

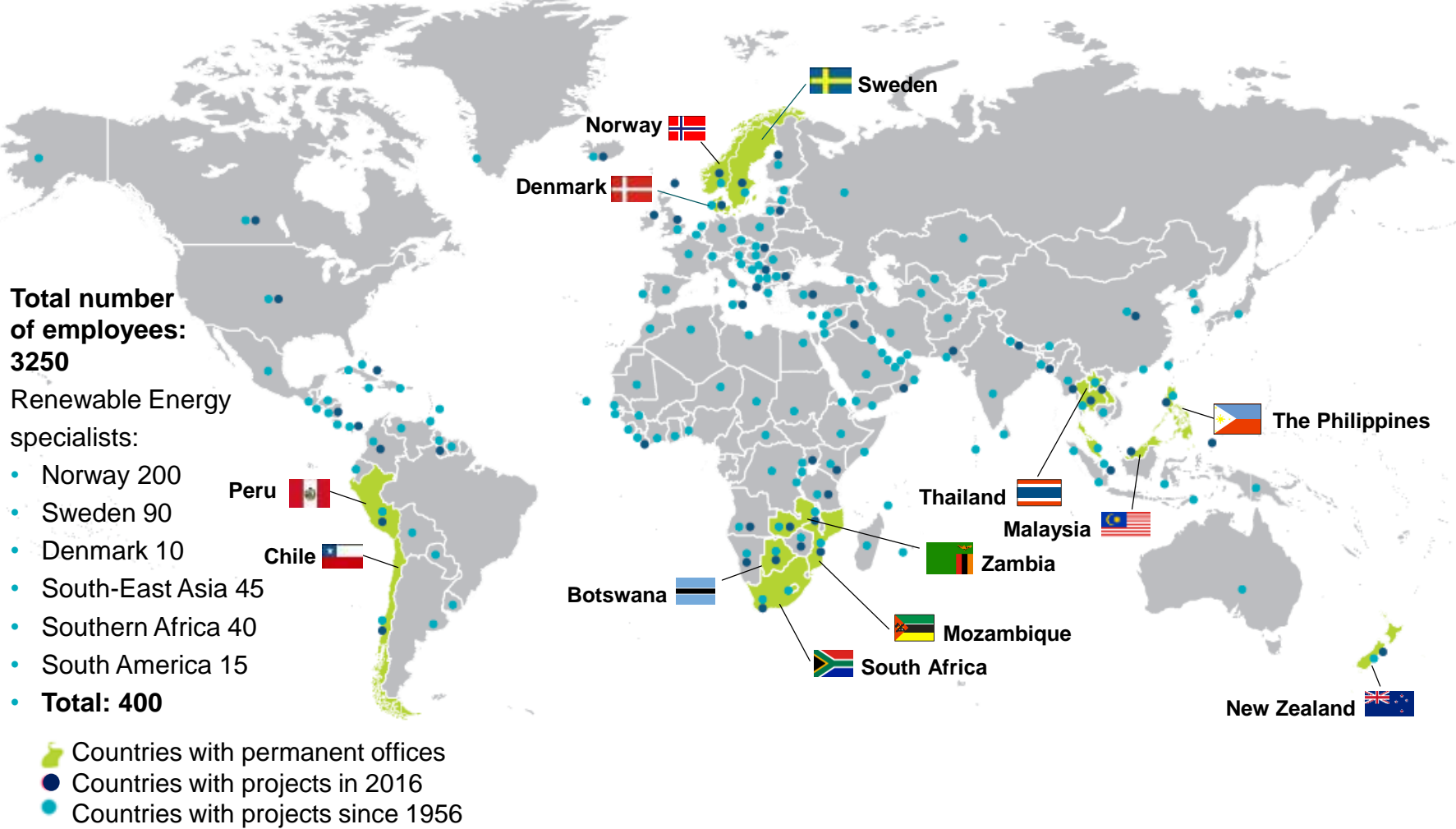
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Upgrading heat distribution and small hydro

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Norconsult – International renewable energy consultant working all over the world



Thermal energy – Successful history with EEA Grants in Bulgaria.

- ▶ Based on the program BG04 «Energy efficiency and Renewable Energy» funded by the Financial Mechanism of the EEA 2009-2014.
- ▶ Municipality of Gabrovo
 - ▶ Upgrading of the internal heat distribution system in the School of Mathematics
 - ▶ A new gas boiler in a kindergarten to replace the old fuel oil boiler
 - ▶ Information exchange through training held in Bulgaria and Norway



- ▶ Municipality of Lom
 - ▶ Surplus heat from a local biogas power plant to heat up municipal buildings.
 - ▶ Information exchange through training held in Bulgaria and Norway

Key success factor:

A local company with strong competence on EEA Grants as well as strong network with potential clients

Outcome from the project in the Municipality of Gabrovo

- ▶ New gas fired boiler, backup with liquid fuel
- ▶ Separate circulation pumps with automatic control for each branch
- ▶ All heaters replaced with aluminium radiators with individual thermostat temperature regulation
- ▶ New pipelines

