

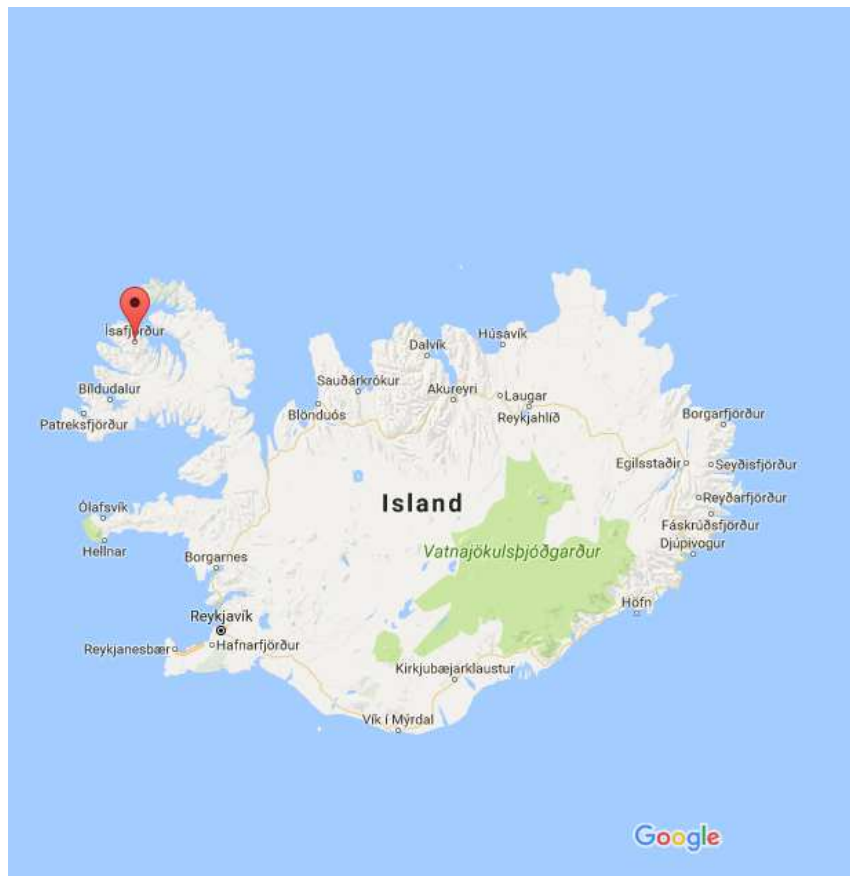


Fossarvirkjun HPP - Iceland

Glasgow, 2016-11-09

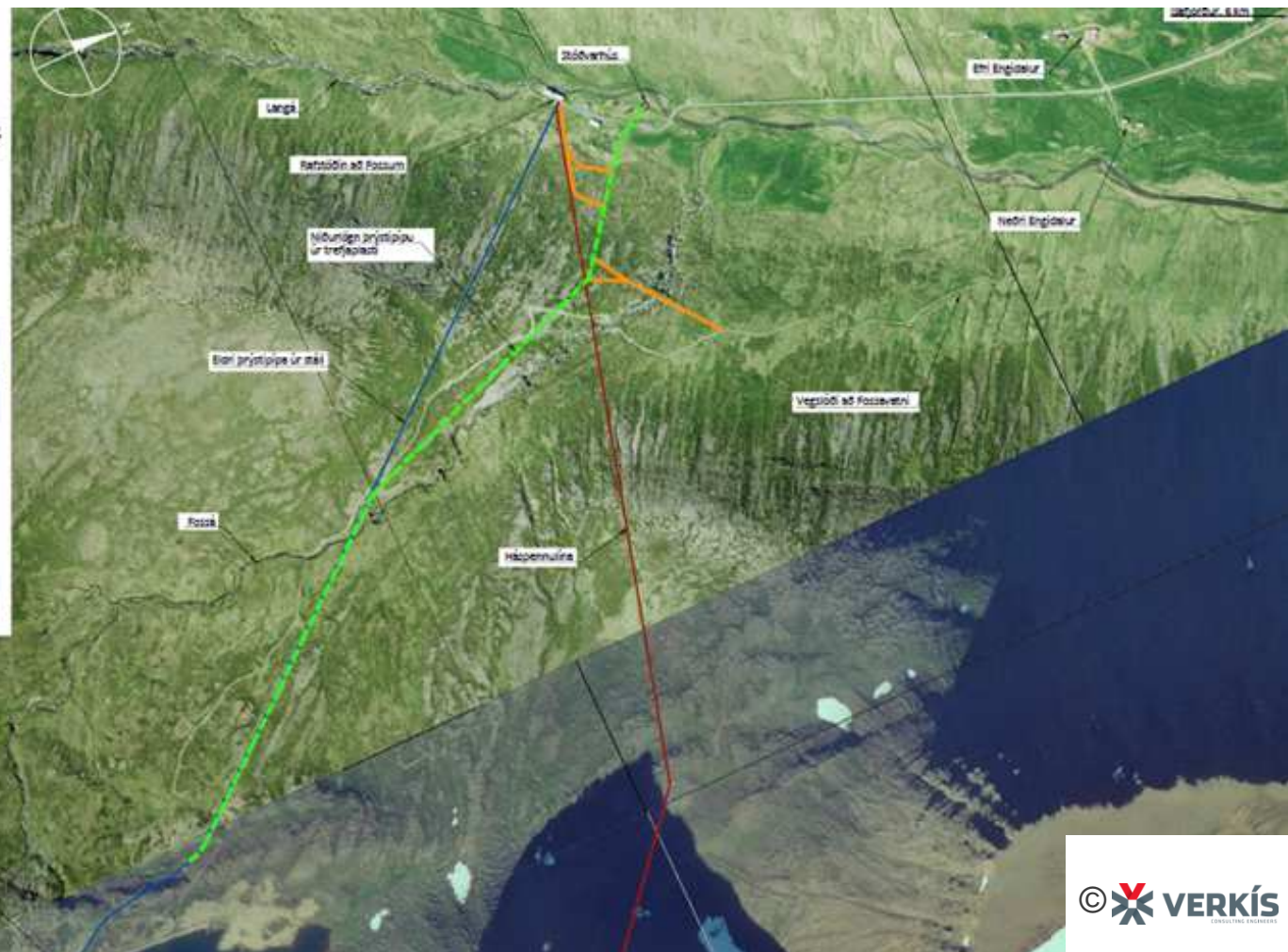


Geographical Location of Fossarvirkjun



- The project is located in the north-western part of Iceland, in Skutulsfjörður at the Westfjord peninsular. The distance by road to the town Ísafjörður is only 7 km.
- Fresh water river, fed by direct runoff and springs

Project Overview





System Overview

The required scope for the new plant consists of:

- 2-nozzle Pelton turbine
- Penstock Y-pipe
- Penstock rupture valve
- Spherical inlet valve
- Hydraulic power unit
- Synchronous generator
- Separate flywheel system incl. el. coupling
- Lube oil unit
- Cooling water system
- Control and protection system
- Low voltage switchgear
- Direct current system
- Auxiliaries and spare parts
- Shipment
- Erection supervision
- Commissioning
- The old penstock has been used for leading the power and signal cables to the intake structure

Historical Background



- The existing station, called Fossavatnvirjkjun, was built by the village of Ísafjörður in 1937.
- Originally the power station at Fossavatnvirjkjun was the basic power source for the Ísafjörður area. The output was just 600 kW.



