A Challenge to the IoT Industry:
Transition our World to Sustainable Development

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#1 Challenge: Moving to Sustainable Development

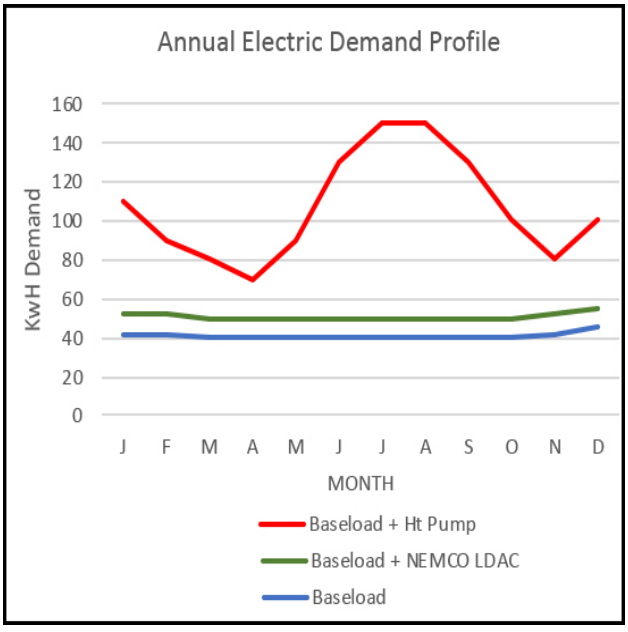
For decades, the UN, governments and researchers have been analyzing Climate Change, legislating and threatening carbon reductions, with minimal success. We need to transition the major economies to sustainable development by 2030 to avoid catastrophic climate change, the kind in dystopian tales.

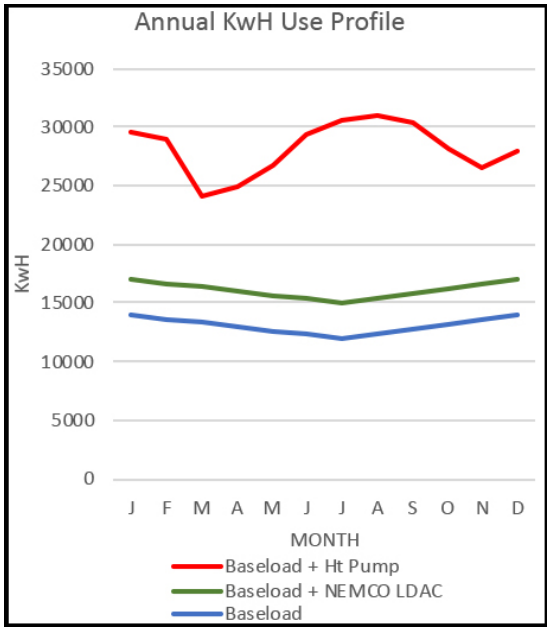
The IoT industry is the *only* industry that has the dynamism and ability to transform monolithic and conservative industries quickly. To do this, it must continue to expand its sights from IoT alone to include developing the complete energy trifecta of transport, food and building systems.

The IoT industry has already started down the path of transitioning the transport and food industries. It is set to drastically reduce the amount of energy they require and transition them to all-electric systems. Through their transport and food systems, IoT will integrate communities, countries and the world.

To complete the energy trifecta, IoT companies will penetrate and transform the construction industry, moving buildings, communities, cities and countries to sustainable development. IoT will initially target high energy using systems such as air conditioning where the energy and toxic refrigerants are a double threat. When building energy use is minimized, cities will generate 3 times their operating energy and rural areas 5 times their operating energy to support their transport and food energy requirements.

The annual operating electricity profile, shown below, highlights the highly problematic Air Conditioning electrical peak loads and use for an all-electric, ground source heat pump system, a system considered one of the most energy efficient today. This sinusoidal profile will be amplified when climate change brings warmer *and* more humid summers and colder spells in winters. This electrical use *must* be eliminated by new air conditioning technology. In the very near future, the IoT industry will not only embed the software to measure, monitor, analyze and control the building systems for operation and maintenance to produce the optimum end user experience, they will control the manufacturing and installation of the whole system.





