

Technology: High Efficiency HVAC systems

Description and Definition

High efficiency heating, refrigeration and air conditioning systems (HVAC) can be defined as technologies that have the potential to reduce energy consumption, while providing a high quality of service (heating or cooling). In tropical countries such as Grenada, refrigeration and air-conditioning or RAC systems are mostly used for cooling buildings, industrial refrigeration and other commercial refrigeration applications, such as in supermarkets. In the context of this fact sheet the following high efficiency applications are considered: inverter technologies and high efficient refrigerants with low global warming potential.

- Inverter technology constantly regulates the speed of the compressor so as to continually maintain the temperature. With this approach the energy used is reduced as the motor consumes less current, while the temperature for the application, for example comfort cooling is maintained.
- Many refrigerants or the substances used to remove the heat from a space, have high operating efficiencies. For example,

Potential in Grenada

High efficiency HVAC systems have tremendous potential to be widely deployed in Grenada. In this regard, many of these technologies already exists in the market. For example, in the hotel sector where a majority of these systems were installed, the potential for energy cost savings and GHG emission reduction was demonstrated

Mitigation to climate

With the consumption of less power, the emissions of GHG from the source of fuel are reduced. For example, if the source of fuel is fossil based, like diesel for example, then reduced consumption should result in the reduction of carbon dioxide. This indirect emission scenario is true for both technologies under consideration.

With the use of high efficient refrigerants, such as HFC-290, which has a GWP of 5, direct emissions of these substances into the atmosphere will reduce the impacts on the global climate.

The quantification of the reduced GHG emissions is not possible as, there is lack of data on such equipment installed to determine the quantities. However, in the tourism sector in Grenada, where it is estimated that approximately 48% of electricity consumption is from HVAC, the implementation of energy efficient HVAC equipment in that sector resulted in avoiding approximately 5,800 TCO₂eq per year being emitted into the atmosphere. This demonstrates the tremendous climate change mitigation potential that can be derived from a national energy efficient project targeting the HVAC market.

Advantage(s)

- Consumes less energy than conventional systems
- Reduced environmental impact
- Lower operational costs
- Less failures
- Parts tend to have a longer life-span, hence longer life-span of the systems

Disadvantage(s)

- Some of the technologies may have safety issues, such as the flammability of hydrocarbon substances
- May be more costly than conventional systems
- Some of the technologies may require more highly skilled technicians for maintenance

Costs and other financial requirements

The initial cost of the systems may be higher than the conventional systems, although as the technologies begin to mature these initial costs are lowered. However, with the advantages highlighted above the savings produced through efficient use of energy, should result in a shorter payback period and lower lifecycle costs.

Status of the technology in Grenada

Many of these technologies are prevalent in Grenada, especially substances used in the unitary air conditioning systems. A survey conducted in 2017, showed that some technologies, especially in the commercial sector rose significantly between 2012 and 2015. However, these technologies employ the use of substances with relatively high GWPs.