

**Keeping comfortable in our home or church building  
and the effect on our weather and climate**  
(Part One)

We all like to stay comfortable wherever we go. In the summer, we turn on the air conditioner to stay cool, and in the winter we turn on the furnace to stay warm. There is a variety of equipment that we use to accomplish this cooling or heating, each with a different effect to the weather and climate.

One choice for winter heating is an oil burner. The oil is removed from deep in the earth and when burned, releases its carbon content into the atmosphere as carbon dioxide. This carbon dioxide contributes to warmer weather and over time to climate change. Another choice would be to burn natural gas. This also contains carbon and similarly leads to more carbon dioxide and climate change. Moreover, leaks of natural gas at the gas well and its associated pipeline operations allow enough natural gas to enter the atmosphere that it also contributes to climate change.

Another possibility is “electric heating” or “electric resistance heating.” Small, portable electric heaters are an example of this type as well as baseboard heaters which are powered directly by electricity. These devices convert the electric energy, on a one for one basis, directly into heat energy. The effect on weather and climate is dependent on the source of the electricity. If the power plant burns coal or oil or natural gas to run, then there is carbon dioxide released at the plant associated with generating the electricity used. If the electricity comes from wind or solar, then there is no carbon dioxide, and no weather effect. We say that the effect on weather and climate is dependent on the source of the electricity.

In the summer we find the outdoors to be too warm, so we turn on the air conditioner to stay cool. This is an appliance that rather than bringing heat into the room, removes heat from the room, and moves it to the outside air. The amount of heat removed is several times the energy of the electricity used to operate the air conditioner. The impact on climate and weather depends on the electrical energy source used by the power plant, wind generators, or solar collectors.

Although a traditional air conditioner moves heat from indoors to outdoors, it can be reversed, by changing some valves, to move heat from outdoors to indoors. This can replace the heating equipment described above, and is called a heat pump. The amount of heat delivered indoors is usually several times the energy of the electricity used to operate the machinery. Therefore, it is more advantageous than the “electric heating” discussed above. Again the climate impact depends on the source of electrical power used.

However, this heat pump loses efficiency when heating a building on a very cold day (like 0°F). One alternative is to tap into the nearly constant temperature in the soil 20 feet or more below the surface. Here a steady temperature near 55° can be used as the outdoor place for the heat pump. Such a mechanism is known as a ground source heat pump, or geothermal heating. Over a whole year this ground source heat pump will use less electricity and cost less to operate than an ordinary heat pump as previously described.

Part one of a series.