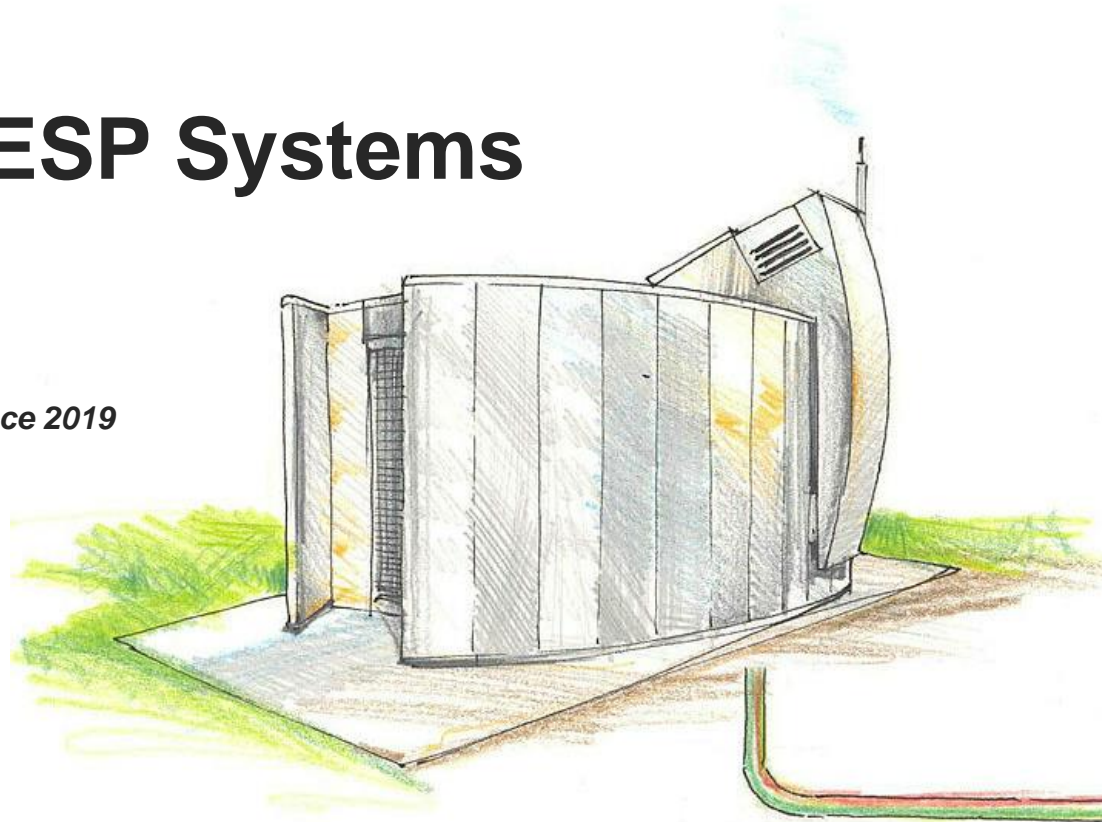
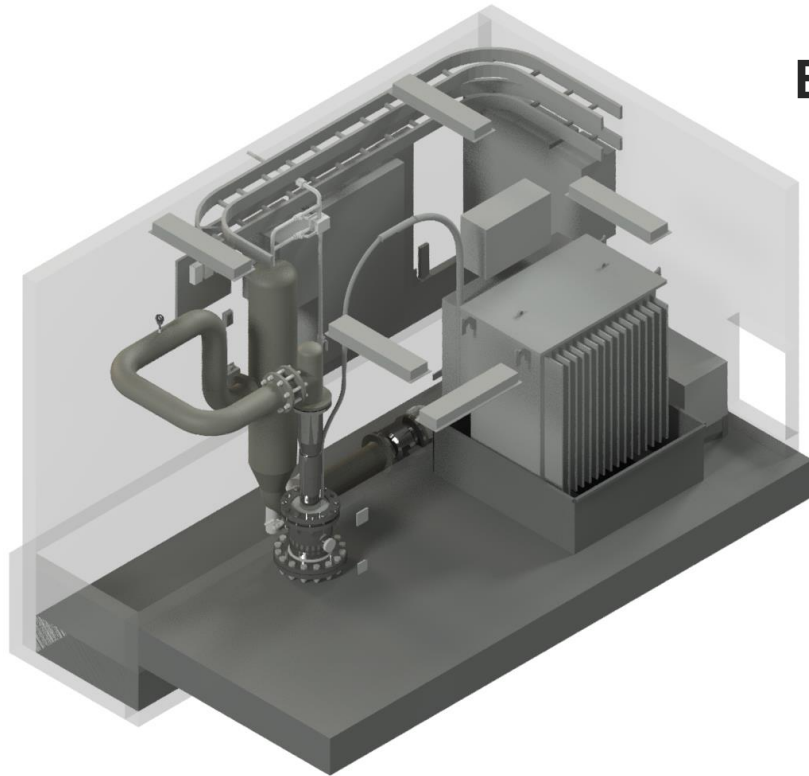


