

Non-technical Description of 'Dora-II 9.5 MWe Geothermal Energy Project'

1. General description of the project

It is a geothermal power plant project in Western Anatolia, Eagean Region, Aydin province of Turkey. It is operated by Menderes Geothermal Elektrik Uretim A.S.

Its installed capacity is 9.5MW, with an annual electricity production of 70,000 MWh. The electricity generated by this project is connected to the national grid to replace the fossil fuel power generation. The project utilizes Binary cycle system where the fluid obtained from the well transmits its temperature to another fluid (pentane) with lower evaporation degree. The hot water outgoing from the heat converter is not used in energy generation, it is re-injected to the wells in a closed cycle. The organic gas in the secondary cycle (closed cycle) propels the turbine. The system is environmental friendly as non-condensable gases are captured and no emission is a point in question.

The estimated project emission reduction is about 39,358tCO₂e/yr.

The project aims to:

- Develop the existing geothermal site potential,
- Reduce the air pollution caused by electricity generation,
- Reduce the dependency on the import for

2. Location

The project is located in Western Anatolia, Eagean Region, Aydin Province



Figure.1. The location of the project site marked with A.

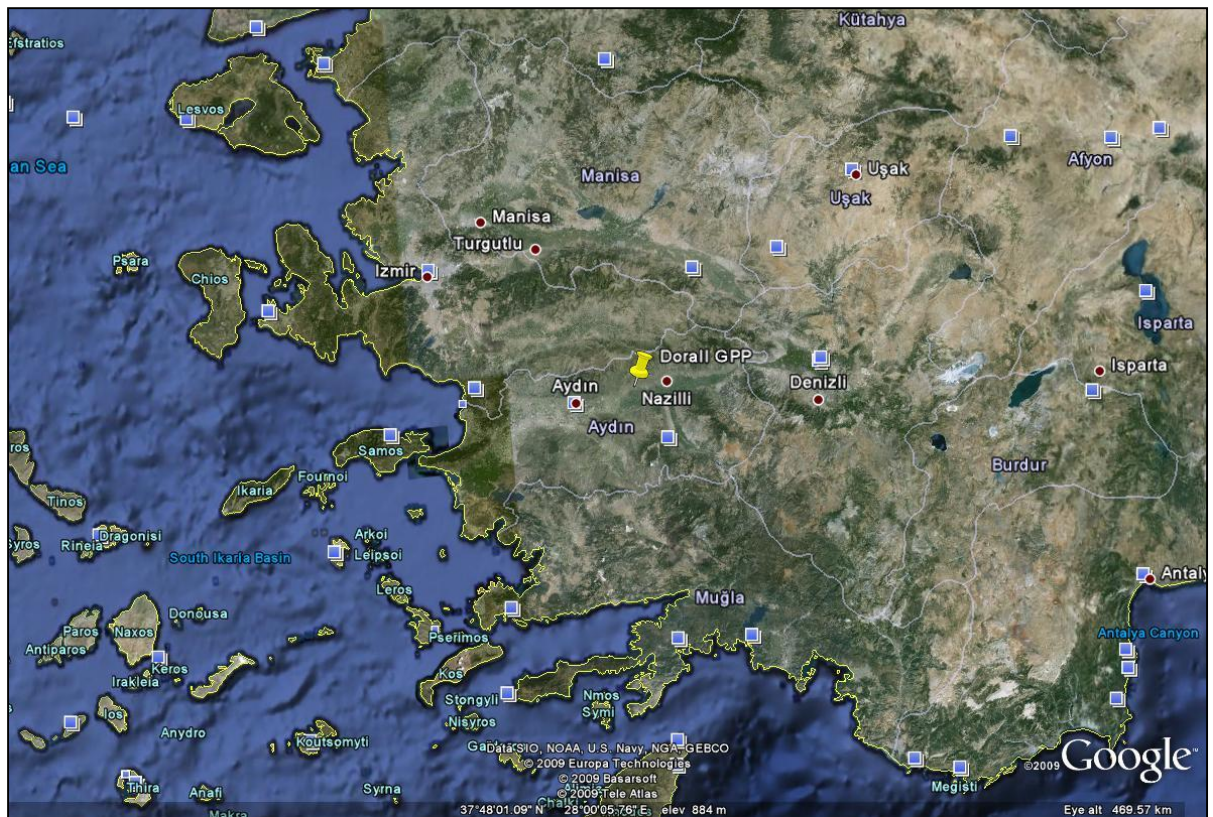


Figure.2. The project site in a closer view.

