## Case Study “Zechstein Geothermal Water”

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Wintershall Dea Deutschland is currently on its way to abandon the tertiary measure of steam injection for oil production in the Emlichheim oil field for the purpose of $CO_2$ emission reduction. The recovery mechanism will be replaced by hot water injection.
The objective of the project “Zechstein Geothermal Water” is to provide sustainable emission free heat for the Emlichheim hot water development by repurposing existing wells to a geothermal doublet system in the Zechstein formation. In consequence, additional sustainable heat would boost production and further reduce $CO_2$ emissions of the hot water development, since facilitating geothermal energy could replace a considerable portion of fuel gas for heating up injection water before re-injection into the Bentheimer sandstone of the Emlichheim oil field.
Due to the high temperature of the Zechstein formation the geothermal water would be heated up while circulating through the Zechstein formation and made available on surface at approx. 110°C with almost no $CO_2$-footprint. This supports Wintershall Dea’s sustainability objective of reducing the scope 1 emissions significantly.
The steam injection causes $CO_2$ intensity which is far above company and IOGP average. The specific emission intensity after implementation of the hot water development will reduce $CO_2$ intensity by 80%. Implementation of the Zechstein geothermal cycle would reduce $CO_2$ intensity even further by replacement of gas to heat injection water and reduce $CO_2$ intensity even below company and IOGP average.
Using Zechstein for geothermal purposes is novel territory and existing infrastructure used for E&P activities might offer new opportunities.
The concept would enable Wintershall Dea Deutschland to utilize sustainable industrial heat directly in our facilities. We can make use of our extensive field experience and reservoir knowledge along with 10 years of water injection history to minimize subsurface risks. Using existing infrastructure helps in terms of reliability and predictability. This will ultimately lead to a technical advantage compared to conventional geothermal projects.