
ICELAND DRILLING

# Overview of Iceland Drilling

ICELAND DRILLING

**Business Area**

- Iceland Drilling Company (IDC) was established in 1945
- IDC´s main focus is on drilling high-temperature geothermal wells

**Drilling history**

- Between 300-400 geothermal wells since 1970
- Thereof 250 for the last 10 years
- Well depths range from 1.000 to 4.630 meters
- Temperature up to 450°C

**Ownership Structure**

- 45% owned by 3 of the 5 largest Icelandic Pension funds
- 55% owned by various investors.

**Certification QHSE**

- Since 2008 - Quality Management System - ISO 9001:2015
- Since 2010 - Environmental Management System - ISO 14001:2015
- Since 2010 - Occupational Health & Safety Management System - OHSAS 45001:2018

bsi. ISO 9001 Quality Management FM 534725

bsi. ISO 14001 Environmental Management EMS 567074

bsi. OHSAS 18001 Occupational Health and Safety Management OHS 567075

# Operations

**Operating countries past and present**

- Iceland, Germany, Denmark, Switzerland, Philippines, New Zealand, Nicaragua, Djibouiti, Dominica, Montserrat, St. Vincent and Azores

**Future markets**

- Indonesia, S-America and East-Africa

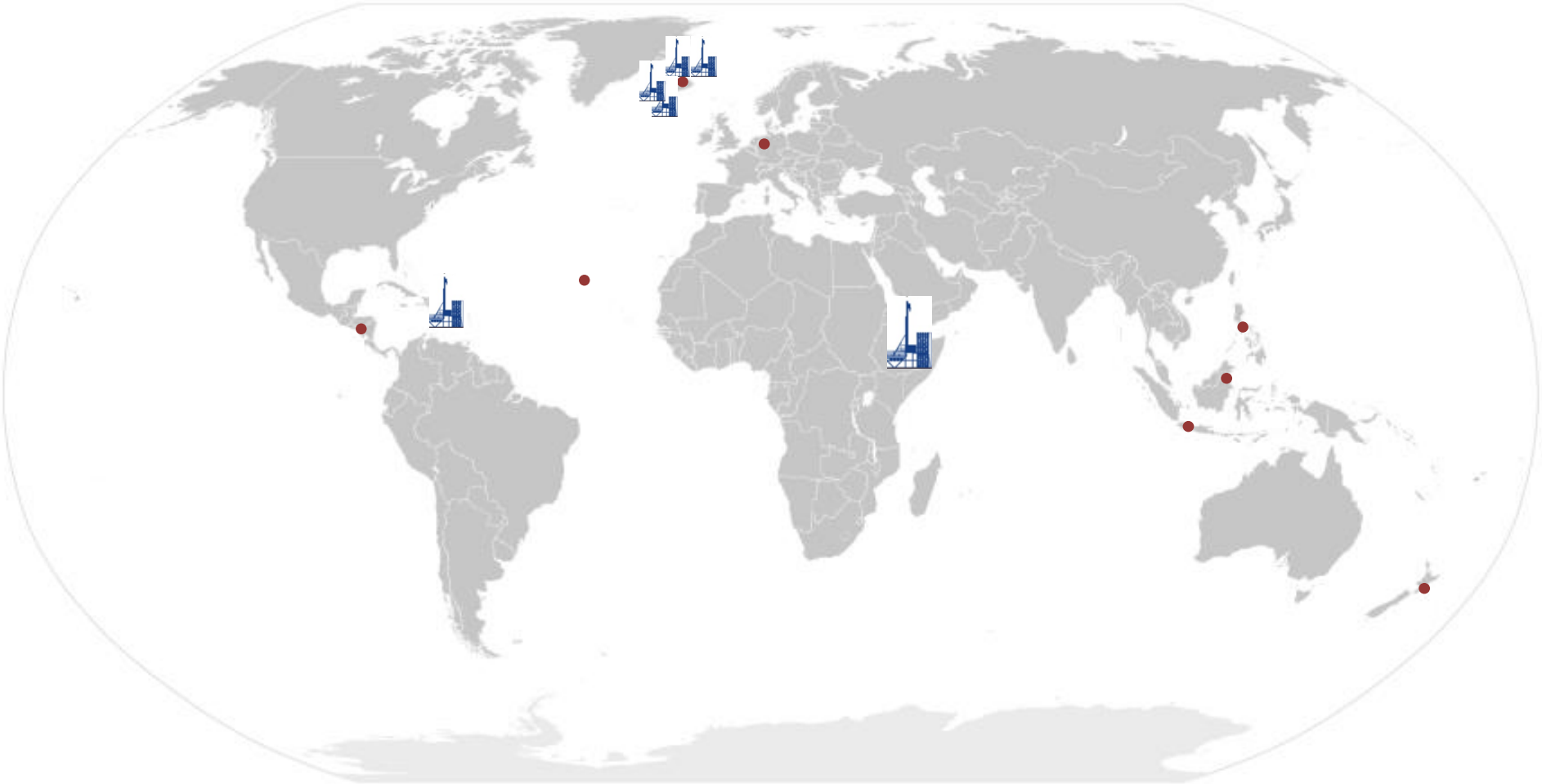
**Rig and employees**

- Modern fleet of 7 rigs
- 5 rigs in Iceland,1 rig in Djibouti, 1 rig in St. Vincent
- 160 employees

**Community involvement**

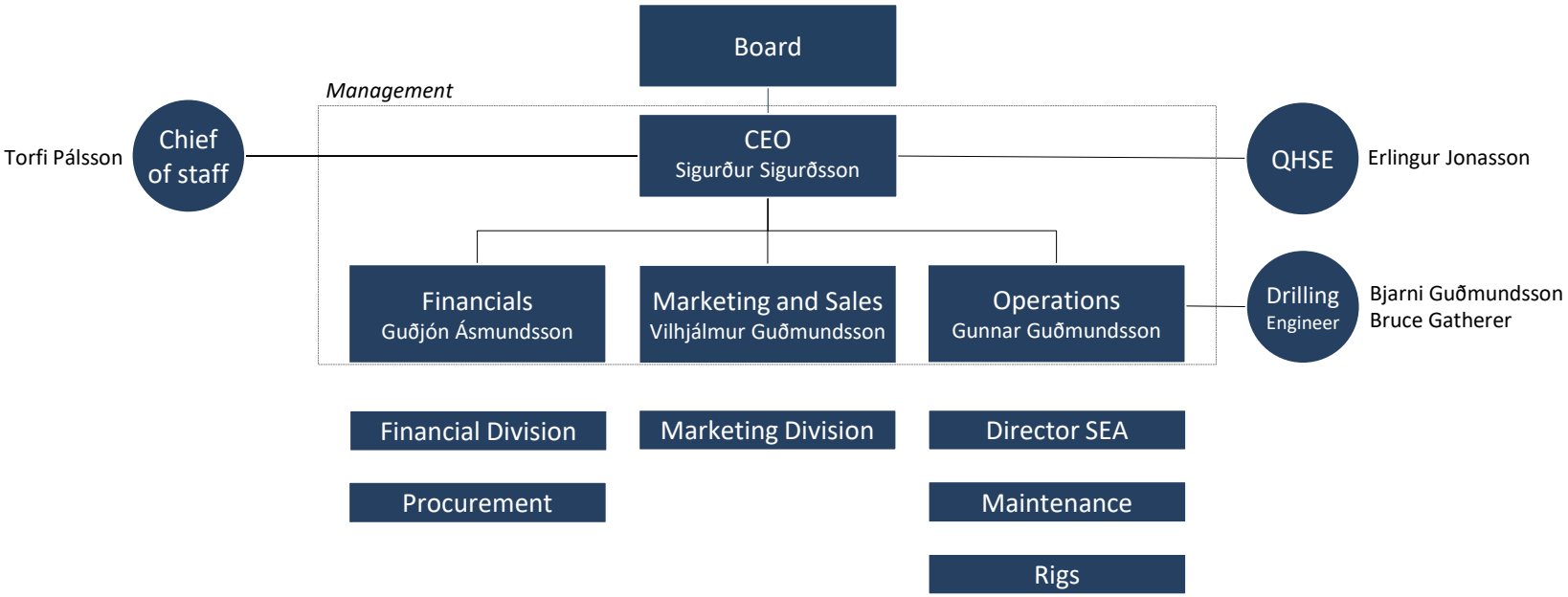
- Collaboration with local contractors and suppliers
- Providing employment for local communities

