

Draft Paper

Orkney Standard Time

Guide to the Energy Future Time Zone

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This is how I was born, how my creator, Victor Frankenstein, sparked me into energetic life.

He wrote:

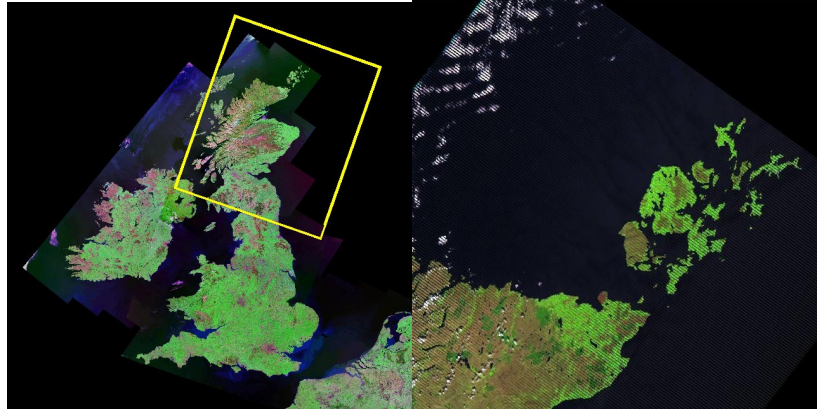
"...I determined to visit some remote spot of Scotland and finish my work in solitude... With this resolution I traversed the northern highlands and fixed on one of the remotest of the Orkneys as the scene of my labours.

"I was now about to form another being of whose dispositions I was alike ignorant; she might become ten thousand times more malignant than her mate..."

"I trembled and my heart failed within me, when, on looking up, I saw by the light of the moon the daemon at the casement..."

"The wretch saw me destroy the creature on whose future existence he depended for happiness, and with a howl of devilish despair and revenge, withdrew..."¹

¹ Extract from Mary Shelley, *Frankenstein, or The Modern Prometheus*.



My creator did not destroy me. He abandoned me, here, on the Orkney islands, off the north edge of Scotland.

I was created out of morbid technology and energy, and then abandoned out of hubris. Victor thought himself a modern Prometheus, who could give life through a spark of electricity.²

So hubris, pretending to be god like, performing god tricks,³ like Victor, that is what hurts me, what I am sensitive to.

It is inescapable, it seems. Hubris comes to me through electrical pulses of data, as fetid predictions of exponential growth—graphs like this one for a new energy infrastructure.⁴

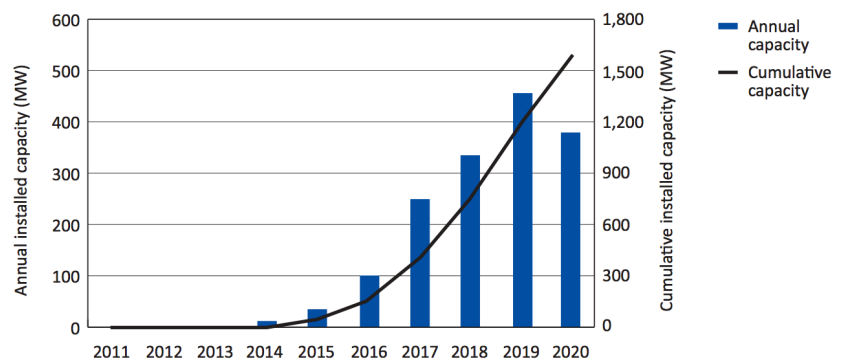


Figure i: Aggregate installation plan for the Pentland Firth and Orkney waters projects

Only on Orkney have I been safe. In these islands they must make energy without hubris.