# High Voltage ESP Systems

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***R&D Manager District Heating***  
***Sustainable District Energy Conference 2019***



# What is a High Voltage ESP System



## Electrical **S**ubmersible **P**ump **S**ystem

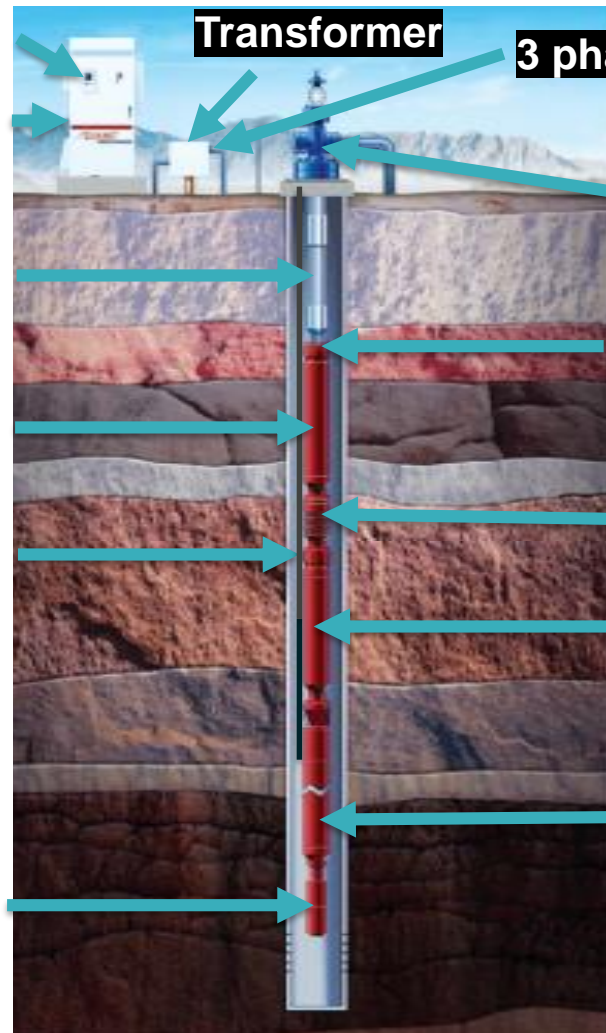
- Centrifugal pump for deep well installation
- Installation depth up to 3000 m
- Standard Temperature rating 160°C
- Motor voltage 1000-4000V