# Market Area



| Managua Nicaragua | Indonesia Jakarta | Hekla Energy Holland | Head office Iceland | Manila Philippines | Taupo New Zealand |
|---|---|---|---|---|---|

# Parent Company Global Structure



# Rig fleet

- Medium sized rigs suitable for geothermal drilling as well as oil and gas
- Highly automatic for safe and fast operation
- Maintained to highest standards

| Rig name | Year | Manuf. | Model | Hook Load (mt) | Mud Pumps (hp) | Draw works (hp) | Top Drive | Drilling Depth (m) | Loads in transport | Location | In use / Idle |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Thor** | 2008 | Bentec | ER350 | 350 | 3 x 1600 | 1500 | PTD500 | 6000 | 80 | Iceland | In use |
| **Tyr** | 2007 | Drillmec | HH300 | 270 | 3 x 1000 | n/a | DM300 | 5000 | 60 | Djibouti | Rigged up |
| **Odinn** | 2006 | Drillmec | HH220 | 200 | 2 x 1000 | n/a | DM220 | 4000 | 55 | St. Vincent- Azores | Transit |
| **Geysir** | 2004 | Drillmec | HH220 | 200 | 2 x 1000 | n/a | DM220 | 4000 | 55 | Iceland | Idle |
| **Jotunn** | 1973 | Gardner D | 700 E | 180 | 2 x 800 | 700 | Kelly | 3300 | 45 | Iceland | Not in use |
| **Sleipnir** | 1998 | Drillmec | G102 | 100 | 2 x 700 | n/a | DM102 | 2200 | 35 | Iceland | Idle |
| **Saga** | 2001 | Drillmec | G55 | 55 | 1 x 500 | n/a | DM50 | 1500 | 15 | Iceland | Idle |

# Services

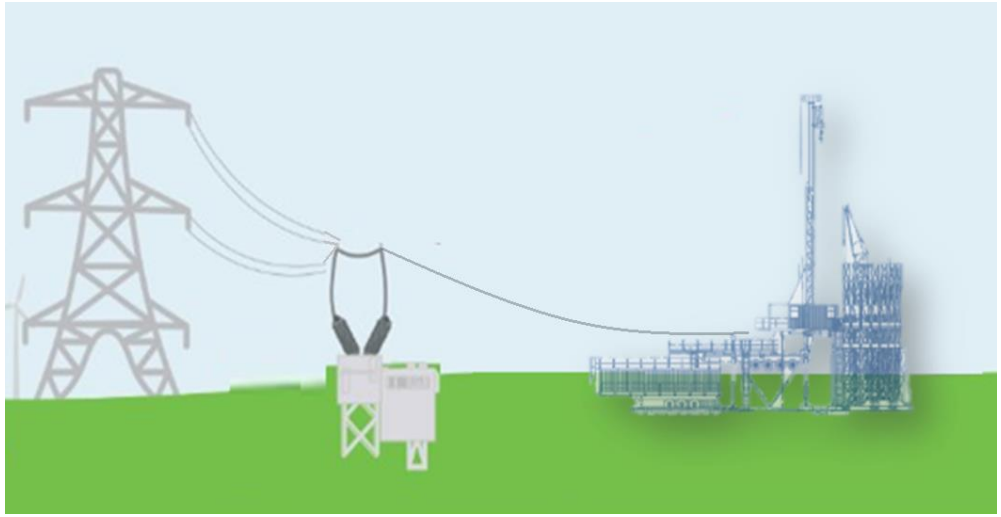
- IDC's service offering ranges from conventional day rate drilling services to integrated drilling solutions on meter rates
- **Conventional Day rate contracts**
- **Meter-rate contracts**
- **Integrated geothermal drilling services**
  - Rig and Crew
  - Casings and wellheads
  - Cementing and drilling materials
  - Directional drilling services
  - Well logging services

