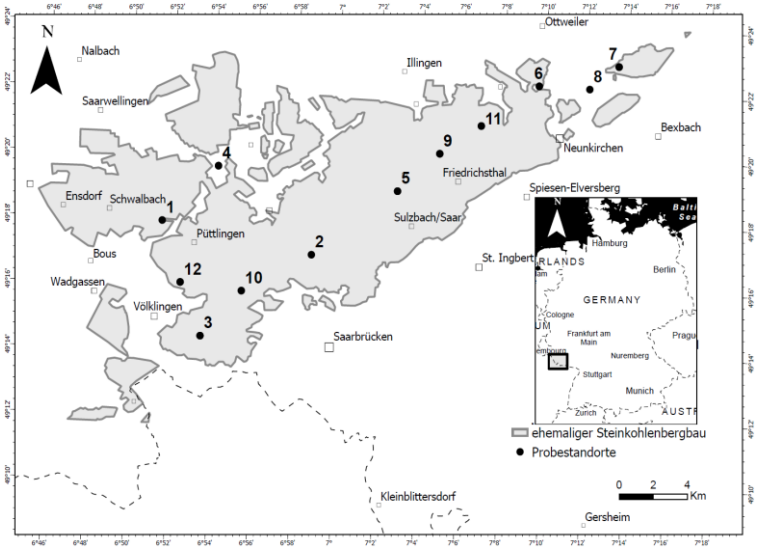
Case Study: Germany – Saar Coal Field, Saarland

Saarland is a state of Germany located in the west of the country. It covers an area of 2,570 km² and has a population of 990,000. It is the smallest German state in both area and population. Saarbrücken is the state capital and the largest city. To the west and south Saarland borders France (apart from a few kilometres of the Moselle River bordering Luxembourg) and to the north and east the German state of Rhineland-Palatinate.

Figure 1.1
Currently operating mine gas plants in the Saar Region



Source: Schemmer

More than 500 years of hard coal mining influenced topographic, economic, and social levels in the Saar Region. For many years it was an important mining district for high volatile bituminous coals. The Saar Nahe Basin (SNB) is an intramontane late orogenic sedimentary basin in the internal zone of the Variscan mountain belt originated in the Carbon era (Westphalian A to the Stephanian D). The coal deposit consists of approximately 500 coal seams with a cumulative thickness of more than 150 m and a coal content of about 120 billion m³ (Juch, 1994).

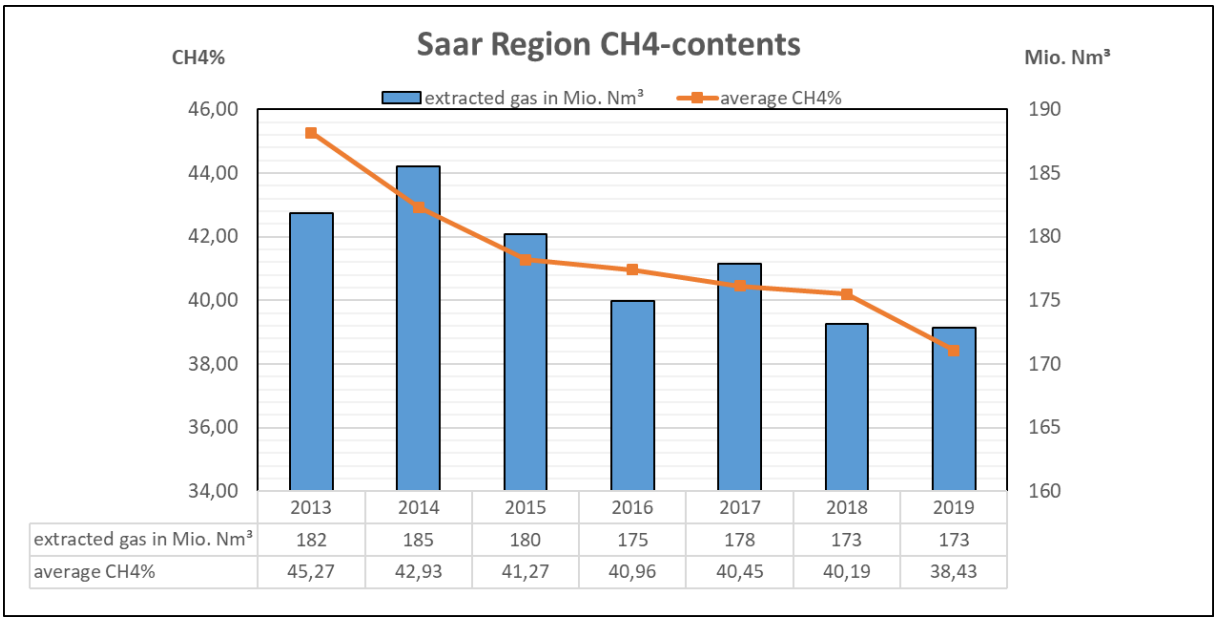
Since 1429 until 2012, the Saar coalfields have been mined. Production peaked in 1957 with 16 Mio. t and decreased to 5.7 Mio. t in 2010. In 2012, the last year of production, 0.4 Mio. t of hard coal were excavated (statista.de).

In the 1970s for safety reasons, the coal mining company Saarberg AG started to drain the hazardous methane from the underground working sites and built up a mine gas network, which reached a total length of 110 km. This network is still running, even after the mines' closures, and provides heat for 21,700 and electricity for 234,500 households throughout the Saar region. Thirteen mine gas plants are currently connected to this network, which process the Abandoned Mine Methane (AMM) from the former coal mines. Steag New Energies runs those facilities and provides sustainable energy and heat for these consumers in the region.

As shown in diagram 1 the drained amounts of mine gas as well as the methane concentration declined over the last 6 years. Since 2016, the drained gas quantity seems to be rather stable; the concentration of methane is decreasing from values of up to 45% CH4 in 2013 to 38% CH4 in 2019.

Figure 1.2

Methane Qualities and Mine Gas Quantities



	2013	2014	2015	2016	2017	2018	2019
extracted gas in Mio. Nm³	182	185	180	175	178	173	173
average CH4%	45,27	42,93	41,27	40,96	40,45	40,19	38,43

Source: Schemmer

In order to facilitate the transition away from fossil fuels to renewable energy sources, in 1991 Germany passed the Electricity Feed-In Act, which was the first green electricity feed-in tariff scheme worldwide. This Act was replaced in 2000 by the Renewable Energy Sources Act (EEG), which while modified several times over the years, comprised of a series of regulations that provided feed-in tariffs to encourage the generation of renewable electricity. The EEG also addressed the AMM, however, it classified it not as a renewable energy source, but as a sustainable one. Nevertheless, this type of subsidy will end for some plants between 2020 and 2024, making economic viability obsolete.

In order to avoid the shutdown of these plants, the governing parties of the Saarland agreed in their coalition agreement to assure the operation of such gas extraction systems. The most significant fact about this coalition agreement is that, despite the lack of economic efficiency, the operation is guaranteed for the benefit of the environment and the well-being of local residents.