Annual Electricity Profiles for an "efficient" 10,000ft^2 Medical Building
The Base load is Lighting and Auxiliary Loads
The Base Load Profiles do not include Medical Equipment

#2 Challenge: Solving the Air Conditioning Problem

A list of what is required from future Air Conditioning technologies:

1. Use minimal electrical and fossil fuels; eliminate peak electrical and fossil fuel use during peak Summer and Winter weather conditions. Eliminate toxic chemical refrigerants.

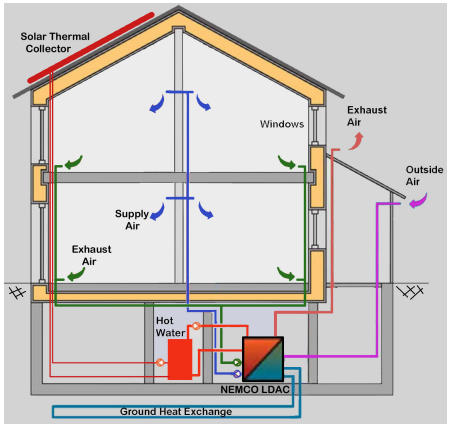
2. Provide excellent indoor air quality to the building for quality end user experience including excellent comfort, health and safety. Provide reliably clean, purified and sterilized fresh air with separate temperature and humidity controls.

3. Integrate measurement, monitoring, analysis, control and maintenance of building energy systems. Provide least total cost, plus ease and convenience of use.

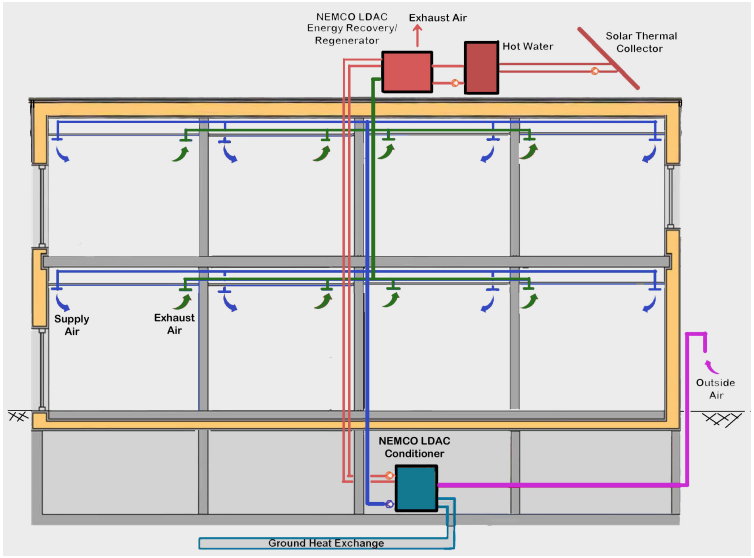
The current electric refrigeration air conditioning systems meet none of these requirements. Neither do conventional air handling systems that recirculate polluted indoor air and spread disease while providing poor temperature and humidity control and, in many cases, worse air quality than polluted outside air.

The technology to be encouraged is a liquid desiccant system that can provide all the characteristics we require. IoT companies need to take the lead because they can respond to the speedy development and rapid global deployment of this technology to meet the challenges posed by climate change and carbon reduction. Below are examples of NEMCO LDAC, the technology required for both large and small systems. Our Non-Electric, high performance, Air Conditioning technology was patented in 2017 to answer *all* the requirements.

IoT companies will help transform the $30 Billion/Year air conditioning industry and brand software integrated whole systems to optimize the end user experience. The end user includes the building occupant, owner and facility management and maintenance staff.



