



*Contact*TM



Geothermal markets, financing and technology trends

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Well test, Ohaaki, NZ

Contents

MDB investments for geothermal energy 2005 - 2041

Total project cost by country

Development Bank investments

- **Country**
- **Development phase**
- **Africa example**

Further de-risking?

Technology

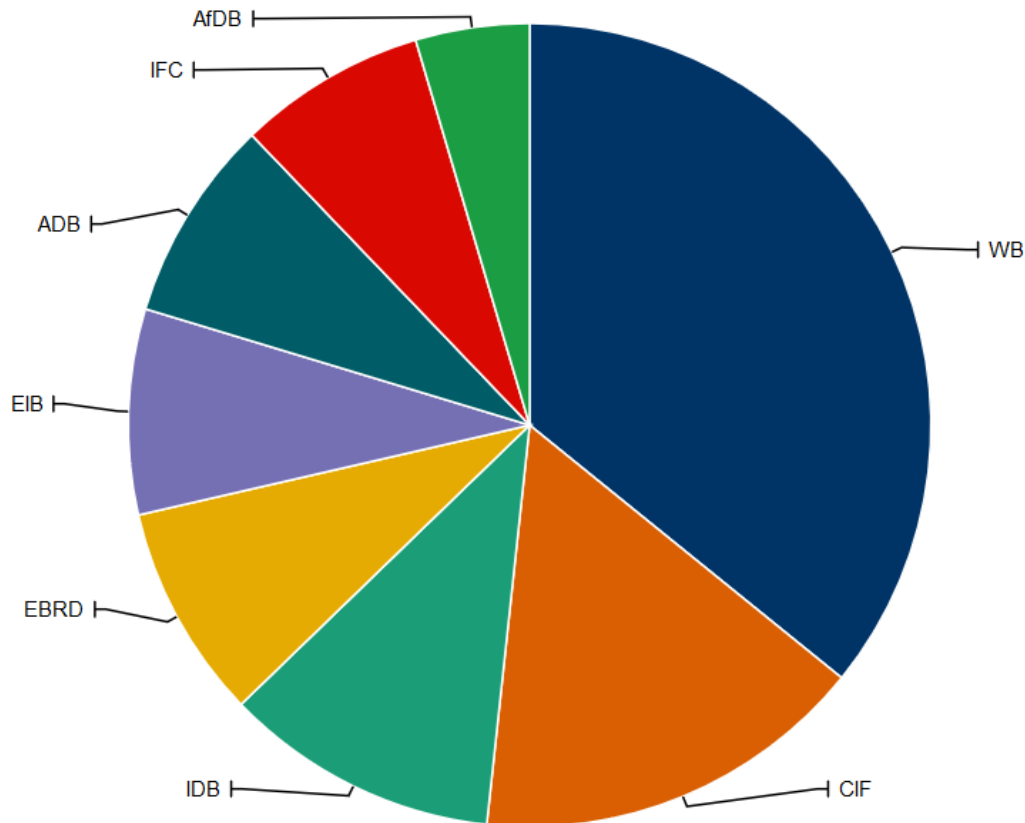
Data source: World Bank website

https://databox.worldbank.org/Geothermal/Geothermal_Investments/2v4r-gz4v

Investments in geothermal power projects

by Multi-lateral
Development Banks
(MDBs).

