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## **Analysis**

### **Learning from Germany's energy revolution**

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It's surprising what you learn when you live abroad.

I'm on an academic leave from Selkirk College in Castlegar, B.C. I'm currently teaching at Brandenburg Technical University in Cottbus, Germany.

Here's some of what I've learned.

Europe may consider a common language in the school curriculum of all member states. The common language might be French or a constructed language. Europeans would allow 50 years for the transition so everyone would be able to speak their native language and the common European language. Imagine that type of long-term planning.

Europe may consider a common military.

Europe isn't too chuffed about Brexit. The tabloids are having fun, but in more serious discussion, the European Union emphatically does not want to be coercive.

But this isn't about a European language, European military or Brexit. It's about the European transition from fossil fuels to renewable energy.

There is both a European policy and member states' policies for transitions from fossil fuels to renewable energy. For example, countries are giving auto manufacturers notice that after a certain date, gasoline- or diesel-powered vehicles may not be sold. Germany has a cluster of policies and discussion papers known as "Energiewende" that address this transition with milestones, deadlines and penalties for non-compliance.

Where I'm living, there is a huge coal mining and thermal electric power industry.

The quality of the coal varies. Around Cottbus, the coal is lignite — soft coal with a low energy density, high sulphur content and very high moisture of around 50 per cent.

There are serious environmental issues associated with mining lignite. The most insidious aspect of lignite mining is the formation of sulphuric acid in the drained soil. The soil has a naturally high pyrite (iron sulphide) content. When iron sulphide is exposed to air and water, a series of natural reactions occur that result in the formation of sulphuric acid. Over the life of the open-pit lignite mines, the volume of sulphuric acid formed has created serious environmental problems.

Beyond the adverse environmental effects of lignite mining, lignite combustion requires coal to be transported to a power plant, dried, crushed and burned; once power is generated in that way, sulphate and particulate air pollution must be controlled and waste disposed.

During the Cold War era, lignite was the only option for electric-power generation in East Germany. Little was invested in environmental protection. Things have improved substantially since 1989 with sulphate and particulate emission control, but mercury and carbon dioxide emissions remain.

In Europe, everyone I meet acknowledges the reality and seriousness of climatic change and the role of fossil fuel combustion in emitting carbon dioxide into the atmosphere as the primary cause.

Replacing coal-powered electricity with renewable energy improves public health. It also saves money. I visited a German village, Feldheim, where all energy is generated from renewable sources.

Feldheim has third-generation wind turbines that stand 147 metres tall with 56-metre blades. The wind was imperceptible at ground level and a brisk 30 km/h at hub height. Crops can be grown all around the turbines. Energy sale is now a valuable revenue stream for Feldheim's farmers.

It also has a biogas plant that uses crop residue, animal manure and cereal to generate methane. The methane is used to boil water for a district heating system. The material processed in the biogas plant can be applied to the land as fertilizer.

There is a bioenergy plant that takes waste from the trees harvested in the community forest and burns it in a high-efficiency combustion system to boil water for the district heat system.

There is an experimental 10-megawatt storage battery to provide temporary electricity storage to try to supply the grid when demand and prices are at their highest.

Feldheim generates a large surplus of electricity that it sells to the national grid. Citizens are shareholders in their energy business. When the citizens were told they could not distribute their electricity on the national grid to themselves, they dug up the streets and installed their own electric grid. People pay about half the national price for electricity. Their investments in renewable energy earn a good financial return. The environmental benefits are coincidental.

This is a small, conservative farming community that recognized the economic and environmental benefits of renewable energy, but it is not alone.

Canadians need to hear how European communities are taking control of their energy resources to the benefit of their local economies and individual pocketbooks. Canada needs its own "Energiewende."

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