Borders College and SHARC

“Flushed with Success!”

Peter Smith, Robert Hewitt, Russ Burton

EAUC Scotland, Stirling, 22 February 2017

BORDERS COLLEGE

Borders College

- Smallest Regional College in Scotland
- 5500 students (1650 FTE)
- £12M turnover
- 3 Campuses plus 2 learning centres
- Co-located with HWU in Galashiels

BORDERS COLLEGE

Sustainability at the College

- Scotland's Climate Change Declaration (2007)
- Early signatory to UCCCfS
- Environmental Policies and Sustainability Committee
- Carbon Management Plan 1 2009-15
- Carbon Management Plan 2 2016-21

BORDERS COLLEGE

Borders College

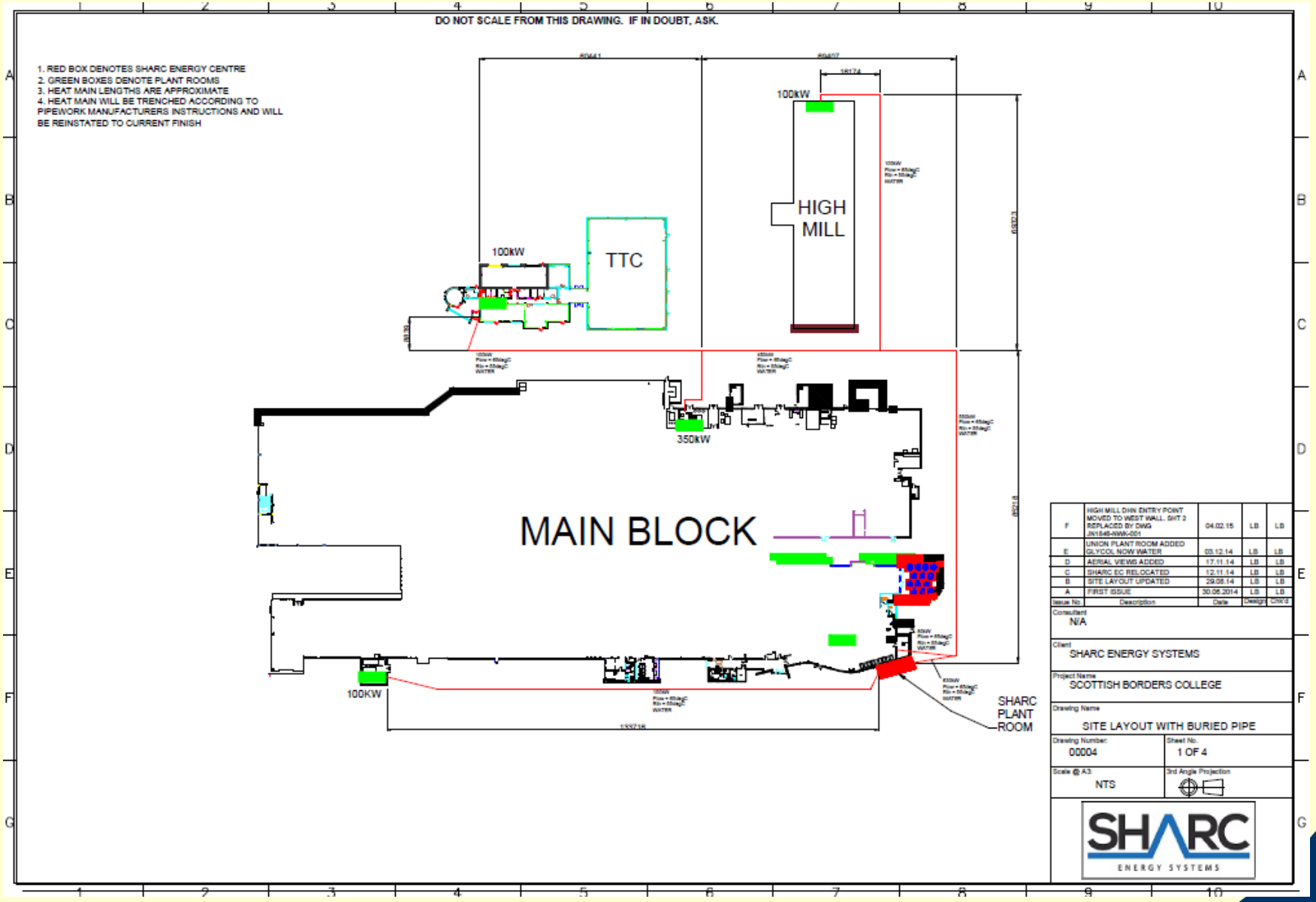
- Developed a Carbon Management Plan 1 in 2010 to reduce CO2 by 25%. Achieved 27%.
- Heavily dependant on gas fired heating at Galashiels Campus and actively looking for a low carbon alternative.
- Evaluated biomass, (various options inc pellet & chip)
- Worked with SBC on Langlee district heating proposal.

