

A wide-angle photograph of a geothermal landscape. In the foreground, a shallow, steaming pool of water is visible, with white steam rising from it. The surrounding terrain is rocky and sparsely vegetated. In the middle ground, a person is visible, walking away from the camera towards the left. The background shows a range of dark, jagged rock formations under a clear sky. The overall scene is arid and rugged.

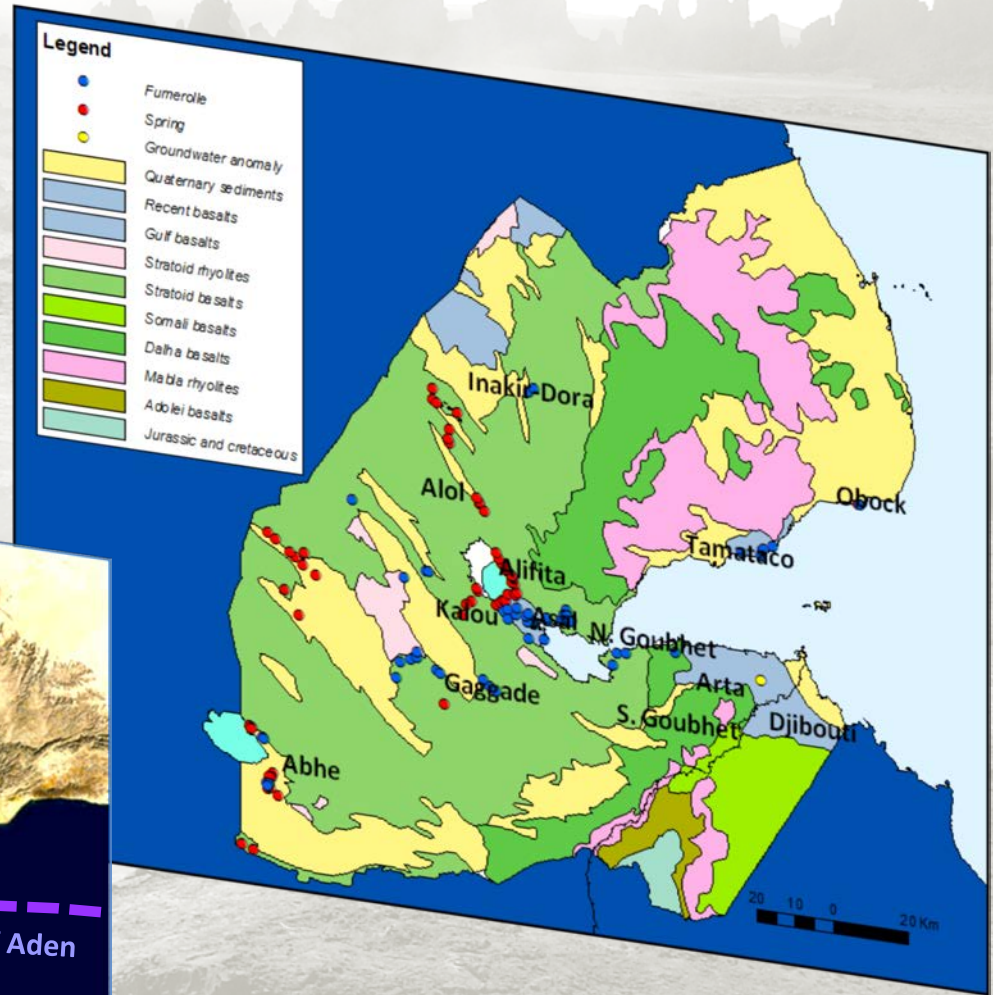
**MINISTRY OF ENERGY AND NATURAL RESOURCES
ELECTRICITY OF DJIBOUTI
Project Management Unit**