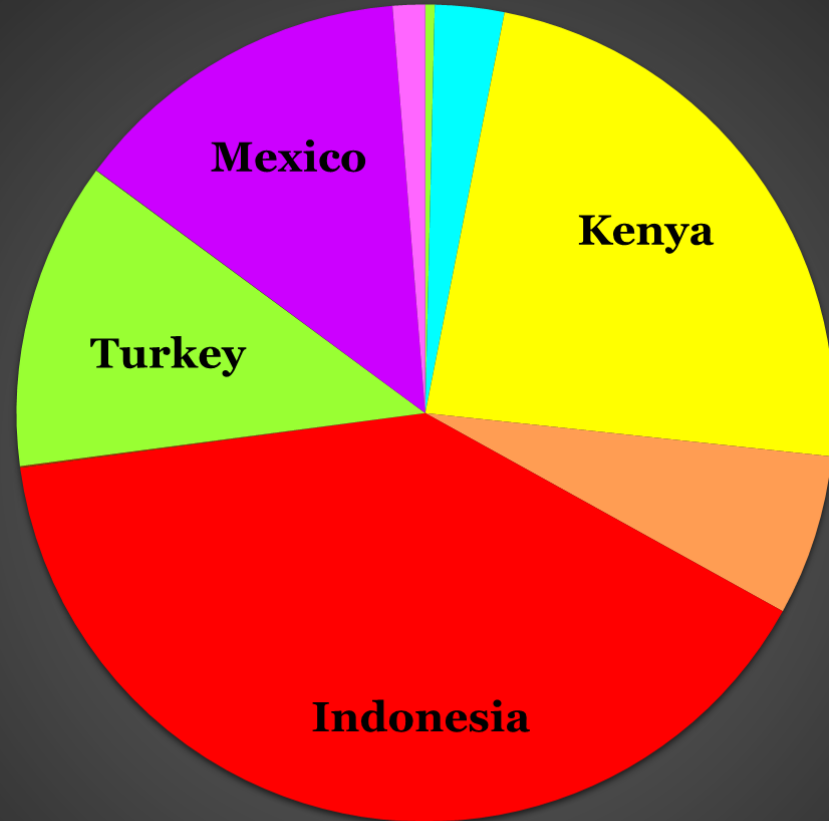
Data from
2005 -2014
for this presentation