BORDERS COLLEGE

Borders College

- Shared Campus with HWU has 3 buildings, 5 plant rooms and over 19000m2.
- Mixture of Victorian Mill, 1960s construction and new build in 2009.
- Met with Sharc in March 2014, completed feasibility studies, identified procurement route and works commenced 2015.
- System integrates seamlessly with existing heating distribution and BMS with no adverse comfort identified by users.

BORDERS COLLEGE



BORDERS COLLEGE

About the Business:

IWS founded by a team of HVAC & geo-exchange engineering professionals (2010)

Headquartered in Port Coquitlam, BC Canada

Developed "The Sewage SHARC" **(Patented)** Continue to invest in R&D to develop the technology

Deployed 1st of several SHARC installations operating in BC/North America (2012)

Established SHARC Energy Systems - to serve UK / EU market.

First UK installation Borders College (Dec 2015)

Released the PIRANHA System designed for smaller scale projects. **(Patented)**

Won the 2016 AHR Innovation award for the Green Building product Category

2010 2011 2012 2013 2014 2015

International Wastewater Systems

IWS Technology

SHARC ENERGY SYSTEMS

	SHARC	PIRANHA
		
2 key technologies	• 7 years development and POC • 13 successful installs • 1st EU installation – installed under 20 year HPA • Technology now commercially viable.	• Recent development • Miniaturisation & Simplification of SHARC • Developed in response to market demand • Under field test • Successful outcomes to date • Expect full commercialisation 2017
Capabilities	Space conditioning and water heating	Water heating
Engineering	Custom design	Self contained unit
Capacity	440 kW (Increased capacity with duplicated modules)	50kW or 100 kW
Typical Installation	Commercial and 200+ unit residential applications	Commercial and 50-200 unit residential applications