# The use of alternative power to the drilling rig

ICELAND DRILLING

Instead of using Diesel, then the rig can be powered using:

- ..electricity from a utility grid
- ..hybrid; a combination of grid power and diesel generators
- ..Hybrid; a combination of power banks and utility grid



# No Diesel – Power from the utility grid

Our Drilling Rig is equipped with a link between the power grid and the rig.
Medium Voltage Transformer Unit (TRAFO)

What will you gain:

- Reduced Cost compared to Diesel
- Lower Emissions CO2,CO,NOx,Sox, and therefore reduced footprint of drilling operations
- Reduced size of well pad
- Less noise - Quieter operation

Alternative the usage of energy storage such as flywheel

# Integrated Drilling Service

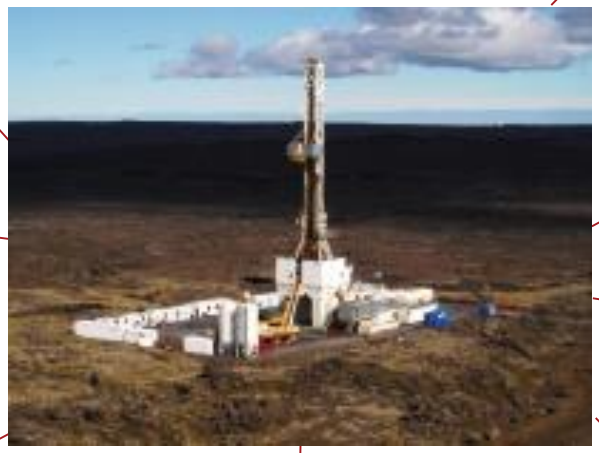
ICELAND DRILLING

Casing material

Casing Running Service

Cementing Service and material

Drilling Rig

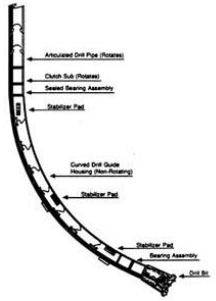


Wellhead

Mud material


Bits

Directional Drilling



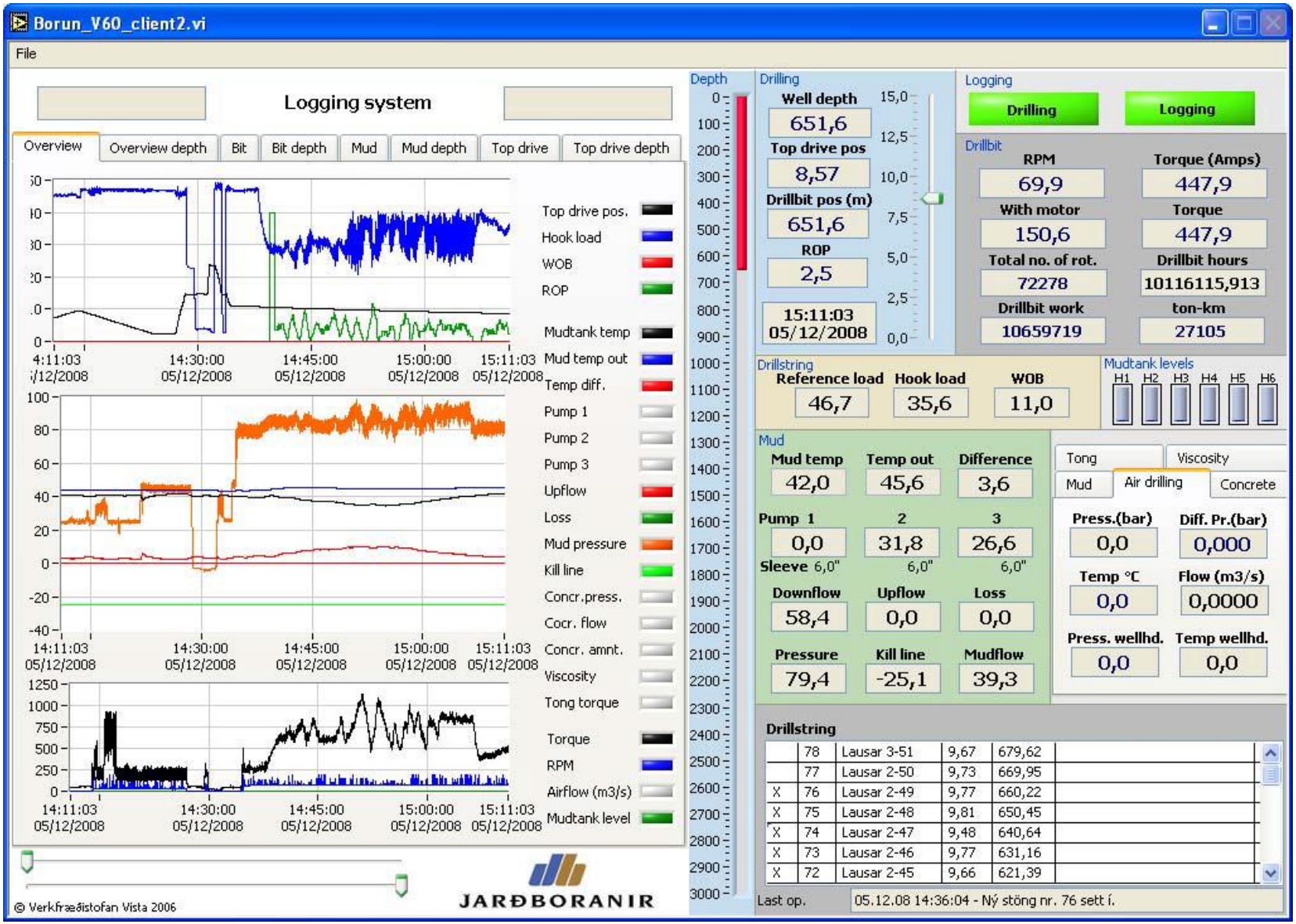
Mud logging, Bore hole logging, well testing and geothermal consultation service in cooperation with for ex. ISOR in Iceland