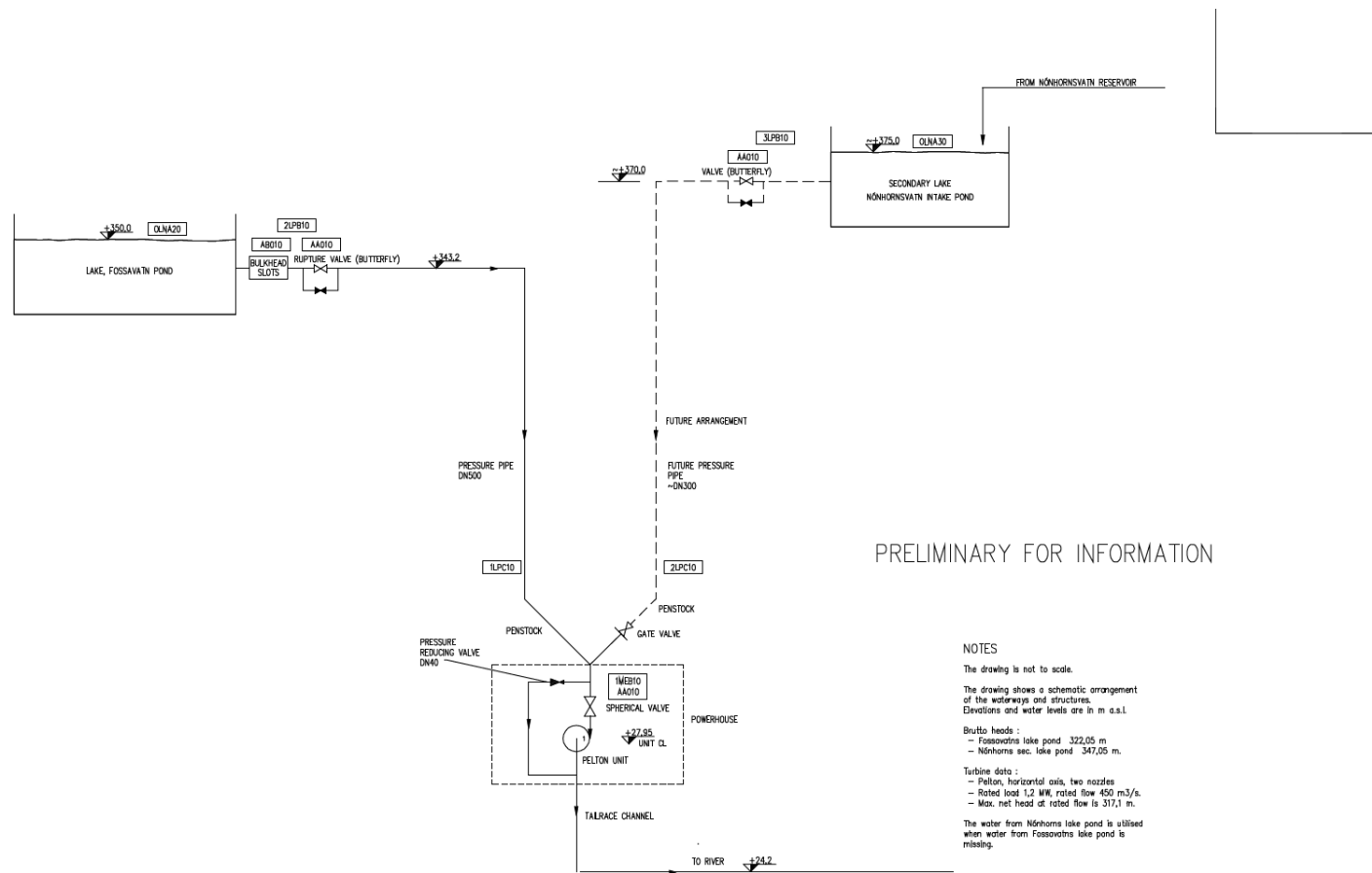
Technical Data

Fossarvirkjun HPP

Turbine type	PH2c710/200
Number of turbines	1
Gross head	323 m
Net head	308 m
Discharge	450 l/s
Output	1221 kW
Speed	1000 rpm
Runaway speed	1804 rpm
Distance runner center over tail water level	1,80 m
tail water level	40 m.a.s.l.



Technical Requirements



PRELIMINARY FOR INFORMATION

NOTES

- The drawing is not to scale.
- The drawing shows a schematic arrangement of the waterways and structures. Elevations and water levels are in m a.s.l.
- Brutto heads :
 - Fossavatns lake pond 322,05 m
 - Nónhorn's sec. lake pond 347,05 m.
- Turbine data :
 - Pelton, horizontal axis, two nozzles
 - Rated load 1,2 MW, rated flow 450 m³/s.
 - Max. net head at rated flow is 317,1 m.
- The water from Nónhorn's lake pond is utilised when water from Fossavatns lake pond is missing.