International Wastewater Systems

IWS Technology

SHARC

SHARC ENERGY SYSTEMS

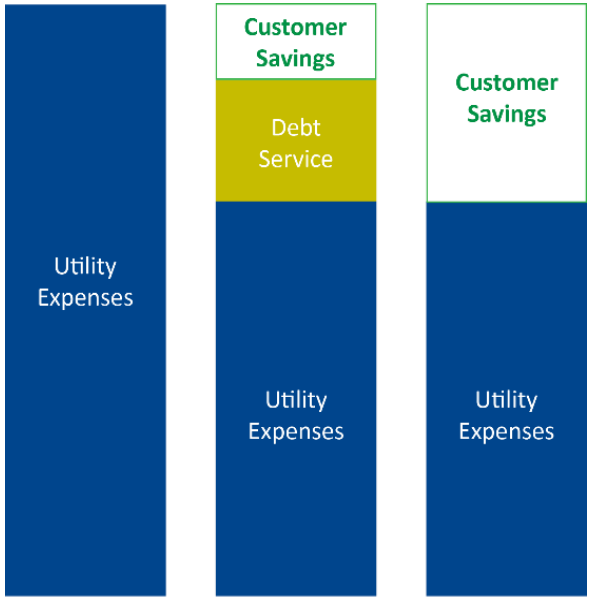
Project Development Approach

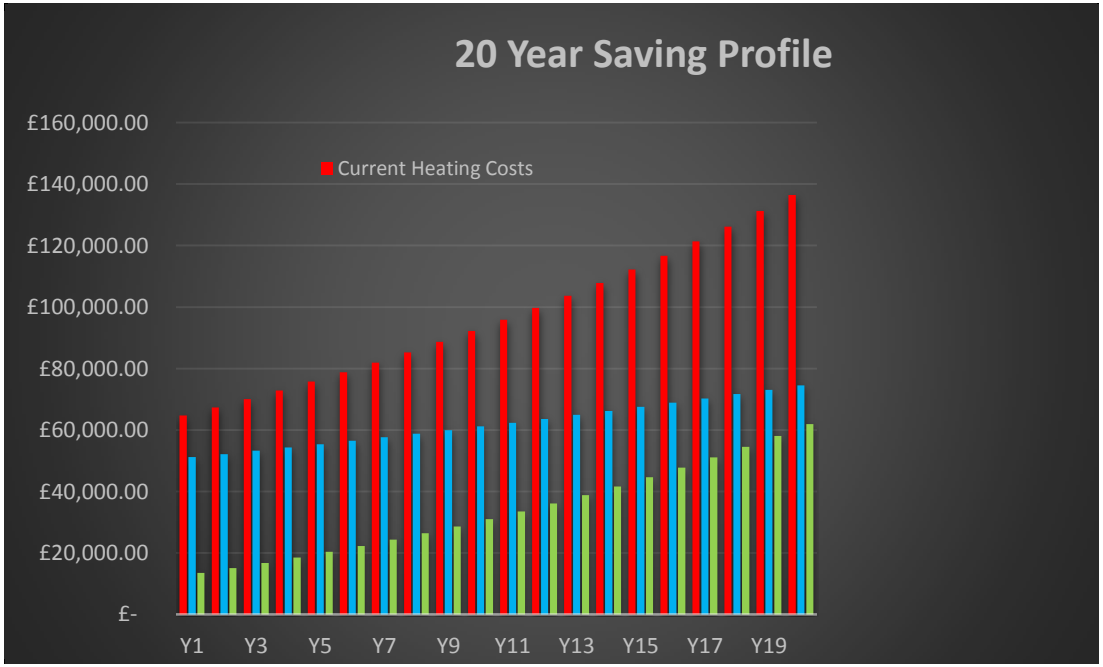
1. Desktop appraisal
   - Client issues RFI including heating data (1/2 hourly where pos)
   - SHARC review sewer networks and secure water company feedback on assets
   - Prepare high level analysis of opportunity – Technical – Economic and Social

2. Follow up with detailed feasibility assessment (paid)
   - Attend site to carry out survey of
   - Plant room and building side heat distribution and management system
   - Evaluate suitable location for SHARC EC
   - Evaluate civils challenges for sewer access
   - Finalise detailed proposal and heat supply offer

3. Detailed design
   - Energy Analysis
   - SHARC installation details
   - Building side mechanical adjustments specification
   - Regulatory and statutory consent