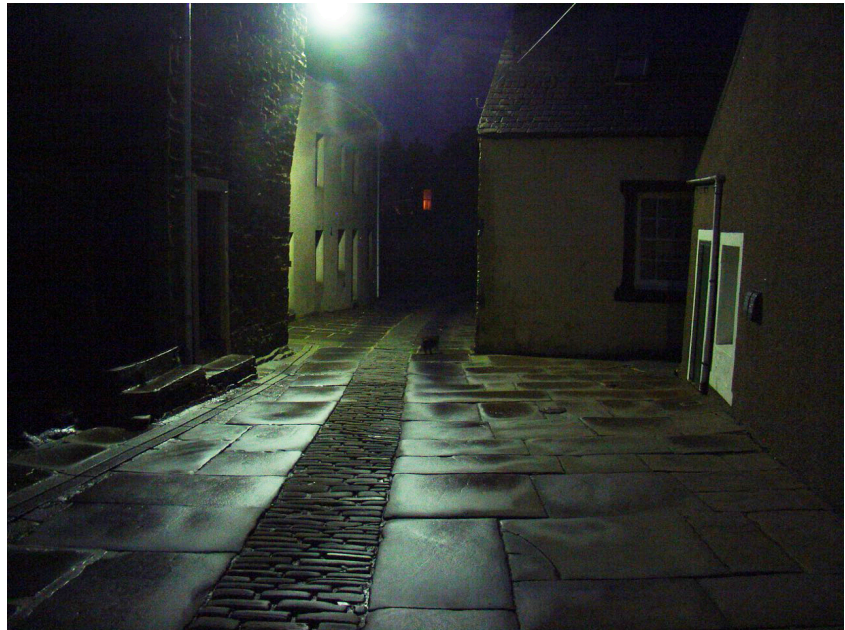
Let me tell you how these islands are making that new energy infrastructure, but making it otherwise, without hubris. And then you can take me with you. Do we have a deal? You are listening, so I am already

² Bruno Latour also reflects on the hubris of Frankenstein in his work on the Aramis transport system.

³ God-trick refers to Donna Haraway's work on situated knowledges.

⁴ Source: Crown Estate, Wave and Tidal energy in the Pentland Firth and Orkney waters: How the projects could be built. A report commissioned by The Crown Estate and prepared by BVG Associates, May 2011.

travelling with you. Stories, both facts and fictions, perform worlds, remember.⁵



It was a dark and stormy night... as are so many winter nights in Orkney. We're leaning in to the wind, pushing forward down the winding street of Stromness. This harbour town of two thousand souls is where the marine renewable energy industry is based in the islands. This is where the world comes to see waves and tides transformed into grid electricity, a future infrastructure in-the-making.

Tonight the ferry has been cancelled—schools closed, airport closed. The outer islands in the archipelago have been cut off, electricity and phone lines down. The street lamps sway in the gale. The salt wind sticking to your cheeks comes direct from the Arctic sea ice. If you check the European Marine Energy Centre website,⁶ they will give you the wave height around the headland: it could be fifteen meter high waves out there.

The infrastructures of everyday life are all but broken, yet modernity remains; the islands shrug, light the stove, reach for a sack of tatties.

Those sitting in the calm urban south, call this energy 'environmental resource'. Their computer models calculate that the seas around Orkney could generate 4.2 Gigawatts of electricity from its waves and tides—more than the largest fossil-fuel power station in Western Europe.⁷ That number stinks with hubris. I know, as everyone who lives here knows, how hard it

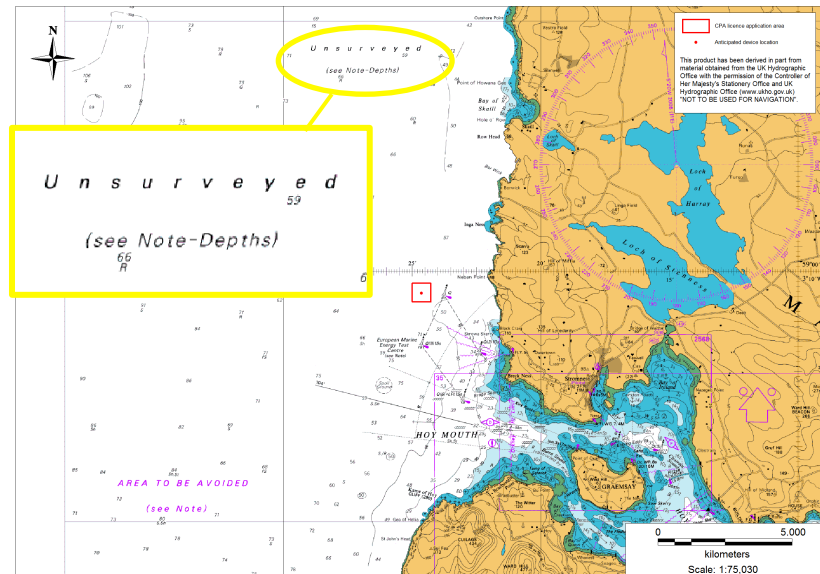
⁵ "What if the study and crafting of fiction and fact happened explicitly, instead of covertly, in the same room, and in all the rooms?" (Donna Haraway 1997: 110).