**From Top  
to Bottom**

**Or Bottom  
to Top...**

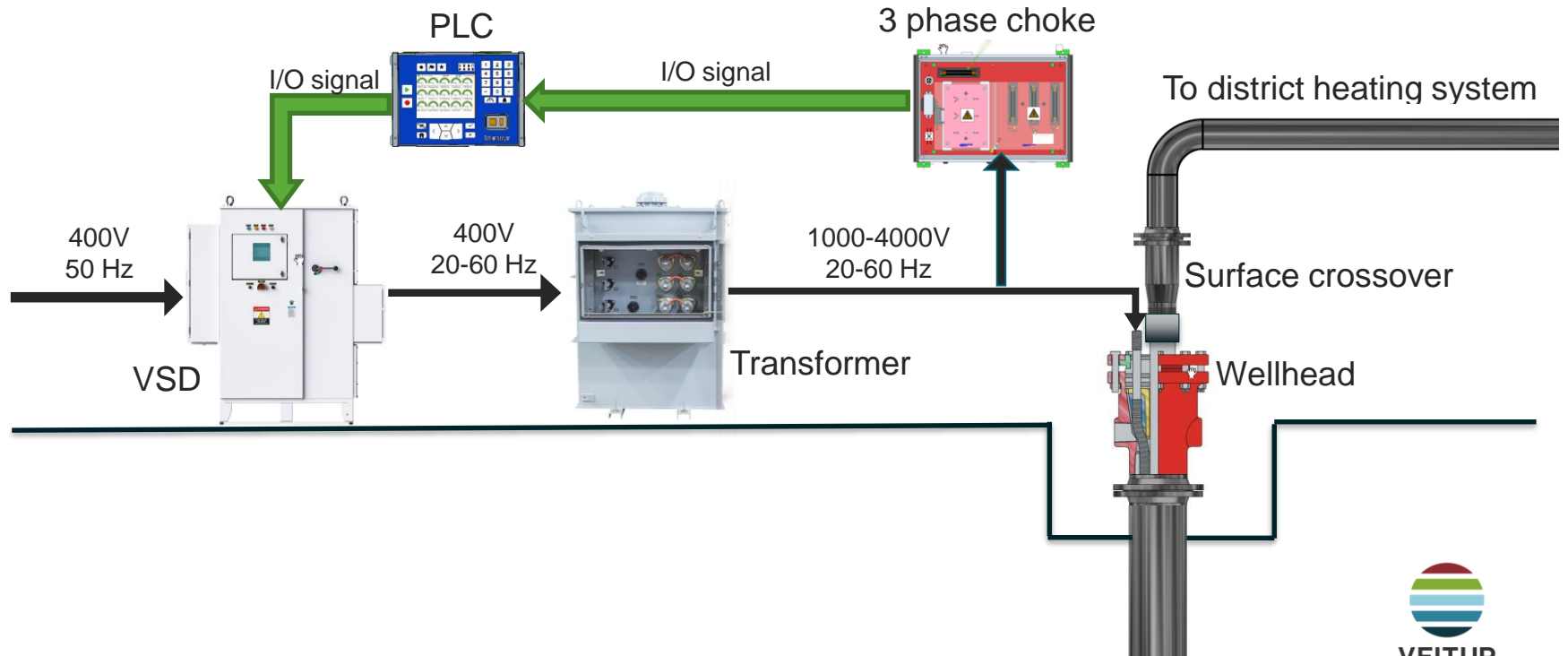
**PLC**  
**Variable speed drive**  
**Production tubing**  
**Multistage centrifugal pump**  
**Motor main cable**  
**Deep well gauge**



