Decarbonization Plan

A lot has changed in the world since we built the building St. Clare's and TBE call home. Both congregations now recognize our moral responsibility to minimize our contribution climate change. As a result, it is the goal of the Genesis Board to steadily and cost effectively reduce the Genesis facility's carbon emissions with the goal of reducing our current emissions by 90% by 2040. In 2010, we started on the journey we are on today (Figure 1).

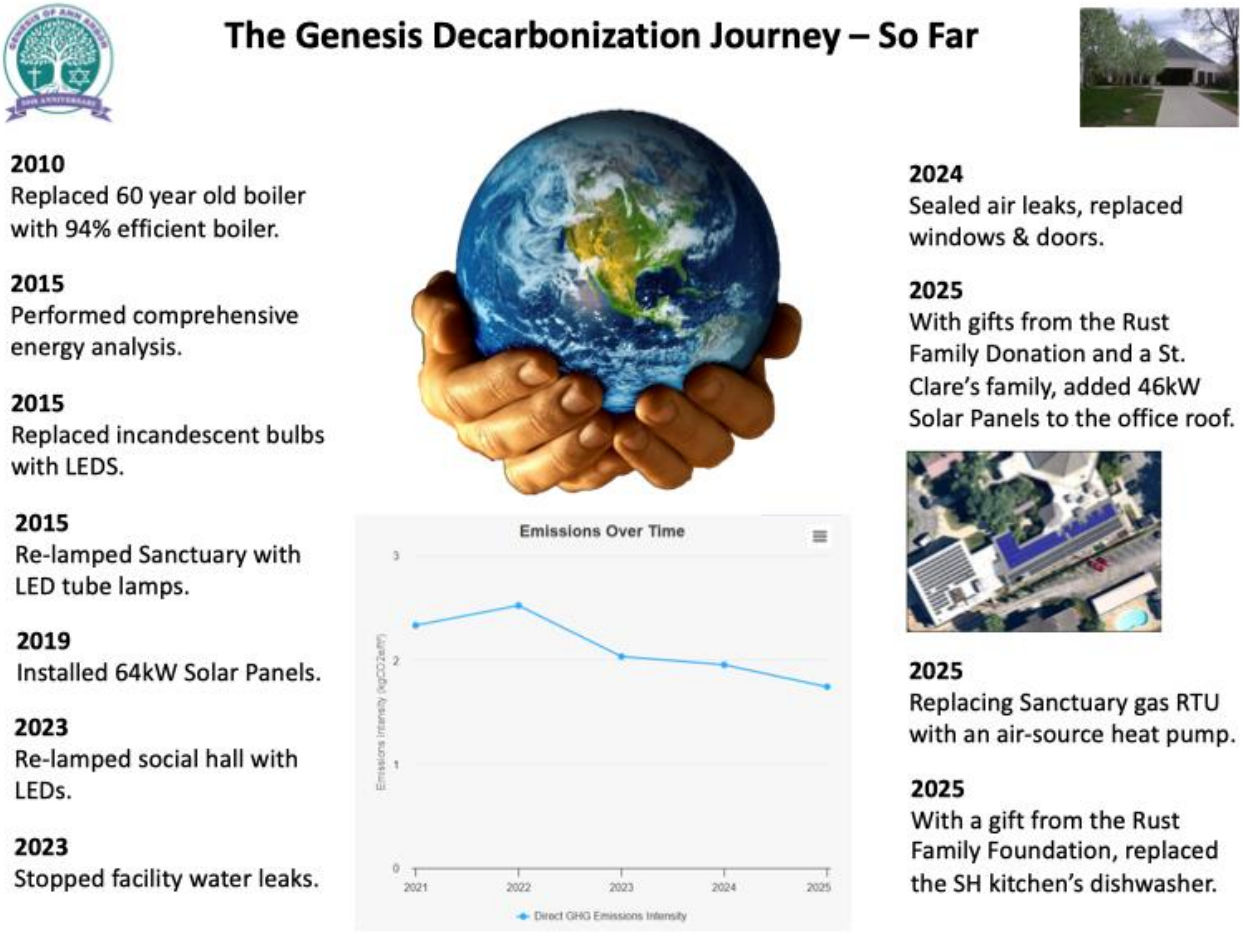

Figure 1 – Genesis Decarbonization Journey

In 2010, we replaced the 60-year-old boiler used for radiator heating offices and the social hall with a 95% efficient boiler. Then in 2015, we performed a comprehensive energy analysis to identify the largest uses of electricity in our facility. Using this data, in 2015 we re-lamped the sanctuary using LED tubes and starting replacing all incandescent lights in our facility with LEDs. Next in 2019, we signed a power purchase agreement with Eastover LLC, environmental investors from St. Clare's and TBE, to provide Genesis with solar power using solar panels which they owned but installed on our roofs. Then, in 2022-23, with the help of a grant from the Washtenaw 2030 District, we hired Inclination Engineering to develop a comprehensive Decarbonization Plan and timetable to cost effectively decarbonize Genesis and modernize facility ventilation systems by 2040-2050. Next on May 11, 2024 Genesis sent the Vestry and the TBE Board an updated Genesis Covenant Renewal which added under ***Responsible Stewardship***, "We continually strive to minimize greenhouse gas emissions with the goal of our facility becoming carbon neutral." Finally, on May 17, 2024, the Vestry accepted the updated 2024 Genesis Covenant Renewal, on 1/12/25 TBE adopted a comprehensive Climate Action Plan, and then on 6/18/25 St. Clare's added **Creation Care** as a key element in our mission statement to **Act for Justice**.

Genesis is now aggressively working to implement the core decarbonization elements of a comprehensive plan supporting the visions of St. Clare's, TBE, and Genesis. Our timetable is shown in Figure 2.