**DJIBOUTI'S GEOTHERMAL PROGRAM
FOR SUSTAINABLE DEVELOPMENT
THE FIALE PROJECT**

**Reykjavik, April 2016
Round Table, ESMAP**

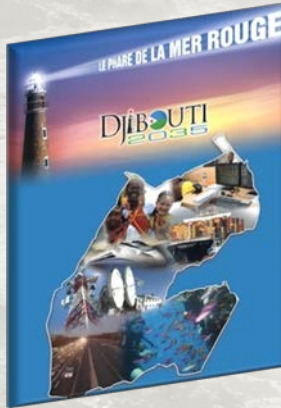
DJIBOUTI GEOTHERMAL RESOURCES

- triple junction (30 My)
- rifting system
- volcanic / tectonic activity
- hydrothermal activity



COMMITMENT FOR GEOTHERMAL ENERGY...A PRIORITY

Objective for a sustainable development



DJIBOUTI 2035 VISION & S.C.A.P.E 2015-2019

- *Third Pillar of the Strategy*

"Diversified and competitive Economy with the Private Sector as the Engine"



UN CONVENTION ON CLIMATE CHANGE. COP21

- *Intended Nationally Determined Contribution of the Republic of Djibouti (2015)*

"...reduction of GHG by 40% by 2030..."

DJIBOUTI GEOTHERMAL EXPLORATION HISTORY

FIRST PHASE (1970 – 1975)

- Preliminary surface studies (SW) 1970-1975
- First 2 drillings in the Asal rift in 1975

SECOND PHASE (1981 – 1990)

- Geothermal prospects identification
- 2 drillings in Hanlé plain
- 4 drillings in Asal rift deep reservoir study
- Scaling and corrosion study on well Asal 3
- Asal rift shallow geothermal reservoir perspectives

THIRD PHASE (2002 – today)

ASAL RIFT

- New geophysical studies
- Fiale Geothermal Project
WB, AfDB, ESMAP, AFD, GEF, OFID

OTHERS

- National capacity building
- New prefaisability studies achieved:
Lake Abhé, North-Goubhet, Obock,
Lake Alols,
- Asal rift shallow reservoir drilling programme



NATIONAL INSTITUTIONS CAPACITY BUILDING

CERD

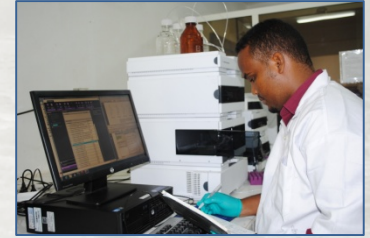
CENTER FOR STUDIES AND RESEARCH OF DJIBOUTI (1979)

- Implementation of specialized laboratories:
*geology, geophysics, geochemistry,
reservoir engineering, GIS/remote sensing*
- Research fund
- Infrastructures, scientific equipments,...etc.
- Trainings

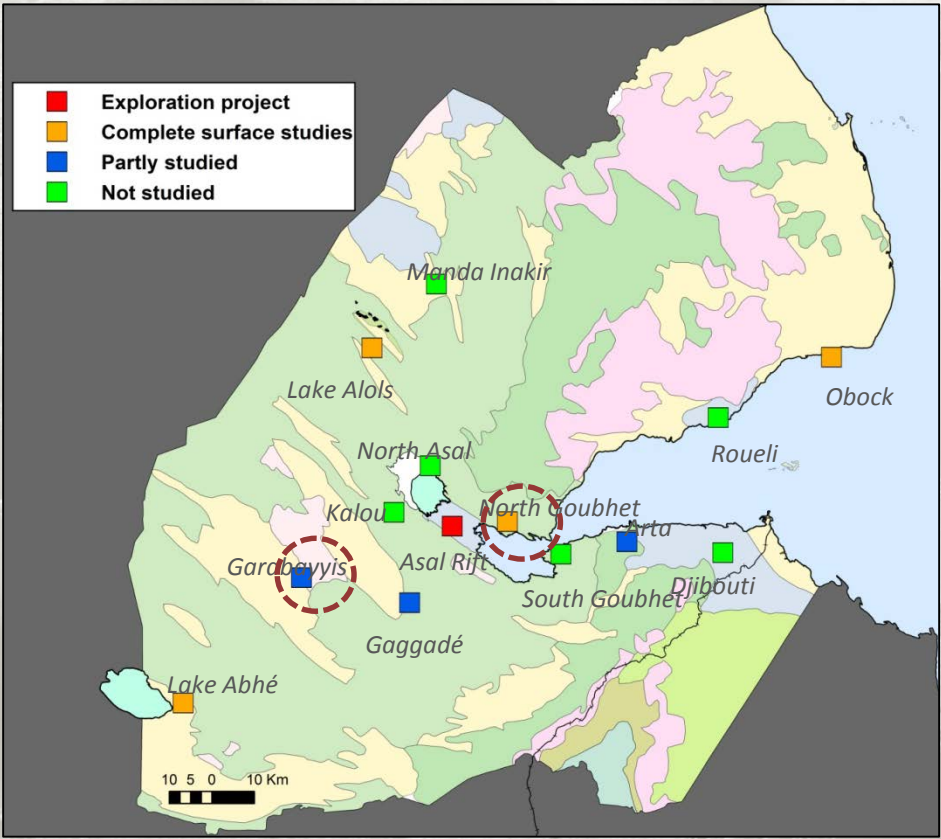
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OFFICE OF GEOTHERMAL ENERGY DEVELOPMENT (2013)

