



Ocean Energy – Investing in a new EU industry

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Atlantis - MeyGen

- 6MW project - Scotland
- 4 turbines – 2 manufacturers
- First power in 2016
- Turbines installed in 30 min
- Phase 2 under way
- Phase 3 = 74 MW fully consented
- Full project - 398MW









Update | 398MW MeyGen Project

The world's largest tidal stream project

Blades
Variable pitching blades to optimise yield and minimise structural load

Tidal turbines are fixed to the seabed either via a gravity base or fixed (drilled) pylons. They are connected to the grid via an armoured power export cable and are typically controlled via a SCADA system.

Rotor
18 to 20 metre rotor diameter tailored to the specifics of the site

Yaw System
Yaw System Rotates Nacelle to face tidal flow on each tide

Deploy-and-go Modules
Stab & Wet-mate connection system allows rapid and simple turbine deployment and recovery.

Rated turbine capacity of 1.5MW
Modular industrialised sub systems for easy maintenance and high quality
Multiple levels of redundancy and comprehensive monitoring system maximise offshore reliability
25 year life with low maintenance 6 year service intervals

Tocado Tidal plant at Delta Works The Netherlands

1.25MW installed end 2015, powers 1.000 Dutch households

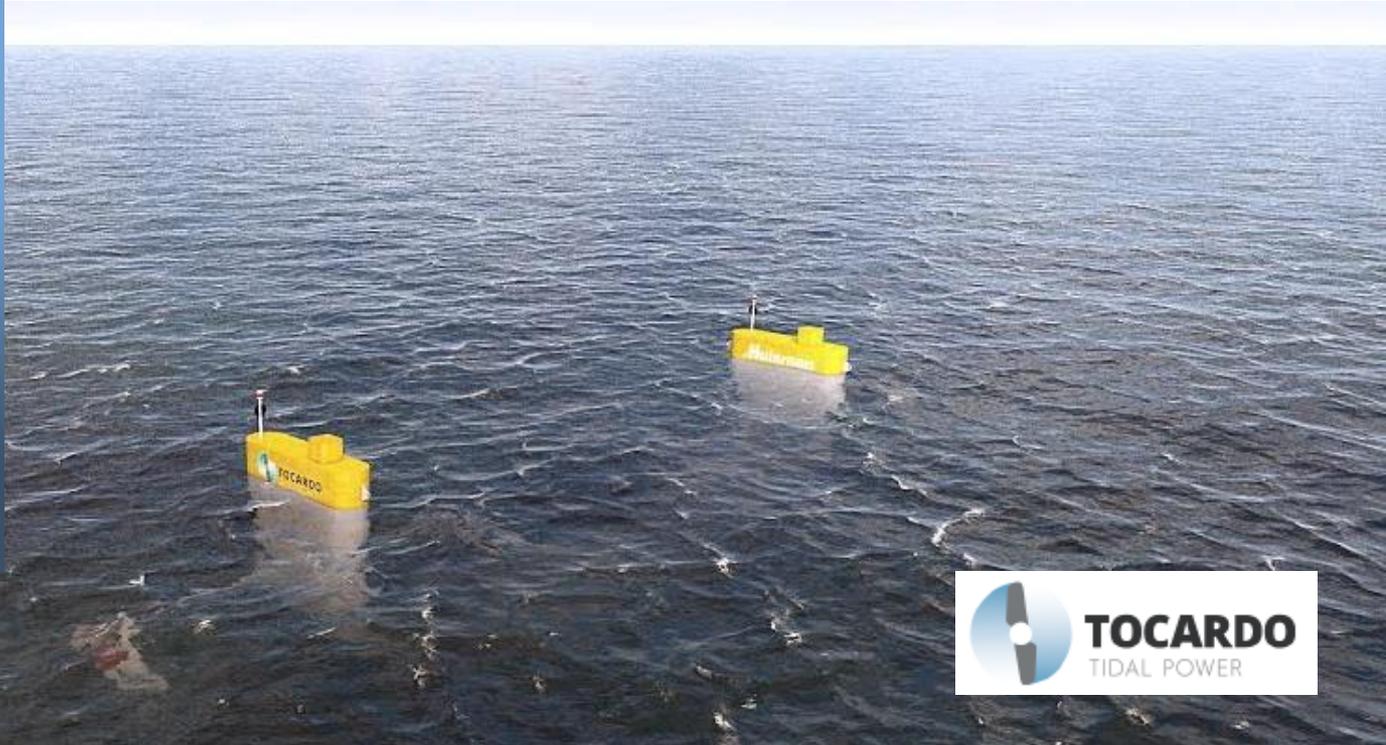
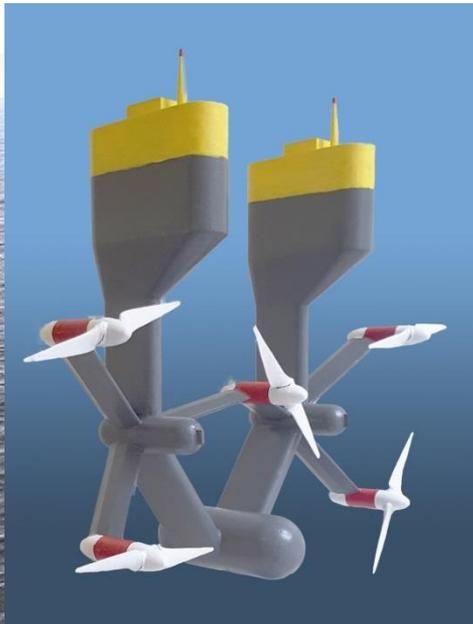
Permits for 2nd sluice gate, €10.5m - further roll-out to 30 of 64 sluice gates



