

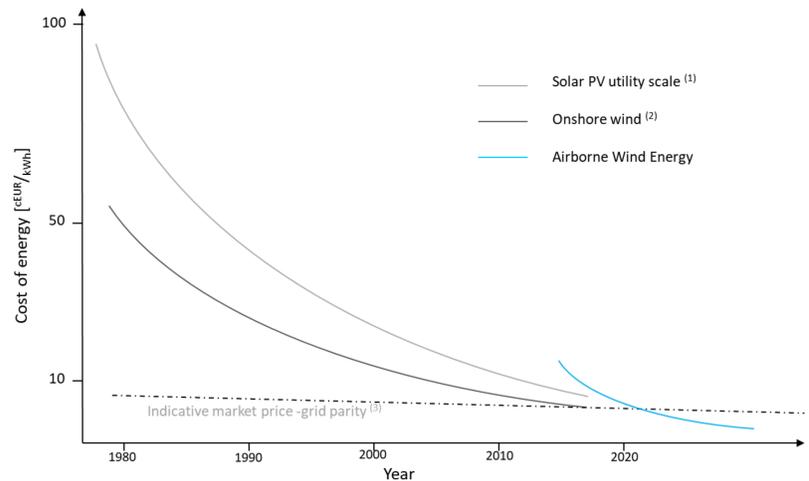
POLICY RECOMANDATIONS

Key advantages of Airborne Wind Energy:

- The geographical market is very large due to the availability of wind at high altitudes
- Potential to become price competitive

The history of new energy technologies introductions, provides empirical evidence of which strategies works and which fails. Studying the top 10 wind turbine suppliers, revile that all turbine models has been a part of a gradually increase in scale from origin designs <300 kW in the 80s and early 90s. Attempts to jump directly to large scale consequently fails. Lack of the higher subsidies offered in early phase of introduction, makes later introduction more challenging preventing new companies entering with their own designs.

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Indications that a technology is maturing:

- Attracted volume of investments
- WACC (Weighted Average Cost of Capital)
- Market share in the energy mix

Maturing factors:

- Accumulated operational experience, by each turbine supplier individually. Can be forwarder to new models in small scaling steps

Factors helping to introduce an immature technology:

- Political and private incentives
- Niche markets with lack of alternatives
- Small scale/low volume

Introduction of energy technologies are political driven, not market driven.

Support a smart scaling strategy

Energy technologies are important for the society that it receives political attention in all aspects. Historically **AWE systems can expect receive public support through specific incentive schemes** due to the large benefits it will have to the society. The aim for the public incentives will then be to grow the industry which implies the introduction to be financially profitable for the stakeholders.

A strategy could be to scale up directly up to a model which business case can compete with mature technology. However, historically, the large volume of investment is not available due to the lack of operational experience. The result normally becomes that the technology is not capable to attract necessary investments to complete its maturing process.

Small scale plants do have longer path of evolvment before becoming relevant. The volume of investment needed in small scale to mature the technology will not have a high political risk, consider it is a energy technology introduction. However the volume will increase by increasing the scale.

A technology specific public funding scheme should be established in order to mature the technology from an introduction scale, to a scale where the technology can be an likeworthy alternative with mature technology.

The benefits of the AWE technology will be that this phase of introduction will be **completed in shorter time** due to the technology inherent advantages compared to the technologies introduced earlier. Believing in the graph in the up right corner, a policy recommendation, on behalf of the industry, should be made as soon as possible.

Involve civil society in technology introduction

The history of introduction of new energy technologies has proven a model which works. The quadruple helix of innovation add the civil society to the more known triple helix of innovation.



BUSINESSES + AUTHORITIES + SCIENTIFIC INSTITUTIONS + **THE SOCIETY**

The civil society responsible for most of the rooftop installations, plays an obvious role in introduction of solar. But also in introduction of conventional wind power the civil society have also played a very important role. A good example is the introduction of wind power in Denmark.

By involving the civil society the following happens:

- **Social acceptance**, removing the edge of the “not in my backyard”(NIMBY) effect.
- **Political capital**, support among voters secure lasting incentives allowing the industry to get foothold

These two factors work together. If incentives fails to get social acceptance, the NIMBY effect will force the politicians to remove incentives before the industry get a foothold (USA, 1980s). On the other side, like in Denmark, great social acceptance makes it hard to take away the incentives. A feed-in tariff still are available in Denmark which let private investors be involved in distributed wind power capacity.

Involvement of the civil society should not be limited to distributed capacity. It is not their property that are important, it's their involvement by principle and financially.

Policy recommendation:

1. Subsidize introduction of AWE – give the value chain ability to evolve
2. Involve the civil society

This is a input from Kitemill AS. Kitemill are open for further discussions of policy recommendations.