3. Contributions to national and local sustainable development:

Component	Score	Rational
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• Indicators	(-2 to +2)	
Local / Regional / Global Environment		
• Water quality and quantity	0	<p>The brine is only used for electricity generation and re-injected underground. Therefore either groundwater resources or surface water is not negatively impacted or disturbed.</p> <p>Furthermore, as the plant is operated in a closed cycle, neither the geothermal fluid nor the organic Rankine Cycle fluid is discharged causing any potential damage to the ambience including soil.</p>
• Air quality (emissions other than GHG)	0	<p>The fluid circulation system is closed and no emission of any gases that may potentially hamper the air quality is caused during power generation.</p> <p>Brine extraction causes limited sulphur odour but it does not cause any negative impacts.</p> <p>As mentioned above, the non-condensable gases resulting from the project operation are captured and carried out of the project boundary with pipelines to be used in another industrial facility, thus not released to the atmosphere.</p>
• Other pollutants (including, where relevant, toxicity, radioactivity, POPs, stratospheric ozone layer depleting gases)	0	<p>No significant change compared to the baseline, since the plant is a closed circulation system.</p> <p>Noise level during operation is estimated to be below the limits allowed by the regulations.</p>
• Soil condition (quality and quantity)	0	<p>The project activity does not produce any waste, which decreases soil condition in quality and/or quantity.</p> <p>The extraction has not cause any earthquake impacts.</p>
• Biodiversity (species and habitat conservation)	0	<p>As compared to the baseline, no significant change in biodiversity is generated.</p>

<i>Sub Total</i>	+0	
Social Sustainability and Development		
<ul style="list-style-type: none"> * Employment (including job quality, fulfillment of labor standards) 	+1	<p>The project leads to employment generation during construction and for operation of the power plant itself and in the implementation as a GS VER project. During operation some workers is hired. The workers are registered to social security and benefit from health services as well as retirement benefits afterwards. Considering the fact that a majority of the villagers were farmers previously, the project provides better jobs with social benefits.</p>
<ul style="list-style-type: none"> * Livelihood of the poor (including poverty alleviation, distributional equity, and access to essential services) 	0	<p>The project has generates additional job positions and therefore income in the area. The villagers working in the power plant have a regular income which increases their life quality. The workers' families are also benefit from health services covered by social security payments. Those who have jobs in the power plant were farmers previously and most of farmers have been established to live in poverty in the country. Thus it is evident how much the project activity contributes to the alleviation of poverty in the area.</p>
<ul style="list-style-type: none"> Access to energy services 	+1	<p>The project activity improves the scale and security of energy supply in the country. Turkey is highly dependent on imported energy resources to cater to the growing energy demand of the country. By utilizing national energy resources for energy generation, the security of energy supply is improved.</p> <p>Being a regional grid connected power plant, the project adds capacity to the regional power matrix, thus alleviating the burden on the power grid in meeting the regional</p>

		demand and improving electricity availability by some extent in an already power deficient country.
<ul style="list-style-type: none"> * Human and institutional capacity (including empowerment, education, involvement, gender) 	+1	People involved are trained with the necessary skills for the successful operation of the energy generation facility.
<i>Sub Total</i>	+3	
Economic and Technological Development		
<ul style="list-style-type: none"> * Employment (numbers) 	+1	The project activity generates employment opportunities during the project's construction and operation period. Most of the permanent employees are from the village.
<ul style="list-style-type: none"> Balance of payments (sustainability) 	+1	Through employment of clean electricity generation sources, the national electricity imports can be reduced by catering to the issues of energy security, thus also foreign exchange by minimization of imports. Electricity generation from renewable energy sources like geothermal source is completely independent from imports and thus does not have any negative effects on the balance of payments.
<ul style="list-style-type: none"> Technological self reliance (including project replicability, hard currency liability, institutional capacity, technology transfer) 	+1	The project encourages new investors in geothermal power generation. The system optimizes the usage of geothermal energy by organic rankine cycle. This is the second such project by the project promoting entity (MEGE) in the same region, with one more such project planned in the future. Thus more projects could be developed by other entities as well.
<i>Sub Total</i>	+3	
<i>Total</i>	+6	

In conclusion, this project complies with national policy, and it has contributed positively to the national and local sustainable development.

4. Other description

This project has been registered as GS project (ID GS445). Its first crediting period has been ended. It is applying for the second crediting period, which is from 01/03/2018 to 28/02/2025. There is no additional change in project compared to the first crediting period.