# Service provided for each client

| Service | HS-Orka | ON | St. Vincent | Azor | MRP | Orka Energy | Djibouti |
|---|---|---|---|---|---|---|---|
| Rig with crew | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Drill bits | ✓ | ✓ | ✓ | | | ✓ | ✓ |
| Directional Drilling | ✓ | ✓ | ✓ | | | ✓ | ✓ |
| Air drilling service | ✓ | ✓ | | | | ✓ | |
| Casing running service | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ |
| Cementing service | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ |
| Cementing materials | ✓ | ✓ | ✓ | | | ✓ | ✓ |
| Mud engineering | ✓ | ✓ | ✓ | | | ✓ | ✓ |
| Mud materials | ✓ | ✓ | ✓ | | | ✓ | ✓ |
| Casing material | ✓ | ✓ | ✓ | | | ✓ | |
| Wellhead | ✓ | ✓ | ✓ | | | ✓ | ✓ |
| Fishing gear | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ |
| Rigsite perparation (Civil work) | | ✓ | | | | | |
| Logging during drilling | | | ✓ | | | | ✓ |
| Well flow test ** | | | | | | | ✓ |
| Water supply (only operation) | | | | | | | ✓ |

# VISTA Logging System - Real time data to clients

ICELAND DRILLING



# Svartsengi– Iceland – (IDDP2)

**Client: Alterra Power – HS Orka**

- **Geothermal Power Plant at Svartsengi**
- **Total capacity:** 76,5 MWe, 80 MWt
- **History:** Drilling started in 1971. As of December 2007, production was 76.5 MW of energy,Surplus mineral-rich water from the plant fills up the Blue Lagoon, a popular bathing resort.
- **Wells:** IDC has drilled all 26 HTHP wells in the area.
- **IDDP PROJECT at Reykjanes**: IDC finished in January 2017, drilling a 4630 meter deep geothermal well in Reykjanes, as part of Iceland Deep Drilling Project reaching super critical geothermal steam.