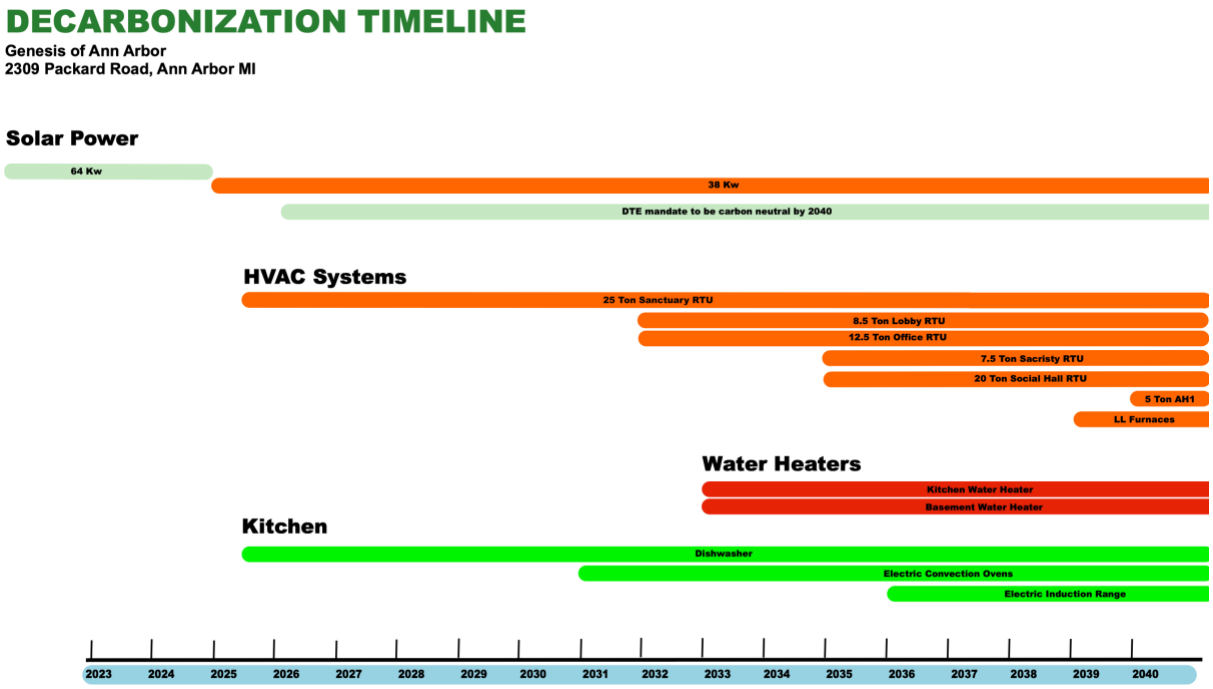

Figure 2 – Genesis Decarbonization Timeline

Electricity

In 2025 Genesis installed additional 76 (38kW) of solar panels on the Office roof and purchased at a 50% discount the existing 160 (64kW) previously installed Social Hall and Office solar panels owned by Eastover LLC. (Figure 3) All Genesis roofs except the Sanctuary, now have solar panels. On average, our emission-free solar panels now provide 41% of the electricity Genesis uses. Factoring in DTE's use of renewable energy, this means around 54% of all the electricity we use, produces zero carbon emissions. If DTE achieves its renewable energy goal, by 2040, 94% of our facility's electricity will produce no carbon emissions.

Figure 3 – Every Genesis roof except for the sanctuary is being used to generate electricity.

Reduce Building Heat Loss

To minimize the energy required for heating/cooling our facility, we replaced both the Social Hall windows and the lower-level classroom windows with windows having improved thermal insulation. The new lower-level windows are dramatically reducing our heating/cooling requirements on the

