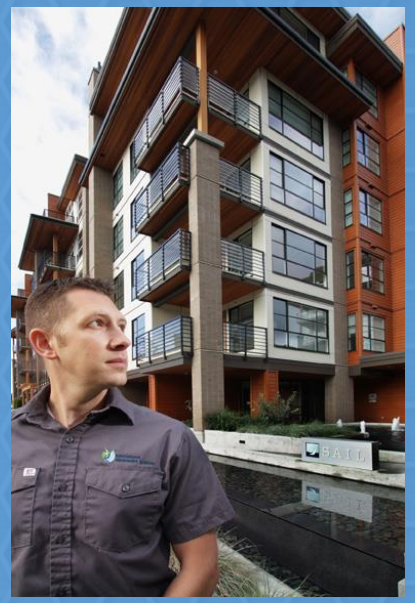


International Wastewater Systems

SHARC ENERGY SYSTEMS

CSE: IWS & Börse Frankfurt: IWI

FEB - 2016

Agenda

- Project Background
- Relationships and Contracts
- Economics

https://youtu.be/DATn4kjzxEo

- Technical
- Marketing – Project Launch and Social Benefits
- Opportunity & Challenges

Project Background

- SHARC Energy Systems – Business launched June 2014.
- Introduced to college by Scottish Water in July 2014
- College GHG emissions challenge ongoing following
  - Energy efficiency retrofit
  - Solar installation
  - Looking for a renewable heat source
- Competitor – Biomass boilers
- SHARC Feasibility completed August 2014 demonstrated
  - Similar GHG savings to biomass
  - Saved on fuel delivery
  - Stabilised heat price
  - No up front capital
- Commenced contract negotiations – November 2014
- Started works June 2015.

Project Relationships and Contracts

- SPV established (SHARC Caledonia)
  - 60/40 JV between GIB/Equitix and SHARC
- JV to Borders College – Ultimate client and consumer of heat
  - 20 year Heat Purchase agreement (aligned to UK Government RHI timeline).
  - License to occupy - allowing SHARC asset to occupy college land for 20 years.
- JV to Scottish Water – Provider of resource – and lead generator
  - Use of Sewer contract
  - Carries a “Technical payment” - related to capex value (commission)
  - Ongoing annual rental (Gate fee) – related to energy generated PA
- JV to SHARC
  - Shareholder agreement to govern management of SPV
  - Installation contract to cover project
  - O&M contract to cover operation of system for 20 years
- Suit of contracts can be rolled out to any project going forward

Project Drivers

- UK Demonstrator (SHARC)
- Carbon Savings
  - 150 tons of Carbon saved per year (Brown Electricity Calculation)
- Building Comfort levels - 1.8GWh's of heat demand per year
  - 95% expected to be delivered by SHARC
  - Supplemental Gas supply to top up in extreme cold
  - Existing Boilers system retained for resilience
- Economics
  - System eligible for RHI
  - Heat sales to college fixed at below gas for 1st 5 years
  - Heat from SHARC at 400% v Gas boiler 85%
- Capex – £950,000.00 covered by SHARC
- O&M costs – covered by SHARC – include
  - Maintenance
  - Electricity
  - SW gate fee

International Wastewater Systems

BORDERS COLLEGE

SHARC ENERGY SYSTEMS

Project Technical

- Pre-contract design
  - Civil Engineering
  - Mechanical & Energy engineering
  - Due Diligence from Equitix TA (WSP)
- Onsite construction of
  - Energy Centre
  - Sewer Interface and Pumping station install
  - 500m of Flow return heat network, connecting 5 plantrooms
  - Plant room adaptation of college heat distribution – connection to LLH
- Off site production of equipment for install at site
  - SHARC skid and PHX
  - Heat Pumps
  - Controls – software development
  - Pump sets
- Post contract commissioning

International Wastewater Systems

SHARC ENERGY SYSTEMS

SHARC wet well incorporating a penstock into main sewer

The Borders project utilizes the adjacent town Sewer for supply

Construction of the sewer interface

International Wastewater Systems

SHARC ENERGY SYSTEMS

500m low temperature heat network installed

Heat distribution from Energy centre to Network

Pre-Insulated heat network external connection to High Mill

International Wastewater Systems

SHARC ENERGY SYSTEMS

Retrofit Solution to ageing building.