# Þeistareykir – Iceland –

**Client: Landsvirkjun (National Power of Iceland)**

- **History:** Exploration field under development since 2003, estimated capacity output today 50 Mwe
- **Total capacity: 90MW**
- All 22 wells drilled by IDC
- Spud-in June 2016 with Rig Óðinn and Sleipnir

# Krafla - Iceland

**Client: Landsvirkjun (National Power of Iceland)**

- **Geothermal Power Plant at Krafla**
- **Total capacity:** 60 MWe
- **History:** The **Krafla Power Station** is a geothermal power station located near the Krafla Volcano in Iceland. Seismic and volcanic hazards threatened development but plant has been on operation since 1977
- **Wells:** All 43 HT Wells have been drilled by IDC
- **1700 m well drilled summer 2016: Rig Sleipnir**

# Hellisheidi - Iceland

**Client: Reykjavik Energy**

- **Geothermal Power Plant at Hellisheidi**
- **Total capacity:** 303 MWe, 133 MWt
- **History:** Electricity production with two 45 MWe turbines commenced in 2006. In 2007, an additional low pressure steam turbine of 33 MW was added. In 2008, two 45 MW turbines were added with steam from Skarðsmýrarfjall Mountain.
- **Wells:** All 58 HT wells and 17 injection wells by IDC
- Contract for 10+5 wells to be signed end of May 2017. Still ongoing

# Azores

- **SOGEO:** Geothermal Power Plant on SAO MIGUEL ISLAND.
- **Total capacity:** 23 MWe
- **History:** Geothermal generation meets 50% of São Miguel's electricity needs
- **Wells:** IDC has drilled 13 wells in Sao Miguel and done workover on 2 wells

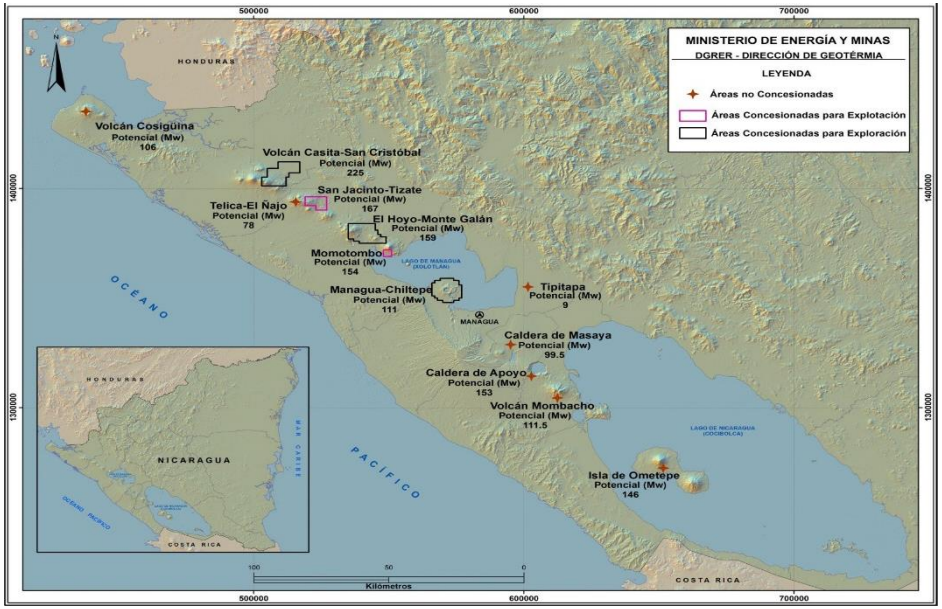
- **GEOTERCEIRA:** Exploration field on Island of Terceira
- **History:** 12 MW power development plan is in place for Terceira.
- **Wells:** IDC has drilled 5 wells on the island

# Nicaragua

**Client: Polaris Energy**

**San Jacinto - Nicaragua**

- **Geothermal Power Plant Project**
- **Installed total capacity:** 78 MW
- 7 wells program in 2 phases, plus 4 workover wells
- Spud-in October 2015 with rig Tyr
- Phase 2 finished in 2017




# Caribbean

ICELAND DRILLING

## Client: St Vincent Geothermal ltd:

- **Bid on 4 wells – Successful bidder, -**
- **Contract signed in Dec 2018**
- **Spudding in May 2019.**
- **Already drilled 3 wells out of 4**

