

Energy: A Distributed, District, and Renewable System

The strategy for provision of energy to the Manchester district is to begin with a determination of how much energy is available directly to the district (solar) and to then determine how much of the energy requirement can be supplied by energy harvested from within the district including solar (electricity, heat, light), waste heat from solid and liquid waste and from waste heat generated from industrial processes.

The backbone of the physical energy generation and distribution infrastructure will be a combination of distributed and district energy.

The majority of buildings will achieve a net zero standard, generating their own energy requirements with energy supply and demand managed through the district energy system. Examples of current net zero building design include the Bullitt Building, Seattle; Avalon Homes CMHC Calgary, and the UBC Sustainable Building.

Energy captured from wastewater (see Olympic Village, Vancouver; Docklands, Victoria) will also be managed through the district energy system. Combined Heat and Power (CHP) will supplement energy demand (heat and electricity) using some combination of natural gas, wind and solar energy from southern Alberta and hydro-electricity supplied through a western Canada grid.

Building on current practice the rail transportation network, current LRT and future streetcar grid will be powered by renewables – likely wind.

Private auto use will be significantly reduced due to LRT, regional rail, streetcar, a community operated carshare, bike grid, green network, and the provision of high quality walking environments on the entire transportation street and rail grid. The auto fleet will be fully electrical powered with electricity derived from the district distribution system and the provincial and western Canadian grid.

The streetcar network and carshare fleet will be owned and operated as a local utility through a Transportation Cooperative, the Community Association or a Private provider. Construction will be financed by a one-time levy on businesses and households. Operation of the systems will be through user fees and annual local tax levy.

Scale is a key research issue. At what scale or combination of scales low carbon renewable energy be delivered most effectively? Will every building be a powerplant? Should energy infrastructure be organized on a block basis so that it does not have to deal with transecting other infrastructures (e.g., water and sewer and roads? Should it be delivered at a sub-district level with energy systems customized for the dominant land use (industrial, commercial or residential) or should it be conceived at a district level with a district scale multi-fuel generation facility for the entire district thereby taking advantage of synergies and cascading between industrial, commercial and residential energy demands.