD based lending to the project company.
- Other new commitments include a project in Africa and a fund to MENA region.

FY2011	FY2012	FY2013	FY2014	FY2015	FY2016	FY2016 (in USD)
0.2	3.8	0.1	2.1	186.4*	18.4	184ml

*including USD 1.5 bil commitment to ADB "Leading Asia's Private Infrastructure Fund" (LEAP)

Tsetsii Wind Farm Project in Mongolia

- The project (50MW) will help contribute to Mongolia's sustainable economic development and the mitigation of climate change.



A winner of IJ Global Awards 2016



Signing of Agreements



Work in Progress



* Newcom is a Mongolian clean technology and infrastructure investor committed to bringing global expertise and innovation to Mongolia.

** SB Energy is a subsidiary of SoftBank Group Corp. and one of the leading renewable energy companies in Japan.

Exchange rate: USD/JPY = 100

Our main message for TICAD 7

JICA's approach for energy development in Africa

“Goal 7: Ensure access to affordable, reliable, sustainable and modern energy (i.e, clean power) for all”

1. Develop **base load** energy utilizing indigenous energy resources: geothermal, hydro and natural gas
2. Develop **regional power pools**: International AND domestic backbone transmission lines and distribution networks
3. **Develop capacity** of utilities: Policy setting, planning, business management and O&M

We will continue our **current focus** on..

- **strengthening national and regional grid** through the following activities
 1. Develop **on-grid generation** capacity (esp. geothermal and gas)
 2. Develop regional and national **transmission networks**
 3. **Capacity building** of energy ministries and national utility companies

..and we will do **more** to..

1. Develop other renewable such as solar and wind
2. Promote private sector investment
3. Contribute more to improving access, including beyond the grid

What are the reasons behind our shift?

1. **600 million Africans** will not reach the SDG7 goal (IEA, 2017)
2. **GoJ's renewed commitment** to achieve the Paris Declaration (Foreign Minister Taro Kono, IRENA Assembly, UAE, Jan 2018)
3. **Growing interest from Japanese investors** in Africa's renewable energy sector (e.g. Soft Bank Group chairman's visit to AU Summit, Mauritania, July 2018)

What are the Japanese investor's needs for the African energy sector?

1. Bankable projects
2. Transaction advisory support
3. Standardization of methods and contracts
4. Risk mitigation and infrastructure

1. Collaboration for developing master plans

1. Ethiopia (M/P, 2015)
2. Kenya (M/P, 2017)
3. Rwanda (M/P, 2016)
4. Uganda (M/P, 2011)
5. Tanzania (M/P, 2017)
6. Mozambique (M/P, 2018)
7. Angola (M/P, 2018)
8. Nigeria (M/P, 2019)
9. Cote d'Ivoire (2019)
10. Senegal

(M/P): Countries that JICA recently conducted (or is conducting) masterplan study and completion year.



Thank you.

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