lower-level. Then, in 2025, we contracted to have the facility pressurized to identify areas where air leaks lost energy. Steven Kurz is now sealing the identified air leaks.

Replace Genesis HVAC Systems to Reduce Reliance of Natural Gas

The key part of our decarbonization plan is to cost effectively replace all our existing HVAC systems (Figure 4) with technologies which reduce or eliminate burning natural gas. Both geothermal systems and heat pumps are being considered, but at this time, only air-source heat pumps are cost effective and ready to replace Genesis HVAC systems. However, we are in conversations with Pattengill School to see if we can use the soccer field adjacent to our rear parking for installing and sharing a geothermal field and a parking lot. If these discussions are fruitful, our decarbonization plan could be updated to utilize geothermal for replacing our hot water systems.

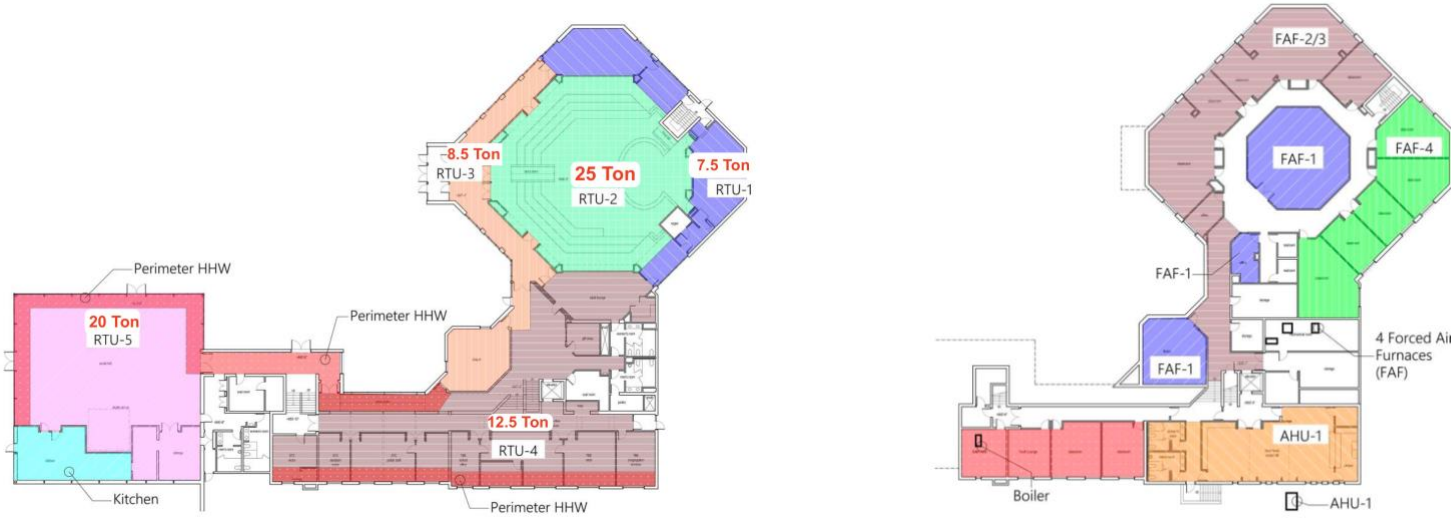

Figure 4 – Genesis is heated using Roof Top Units (RTUs), a boiler, and forced air furnaces.