Constructional Realization

Grummynd

Byggingar og efnisálysing
Stöðvarnarskipti og spennistöð. Húsið er byggt úr steinsteypu. Uvæggi eru einangraðir að innanverðu að hluta til með 50 mm einangrun og murrhúðaþrúða klæddir með trefjagjöplötum. Þak er einangrað að ofan með 150 mm einangrun og klætt með dúk. Ofan á dúk verður flöt og 80 mm lag af sjávarsluþúfu fjórugjöli. Ytri klæðing útvægja er steinub með tókki og löst steinngu. Gluggar og hurdlir verða úr dökku hárhvít og harðri og hárhvítar klæddir með rásdóm krossvöli í sama lit og karmar. Veggur milli spennistöðvar og stöðvarhúss er úr steinsteypu, veggur við salerni er byggður úr blökkgrind, spónagjötum og gíli. Húsið verður hlítt með rafmagnsdröfum.

Brunnsvárnir:
Brunnsvárnirng atól eru samkvæmt reglugerð. Veggur milli spennistöðvar og vélásalar er A-REIM90. Flötaleiðir skv. tækninu.

Aðkoma:
Aðkoma að stöðvarhúsi verður frá veði sem lögur inn Engdall að nুবറandi rafstöðvarhúsi OV.

Inntök:
Vahn verður lengið úr vahnslögn og rafmagn frá rafal.

Loftrafsing:
Vahn loftrafsing er úr vélásal, rafasal og salerni. Spennarymi loftrafs um koftrafsar.

Skölp:
Skölp verður leitt í rotró stöðsetta vestan við stöðvarhúsið. Afallsvatn úr dæluþrom verður leitt í olluakjúlu.

Skilmálar fyrir löð stöðvarhúss:
Stöðvarhúsið verður staðsett innan löðar OV. Byggingareitur fyrir stöðvarhúsið er 900 fm og skal stöðvarhúsið vera staðsett innan hans. Tvö bílastæði verða við stöðvarhúsið.

Skyrtingar

- MHL 01 Matfölanúmer
- [0101] Rýmiánumer
- 0.00 Gólfhóð
- BN Þakförfall
- GN Gólfhórfall
- R Reykaskyrjar
- U Ó- og neyðarkyrjar
- EC-290 Hurdlir með merktu brunnumhúða
- FSL Handtöskuvæki