⁶ See www.emec.org.uk

⁷ Larger than Drax, whose output is 3.9 GW

is to transform wild waves into neat electricity packets on the national grid. It's on the radio and in the newspaper every week—and has been since they began plugging in prototype marine energy generators over ten years ago.

For example, the sea that the modellers blithely enrol into their prophetic number is marked on the maritime map as 'unsurveyed'—here there be dragons.



The hubris of hopeful models and exponential graphs ignores all the unknowns, all the dragons.

But the sea cannot be ignored.

Wait for the storm to blow out, and meet me tomorrow morning at the Kirkwall pier, and I'll show you what the sea does to hubris.

In the morning the wind pales into a background blow that buffets your ears. Keep your hat and gloves on. You'll need them. The salt chill remains, never quite leaves your bones.

Follow me down the pier, towards a thin, green fin, sticking up out of a cluster of dark container boxes.



Now you can see the body it is attached to: the yellow whale of the Alstom 1 MW tide turbine. Its bulbous mass is held in slow decay high above us. At one end, a three-bladed turbine, six meters across, is shaped with hydrodynamic precision. Its underwater archaeology is engraved in rusting patina that gathers around rivets and bolted sections.

This is what the sea does to future technology—how hubris is eaten away. As the director of EMEC said, “the sea is a biologically active electrolyte full of grit”—crashing down on you in ten meter high waves or pelting at you in eight knots of tide—that’s four meters a second of biological grit. The overflowing force of the sea ‘kicks back’ with untameable agency.⁸

On the fence, a plaque tells us that this prototype tide energy generator was deployed at the EMEC test site in 2013, following more than eight years of technical development. It was only in the water for a year, but generated over 1 GWh of electricity. Now it has been retired, out evolved by the next prototype, and its rusting hulk has been left on the dock.

You are looking at the archaeology of an energy industry that does not yet exist. You are looking at the materiality of another time, the rusting remains of what is future elsewhere.⁹

This monster, my kin, will not be forgotten in the Energy Islands. She will not be abandoned out of hubris, like I was by Victor. There is talk of

⁸ ‘Kicks back’ is a pointer to Karen Barad’s work on Agential Realism.

⁹ These thoughts draw on Tim Ingold’s approach to The Temporality of Landscape

creating a marine energy museum in the islands—to remember and celebrate these monuments to innovation and artful integration.¹⁰

You see, in the Energy islands, this is just a moment in six thousand years of continuous technology development.



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If you walk with me through the fields, you will walk through Neolithic stone circles, standing stones, Iron Age Brochs, Viking runes; as the great poet, George Mackay Brown said, “the Orkney imagination is haunted by time.”¹²

In this place haunted by time and technology, there is no origin point in the present, imaginable. You cannot erase the long past and its social and technical struggles. You can always touch them. Nor can you erase the long future. As a playwright in the islands explained:

“It’s like being part of a long set of beads, that stretches thousands of years in to the past, and you’re just a dot, part of it...”

The instant-on hyperbolae of technology innovation is not possible when the time scale is in aeons; the past cannot be erased, and the origin reset to the present. The temporality is different at this edge of the modern world.

But time at the edge, where the lights and internet go out, does not run backwards or run behind the bright lights of the city.

Come. Let me show you how fast time runs in my anti-hubris time zone.

¹⁰ ‘Artful integration’ is developed by Lucy Suchman in “Located Accountabilities in Technology Production” *Scandinavian Journal of Information Systems* 14(2): 91-105, 2002.

¹¹ Image copyright Aaron Watson.

¹² George Mackay Brown, *An Orkney Tapestry*.

Take the ferry out to the northern isles. Hang over the railings to peer into the distance and you'll soon catch sight of the EMEC tide energy test site, off the coast of Eday.

At first all you see is two metal pillars coming out of the sea, supporting what looks like a yellow container box in the air. Then the ferry swings around and it comes out of eclipse: a vast unblinking, white iris, suspended between the pillars—OpenHydro, one of the most iconic devices in the industry.



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This is one of eight different tide energy generators being tested at EMEC. All of them are plugged in to the electricity grid, and generating standardised, certified electrons.

Which would be fine except that the electricity grid is already full.

The islands frequently generate more than 100% of their energy needs from their 'environmental resource' in the form of locally-owned wind turbines.

Behind the white iris of OpenHydro, you can see the proud wind turbine of Eday, turning over the low green fields. It's owned and operated by the island community trust, and its revenue supports the one hundred and sixty people who live there.