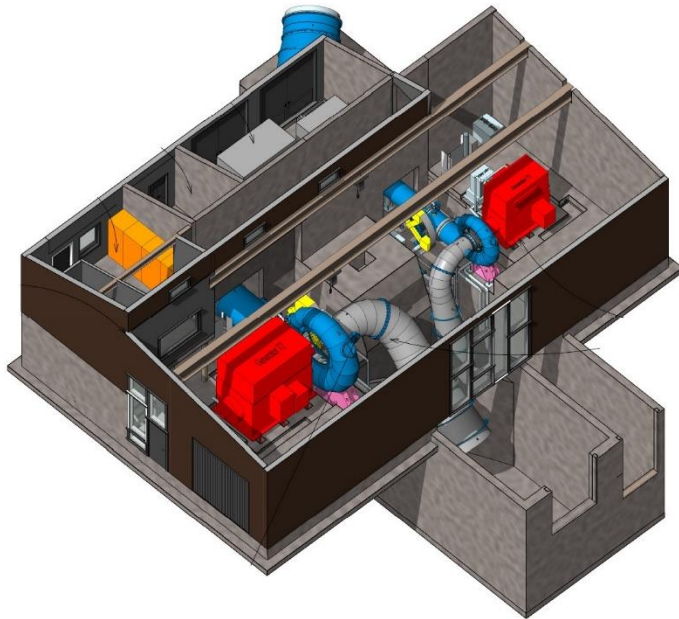
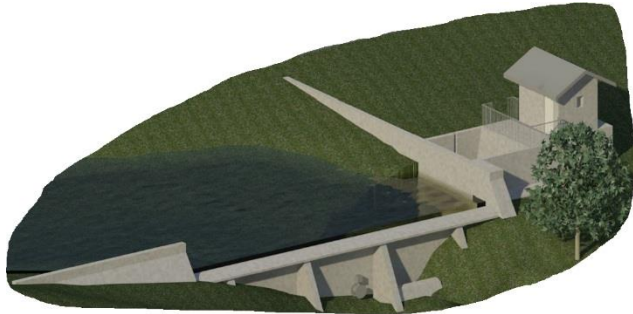
Outcome from the project in the Municipality of Gabrovo – Final report

Activity	Specific targets	Expected results	Indicators set	Indicators achieved
1	Formed project team. Reporting of the project. Monitoring and control.	Sustainable implementation of the planned project activities	3 technical reports	3 technical reports
2	Successful tendering/ public procurement	Selected subcontractors Signed contracts	6 tenders	Published 6 public tenders, 6 tenders have been finalized
3	Strengthen bilateral relations	Partnership Agreement, successfully implemented project	1 Partnership Agreement 2 visits of Norwegian Partner 1 study visit in Norway	1 Partnership Agreement 2 visit of Norwegian Partner 1 study visit in Norway
4	Improvement of quality of life	Implemented energy efficiency measures	28,14 ton CO ² per year saved emissions 89,8 MWh/year saved energy	28,14 ton CO ² per year saved emissions 89,8 MWh/year saved energy

Outcome from the project in the Municipality of Gabrovo – Final report

Activity	Specific targets	Expected results	Indicators set	Indicators achieved
5	Quality implementation of measures	Executed construction, authors' supervision s and investors control	2 buildings approved with implemented measures	2 buildings approved with implemented measures
6	Promotion of the received financial support by FM of EEA	Successfully implemented publicity plan	<ul style="list-style-type: none"> • 2 billboards • 2 permanent explanatory plates • 1 bilingual banner • 200 sets of information materials • 2 conferences • 4 press releases • 1 training • Publication of updated information on the web site 	<ul style="list-style-type: none"> • 2 billboards • 2 permanent explanatory plates • 1 bilingual banner • 200 sets of information materials • 2 conferences • 4 press releases • 1 training • Publication of updated
7	Transparency in reporting	Approved final financial report	1 auditing report	1 auditing report

Small hydro power– Norconsult covers everything from water to wire



- ▶ Key qualifications
 - ▶ Hydrology, sediments and flood protection
 - ▶ Dams, gates, vales and penstocks
 - ▶ Power station layout and civil design
 - ▶ Turbines, generators, transformers and control systems
 - ▶ Grid connection and grid stability analysis
 - ▶ Contract and project management
- ▶ Our integrated teams are performing
 - ▶ Hydropower planning and project optimization
 - ▶ Conceptual design and tender documents
 - ▶ Detail design and construction follow up
 - ▶ Support during equipment installation and commissioning
 - ▶ Utilizing multi discipline BIM improves project quality and progress

Upgrading small hydro power in Norway – reducing losses and increasing production

- ▶ Small plant erected in 1941 and partly upgraded in 1971
- ▶ No modification of reservoir, maximum flow or head
- ▶ Full upgrade in 2012-2014 (3 year project time)
 - ▶ Main data
 - ▶ Installed power: 740 kw upgraded to 1160 kW (+57%)
 - ▶ Yearly production: 3.67 GWh/year upgraded to 5.20 GWh/year (+42%)
 - ▶ Economy: Upgrade almost break even with ordinary power prices, with green certificates it became profitable
 - ▶ Modification of intake: Removed sediment and trash problems
 - ▶ New penstock: Replacing old wooden penstock with buried GRP penstock
Increased diameter from Ø1100 to Ø1200 mm, reducing head loss by 3%
 - ▶ New electromechanical installation replacing the 73 year old equipment:
 - ▶ Power station was upgraded with new ventilation, improved fire protection and a larger access gate.
Removing existing concrete foundation to make space for the new turbine.

Upgrading small hydro power – pictures before and after



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 **Thank you for your attention**