Geothermal Projects supported by MDBs

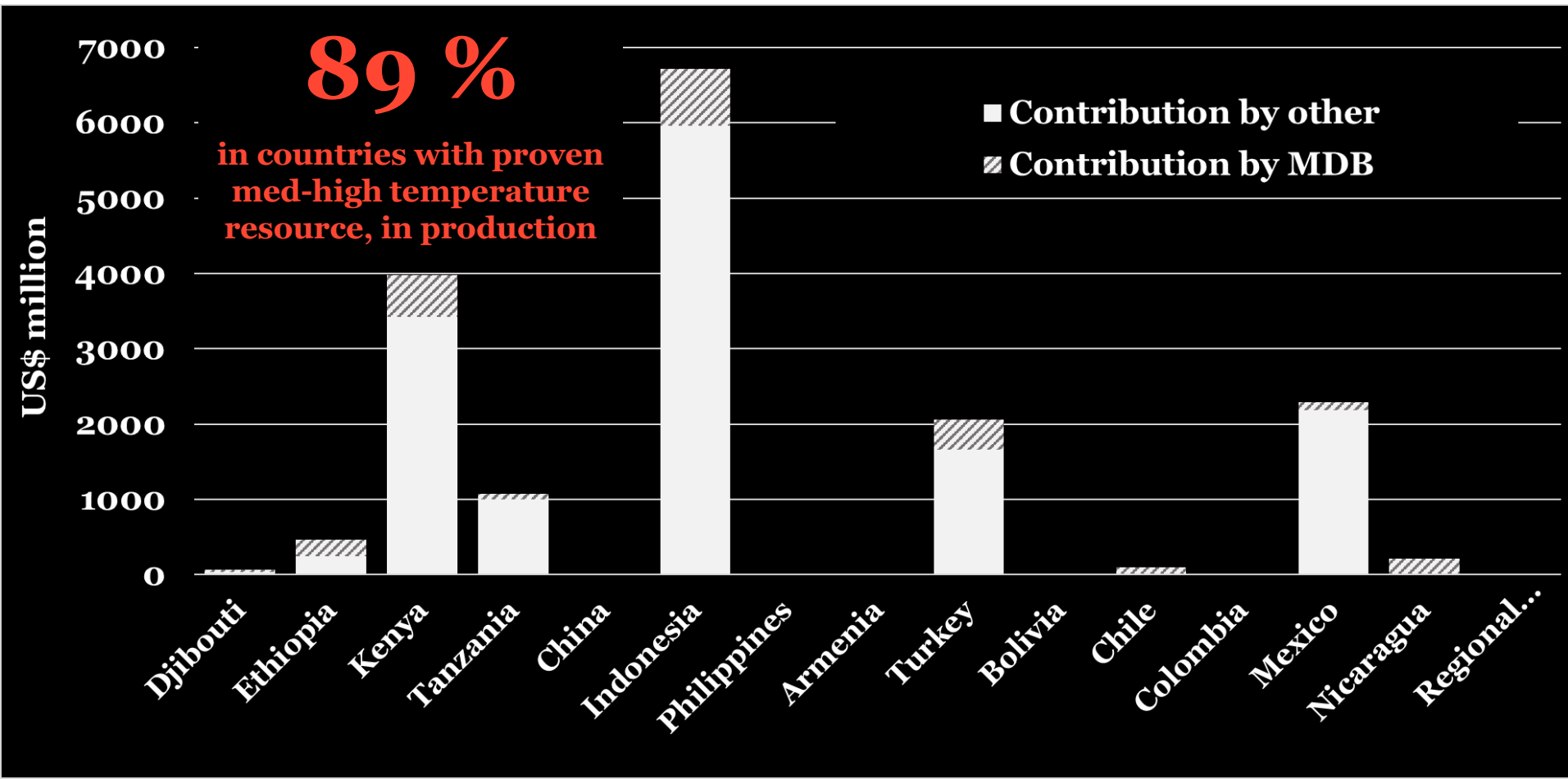
From 2005 to 2014

Total
Project Cost