House NEMCO LDAC Unitary System



Office Block NEMCO LDAC Split System

Both Have Geothermal Cooling and Pre-Warming and Solar Warming
Solar PV and Wind will provide the 8% of electricity
Ubiquitous Application globally

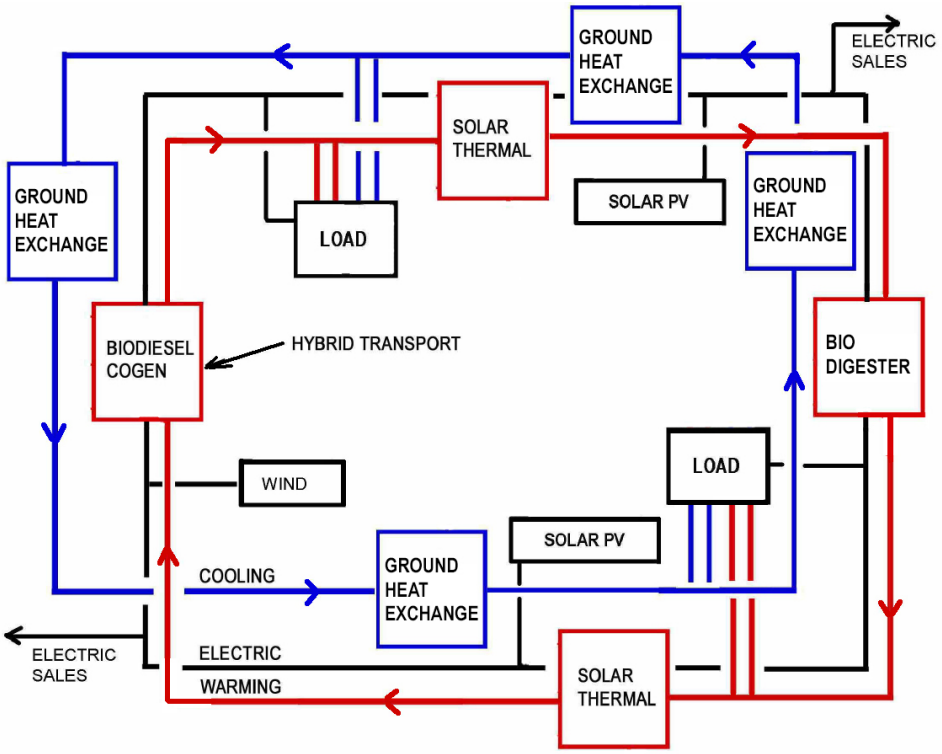
#3 Challenge: Buildings and Community Sustainable Development

To obtain the quickest, least expensive, most resilient, sustainable, high performance solution, a process called back-casting is needed. Our engineering consultancy developed this technique in the 1990's simultaneously with The Natural Step (TNS) Sustainability Platform. Start by setting lofty sustainable, high performance end goals and then back-cast from them to the current situation.

Removing the Air Conditioning roadblock to sustainable development through the adoption of a liquid desiccant technology such as NEMCO LDAC, other building energy systems that are already being revolutionized, such as the building envelope, will be easier to transition. The next steps will be to transition to localized total energy grids such as a campus-wide grid, connecting to other local grids.

The framework is already in place in many areas - district heating and cooling. We need to move the technology so the heating loop requires a much lower temperature and the cooling loop requires a much higher temperature, enabling clean renewable energy sources. See the example below.

This framework will redefine what a true "smart grid" is, with the excess electricity generated used for transportation and food. IoT companies will monitor and control the flow of energy within the grid and to and from the grid to other grids using real time and predictive software.



A District Total Energy System. The Loads are Buildings or Facilities.
Electric Sales are to Transport and Food or other Grids

In the very near future, IoT will profoundly change the way we generate and use energy. It will control from the macro, district energy grids, down to the micro, the individual parts including the a/c systems. It will transition the transport, food and building industries. It will brand new technologies that require minimal electricity and provide ease of use and superior user experience. It will embed these technologies with the software and hardware necessary to apply predictive and preventive maintenance methodologies. IoT will have total control of the flows of energy within the grid, and connect local grids for energy flows to the wider grid network.

This is what the future should look like. Let the dystopian writers take heed, all hail a utopic future!