Our current plan is to replaced our HVAC systems as they reach their end-of-life with air-source heat pumps. Just this past summer, we replaced the 25-ton sanctuary roof top unit with an air source heat pump which uses supplemental gas heating when the temperature drops below zero to heat our sanctuary. We anticipate this heat pump will substantially reduce the natural gas needed for heating the sanctuary at times when the outside temperature is below freezing by 63% or more. As heat pump technology improves, future heat pump replacements are being developed which will need minimal if any supplemental heating during the coldest winter days.

As they reach their end-of-life, between now and 2035 we will replace a 12.5-ton, an 8.5-ton, a 7.5-ton, the 5-ton unit installed for the AACH, and the 20.5-ton Social Hall RTU. Then the hot water boiler for the social hall/office radiators and the lower-level furnaces will be replaced in 2040-2042 with heat pump systems.

By 2042, we plan to replace all Genesis HVAC systems. The cost from 2025-2042 for decarbonizing our HVAC and furnace systems using air source heat pumps is estimated to be approximately $594,000. If geothermal can be used, the installation cost could be substantially higher depending on cost-sharing opportunities with AAPS and the City of Ann Arbor. If geothermal is chosen, the long-term operational costs will be considerably less.

Install WiFi Thermostat Controls

Inclination Engineering has recommended that by installing WIFi linked thermostats controlled by our facilities calendar, we can save a substantial amount of money for heating/cooling our facility. As funds become available, we will add a network of WiFi thermostats controlled by our facility calendar.

This should cost ~$9,000. Although thermostat controls may seem incidental, they are in fact critical to the most efficient operation of our heat pump units.

Replace Gas Hot Water Heaters

Genesis has 2 gas hot water heaters which were recently replaced in 2023. We plan to replace both when they fail again sometime between 2031-2035. If we have a geothermal replacement for the boiler used to heat the offices and social hall, it is possible we be able to use it to also to heat water for both the kitchen and hand-washing. If we replace hot gas water heaters with electric water heaters each costing $3,000, the total cost will be around $6,000. If we are able to tie into a geothermal system, facility plumbing changes would increase this amount considerably.

Replace Gas Kitchen Appliances

The kitchen has two gas appliances: a commercial gas range with built in ovens, and two convection ovens. The remaining appliances, a Hobart dishwasher, two commercial refrigerators, and a commercial freezer, are electric. To improve dishwashing energy efficiency, the old leaking Hobart dishwasher has already been replaced with an Energy Star certified one in June 2025.

To replace the two remaining gas appliances with electrical ones, Genesis will need to add additional electrical service to the kitchen. We estimate the cost of this electrical upgrade to be under $10,000.

The kitchen has a Southbend C0320 10 burner commercial gas range which was installed in 1994 when the kitchen was built. Currently, this 31-year-old gas range operates properly, and could continue running for possibly decades longer as long as repair parts remain available, but to maximally reduce our natural gas usage, this range should probably be replaced. If funds are available, Genesis hopes to replace it 2036 with an electric induction range which is estimated to cost $25,000.

The kitchen has two 31-year-old Southbend GS-20SC gas Double Half-Size convection ovens. They show considerably more wear than the Southbend gas range and need to be replaced sooner. Genesis plans to replace them in 2031 with a Southbend Double Half-Size Electric Convection oven for a cost of $16,000. In total, we estimate the cost of further decarbonizing the kitchen will be around $41,000.

Total Cost

The total cost of decarbonizing the Genesis facility by 2042 is estimated to be at least $650,000. Using today's technologies, the cost of replacing each end-of-life gas burning system is higher than the cost of replacement using existing conventional systems. However, technology is rapidly improving and the cost premium is dropping and soon emission-free replacements will be price competitive with existing systems.

For Additional Information

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