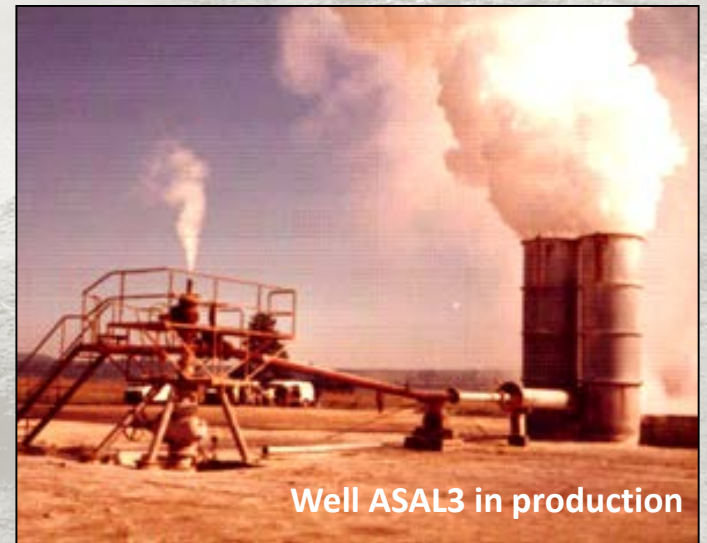
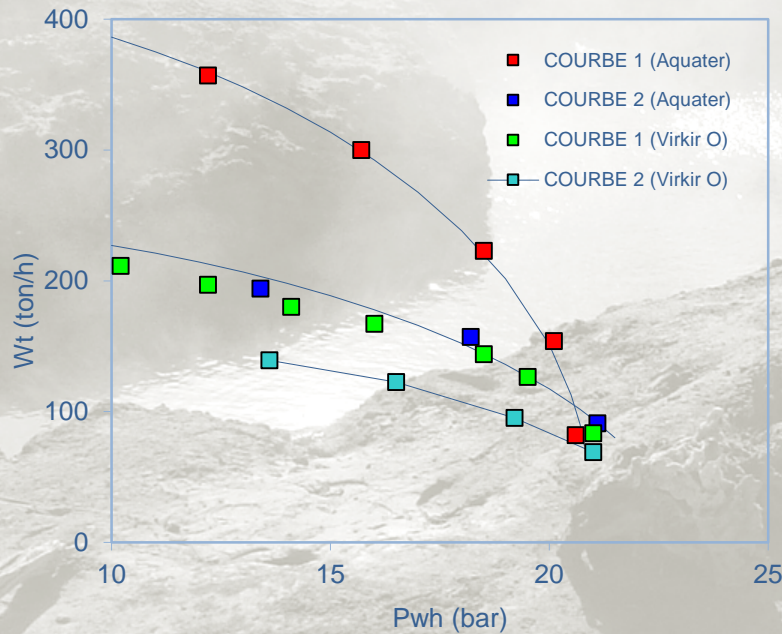
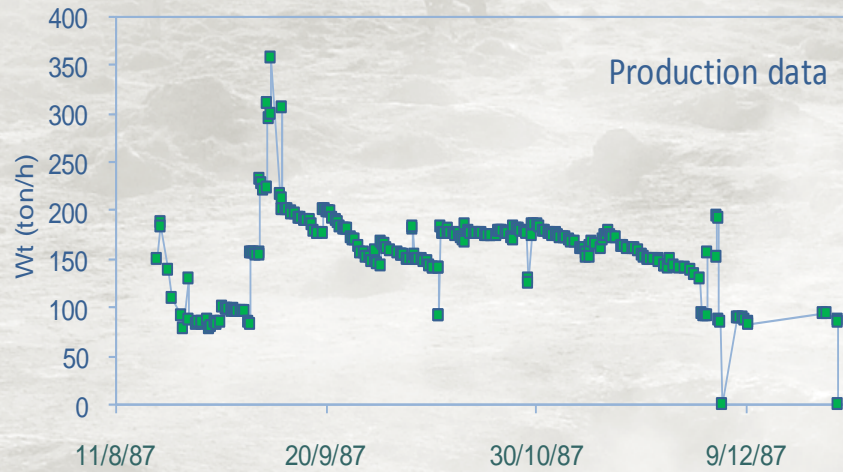
- Infrastructures
- Drilling rig
- Departments:
drilling, reservoir engineering, geophysics
- Trainings