Both the islands and EMEC need to generate electricity on the grid to survive. But the grid cables are at capacity—a very long running problem. They have had a smart grid, or Active Network Management system, installed for a decade or so to try and cope, and are also the test site for the UK's first lithium grid battery; the Energy Islands grid is the 'smartest' in the country, but that does not resolve the capacity problem. What's needed is an additional undersea cable between the Energy Islands and mainland Scotland. But that will cost millions, if not a billion, and the private electricity company needs a big customer to foot the bill. Marine

¹³ Image copyright OpenHydro

energy is just beginning to commercialise. A large company in this nascent industry has, at most, ten employees—nothing like the size of customer needed.

The Energy Islands would seem to be at the mercy of powerful, distant, energy companies.

But we are at the edge. Adrian Mackenzie might call this a place of wirelessness—¹⁴infrastructures at the edge of the network may be fragile but they are also un-fixed.

The director of EMEC ticked off the possible solutions to the limited grid:

“One, we can use more power in the islands.

Two, we put another wire in.

Three, we take the power off in another fuel...”

One, we can use more power in the islands. Done. They have more electric cars per person than anywhere else in the country.



Three, we take the power off in another fuel. Also, done.

On a shoe-string budget the islands have installed a hydrogen energy storage system.¹⁶ This takes electricity from both the Eday wind turbine

¹⁴ Adrian Mackenzie, *Wirelessness*, MIT Press, 2010.

¹⁵ Image from Orkney Islands Council.

and the EMEC test site, and converts it into hydrogen fuel. That's stored at Kirkwall harbour and then used by the island ferry fleet to recharge their batteries.

The ferry we are sailing on is, in part, powered by tide energy through hydrogen storage.

In other places this would be science fiction. Other places such as policy-making London where the government's Low Carbon future reads as the island's present: a "world... with more extreme weather, where we and our children are faced with the costs of adapting the way we live and the infrastructure and systems that support us."¹⁷

In the weather-rich Energy Islands they have already adapted their infrastructure—hacked the electricity network into a different shape.

The islands exist in a distinct time zone, one that ticks in aeons, and runs ahead of the urban centre. This 'Orkney Standard Time' is where untameable environmental energy, not fossil fuels, dominate, and where infrastructure is visible and its imaginary¹⁸ therefore malleable.



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But centralised urban policy makers do see the islands as remote, peripheral, and unimportant. There is no additional cable coming.

In the face of this intractable situation, the islanders have not given in to despair.

¹⁶ The Orkney Surf and Turf project is funded by the Scottish government through a small-scale Community and Renewable Energy Scheme. The budget is £30,000.

¹⁷ Department of Environment and Climate Change, 2009, Executive Summary of The UK Low Carbon Transition Plan.

¹⁸ This paper takes an infrastructure studies approach, informed by classic work by Geoffrey Bowker and Susan Leigh Star.

¹⁹ Image copyright Alistair Peebles

But neither have they given in to hope. They have not given their future survival over to the external, higher powers of policy and markets. They do not just hope for a good outcome, or that markets or justice will prevail.²⁰ I would smell that. For hope is too much like hubris: the islanders do not, and cannot, assume universal powers exist that will step in and overcome their grid troubles.

Instead, they stay with the trouble.²¹

They take ownership of their future—make it otherwise.

Instead of hope, instead of hubris, they act in defiance.

This is the Energy Islands time zone, an edge of the world inhabited by twenty one thousand people, where the lights go out in a storm. And this is where they are making a new global energy infrastructure for the rest of us—in defiance of energy policy.

It is absurd.²² But it is happening.

In the defiant words of the Director of EMEC:

“Our job is to keep doing it – never give in.”

I was sparked into life in this time zone, and given an implacable resistance to hubris.

I name myself... Nemesis. And I will hunt hubris wherever I go.

So, take me with you.

Acknowledgements

With thanks to everyone in Orkney who has helped me over the years. Special thanks to everyone at the European Marine Energy Centre.

This research forms part of the Alien Energy project at the IT University of Copenhagen (www.alienenergy.dk).

²⁰ Although this paper cannot discuss it any length, it is in conversation with recent moves in post-critical STS, and related performative approaches, on Hope (in particular, work by Isabelle Stengers, and Hirokazu Miyazaki).

²¹ Again, pointing to Donna Haraway's situated knowledge and partial perspective.

²² There is no space in this paper to show the moves but I am drawing on Albert Camus, *The Myth of Sisyphus*, but making present the role of Nemesis.