Netherlands: Groningen rocked by earthquakes from natural gas extraction

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Several earthquakes over the past year in the province of Groningen, the Netherlands, have highlighted the dangers of natural gas extraction in the area. The most recent quake registered 2.8 on the Richter scale on December 29 and was centered a mere 11 kilometers (approximately 7 miles) from the city of Groningen itself. The quakes are the result of ground settling following gas drilling.

Past quakes have prompted some action from Dutch authorities, who have been forced to provide assistance to infrastructure and houses damaged by previous quakes. Approximately 40,000 properties are considered at risk of damage by earthquakes and are being inspected by government authorities.

The earthquakes are a relatively new phenomenon in the province, with none on record prior to 1986. Gas extraction in the area first began in 1963 and rapidly expanded to exploit the vast natural resources in the province.

According to *GEO ExPro*, an industry-oriented geological magazine, the Groningen gas field "is the largest gas field in Europe and the tenth largest in the world." It had original reserves of 2,800 billion cubic meters of recoverable gas. (For comparison, the North Sea had original reserves of "only" 1,325 billion cubic meters.)

The Groningen gas field is currently monopolized by Nederlandse Aardolie Maatschappij BV (NAM), a company owned by Royal Dutch Shell and ExxonMobil. The Anglo-Dutch and the American corporations each own 50 percent of NAM.

The field was already about halfway depleted by the time the earthquakes began in the 1980s, and the quakes have been increasing in intensity and frequency since. The strongest quake so far was 3.6 on the Richter scale in August 2012.

The Royal Netherlands Meteorological Institute (KNMI) estimates that the maximum earthquake magnitude for the province could be as high as 5.0 on the Richter scale, which would be a moderate quake with some damage to buildings. The 2010 Ontario-Quebec (Canada) earthquake and 2008 Lincolnshire (UK) earthquake were both 5.0 quakes.

In response to the increasing quakes, the University of Groningen and the city's municipal government have demanded a further reduction of gas extraction and an increase in the reinforcement of Groningen's homes and infrastructure.

The *UK*, the University of Groningen's independent news magazine, reports that residents are worried about the increased earthquakes and that the university itself is concerned about "reputational damage."

While gas extraction has decreased by about a quarter, it seems likely that domestic and international circumstances could provide an excuse for the Dutch government to ramp it up again. Domestically, the Groningen gas field provides a huge windfall for the Dutch government—total Dutch natural gas production is a €12 billion industry annually, and the cuts will lower government income by hundreds of millions of euros. With these cuts expected to cost the Dutch government €1 billion in 2016, austerity measures will be promoted as a necessary evil.

Internationally, a volatile energy market could provide room for NAM (i.e., Shell and ExxonMobil) to pressure the Dutch government to allow increased production again. The *UK* notes that Groningen gas can hardly be replaced altogether, as the only current alternative is natural gas from Norway or Russia—and that would require infrastructure for adding nitrogen.

Another potential domestic alternative would be the development of shale gas reserves within the

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Netherlands, which would require the use of hydraulic fracturing, or fracking. Not only would this require the development of new infrastructure in the region, but fracking carries its own health and earthquake risks. For now, there is a moratorium on fracking in the country pending further research.

Despite the risks of climate change—particularly to a country where about one-quarter of the land is below sea level—there has been little investment in sustainable energy production in the country. Only 3.7 percent of energy consumed in the Netherlands came from renewable sources in 2010, a decrease from 4.1 percent in 2009.

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