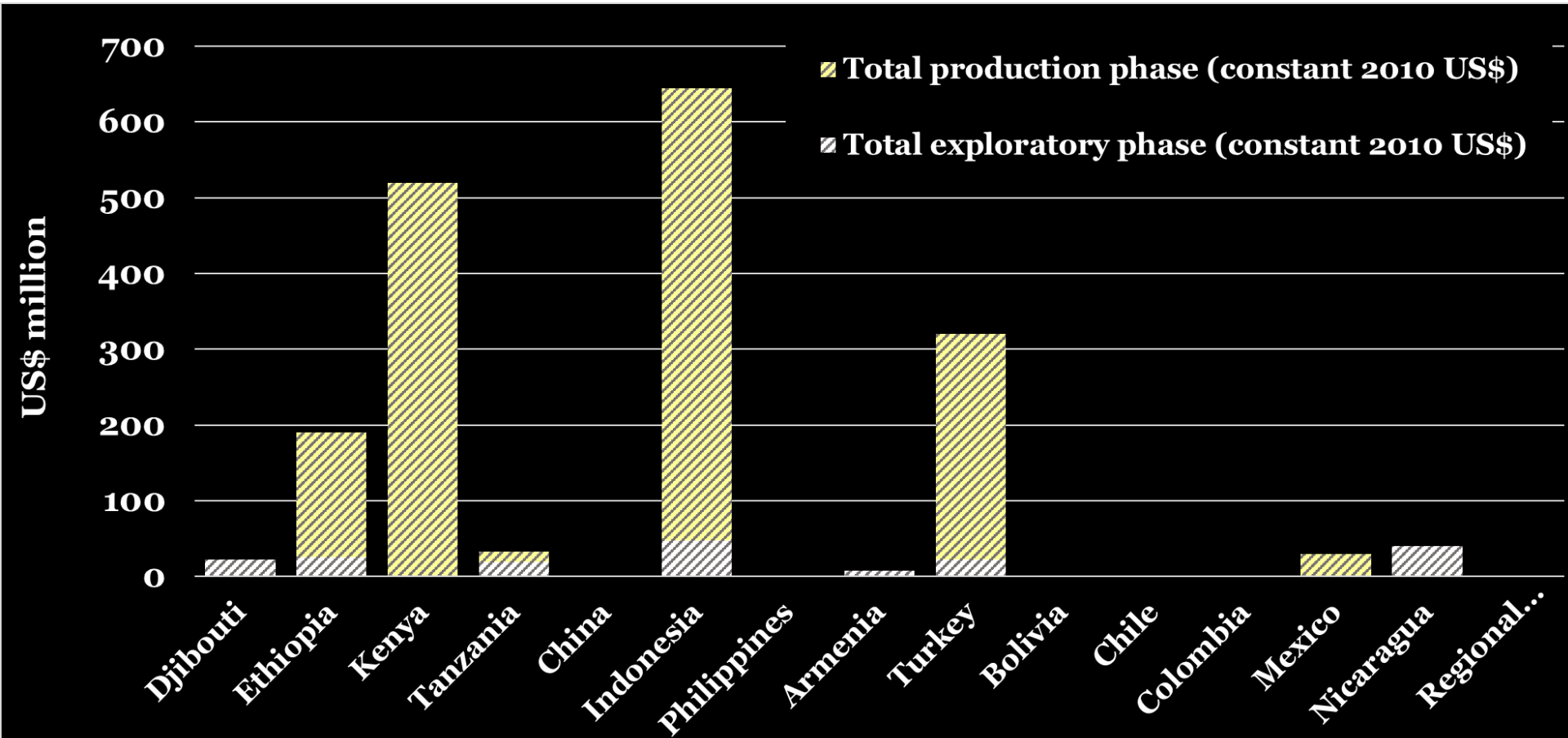


Djibouti Ethiopia Kenya Tanzania Indonesia
Armenia Turkey Colombia