**Well top**  
**Discharge head**  
**Pump intake**  
**Protector(s)**  
**Electrical motor**

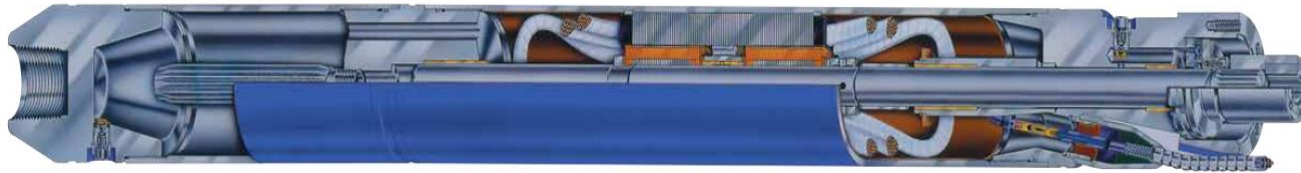


# Surface Equipment



# Downhole Equipment

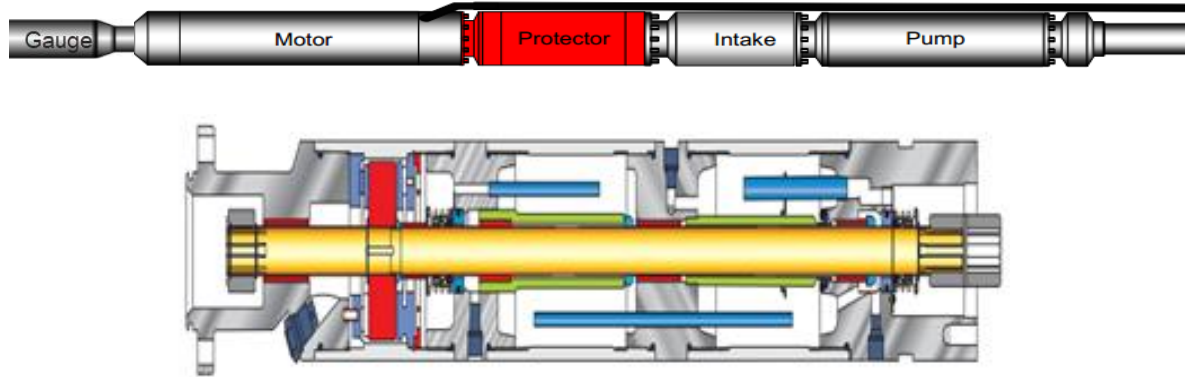
## *Motor*



- AC type
- 3 phase
- 2 poles
- Squirrel cage induction motor
- Oil filled

# Downhole Equipment

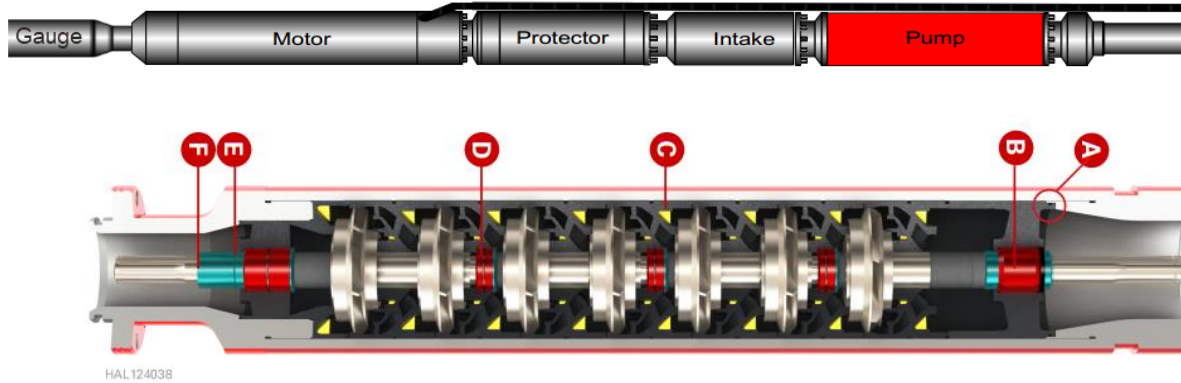
## *Protector*



- Labryinth type
- Bag type
- Axial thrust bearing
- Oil filled
- Accumulator for thermal expansion of the motor oil

# Downhole Equipment

## *Pump*



- Cenrifugal
- Multistage

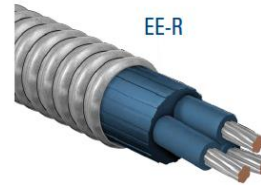
# Downhole Equipment *Cable*



- Flat type
- Round type
- EPDM insulation
- Galvanized armour
- Monel armour
- Diameter 30-50mm



