

# Volcanoes and Sustainability

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The secret for harvesting from existence the greatest fruitfulness and the greatest enjoyment is – to live dangerously!

'Build your cities on the slopes of Vesuvius!'

Nietzsche's exclamation-strewn advice should encourage us all to migrate to Southwest Iceland, where nature's latest effusions once more illustrate the confounding character of the unexpected; carefully-laid plans and routine assumptions become redundant, and luck and ability to adapt become predominant.

The volcanic dust leaves me stranded in Seville, where I am forced to extend my visit, and continue to endure 22°C sunshine; the pervasive smell of orange blossoms; the ambience of the glories of Moorish and Christian architecture, which prove that two great cultures combined are more than the sum of their parts; the spirit and reality of Murillo and Velásquez, and – everywhere – people of beauty, enormous spirit and hospitality, wine and culinary offerings that compare with the best in the world, and the inevitable Irish pub – Flaherty's facing the cathedral – in the unlikely event that I'm overcome by homesickness or need to watch the latest Premiership entanglement. Given these admittedly difficult circumstances, I'm adapting remarkably well.

Volcanic eruptions are life-sustaining events. They extricate from the bowels of our planet the nutrients that are essential for life, and compensate for the secular tendency of modern agriculture to deplete the natural assets of the soil. People live around Vesuvius, not because Nietzsche advised them to, or because they are in love with risk, but because of the richness and productivity resulting from their local volcano, and our planet needs this periodic replenishment.

But as the local residents in Iceland and all the businesses and events which depend on mobility, including the funeral of President Lech Kaczynski, know, there are costs. In the past, such events have imposed enormous costs: thousands were killed in 1816 by the volcano in Tambora, Indonesia, which injected 50 cubic kilometres of ash into the atmosphere. And it exemplified also the interconnection between climate change and volcanoes. The ash blocks sunlight from reaching the Earth. The year 1816 was known in Europe and the US as 'the year without a summer', and people spoke of a 'six-year volcanic winter'.

And so, in addition to replenishing our store of nutrients, volcanoes give us a short respite from global warming. Nature will continue to make a mockery of our best-laid plans. But we are the first generation to add to nature's useful randomness by our egotistical challenge to the well-being of our special space in the universe, illustrated by our depletion of the ozone layer; acidification of far-distant lakes; the elimination of other species, and the warming of our planet. The Iceland volcano can be interpreted as God saying, 'I'm giving you humans a little more time to get your act together, and do what is right for you and especially for your children by stopping the overloading of the atmosphere. But...'

Here in Seville, there is a very exciting initiative to mobilise human endeavour to find new ways of sustaining our existence on earth. The Abengoa company ([www.abengoa.com](http://www.abengoa.com)) has developed the largest facility in Europe – the Solucar Platform – to mobilise the sun to produce electricity. The activity ranges from high-end research and development to operating relatively large-scale demonstration plants. Several pioneer demonstration facilities are in operation at the platform, including a high-temperature, solar-thermal tower

power plant, using glass to reflect and concentrate light and produce steam. The visual effects of this process are stunning and improvements evolve quickly that improve efficiency and reduce costs. This work is complemented by several high concentration photovoltaic facilities, a hydrogen from renewable energy demonstration plant, and – perhaps most important – a demonstration project on heat storage in molten salts.

The prospects of success are good. The company has a wide portfolio (bioenergy, construction, water supply and treatment), which complements its solar activity; it operates successfully in many parts of the world (the US, Asia, North Africa), which means it can access both technologies and markets there, and it has considerable support from city (Sevilla), regional (Andalucia) and national government and the European Union, although the subsidies for renewables in Spain are still less than those provided to the coal industry.

But most important of all is a commitment to innovation that is pervasive, supported in part by research funded by the Focus-Abengoa Foundation – which also supported the Forum on Energy and Climate Change which brought me here – and a Scientific and Research Collaboration with the University of Seville. And there is great pride and idealism behind it all. Jose Dominguez Abscal is the technical general secretary at Abengoa. He told me that they see it as a way for Spanish ingenuity generally, but especially in engineering, to make its mark and contribute to global solutions, and to provide the people of Spain with an innovation-led set of enterprises that will provide jobs and a sustainable future.

Volcanoes will continue to happen, but, to echo Kermit the Frog's lament about women – 'You can't live with them, and you can't live without them'.