Research/Labs plantroom SHARC pipework interface

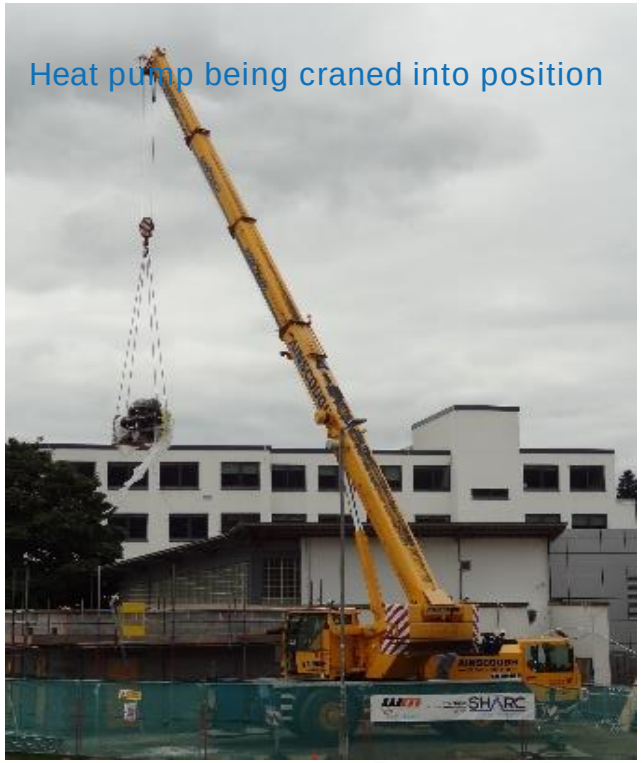
SHARC pipe work installation to TTC building

External mains into Research/labs

High Mill Building Occupied by Herriot Watt University

Energy Centre constructed to house the SHARC equipment

The construction of the Energy Centre



Heat pump being craned into position

400kW heat pump & 2500Litre buffer vessel

Project Opportunities

Marketing - The Borders project demonstrates

- The retrofit credentials of system.
- The use of the system in DHN opportunity.
- The tie in to town sewer networks.
- The ability to fund projects under heat supply agreements.

Customer benefits - SHARC Energy will provide the College with

- 1.8 GWh of annual heat
- GHG emissions saving of in excess of 150 tones per year
- 20 year stable heat supply price

Social Benefits

- Regional Employment – during construction and operational stage
- Energy Security - Locally produced energy supply
- Reduced GHG emissions
- Contribution to local economy
- Opportunity to include small social fund to support adopting customer

Borders College Launch

Project Launch Event 8th December 2015

- 100 + delegates attended
- Event Supported by Scottish Government Minister
- Event Supported by SW main board Director
- Substantial Post event PR and media coverage

Demonstrator credentials of system continue to support on going promotion to market;

- 6 post event demonstration visits
- 1 event involved 40 delegates.

Project Opportunities & Challenges

Performance after first half of operation

- ✓ 150MWh's heat delivered – down on estimates due to early Easter break & unseasonal summer weather.
- ✓ Heat delivery to college operating comfortably at 55°C flow (project modeled at 63°C)
- ✓ System COPs consistently above 4.5 (project modeled at 3.7)
- ✓ BMS & retained boiler interface needs some work
- ✓ Monitoring process has identified modifications to improve performance and resilience
- ✓ So far so good!

THANK YOU

For more information please visit our website at
www.sharcenergy.com

Or Phone office lines
UK +44 115 870 0021
Can +1 604 219 2838

CONTACT

Lynn Mueller – Lynn.mueller@iws-sharc.com
P: +1 604-475-7710
Russ Burton – Russell.burton@iws-sharc.com
P: +44 7990 550063

International Wastewater Systems

SHARC ENERGY SYSTEMS

CSE: IWS & Börse Frankfurt: IWI