Black & Veatch has been involved with the analysis and design of district energy and Combined Heat and Power systems for over 40 years. These cogeneration systems deal with the simultaneous production and distribution of useful thermal hot and chilled water and electricity. Black & Veatch helps its customers benefit from district energy systems while managing the many complexities.
DISTRICT HEATING PROJECTS

LONGLEAT ESTATE BIOMASS HEAT STUDY | Longleat Estate | Plant Specifications |
Black & Veatch was commissioned by Longleat Estate to carry out a feasibility study to review the opportunities for biomass heat and biomass combined heat and power (CHP), the main drivers for the study were:
- Cost saving and reducing the impact of oil prices
- Reducing perceived problems with electricity supply to the site
- Investigating use of wood fuel supply available at site
- Future proofing operational cost of maintaining the state

Black & Veatch proposed:
- Installation of a biomass boiler rated at 350kWth
- Subterranean fuel storage
- Sourcing of biomass feedstock from the Longleat Estate
- Savings of £35,000 to £68,000 per year

Following completion of this initial scope of work, Black & Veatch then carried out the following work packages:
- Preparation of biomass energy centre and district heating system specifications
- Preparation of conditions of contract
- Pre-qualification of biomass installers
- Logging of trials pits
- Tender review and review of business case for biomass at site

SMALL HEAT PROJECT DEVELOPMENT | Confidential Client | Technical Advisor |
Black and Veatch was appointed to the role of technical delivery consultant for the detailed engineering, design and advice throughout the design, procurement and installation of a district heating scheme served from a biomass boiler at a military site. The project involved the installation of a 600kW woodchip biomass boiler, walking-floor fuel-handling plant, associated MECIA works and connection to two existing boiler houses. Black & Veatch was responsible for identifying suitable boiler manufacturers, creating fuels and performance specifications, outline design, tender evaluation, detailed design reviews and client support.

BIOMASS DHN & CHP | Regen SW and South West Regional Development Agency (SWRDA) |
Black & Veatch was commissioned to review a number of district heating options across Dartington Hall Estate to support the changes in the use of buildings on site and the development plans for the next 20 years.

This work included:
- Review of a range of potential DHN, estimate the heat loads and annual heat load profiles for the different options
- Review potential district heating systems layouts, biomass and fossil fuel boiler configurations and estimated the project capital cost and operating costs of the systems
- Exploring various biomass system configurations between 700kW to 2.4MW
- Review of suitable CHP technologies
- Review of economic and CO₂ savings from the different options

TESTIMONIAL

“Throughout the course of our work together, Black & Veatch has demonstrated very strong skills and understanding in both the technical and strategic aspects of the biomass heating space.”

Keith Allen | BHA Programme Manager

BIOMASS HEAT ACCELERATOR | Carbon Trust |
Following on from the Biomass Sector Review, led by Black & Veatch and the subsequent full design of the Biomass Heat Accelerator (BHA), Black & Veatch acted as the technical advisor to the Carbon Trust (CT) for the duration of the 5 year project. Black & Veatch helped the BHA to deliver the following:
- Gathered data from over 50 biomass installations across the UK and analysed the capital and operational data
- Identified common issues and barriers to further development in the sector and started to take steps to resolve these with key policy makers
- Worked with the key installers to assist their organisations, with a view to creating best practice across the industry and key sectors to disseminate best practice information across the customer base through presentations and guides.

SMALL HEAT PROJECT DEVELOPMENT | Regen SW and South West Regional Development Agency (SWRDA) |
Bioheat aimed to deliver a 32MW pipeline of new installations in the South West of England. Black & Veatch completed a geographical information system (GIS) based screening process to identify potential candidate sites in the South West to convert to biomass heat.

Black and Veatch provided 24 sites with assistance to identify site feasibility, system specification, fuel negotiations, funding applications, planning liaison and demonstration visits.
The sites included a range of biomass heat projects from small heat systems, biomass district heating systems, combined cooling heat and power (CCHP) and process steam systems.