Mexico Nicaragua

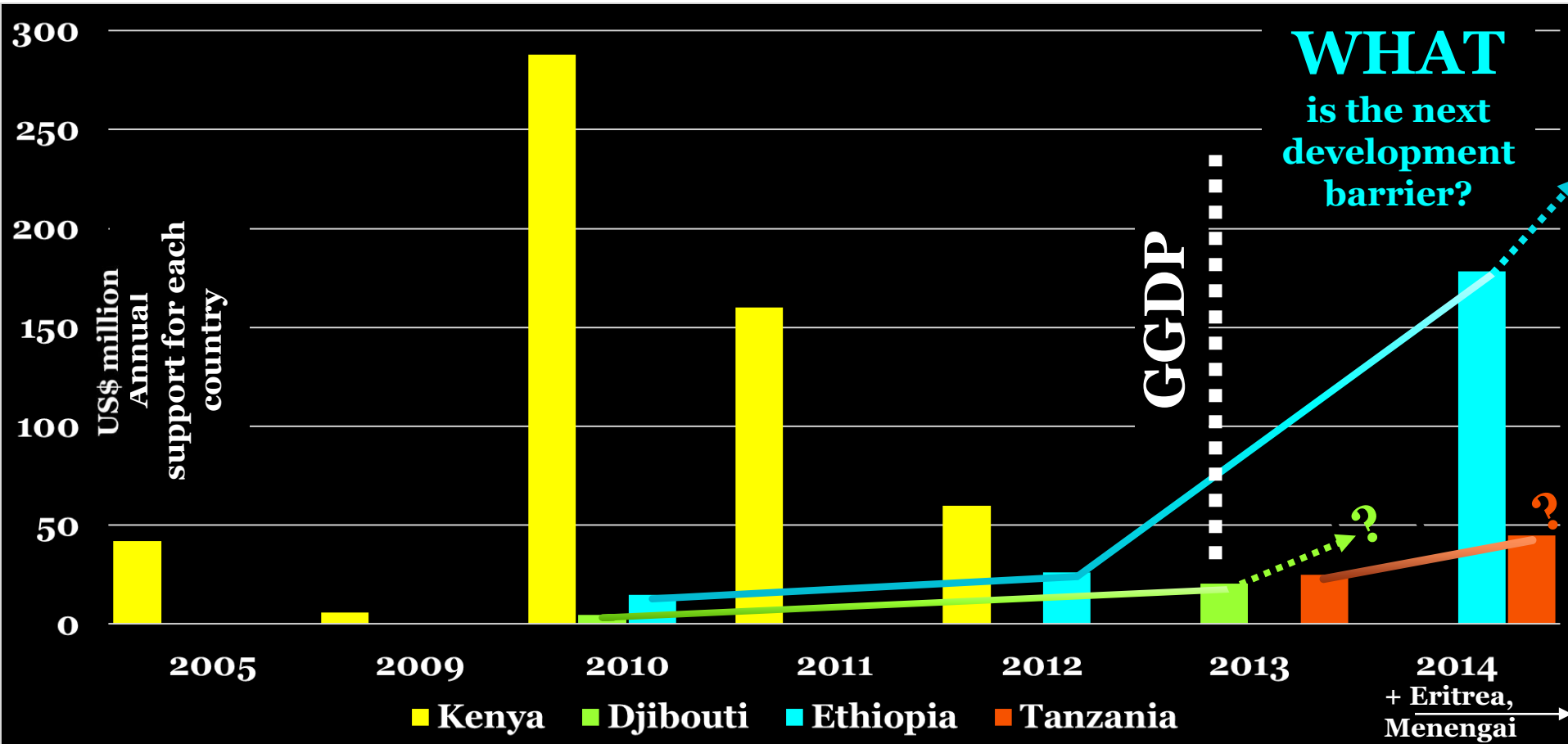
Geothermal Projects supported by Development banks