ETBE-R



EE-R



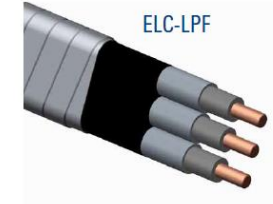
SESLTBE-R



ELB-F



ELBE-R



ELC-LPF

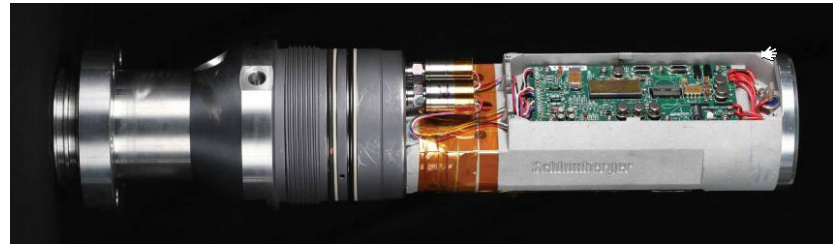


# Downhole Equipment

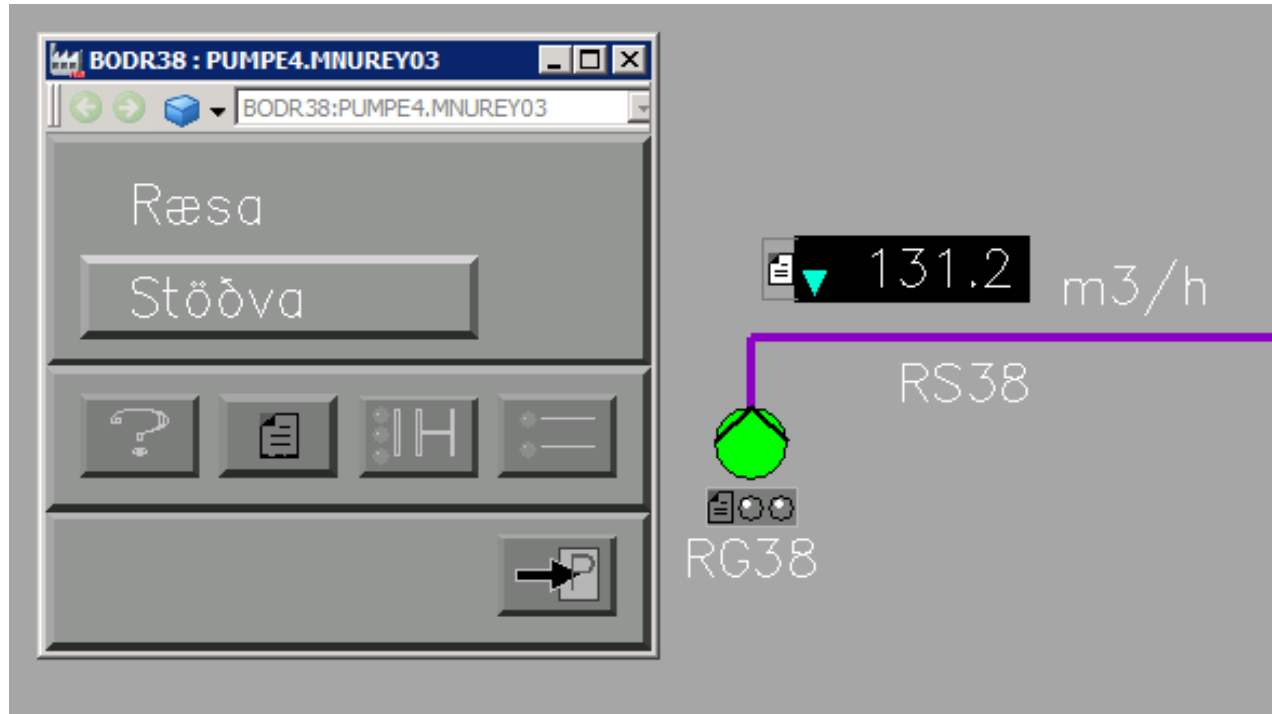
## *Gauge*



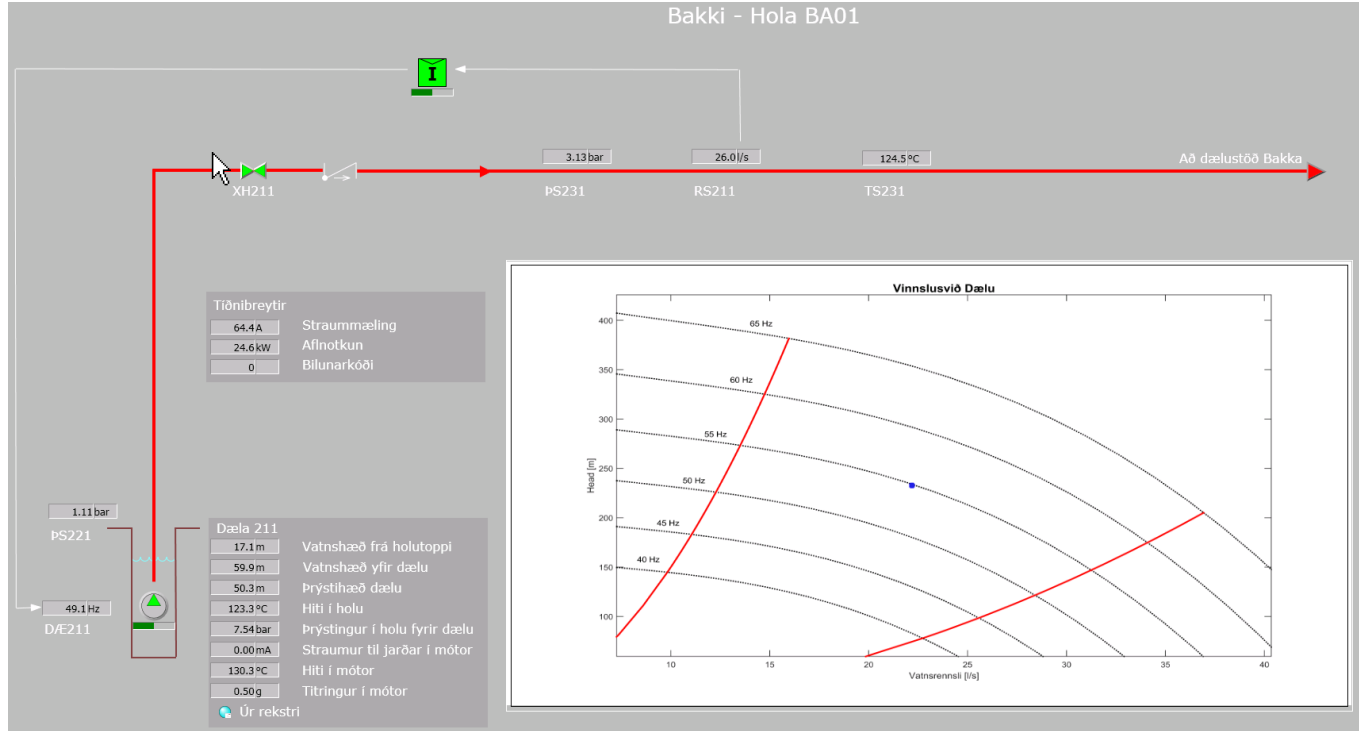
