

Non-standard Applications

Some buildings have a different mix of heating, cooling and DHW needs than homes so it is useful to consider how AE-Street systems might apply to them.

Bus shelters In some cities like Ottawa and Winnipeg the ridership of the public transit systems is determined to a considerable extent on the level of comfort they offer vs. the use of cars. Bus shelters do not need to be heated to normal room temperature because the users are dressed for winter conditions so an AE system could be used to provide an appropriate temperature without needing to use a heat pump.

The spacing between AE injection stations and bus stops is comparable, and they are both normally located on both sides of the street. It would therefore be possible to integrate the two functions, especially if the municipality operates both the transit system and the energy distribution systems. The shelters would need doors, but the incremental capital costs would be very small, the energy cost would be nearly zero, and the GHG production would be zero. Note that the shelters could provide air conditioning as well as heating.

Churches Small churches are sometimes utilized for only a matter of a few hours per week. In that case they could be heated (and cooled when necessary) just like the bus shelters, but since they need to be warm during church services they could be heated by heat stored in insulated DHW tanks that are large enough to store the modest amount of heat that is needed. The hot water could be maintained by a small vertical solar collector on the south face, with an electrical backup for exceptional circumstances. Note that the capital, running and maintenance costs would be very small if the church is connected to an AE-Street network.

Office Buildings Office buildings are somewhat similar in that they are in use for only about 25% of the time. In that case the heating could employ a heat pump rather than the solar/heat store system, but a heat pump operating at a COP of 4.0 would consume only about 7% as much electric energy as an electrically heated office building, again without producing GHG.

Warehouses, Factories and Sports Facilities Many buildings are only partially heated because there are few occupants or because the occupants are physically active.

Food storage Food is mostly stored in buildings that are cooled enough to preserve the food but that provide protection from freezing. This is another application that could be run without needing a heat pump. Since AE-

Street systems always provide concurrent heating and cooling capabilities, the heating/cooling sources can be mixed to provide a constant temperature without requiring either extra energy or additional hardware.

Large Offices and Apartment Buildings Large buildings commonly require large cooling capacities but relatively little heat. As AE-Street networks get larger these needs can be balanced out against other buildings that have the opposite needs so that they support each other without actually requiring any special links.

Greenhouses An inexpensive source of heat is needed for greenhouses, and again the ability to control the temperature is useful for some growing situations.

IT Buildings IT buildings such as those used for telephone switching systems typically generate excess heat. Employing conventional air conditioning is both expensive and environmentally undesirable.

The Heat Island Effect Large cities are often uncomfortably warm in the summer because conventional air conditioning systems dump a massive amount of extra heat into the air. Using AE-Street systems eliminates both this thermal pollution in the summer and the buildings-related air pollution in the winter.

Equipment Protection Some equipment needs to be protected from either excess heat or excess cold. You could, for example, melt snow and ice from PV generation or solar hot water panels so that they could provide energy at times when they might otherwise be useless.

Streets, Sidewalks, Airports Critically important surfaces that need to be kept clear of snow and ice can make good use of a heat source that is inexpensive and non-polluting.

Cars If we switch to plug-in cars in the future then we need to find a way to heat them up in the mornings. Using electricity for that task is wasteful. If the plug contains a thermal link then it could maintain the interior temperature and also recharge the battery whenever the car is parked. The batteries in such cars also need to be kept warm.

We use heating and cooling for a very wide variety of applications, many of which are major sources of energy consumption and GHG production. We tend to use electricity for many of those applications because it is so convenient, but AE-Street systems could handle many of those applications, in addition of course to its primary role of heating and cooling homes and other standard types of buildings.