An Energy Utility Perspective and Approach to Airborne Wind
Renewable energy is one of the three key pillars in E.ONs strategy

Global trends like sustainability and climate protection, digitalization and technological innovation are altering the energy landscape. At the same time our customers’ energy needs are changing.

A new energy world – decentralized, green, and interconnected – is emerging. Our core businesses reflect the key energy trends:

- **The global growth of renewables**
- **The transformation of yesterday’s power lines into tomorrow’s smart energy networks**
- **The increasing demand for innovative customer solutions**
Great cost reduction has been achieved for conventional renewable energy...
Great cost reduction has been achieved for conventional renewable energy, AWE has the potential to make the next jump in the curve.
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“The only place SUCCESS comes before WORK is in the dictionary”

- Vince Lombardi
E.ON in the AWE industry

- E.ON, together with Shell and Schlumberger invested approx. 6M€ in Kite Power Systems
- E.ON committed to invest in development, and if successful, construction and operation of a demonstration site in County Mayo in Ireland
- Entering into a collaboration agreement with Ampyx Power as a first user of the site
- Working together with promising technology developers, research institutes, authorities and legislators
- Attended AWEC 2013, 2015, 2017


https://www.irishtimes.com/business/innovation/energy-generating-drones-get-clearance-for-3m-take-off-in-mayo-1.3045271
Test Sites scope

**Onshore**

Purpose;
- Testing and verification of full system behavior
- Power prediction
- Array/wake effects
- Assessment of O&M requirements
- Technology development

Requirements;
- Permits, O&M facilities, Grid connection
- Large, flat area without obstacles
- Restricted airspace ~1 km dome over and around the site

**Offshore, conventional foundations**

Purpose;
- Testing and verification of full system behavior in offshore environment
- Assessment of regulatory requirements
- Assessment of offshore specific O&M Requirements
- Permits, O&M facilities, Grid connection
- Fixed sea bed foundations
- Close to shore
- Restricted airspace ~1 km dome over and around the site

**Offshore, floating foundations**

Purpose;
- Testing and verification of full system behavior in offshore environment
- Testing and verification of floating foundation concept + airborne wind
- Floating foundation specific O&M (such as towing full system to shore, ..)

Requirements;
- Permits, O&M facilities, Grid connection
- >25m water depth
- Close to shore
- Restricted airspace ~1 km dome over and around the site
There are three stages of the AWE assessment which is designed for different purposes:

**Early contact**
- Governance & company
- History & way forward
  - Technical concept
- Targeted commercialization
- Opportunities to working together

**Test site collaboration**
- HSE
- Electrical system
- General system design
- Main components
- If applicable; Offshore specifics

**Commercialization**
- HSE
- Main components
- Failure rates
- O&M concept
- Supply chain
- Offshore specifics

- Days
- Weeks
- Months
In our assessment we consider three different topics:

- Governance
- Commercial
- Technical
Stage 1: Early Contact

- TRL
- Utility Focus
- Working Together
Stage 1: Early Contact
Stage 2: Test site collaboration

Technical and Commercial aspects are “Exciting” (and important!)

But Governance is also vital!

- Approach to HSE
- Standards and certification
- Company structure
- Knowing how to work together
Stage 3: Commercialization

We look forward to seeing kites in our skies.

But there are many obstacles on the road to success.

To take the right direction, AWE companies need to plan the route to commercialization.
The AWE approval assessment consists of 26 different modules

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Conclusions

E.ON see a great potential in AWE

Working with AWE companies – we hope to find the way to success

We can only do this working together

Thank you for listening