Tocado/Schottel project Isle of Wight - England



- Fully consented 30MW project,
- Project development by Perpetuus Tidal Energy Centre (PTEC)
- Tocardo to install 20MW over 16 UFS platforms, Schottel Hydro 10MW
- €150mio project, commercial against CfD of € 305/MWh

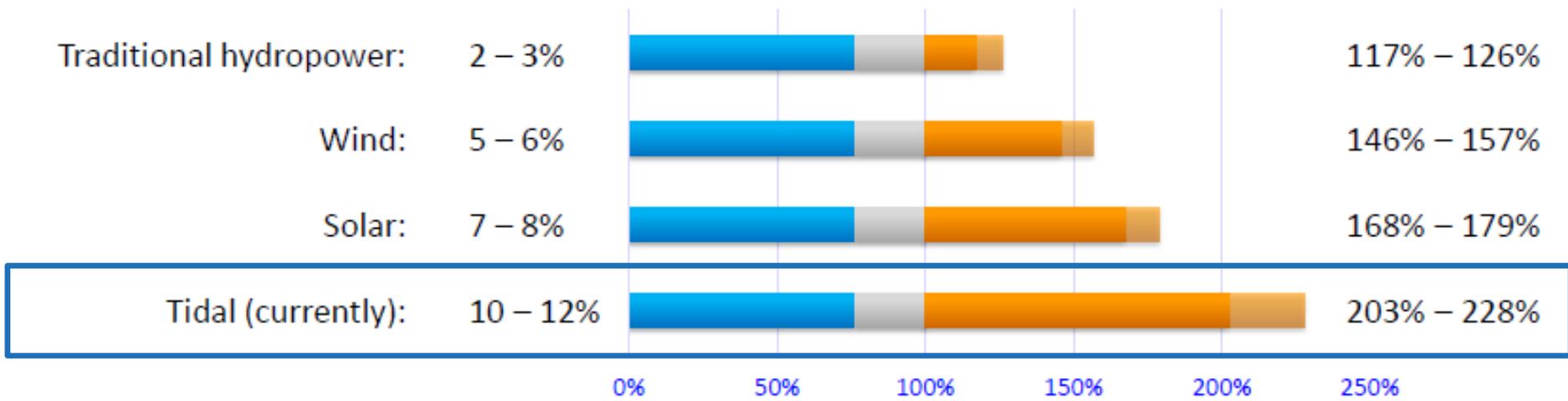


Cost of capital > CAPEX + OPEX

Lowering LCOE = lowering cost of capital



Cost ratios (assuming CAPEX + OPEX = 100%)



➔ Tidal: CoC = major cost component!



Principles for Innovation Fund



- NER300 was « free money » – so should the Innovation Fund
 - Innovation = risks = lack of cheap capital => market failure
 - LCOE is high because cost of capital is high
 - Grants / revenue support remain absolutely needed
 - Lessons from NER300 – upfront and flexible support

- Financial instruments will only help few projects
 - Require repayment – thus adequate revenue
 - Only work where revenue support *OR* a high enough electricity price are available
 - Should be provided at zero/low cost of capital
 - China commercialised wind energy with zero rate capital...



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