

Heikki Paakkinen September 10th 2018

CCPS Meeting, Wave Energy

Wello
DIRECT CONVERSION



Wello Company Background



- Wello provides **technology know-how for wave energy conversion**
- Company is funded by State of Finland, European Union, Finnish equity funds and European power utility Fortum
- Wello was established 2008; the know-how and excellence states back to -70's
- Wello is co-operating with strong partners such as Chinese CIMC RAFFLES OEI
- Wello 拥有独特的**波浪能转化技术**
- 本公司的成立基于芬兰政府，欧盟，芬兰风投基金和欧洲电力公司Fortum的共同支持与资助。
- Wello 成立于2008; 核心员工为拥有出色技术能力与杰出表现的70后
- Wello正在与中集来福士海工研究院进行合作



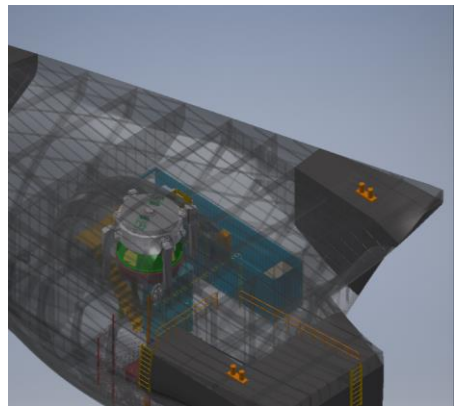
Wave Energy

- Wave energy is a viable solution to the constantly growing **need for clean, renewable energy**
- Wave energy = cost savings
- Wave energy = clean air and clean oceans
- Wave energy = endless source of energy
- Wello's Penguin is **proven and full scale tested technology** for converting ocean waves into electricity
- 波浪能是**清洁能源**，可以满足不断增长的绿色能源需求
- 波浪能 = 节省能源成本
- 波浪能= 清洁的空气与海洋
- 波浪能= 无限的能量源
- Wello的**企鹅号波浪能转换技术**与全尺寸型号产品经过了全面的测试，可以高效的将**波浪能转化为电能**。



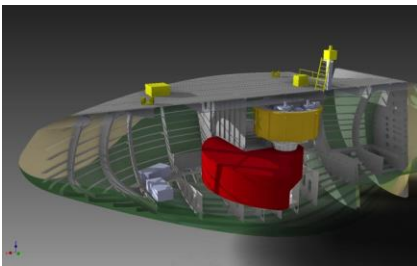
Penguin Wave Energy Converter

- Wello's wave energy converter is called the Penguin
- Penguin has proven the superior technology
- Penguin has survived 18m waves
- Penguin is a floating WEC, -easy installation
- Penguin has all components inside hull, -safe and robust
- Penguin is based on accelerations
- Penguin can be controlled remote
- Power electronics based on wind turbine components. All components needed are already available in China
- Wello的波浪能转换器产品成为企鹅号。
- 企鹅号已经在实际测试中证明了其技术的高效性与可靠性。
- 企鹅号可在18米浪高下生存。
- 企鹅号为封闭式浮体设计，非常易于部署与维护，极大的节省了成本。
- 企鹅号的所有部件封闭于内部，安全且坚固，工作寿命极长。
- 企鹅号转化技术基于加速度原理。
- 企鹅号使用先进的软件与网络技术进行远程监视与管理。
- 其发电机取自于中国生产的风力涡轮发电机。



Penguin Applications

- Penguin can be connected directly to national grid
- Penguin suits to micro grids
- Penguin can provide power to resorts or remote communities
- Penguin can house an energy storage
- Penguin can act as communications, radar and antenna base
- Penguin can act as charging station



- 企鹅号可直接并入电网，并且适配微电网。
- 企鹅号可为旅游或偏远海岛提供电力。
- 企鹅号可以同时加装储能设备。同时作为能源采集与储备设施。
- 企鹅号可以作为紧急逃生与避难设备。
- 企鹅号可以作为通信，远海探测基地。

Wello and China



Know-how

- Wello provides Know-how, IPR and software for devices
- Construction of converters at Chinese shipyards
- Two projects under negotiation with Chinese CIMC RAFFLES OEI
- Joint research and demo project in China developing
- China has an enormous , un-utilized energy potential in ocean waves
- Wello provides always the latest cutting edge technology
- Wello is open for co-operation and joint venture

技术储备

- Wello 拥有设备的专有技术，知识产权与软件技术。
- 企鹅号的建造基地可以设立于中国
- 目前正与中集来福士海工研究院进行两个项目的合作，联合。研发项目与示范性工程合作项目
- 波浪能在中国有着巨大的市场潜力
- Wello 将持续提供最新的尖端转化技术
- Wello欢迎各种类型的合作方式



Finances

Financial Figures

- LCOE, the levelized cost of energy produced utilizing Wello's technology now is from € 50 to € 150 depending on site. In coming years it will go down to **€ 30...€ 40/MWh**
- Wave energy converter investment cost is approximately € 2M/MW nominal power. With efficient manufacturing in China CAPEX can be brought down to less than € 1M/MW

电力成本指标

- LCOE, 按照目前Wello的技术水平可以将成本控制在50欧元至150欧元每兆瓦时（根据当地实际海况变化）在未来几年，我们将降低至**30欧元至40欧元每兆瓦时**。
- 波浪能转换器的投资成本约为2百万欧元每兆瓦。未来凭借中国制造的高效性与成本控制，CAPEX可降低至1百万欧元以下每兆瓦。



Future Potential

- Wave energy will be an exponentially growing source of energy and business in near future
- China has a good chance to take it's place as the technology leader on this branch. - **The momentum is now**
- Immense employment and income possibilities
- Reduction in cost of energy
- 未来波浪能将具有指数级增长的商业潜力。
- 中国有机会把握这个契机来主导未来全球市场-**就是现在**。
- 拉动就业与新能源市场需求。
- 降低污染与清洁能源成本。



Company Values

Nature first
Simplicity
Professionalism

