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Osmogen - Continuous Flow Osmotic Power Generation

Summary Feasibility Sheet

‘The global community needs power and fresh water – The Osmogen project aims to develop modules and systems to provide both’ David Edgecumbe

In an osmotic power system fresh water (from estuary, river or rain) and sea water are fed into separate chambers which are separated by a patent commercial osmotic membrane. Osmotic power stations can be sited anywhere where freshwater flows out to the sea which makes the Severn estuary an ideal area for the first UK pilot site for a larger test system.

Global potential is thought to be more than 1700TWh/yr. Norway for instance is considered to be able to produce about 12 TWh (12×10^{12} Wh) per year. It’s estimated that a power plant the size of Wembly could supply 25,000 homes. Such power plants can also be built as unobtrusive underground energy systems.

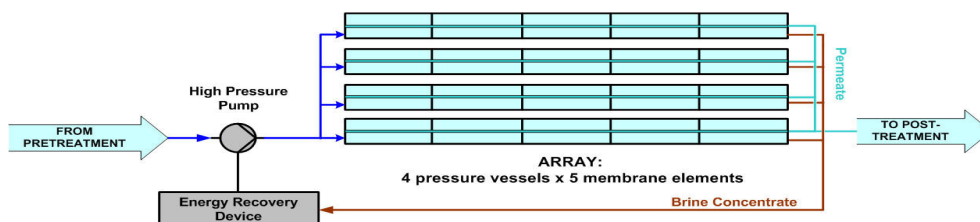
Another attractive feature of osmotic power systems is their simplicity and low noise pollution. This can be of particular interest to the military who could be interested in portable (mobile) ‘silent’ power modules.

Aims and Objectives

To design and build Inergy optimised osmotic power modules which can be used individually or collectively to produce electrical power. The predominant issue and focus for research beyond system design is the Inergy cell structure, geometry and material nature of the ‘partition membrane’ separating the sea water from the fresh water. This partition being a patented optimised selectively permeable Inergy membrane. For optimisation of osmotic power potential the proposal would be to develop matrices of Inergy cells which would increase the osmotic potential through increased surface exposure.

Other applications of osmotic power systems

- Integrated Osmotic Power and Desalination Plants (Can be coupled to Inergy systems)



- Commercial production of salt

Milestones (Target setting)

6 months - End of review on computation, numerical and software systems analysis. First phase Inergy Power Module modelled and constructed.

12 months – Small scale models designed and constructed with patent membranes simulated with available materials using proposed Inergy cell design permutations

18 months – Trialling on coastal field sites with small scale models

36 months – Documentation of research findings and thesis write up for Osmogen Systems power production

Technical Feasibility and Commercial Potential

1. Commercial production of electricity

Statkraft are currently producing power at about 3 Watts/m² of membrane, with 5 Watts/m² seen as the break-even point — A 'blue energy' plant could be built wherever salt water and fresh water meet, "from the fjords of Norway to Asia's estuaries."

It is intended that each portable (mobile) Inergy module will be capable of producing 1 kWatt of power. Each will require a membrane area of 200m². This is achievable with the unique Inergy design proposals, each module containing three sets of Inergy cells encapsulating 67m² of active osmotic membrane. At 1 kW per module each module would produce 8.76 MWatth/year.

Assuming a conservative 'feed in tariff' of 10p per kWatth each module could produce £876/year. An achievable matrix system of 1000 (25 X40) Inergy modules could produce £876,000/year.

A bank of 7 Inergy Systems could produce £6,132,000/year for electricity produced.

2. Sale of modules and Systems

For modules:

If each kWatt module marketed @ £1000 (£1/Watt)

Production of 10 modules /day = 50 modules / 5 day week = £50,000/week

10 production staff @ £500/ week =£5,000/week

Materials for 50 modules estimated = £ 15000/week

Site Utility & Other costs = £5000/week

Potential profits:

Modules £50,000 - Costs £25,000 / week = £25,000 / week profit = £1,250,000/year (If 50 working weeks / year)

For Systems:

This could be multiples of this as global demand escalates

3. Sale of Expertise and Consultation

Subject to project development

4. Sale of System Installation

Subject to agreed margins

Technical Considerations

The proposed design is intended to exceed any current model or system currently in place in terms of aesthetic appearance, power to dynamic fluid volume ratio kW/m^3 and effective power output in kW/MW .