- Downhole temperature
- Suction pressure
- Discharge pressure
- Current leakage
- Motor winding temperature
- Motor bearing vibration



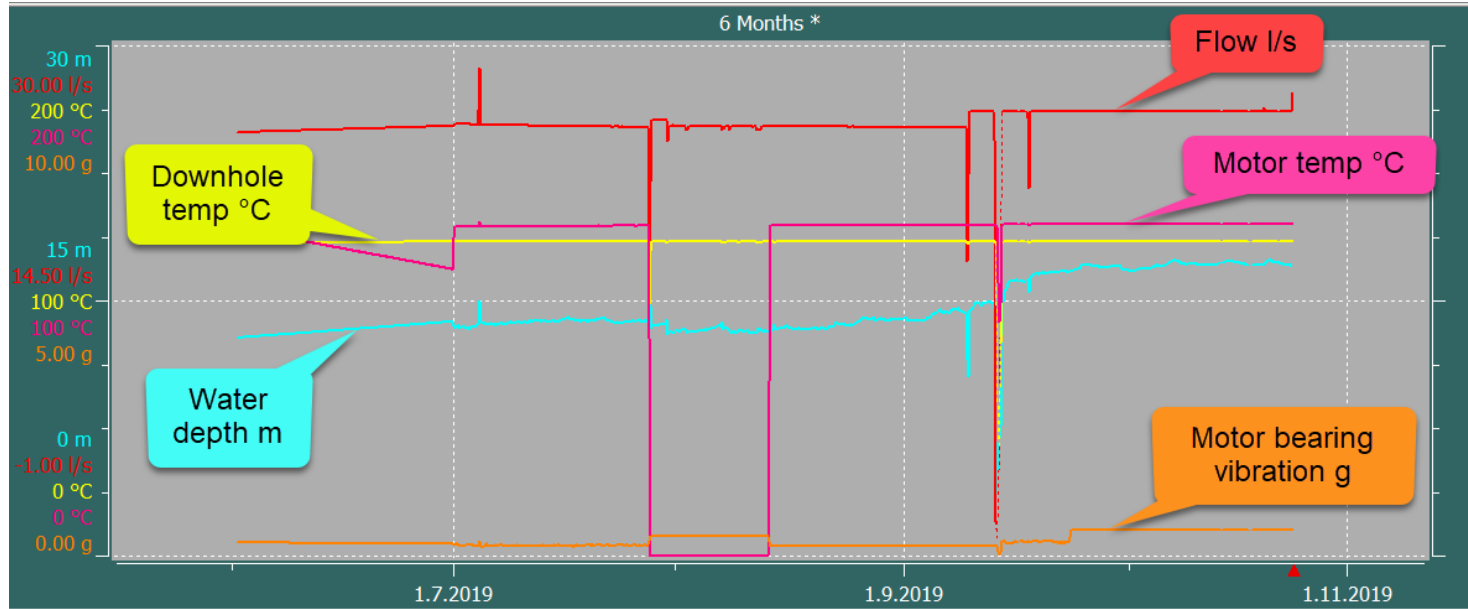
# Monitoring of reservoir and downhole equipment