PREFAISABILITY STUDIES



WELL TEST ON WELL ASAL3 (Asal rift)



FIALE GEOTHERMAL EXPLORATION PROJECT – ASAL RIFT



FIALE GEOTHERMAL PROJECT. DJIBOUTI

Objectives of the Project

- Djibouti economic development and fight against poverty
- Electricity cost reduction to bolster the business environment and the private sector, which is in line with the pillar, “accelerating sustainable growth,” in the Bank’s MENA Regional Strategy
- Mitigate the effect of greenhouse gas emissions bearing in mind that emissions in Djibouti account for only 0.045 percent of global emissions and that the country is in fact a greenhouse gas sink
- Develop and implement adaptation measures to enable the country to cope with the negative effects of climate change

Project Development Objective

Assess the commercial viability of the geothermal resource in Fiale Caldera within the Lake Asal region

FIALE GEOTHERMAL PROJECT FINANCING

AFRICAN BANK OF DEVELOPMENT

- Geothermal Consulting Cie
- Civil works
- Director
- International procurement expert
- Environment and social experts
- Auditors
- Procedures manual
- Operation budget
- ESMP
- Constructions
- Drilling preparatory work
- Pumping system

7.34 millions US\$

OFID

- Drilling Services

7 millions US\$

WORLD BANK IDA

- Drilling Services
- National procurement expert
- Geothermal expert
- Coordinator
- International geothermal expert
- Assistant director

6 millions US\$

ESMAP

- Well test programme control
- Well tests results control
- Well test instrument and equipment

