APPENDIX 6
LOW CARBON SUPPLY IMPLEMENTATION RISKS

This appendix assesses the risks identified for each recommendation made in section 6 of the main report to raise awareness of such risks and how these could be mitigated during implementation. In cases where a "change champion" is identified as the risk owner, this role could be played by the regional coalition working towards implementing the recommendations, the City of Cambridge, and/or other proponents of each aspect of the Low Carbon Energy Supply Strategy.

Recommendation: A district energy feasibility plan should consider all technically viable connections or consumers for a new network within Zone 1. The assessment should consider (i) whether the building is hydronic or not (ii) whether the building has sufficient energy demand to make connection viable (iii) the existing technology in place in the building and the benefits of district heating connection

Risk Identified	Owner of Risk	Risk Category	Mitigation
Large number of non-hydronic buildings identified resulting in reduced connections to DH network.	Building owner / change champion	Financial	Financial support scheme could be considered to incentivize building conversion. Could be combined with support schemes to reduce building energy demand.

Recommendation: Based on the identified consumers, district heating network clusters can be developed

Risk Identified	Owner of Risk	Risk Category	Mitigation
Lack of physical space in road to fit DE pipe infrastructure in identified areas	City of Cambridge DPW /change champion	Financial	Underground infrastructure planning in the public ROW starts to consider and plan for district energy corridors now and how these can be accommodated within the City roads without excessive cost of installation at depth. Innovative solutions should be considered such as re-use of existing infrastructure space including steam chambers, sewer tunnels, and gas pipe trenches.

Recommendation: Clusters developed should take account of planned natural gas rehabilitation works

Risk Identified	Owner of Risk	Risk Category	Mitigation
Lack of access to data on gas network (location, operation and maintenance records, end of useful life expectation, rehabilitation plans for network)	change champion	Technical	Agreements to be developed between gas network operator and Low Carbon Energy Supply Champion to facilitate provision of information.

Recommendation: Based on the clusters developed it will be possible to make agreements with consumers for connection to the proposed district energy network, providing a future customer base and cash flow

Risk Identified	Owner of Risk	Risk Category	Mitigation
Lack of uptake of district energy network connection by consumers.	change champion	Financial	Barriers to connection should be removed to make it easy for consumers to switch utility supply. Thermal energy tariff should be competitive with the gas tariff to incentivize consumer connection.

Recommendation: Initial network clusters could consider the buildings owned by the City and how these can be connected to form an initial network from which to expand

Risk Identified	Owner of Risk	Risk Category	Mitigation
Buildings are not viable to connect due to their locations and proximity to proposed networks	change champion	Financial / Technical	Future infrastructure investment by the City should consider whether it could utilize DH to assist the development of a DH network
Lack of support within City to connect buildings	change champion	Stakeholder	Develop broad consensus and support for the recommendations of this study within the City so all parties are working towards the same objectives
First adopter resistance within City with regard to starting and promoting a district energy utility	change champion	Stakeholder	Develop broad consensus on the need for a district energy utility within City and approach on establishing it. Study trips to or twinning with other City's which have district energy should be considered to develop better understanding of what's required to establish a utility, lessons learnt in other cities and the benefits that are afforded as a result.

Recommendation: The long term energy supply source location for the greater heating network in addition to the short to medium term supply sources should be agreed upon. Long term locations could include the Mystic River Power Plant location as discussed in this report or potentially other locations. Short to medium term thermal supply sources could include excess heat from MIT, Harvard or Kendall Square power plants, using steam to hot water heat exchangers.

Risk Identified	Owner of Risk	Risk Category	Mitigation
Lack of agreement on sitting of an energy supply plant.	change champion / Plant developer / Energy Facility Siting Board	Stakeholder	Siting of any infrastructure is always an issue in any rural or urban area in any part of the world. A full range of public engagement and consultation should be executed to develop siting options.

Residents opposition to plant siting	change champion / Plant developer	Stakeholder	An Environmental Impact Report should be prepared for any proposed site. Public Engagement and consultation should be part of this process to ensure residents understand what is proposed and the benefits of this and to address any issues which residents may have.
Fuel supply chain issues	change champion / Plant developer	Technical	The Biomass Eligibility and Certificate Guideline published by the DOER in August 2012 clearly outlines the requirements of biomass supply and as a result the framework for a biomass supply market to be established. With the creation of a demand for biomass, a market for producing and supplying biomass fuel in accordance with the DOER guidelines will likely develop. Consultation meetings on the proposed demand to be met and detailed biomass requirement guidelines (based on the plant to be installed and quantity of fuel required) should be prepared at an early stage of plant development to give the market advance warning to prepare.
Fuel supply delivery issues	change champion / Plant developer	Technical	Logistics of fuel delivery no matter what the fuel type should be a core basis for site selection. Future trends in transport development should be considered when discussing fuel delivery and site selection today eg. the electrical vehicle fleet and technology is increasing rapidly worldwide and future delivery methods may include electrical trucks or barges.

Recommendation: Hot Water district energy needs to be regulated with appropriate standards in Massachusetts

Risk Identified	Owner of Risk	Risk Category	Mitigation
It is a lengthy process to establish regulation. Until this in place there will be commercial	change champion / Utility Operator / existing energy	Policy	Regulatory policy should be pursued as soon as possible for water based district energy, incorporating policy for tariff settings and purchase / sale of heat.

uncertainty/risk which may delay progression of utility.	suppliers in city / Attorney General / DPU		
Reduced carbon energy supply objective not met due to delays in implementation due to lack of regulation.	change champion / Utility Operator	Environmental	Regulation of hot water district energy with relevant standards should be addressed as soon as possible by the DPU.

Recommendation: A tariff system needs to be established with the regulator

Risk Identified	Owner of Risk	Risk Category	Mitigation
Heat purchase agreement issues. Lack of a transparent tariff system for sale and purchase of heat may lead to establishment of unnecessary capacity to supply a network in the interim period prior to 2040.	change champion / Utility Operator / existing energy suppliers in city / Attorney General / DPU	Technical / Policy / Financial	A tariff system for hot water district energy sale and purchase should be established as soon as possible by the DPU.

Recommendation: A District Heating utility company structure needs to be established

Risk Identified	Owner of Risk	Risk Category	Mitigation
the change champion is not provided with enough support and powers to establish a new utility company.	change champion / Regulatory bodies/relevant stakeholders	Legal / Policy	The establishment of a change champion body should consider all future scenarios which it will have to perceivably deal with over the coming 20 years and put in place systems for addressing these to ensure control of this body is maintained by the relevant stakeholders, while allowing it to progress its agenda despite other pressures which the stakeholders may face.