Tidal power generation, Hayle Cornwall: Utilising redundant infrastructure to enhance commercial viability
Project aims and objectives

Aims

- To describe tidal phenomenon
- Qualify and quantify market requirement for Tidal Electric energy.
- Establish that proven tidal electric technology exists that could be applied to the chosen site.
- To assess the business case associated with other renewable energy technologies and utilise this data to analysis the commercial potential of a tidal electric scheme.
- To give an overview of environmental impacts associated with a tidal electric development during construction and operation.

Objectives

- To identify potential energy within both Copperhouse and Carnsew Pools.
- To apply the business case of established renewable technologies to the development.
- To specify an operating system and the associated technological specification.
- To demonstrate integration into local area plan and UK government energy policy.
- To assess the sustainability of the project in terms of carbon reduction potential.
Hayle Estuary
an Aerial overview

Required navigable channel

Former coal fired power station location with 132kVA national grid connection

Carnsew pool and proposed turbine house position

Copperhouse pool and proposed turbine house position
Carnsew pool

Currently
• Area 14,600 square metres
• Volume 338,922 cubic metres

Recommendations
• Dredge current area to a fill volume of 750,00 cubic metres due to excessive silting.
• Pre-construction turbine house containing 1.5 MW Turbo-Generator
• Double effect pump augmented operating regime.
• Annual Energy production 2.9 GWh
• Lifecycle operating saving of 186.9 Kilo tonnes of carbon (120 years)
Copperhouse pool

Currently
- Area 19,500 square metres
- Volume 287,125 cubic metres

Recommendations
- Dredge current area to a fill volume of 750,000 cubic metres due to excessive silting.

- Pre-constructed turbine house containing 1.5 MW Turbo – Generator
- Double effect pump augmented operating regime.

- Annual Energy production 2.9 GWh

- Lifecycle operating saving of 186.9 Kilo tonnes of carbon (120 Years)
Tidal Range for Hayle Cornwall
Conclusions

It is the UK government has signed up to an EU target to obtain 20% of all energy from renewable sources by 2012 and “close to” 60% by 2050. Within the UK no existing tidal range developments have been operated to date, major existing worldwide developments are limited to less than ten in number. The opportunity exists to produce a low cost operational tidal range project that can both be commercially successful; be utilised as an innovation and demonstration tool for the larger proposed schemes like the Severn barrage to align with the EU targets.

The Hayle Harbour Power Generation scheme fits within the Hayle Area Plan and fulfils an objective of Harbour owners ING Real Estate with the recommencement of sluicing to establish and maintain a navigable water way. Calculations for production and carbon savings have been produced for a dredged maximum pools potential. Cost for producing the potential of energy of the site has been quantified in terms of current renewable energy costs between £27 and 54 million for the 120 year lifecycle of the project.