1.1 millions US\$

AGENCE FRANCAISE DE DEVELOPPEMENT

- Casing
- Well Head
- Accessories

3.25 millions US\$

GEF

- Drilling Services

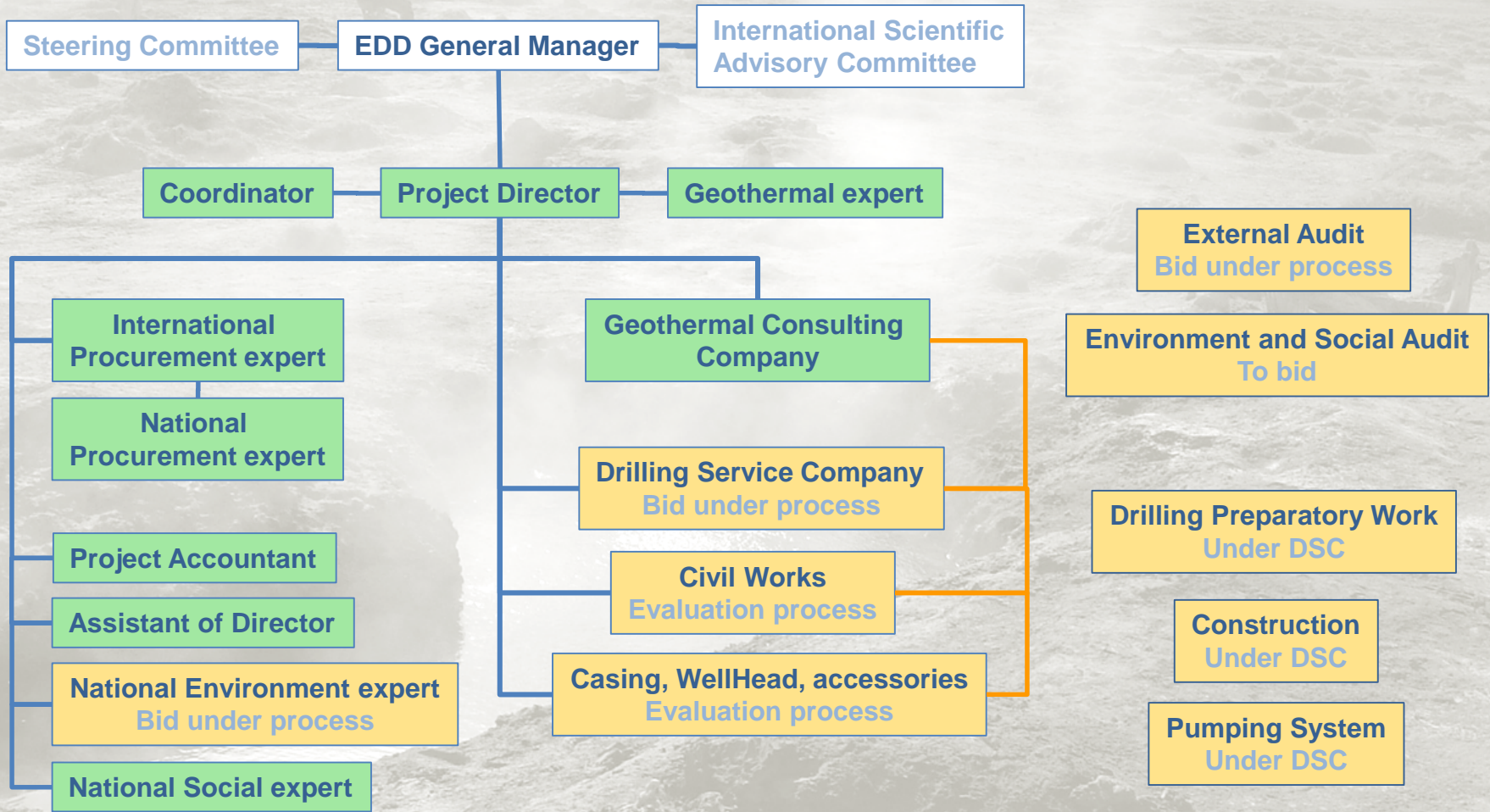
6.04 millions US\$

REPUBLIC OF DJIBOUTI

- Operations...etc

0.5 millions US\$

PROJECT STRUCTURE



— Administrative/Procurement oversight
— Technical oversight

Operationnal
 Under process

DSC: Drilling Service Company
 GCC: Geothermal Consulting Company

MAIN COMPONENTS OF THE PROJECT

Geothermal Consulting Company

- Drilling program; Well program; Drilling supervision; Well test protocol; Well tests; ESMP; geothermal resource evaluation; reservoir modeling; faisibility study; presentation of results for IPP

Drilling Service Company

- 4 directional wells (2500 m); water supply system; camp; well test equipments; Well test instruments;...etc.

Civil Works

- Well pads; 5 km access road

Steel materials

- Well heads; casings; accessories





Thank you