Financing an IWS Project

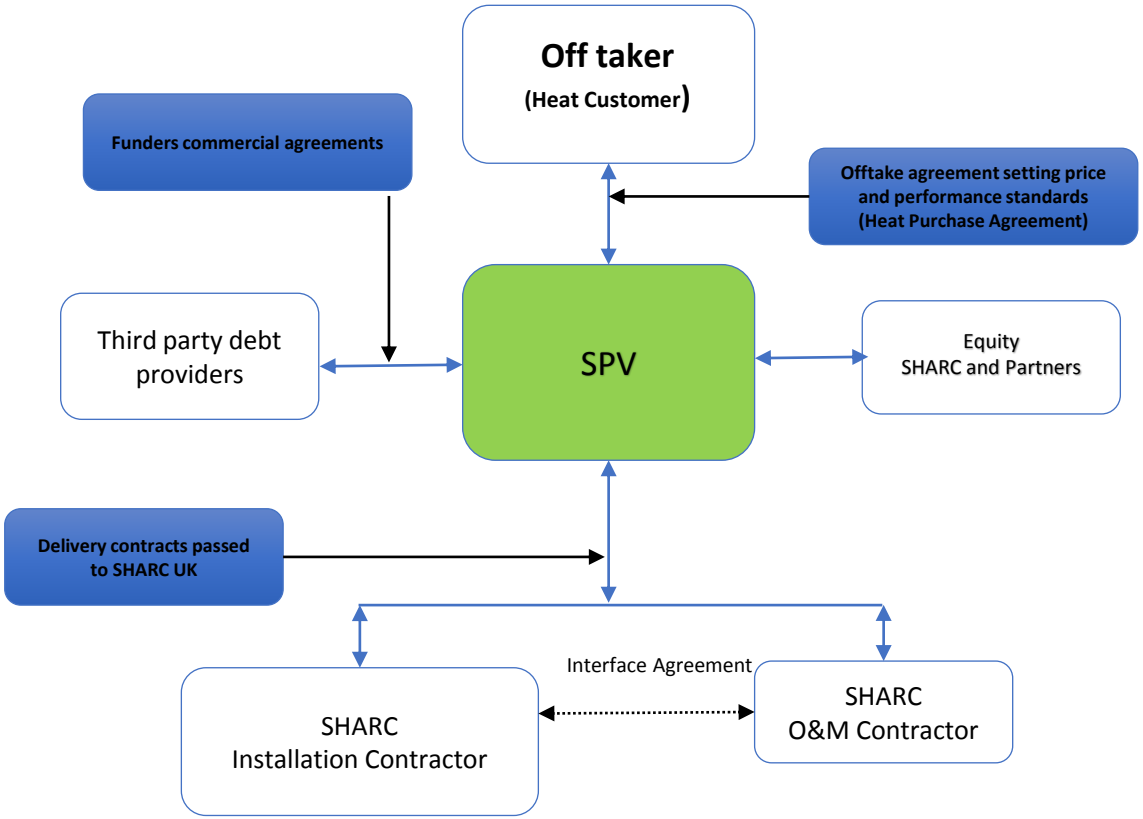




EQUIPMENT PURCHASE
Client Owns & Operates

HEAT PURCHASE AGREEMENT (HPA)
IWS Own & Operate

Business Model being adopted



- **Project SPV to accommodate Debt and Equity participation**
- Equipment funded through SPV who contract with customers on heat supply agreement.
- Commercial funders finance through Debt / Equity
- Finance freely available at 5% on debt, subject to covenant of heat customer.

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BORDERS COLLEGE

SHARC ENERGY SYSTEMS

- 1st of it's kind in the UK
- Based on proven technology
- Supports Scottish Government renewable heat targets
- Impact on down stream waste water treatment monitored
- Opportunity to expand this further

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Project Launch
December 2015

SHARC ENERGY SYSTEMS

BORDERS COLLEGE

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Energy Centre constructed to house the SHARC equipment

SHARC ENERGY SYSTEMS

The construction of the Energy Centre

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500m low temperature heat network installed

SHARC ENERGY SYSTEMS

Heat distributed out of the EC

Circulated through buried heat main

Connected to LLH's in each of the 5 plant rooms on Campus

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The Borders project utilizes the adjacent town Sewer for supply

SHARC ENERGY SYSTEMS

SHARC wet well incorporating a penstock into main sewer

Construction of the sewer interface

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SHARC ENERGY SYSTEMS

- The Borders project demonstrates the retrofit credentials of system.
- SHARC Energy will provide the College with 1.8 GWh's of annual heat
- Carbon emissions saving of around 150 tonnes per year
- Current Coefficient of Performance (COP) over 4
- Fully integrated with the college Trend BMS system ensuring the efficient delivery of both space heating & DHW.

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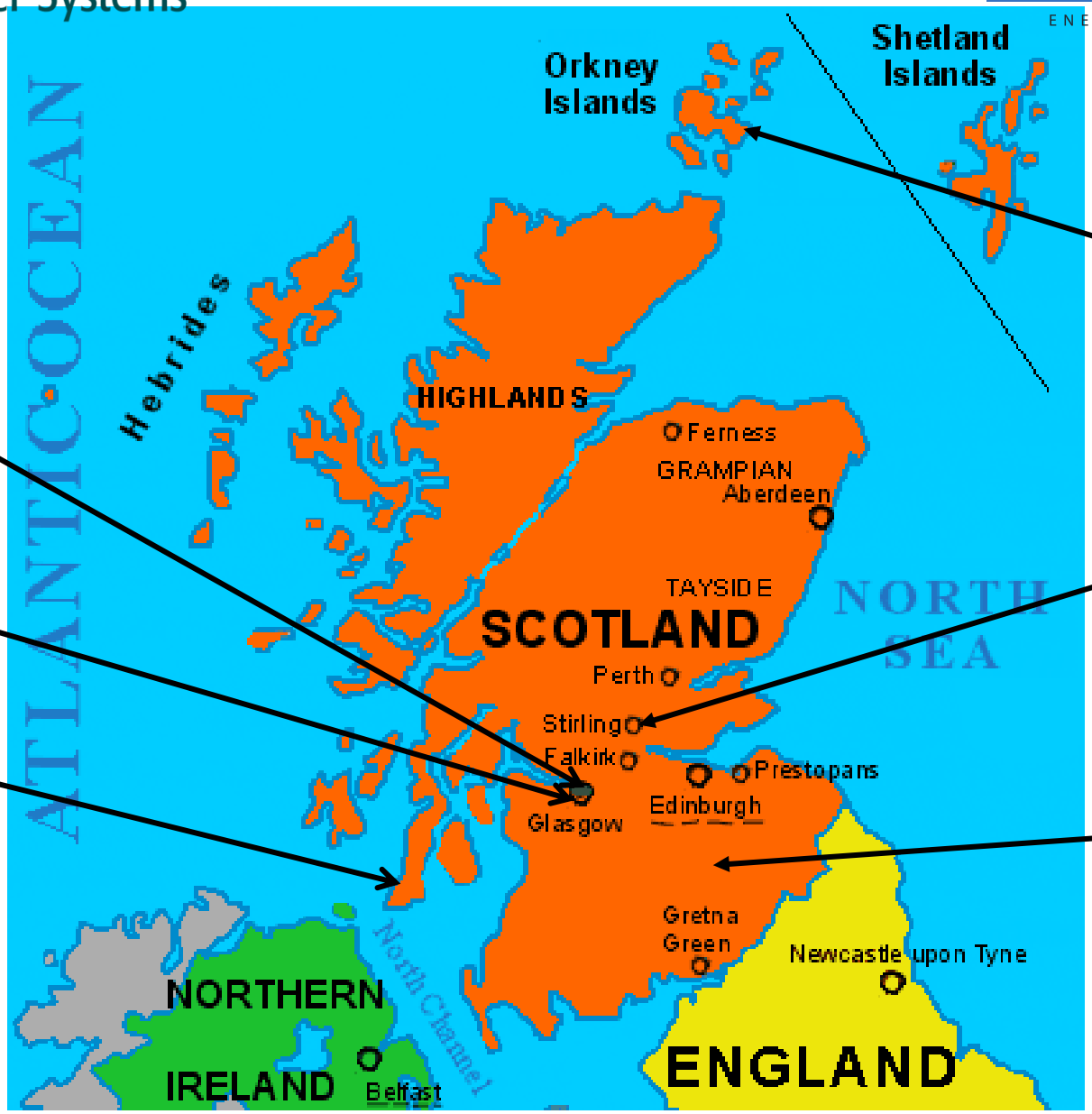