Afsstöðumynf. Mikv. 1/1000

Tæknipjónusta Vestfarða
Aðalstræð 26, 400 lafahól. Sími: 456 3902. Fax: 456 5097

Fossárvirkjun
Grummynd, snið, úllit, afsstöðumynd og byggingarálysing

FOSS.A01.001 | 1/100, 1/1000 (A2) | 01

13-1427

SKAFAFRÖG	WAX	UTL	BRÉTTING	SAÖG	MFR
DRÖGASNIÐ	03.14	NA			
SKAFAFRÖG	03.14	NA			
STYFNAFRÖG	03.14	SG			

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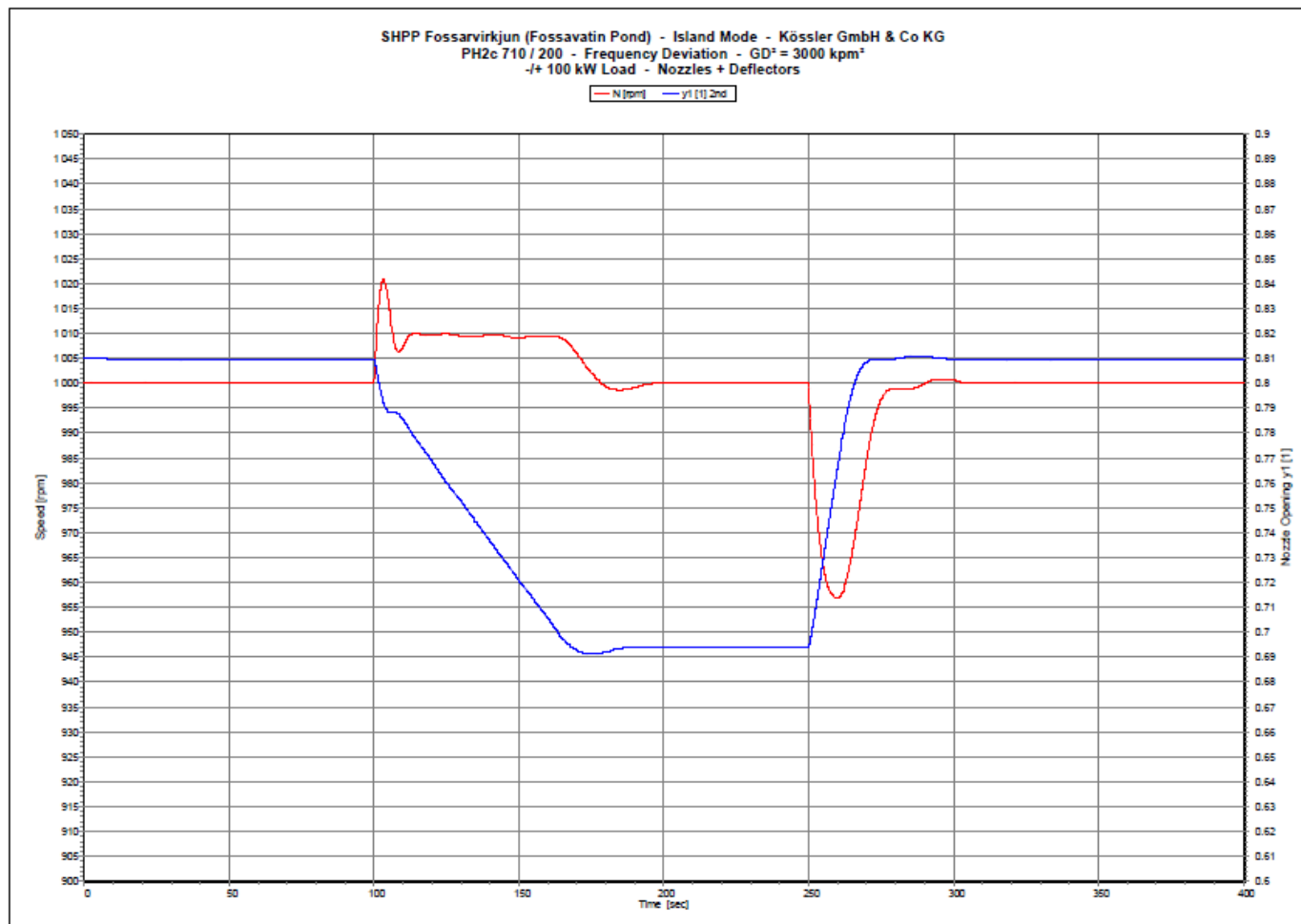
Transient Conditions and Solutions

The main criteria's have been:

- Max. pressure rise at total load rejection $\leq 15\%$ considering the 2 penstock branches with different length and diameter
- Accuracy in power control $\pm 1\%$
- Max. frequency deviation 49,0 – 51,0 Hz
- Max. load step of 300 kW
- No by-pass system, only mechanical solution required
- Conclusion
- [Link Video](#)

