Mine-water Energy Toolkit

Project Management
Summary
This section includes a guide to project management and a more detailed overview of the specific actions necessary to develop, design and construct a mine energy infrastructure project.
Key Points
General 1. To successfully deliver the project on time, within the budget, and in compliance with the project specifications. 2. To achieve the desired technical and commercial operational performance. 3. To minimize environmental and social impact during and after construction. **Project Scope** 4. The project scope includes design, construction, and commissioning. It encompasses all necessary stages, from the environmental impact assessment to testing and quality assurance. **Project Management System and Tools** 5. Detailed project delivery plans are often created and executed using tried and tested systems and tools such as Prince2, Microsoft Project or Zoho Project. 6. Clients sometimes specify particular project management systems and tools. **Project Schedule** 7. A detailed project schedule enables efficient project planning, resource management and execution including tracking the achievement of key milestones and budget adherence.

Stakeholders

8. The engagement of stakeholders is an underestimated critical factor in determining the success of mine energy projects.
9. Key stakeholders include local communities, potential customers, political leaders, regulatory bodies the project owner/developer, project team, contractors, and suppliers.
10. Assess the social, cultural, and economic impacts of the project on the local community and develop strategies to mitigate any negative impacts.
11. Evaluate public acceptance and support for the project, and address any concerns or objections raised by stakeholders.

Quality Management

12. A quality management plan ensures that the project meets defined specifications and performance standards.

Risk Management

13. The risk and issues register identifies and evaluates risks and offers solutions to risk and issue management. The register is constantly updated as risks and issues are managed and new ones emerge. Risks include: safety, environmental impact, delays, cost overruns, and performance quality.
14. Evaluate insurance options and consider the need for additional coverage to protect against potential liabilities e.g. subsidence caused by borehole drilling

Communication Plan

15. Communication plans define how information is gathered and shared among the project team, stakeholders, and external parties. It ensures that project team members are informed about stakeholder sensitivities, issues and interests which helps to optimise co-operation and support.

Procurement Plan

16. The procurement plan assures a compliant process for selecting and contracting suppliers of high quality and cost-effective products and services. It also specifies a process for managing contracts and ensuring the timely delivery of materials and services.

Health, Safety, and Environmental Plan

17. This essential plan ensures that the project complies with all safety and environmental regulations and standards, to protect workers and the environment.

Change Management Plan

18. In addition to risks from common unforeseen events such as illness of key personnel, complex mine energy projects often require changes in approach. A change management plan enables a

disciplined response to change that assesses and mitigates impacts on quality, schedule, and budget.

Draft Scope Checklist for Mine Energy project supplying a Heat Network.

Energy Demand Assessment

- Review prior information & source data
- Issue RFI's (demand, in-building systems, assets, EE measures etc.)
- Data Collection / Stakeholder engagement (data loggers)
- Site Visits (As necessary)
- Existing Building demand analysis
- New Development demand analysis
- Collate aggregate data & mapping
- Develop scheme options

Mine Energy Systems

- Determine the scale and scope of the project, including the estimated heat demand and potential consumers.
- Conduct a thorough assessment of the mine energy resource, including the quality, quantity, consistency and accessibility of the energy supply.
- Evaluate the temperature and flow rate of the mine-water to determine its suitability for heat extraction.
- Assess the available heat extraction technologies such as heat pumps, heat exchangers, and direct use systems, and determine the most appropriate technology for the project.
- Evaluate the potential impact of the mine-water heat extraction on the surrounding environment, including groundwater and surface water bodies.
- Consider the infrastructure requirements for extracting, distributing, and using the heat, including pipelines, pumps, and heat exchangers.
- Identify and understand the regulatory framework and permitting requirements for mine energy projects in the project location.
- Determine the environmental and legal permits necessary for project development and operation, including permits related to borehole drilling, water extraction, heat discharge, and infrastructure construction.
- Evaluate the environmental benefits of the mine energy project, including carbon emissions reduction and energy efficiency improvements.

- Consider the long-term sustainability of the project, including the potential for future expansion, maintenance, and decommissioning.
- Assess the project's alignment with local and national sustainability goals, climate change targets, and renewable energy strategies.

Energy Centre and Central Plant Options

- Assess supply options (accounting for future-proofing) including waste water recovery, industrial heat recovery, mine energy, hydrogen electrolyser heat recovery, and aquifer/borehole thermal energy storage (ATES and BTES).
- energy centre location review
- 3rd Party supply / hosting
- Significant potential constraints
- Assessment of Private Wire Network options
- Plant sizing (including heat and power storage) - including an exploration of heat storage in former coal mine shafts
- Initial Scheme Design (RIBA 2.0) & Costings (+/- 30%)

Energy Distribution Systems

- Review consumer opportunities and future expansion - for example for social housing
- Review connection for key properties (compatibility & costs) and potential connection to the Veolia heat network
- Review routing (heat, cooling & power) and potential integration of routing with other SCC strategic plans such as the Transport Strategy and Connecting Sheffield plan.
- Dimensioning & costs (future proofing review) - including consideration of 'spine' pipe potential
- Review constraints and soft dig opportunities
- Initial RIBA stage 2 design

Economic assessment of scheme options

- Agree Assumptions for model input
- Estimate the capital costs associated with developing the mine energy project, including the costs of drilling, equipment installation, and infrastructure development. Produce FAST financial model
- Develop tariffs (based on BAU) and other revenue assumptions
- Operation, Maintenance/Revenue Expenditure
- Conduct a financial analysis, including a cash flow projection, to assess the economic viability of the project.
- Consider the project's payback period, return on investment (ROI), and net present value (NPV) to evaluate its financial attractiveness.

- Identify potential sources of funding, such as grants, loans, or public-private partnerships, and assess their feasibility.
- Apply Sensitivity to financial model
- Recommended network expansion options
- Risk Appraisal and Mitigation Risk recommendations
- Draft/final report
- GIS mapping
- Next Steps Recommendations

Key Actions

Action	Timeline
1. This is an overview of specific project management actions that are contained in the main body of the document.	