## Previous operations

## Client: MONTSERRAT Government:

- **Exploration Drilling on Montserrat island.**
- 2 wells. 2297m and 2870 m (finished 2013)
- 1 well – Finishing December 2016

## Client Dominica Government

- **Exploration Drilling in Dominica**
- Intermediate size Wells: 3 wells. finished 2011
- Regular size Wells: 1+1 wells finished 2014


# Philippines

**Client: ORKA ENERGY**

**Biliran Island - Phillippines**

- **Geothermal Power Plant Project**
- **Wells:** 5 wells finished 2014
- **Scope of work:** Integrated Drilling Solution

**Client: Emerging Power (EPI)**

**Mindoro – Phillippines**

- **Geothermal Power Plant Project**
- **Total capacity:** Planned 40 MW
- Spud-in October 2015 with rig Geysir. 3 wells.
- Rig moved to Montserrat June 2016

# Ethiopia - Djibouti

**Client: Ethiopia : project Corbetti**

- IDC equity partner
- Start drilling, estimated 3Q of 2019
- 3-5 wells, Phase 1

**Client: Djibouti government.**

- Contract signed May 2017
- Project started June 2018
- Project finished in May 2019
- 3 wells and workover

# New Zealand

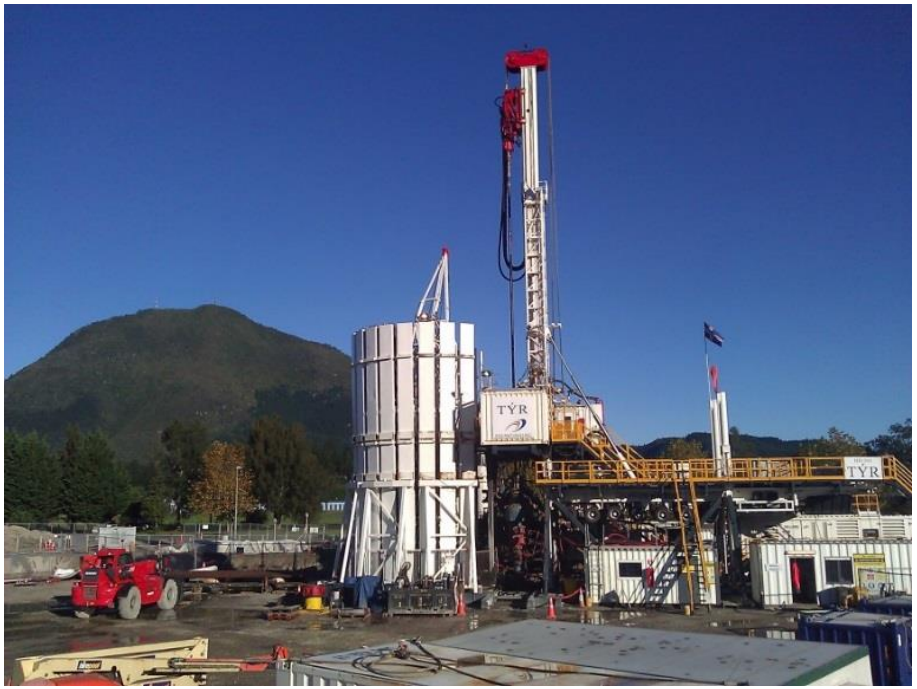
**Client: Top Energy, Northland**

**Ngawha Springs – New Zealand**

- **Geothermal Power Plant Project**
- Spud-in 2018 with rig Odinn
- 6 Wells successfully finished in Feb 2019
- Rig transported to St. Vincent

**Previous campaigns**

- MRP, Ngatamariki 14 wells from 2011 – 2013
- KEA Petrolium
- NTGA, 2 Wells in 2016