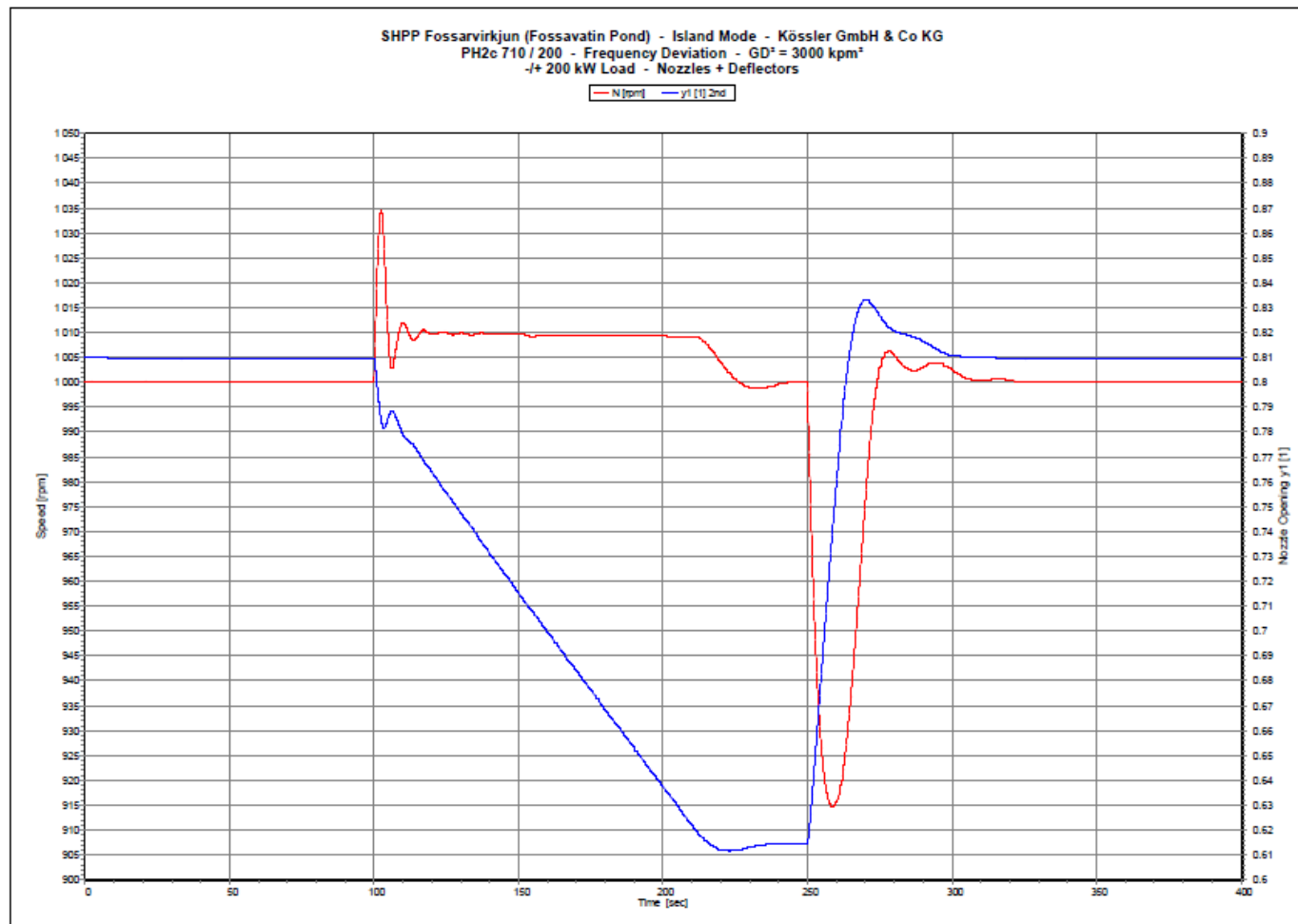


Transient Conditions and Solutions





Transient Conditions and Solutions





Assembly and Weather Conditions



20/01/2015 10:15





Comissioning





Comissioning





Mode of Operation incl. Blackstart

The unit is working in an “isolated grid” serving the towns of Sudavik and partly also Isafjördur due to the bad connection to the main grid. The plant is used also for stabilization of the week grid conditions where the strong operating conditions are coming from. The produced energy (double of the old plant) will be used not only for the electrical supply of the towns; it will be also used for district heating.



Sustainability



- So far part of the energy needed in the area was generated by diesel units.
- Thanks to the HPP Fossarvirkjun the amount of diesel per year could be drastically reduced.
- Due to the rising demand for electrical power the HPP Fossarvirkjun contributes to a sustainable reduction in total CO2 emissions.



Companies Involved



- Orkubú Vestfjarða ohf: Client



- Verkis: Consulting Engineers



- Technical Service Westfjord: Architectural Design



- Schubert: Electrical Equipment and Control and Protection System



- Kössler: Electromechanical Equipment incl. Erection Supervision and Commissioning



Contact:

Kössler GmbH & Co KG

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