Black & Veatch also provided:

- Development and delivery of a biomass heat training course to planners, architects and builders to help them identify potential biomass heat sites
- Programming and organisation of a biomass heat study tour in Austria

### GIS HEAT MAPPING | Carbon Trust |
The Carbon Trust commissioned Black & Veatch to undertake heat mapping in Great Britain, which aimed to identify sites optimally sized and sited with suitable heat load to convert from fossil fuel heating systems to biomass heat. An advanced GIS assessment method was developed to perform spatial analysis and create a national map showing all locations that could viably be converted to biomass heat. The output interfaced an economic model and a database. This study was the first nationwide investigation into biomass heat mapping and identified nearly 32,000 sites.

Added value included:

- Innovative GIS spatial analysis techniques and customisations developed. Data quality procedures were put in place to maintain high data standards
- The methodology can be applied to other countries and regions, to locate the most economic sites

### PIPELINES
Designing pipelines is an integral part of our work. The services we provide include: concept and outline designs, route selection, scheme optimisation, pipeline installation techniques for site conditions including conventional trenching and trenchless technologies, material selection, MEICA design, project management, construction control, supervision and commissioning.

### GLENCORSE NEW WATER TREATMENT WORKS | Scottish Water |
Black & Veatch was appointed to design and construct a new 175ML/d water treatment works and a 90ML/d clear water storage tank at Glencorse. Black & Veatch’s role spanned the entire project lifecycle from early contractor involvement of site selection, initial design development and cost build-up through detailed design to construction and commissioning.

Sustainability and community were at the project’s heart throughout planning, design and execution. The WTW’s size and visual impact was reduced significantly through Black & Veatch’s choice of treatment process. Using grass roofs for the largest structures also helped blend the works into its surroundings.

Believed to be a world first for this size of pipe, the 1200mm HDPE pipes were manufactured in a mobile production facility adjacent to the construction site rather than being imported from the supplier’s Scandinavian factory. This resulted in an estimated 2,000 tonnes of CO₂ emissions saved.

Glencorse has won an impressive ten awards, including 4 Gold from CCS, 2 Gold RoSPA and the Green Apple.

### TESTIMONIAL

“not only an exemplar project in terms of critical infrastructure, but also in terms of sustainable development and carbon reduction, both in terms of construction and operation.”

Paul Jowitt | UK Institution of Civil Engineers

### PIPELINE ROUTE OPTIMISATION METHOD (PROM) | Several Clients |
PROM is a new approach to pipeline routing, with the potential to make cost savings during every stage of a pipeline’s lifecycle. The GIS-based method reduces expenditure during planning and can generate routes optimised to offer the lowest construction and operational costs.

PROM has been developed by Black & Veatch to offer a cost-effective mechanism to make better informed, auditable decisions about corridor routing options. Highly flexible, the method can be tailored to generate routes to meet clients’ priorities at the business, program and project level.

PROM has proven it can provide the following benefits to clients:

- A significant time and cost saving associated with route optimisation and planning
- Reduced Capex and Opex
- Automated profiles and schedules for pipeline management optimisation and cost assessment
- A reusable database that can be quickly tailored and iteratively learns as a project or projects progresses
- The ability to compare quickly the merits of one route with another
- A valuable validation tool that adds extra assurance
- Enables expert resources to be used on the whole process
- Enough flexibility to accommodate local site specific considerations i.e. exclusions round environmentally sensitive schemes
BUILDING A WORLD OF DIFFERENCE®

Black & Veatch is an employee-owned, global leader in building Critical Human Infrastructure™ in Energy, Water, Telecommunications and Government Services. Since 1915, we have helped our clients improve the lives of people in over 100 countries through consulting, engineering, construction, operations and programme management. Our revenues in 2014 were US $3.0 billion. Follow us on www.bv.com and in social media.

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