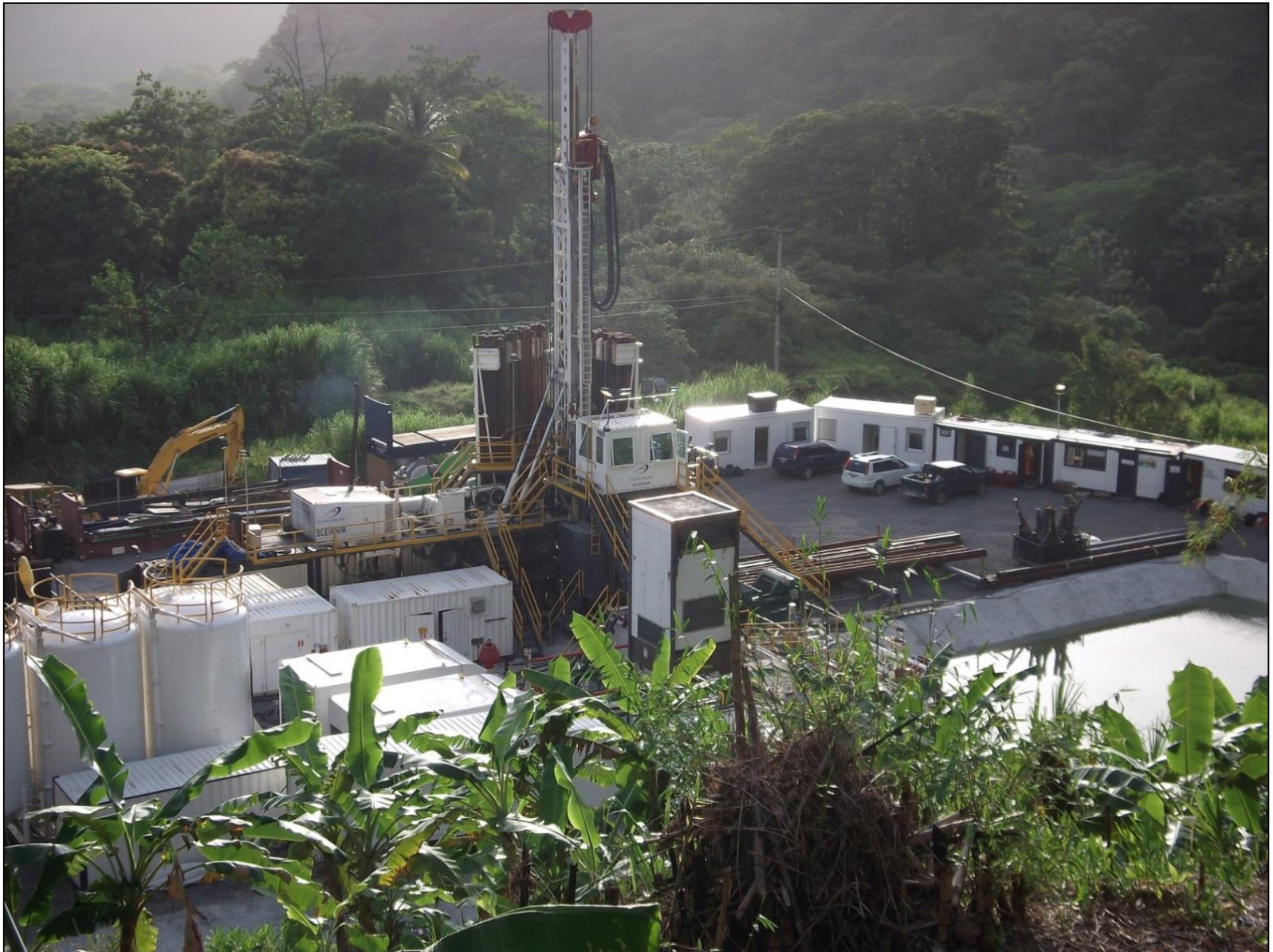

# Drillmec HH-300 – New Zealand

# Drillmec HH-200S – Philippines Biliran

# Nicaragua – Rig Týr HH300

# Drillmec G102 – Dominica Caribbean

# Drillmec G102 – Dominica Caribbean



# Drillmec HH-220.FA : Rig Geysir Iceland

ICELAND DRILLING

# IDDP-2 Reykjanes: Rig Þór,  Bentec ER350

# Montserrat – Caribbean

ICELAND DRILLING

# Montserrat November 2016

# Djibouti Geothermal Project in Lake Asal

# Þeistareykir summer 2016 :
# Rig Óðinn Drillmec HH 220