MDB support: Exploration or Production



Case Study: time series of MDB support for African projects



Further de-risk the development process

Legal & Financial framework for geothermal development

Aim:

**Stability & Clarity
for all involved.**

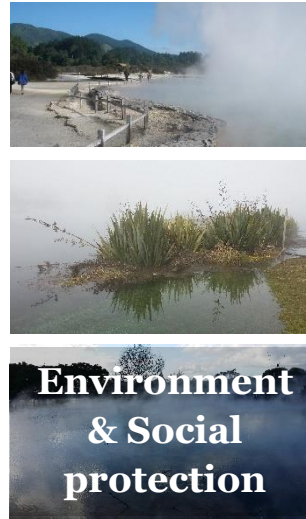
Issues:

**Financial (safe investment)
Social & Environmental**



Nations with large-scale & successful geothermal utilization put a great deal of initial & ongoing effort and thought into this.

Legal & Financial framework for geothermal development



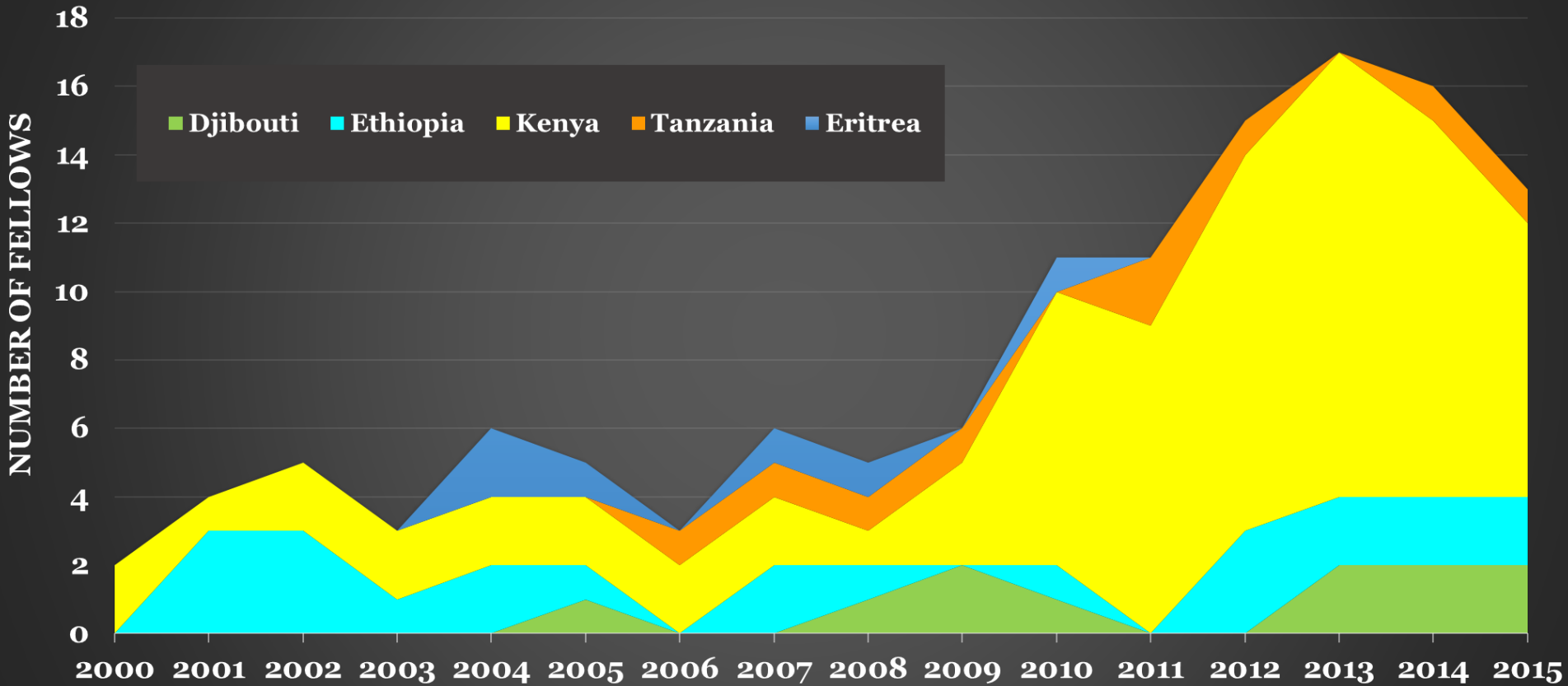
Resource Management Act 1991
 Public Act 1991 No 69
 Date of assent 22 July 1991
 -entment see section 1(2)
 -ontents

...relating to water *Water*
Discharges
 Discharge of contaminants into environment
 Restrictions on dumping and incineration
 in coastal marine area
 Discharge of harmful substances from ships or
 installations
 'prohibitions in relation to radioactive waste or o
 ater and other waste in coastal marine area
Noise
 'to avoid unreasonable noise
Adverse effects
 avoid, remedy, or prevent
 Part II
Environment Court
 Planning Tribunal re-named Environment Court
 Membership of Environment Court
Environment Judges and alternate Environment Judges
 Appointment of Environment Judges and alternate Environ
 Judges
 Appointments of Environment Judges and alternate Environ
 Judges
 When an alternate Environment Judge may act

Regulation & administration

The Human Resource: important in policy & technology

UNU Fellows 2005 - 2015



Technology

Human
resource



- Operational & strategic capability
- Innovative capability

Integration
with other renewables
&
Synergistic combinations



**Triple renewable hybrid
plant in Fallon, Nevada, US**

**Geothermal, solar thermal
and solar photovoltaic**

Mineral
Extraction?

Technology

1950



W433

**1 well
1 stage flash**

2012



**Multiple wells
3 stage flash
45000 tonnes/day**

Technology

1950



2013



THANK YOU

Karapiti Thermal Area, New Zealand