

## Environmental and Social Data Sheet

### Overview

Project Name:	<b>THEISTAREYKIR GEOTHERMAL PLANT</b>		
Project Number:	<b>2015-0388</b>		
Country:	<i>Iceland</i>		
Project Description:	The project consists of the development of a geothermal field and the design and construction of a 2 x 45 MWe new geothermal power plant. The project is located 30 km south-east of Húsavík in the northeast of Iceland. Approximately two-thirds of the power will be supplied to a new silicon metal plant. 9 wells with more than 50 MWe capacity have already been drilled and tested.		
EIA required:	yes required by Icelandic law		
Project included in Carbon Footprint Exercise <sup>1</sup> :	no	(details for projects included are provided in section: "EIB Carbon Footprint Exercise")	

### Summary of Environmental and Social Assessment, including key issues and overall conclusion and recommendation

If it were located in the EU, the project would fall under Annex II of the EIA Directive, leaving it to the competent authority to decide on the need for an Environmental Impact Assessment (EIA). This project has been subject to a full EIA procedure in accordance with national legislation (Icelandic EIA Act no. 106/2000). The EIA has been performed and completed in 2010 with the Planning Agency's positive opinion following public consultation. The project's development consent was received in July 2014 and construction has started.

The main environmental risk to the project relates to geological hazards, while the main concerns from the project are related to noise during construction and potential impact on a protected lava field and nature conservation area which the access road crosses. Additionally, the project will emit some hydrogen sulphide and carbon dioxide to a lesser extent. Following the EIA process, the promoter has proposed the least impact alternative. When taking into account the range of mitigation measures as laid out in the development consent, as well as the final route chosen for the access road, it can be concluded that residual impacts of the project are non-significant.

The social impact of the project is expected to be positive during the construction due to jobs opportunities creation but could have a negative impact on tourism while in operation. Considerable effort has been made to reduce the visual impact of the main power house.

The procedures followed, the promoter's capabilities and the residual impacts of the project and its associated infrastructure are acceptable to the Bank. The project is therefore in line with the Bank's environmental and social standards.

### Environmental and Social Assessment

#### Environmental Assessment

The Peistareykir area has a very active set of fumaroles, hot springs and clay pools and has been registered in the Icelandic Nature Conservation Register. Furthermore, Icelandic law requires that all geothermal power plant over 10 MWe capacity be subject to an Environmental Impact Assessment (EIA).

<sup>1</sup> Only projects that meet the scope of the Pilot Exercise, as defined in the EIB draft Carbon Footprint Methodologies, are included, provided estimated emissions exceed the methodology thresholds: above 100,000 tons CO<sub>2</sub>e/year absolute (gross) or 20,000 tons CO<sub>2</sub>e/year relative (net) – both increases and savings.

The Þeistareykir's EIA has been designed for up to 200 MWe and addresses both the risks to the project and the risks that could be triggered by the project, for a number of alternatives. Essentially, the main environmental risk to the project relates to geological hazards (earthquakes) while the main impacts stemming from the project are expected to be on the landscape and air.

All lava fields younger than 10 000 years are deemed nature conservation area in Iceland. Additionally, the development of the Þeistareykir geothermal power plant involves the construction of buildings and pipelines, and the drilling of boreholes, in a relatively untouched landscape of high aesthetic and recreational value. The area contains archaeological artefacts and traces of ancient sulphur mining, which have been duly fenced off to prevent any disturbance. The need to reduce the visual impact of the buildings has been considered during the design, mitigated through berms, while re-vegetation of the disturbed areas has already started, notably on the road sides.

The plant will also emit CO<sub>2</sub> and H<sub>2</sub>S during operation, although in limited quantities. The CO<sub>2</sub> emissions are estimated to be 12 g/kWh, compared to 350 g/kWh for a modern gas fired power plant. The total expected CO<sub>2</sub> emissions will be 6.7kt/y, while the CO<sub>2</sub>eq emissions from methane are expected to amount to circa 2kt/t, corresponding to 8.7 kt CO<sub>2</sub>eq/y. The total H<sub>2</sub>S emissions are expected to reach 3 800 t/y, which are expected to be well below World Health Organisation and Icelandic regulations following air dispersion calculations. However, those concentrations will be closely monitored.

Regular monitoring is already being conducted on environmental aspects in the geothermal area in Þeistareykir and its vicinity. The objective is to recognise and record the environmental baseline before geothermal utilisation proceeds. Monitoring will continue once operations have begun and reveal how and when a functional geothermal power stations affects its surroundings. The environmental factors include surface temperature, micro-seismic, groundwater and air qualities, noise, fauna and flora.

In November 2010, the Competent Authority (the National Planning Agency), having gathered all the stakeholders' view and concerns, gave its opinion on the proposed least impact alternative. It requested that the following conditions be set when issuing permits:

- Pipes from Bondholsskard pass down to the plains, as well as pipes planned west of the Theistareykir farm site, shall be laid underground.
- Þeistareykir shall prepare a monitoring program on changes in geothermal surface activity in consultation with the National Energy Authority and the Environment Agency of Iceland. Investigations according to the monitoring program should start as soon as possible and results are to be presented to licensors annually.
- During construction, the area where red listed threatened plant species habitats have been detected, as well as wetlands beneath the Ketilfjall mountain, must be fenced off.

The development consent was received in July 2014 for a first tranche of 100 MWe, pursuant to Articles 13-16 of the Planning Act No.123/2010, Regulation No. 772/2012 on development consent and pursuant to the provisions in the Nature Conservation Act No. 44/1999. It was issued on the basis of a joint environmental impact assessment on the aluminium smelter at Bakki in Húsavík, the Þeistareykir Geothermal Power Station, the Krafla Geothermal Power Station II, the high voltage transmission lines (from Krafla and Þeistareykir to Bakki), the Þeistareykir geothermal power plant, the regional planning for the high temperature areas in the Þingeyjar Counties 2007-2025, the municipal plan for the Þingeyjarsveit Municipality 2010- 2022 and the regional and local development plan for the Þeistareykir Geothermal power Station.

The geothermal field will be developed in stages, with the first phase being the project financed by the Bank (90 MW). The effects on the geothermal reservoir will be monitored regularly to avoid depletion. The results will be reported to the Competent Authority to decide on the maximum steam to be harnessed in a sustainable manner.

The project generates electricity for a new silicon metal plant. A new transmission line of 29 km length will be installed to connect both sites. The National Planning Agency gave its opinion on the transmission line in November 2010, and on the silicon metal plant, which replaced the aluminium smelter that had been considered in the initial EIA in July 2013. Both associated facilities' environmental impact assessments were reviewed as part of the Bank's due diligence and the residual impacts are acceptable to the Bank.

**Other Environmental and Social Aspects**

The promoter holds ISO 9 001, ISO 14 001 and OSHAS 18 001 certifications.

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