Picaquoy – Leisure Centre

Kelvin Grove – Museum

Clyde Gateway District Heating Scheme

Aqualibrium – Leisure Centre

Stirling District Heating Scheme

Borders College Galashiels

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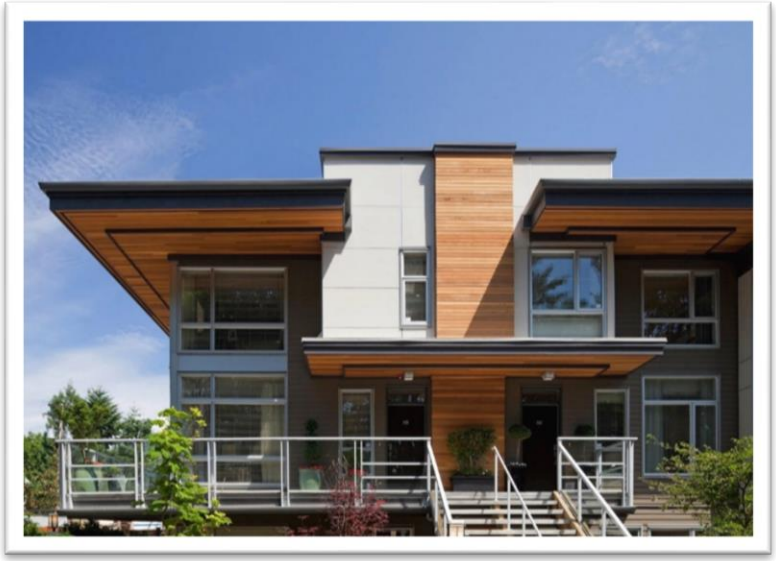
Seven35 – North Vancouver, BC

Canada's first multi-family project built to LEED Platinum and Built Green Gold Standards

Wastewater heat recovery used for domestic hot water heating



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SAIL – Vancouver, BC

172 unit development at University of British Columbia

Hot water supply and radiant floor heating

100 tonnes carbon reduction annually

Scalable to a future district energy system

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SHARC ENERGY SYSTEMS

Regional WWTP - Sechelt, BC

Supplies domestic hot water + building space heating & cooling

LEED Gold certified

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SHARC ENERGY SYSTEMS

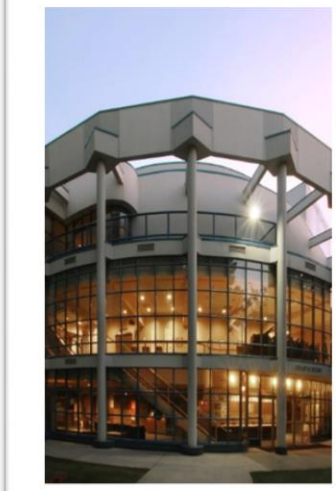
Gateway Theatre – Richmond, BC

50,000 sqft public theatre owned by the City of Richmond

Built in 1984, an ideal candidate for significant energy retrofit projects (existing water source heat pump heating system with natural gas boiler)

Additionally the theatre is built over

an existing city sewage lift station



THANK YOU

For more information please visit our website at
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CSE: IWS - Börse Frankfurt: IWI – OTC: INTWF