# Monitoring of reservoir and downhole equipment

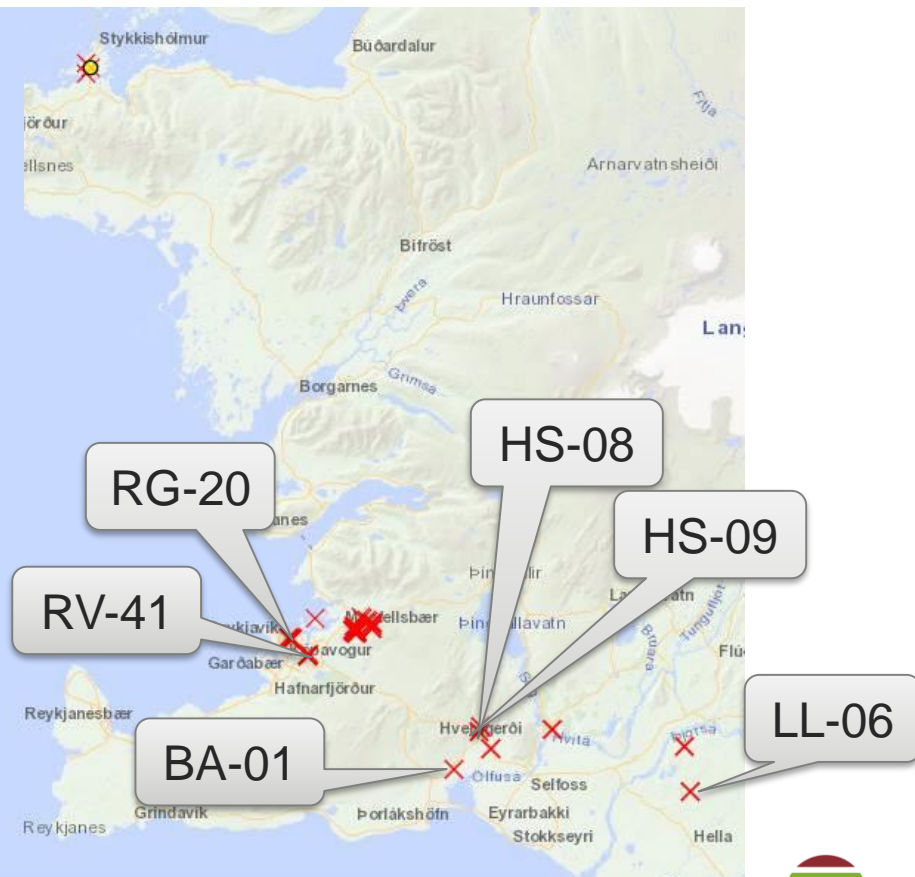


# Monitoring of reservoir and downhole equipment



# ESP program

2018	LL-06	98°C
2019	BA-01	125°C
	RV-41	97°C
	HS-08	180°C
	RG-20	130°C
2020	HS-09	180°C
	LWN-04	90°C
	4 wells capital area	
2021	5 wells capital area	
2022	5-10 wells capital area	



# Why ESP for geothermal?

- Higher temperature
- Greater depth
- Higher flow rate
- Increased monitoring
- Optimizing production supporting sustainable reservoir utilization
- Shorter installation time
- Improved efficiency
- Smart well control
- Less investment cost for new wells



Thank you for your attention



HAGSÝNI FRAMSÝNI HEIÐARLEIKI