

Decarbonization Plan

Genesis of Ann Arbor

3/24/2023

A Phased Plan to Electrify Your Building



DECARBONIZATION PLAN

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Genesis of Ann Arbor

2309 Packard St, Ann Arbor, MI

Year Built

1956/1968/1975/1994

Square Feet

38,000

Site Energy Use Intensity (EUI)

71.4 kBtu/ft²

Scope 1 Emissions

216,600 kgCO₂e/yr

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1—Electrical Changes

2—Envelope Improvements

3—Domestic Hot Water Improvements

4—Basement Ventilation

5—Boiler Room Piping

6—Kitchen Electrification

7—Replace Rooftop Units

8—Replace Boiler

9—TBE Chapel

10—Kitchen Conditioning

11—Lower Mezzanine Classrooms


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GREENHOUSE GAS SOURCES

Three scope categories based on where emissions are generated

SCOPE 1 EMISSIONS

Direct emissions from onsite combustion and transportation.

Building sources include:

- Natural gas boiler for space heating
- 6 natural gas rooftop units and 4 natural gas furnaces
- 2 Natural gas domestic hot water heaters
- Gas range and ovens

BUILDING ELECTRIFICATION

The remainder of this document details a phased plan to replace the fossil fuel-powered equipment above with electric equipment.

SCOPE 2 EMISSIONS

Indirect emissions from purchased electricity

RENEWABLE ENERGY—ACHIEVED ☒

Genesis uses 100% renewable electricity by purchasing renewable energy credits through DTE's MIGreen Power Program.

SCOPE 3 EMISSIONS

All other indirect emissions from purchased goods, shipping, waste, employee and visitor transportation, and other sources.

INVENTORY, SOURCE, AND REDUCE

Scope 3 emissions are often unseen so a first step is to inventory them.

Reduction requires a multifaceted plan. High impact steps include:

- Compost food waste
- Increase plant-based meals
- Review suppliers' decarbonization performance
- Provide EV charging stations for visitors and employees

ADDITIONAL RESOURCES:

[EPA Scope 3 Inventory Guidance](#) | [LiveZeroWaste.org](#)

REACHING ZERO CARBON EMISSIONS

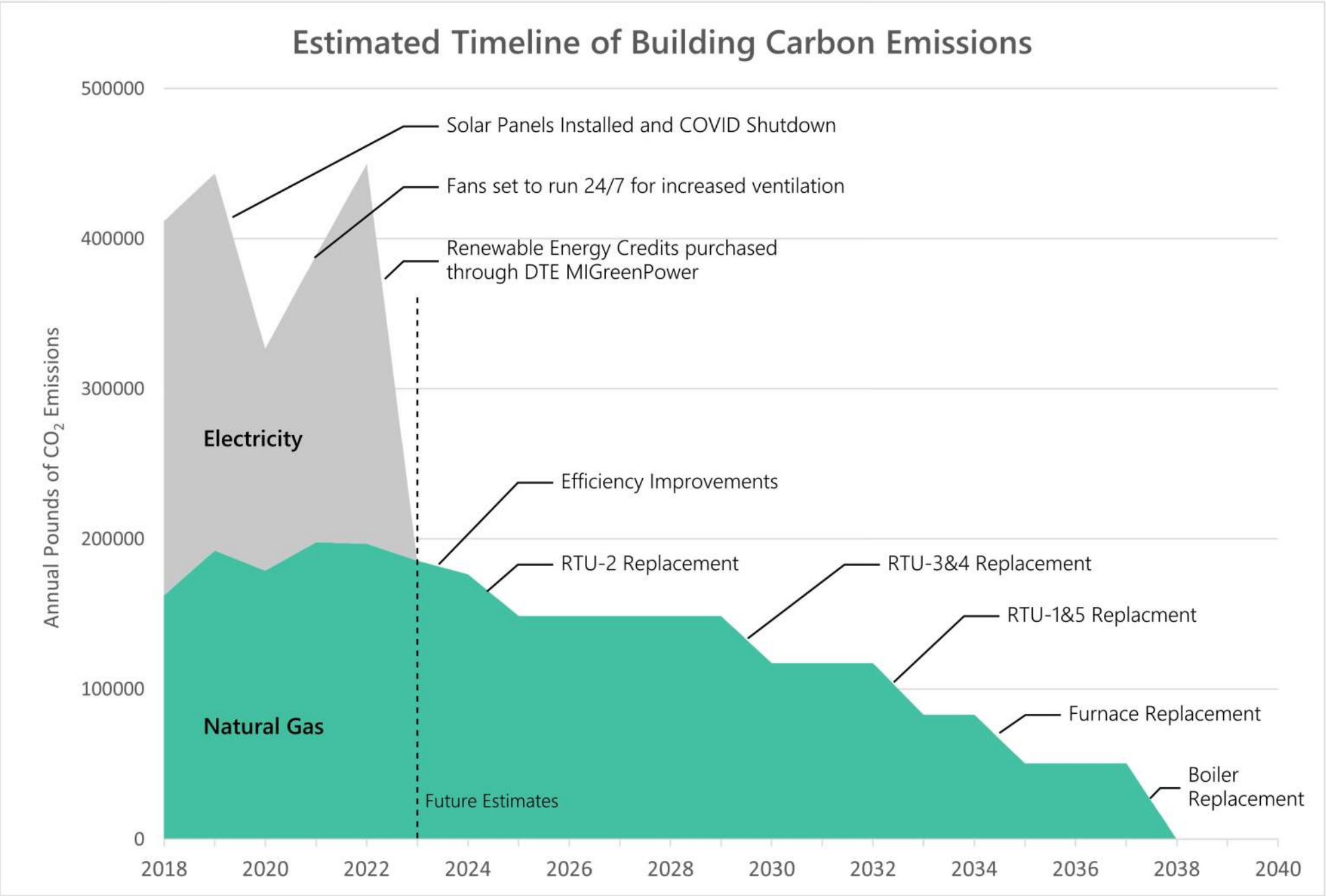
Genesis of Ann Arbor
2309 Packard St, Ann Arbor, MI

COMMITMENT TO ENVIRONMENTAL STEWARDSHIP
Climate change is a global threat and addressing it will require action from organizations of all sizes. Reducing the building’s greenhouse gas emissions is in keeping with the congregations’ principle of environmental stewardship.

ELIMINATING SCOPE 2 EMISSIONS
Genesis produces renewable electricity from its rooftop solar panels and purchases renewable energy credits from DTE for the remaining electricity consumption. This has drastically reduced the annual building carbon emissions.

BUILDING ELECTRIFICATION
The building natural gas emissions will be reduced over time as gas burning equipment is replaced with all electric equipment. The adjacent timeline shows the estimated carbon emission reductions as each task in the decarbonization plan is completed.

CARBON NEUTRAL BY 2040
If Genesis stands by its commitments and puts its principles into action, its building can reach carbon neutrality by 2040. The process will require careful planning and deliberate design. It will also require the organization to invest money in equipment costs that will return future dividends of energy savings. This decarbonization plan offers the initial roadmap for this journey.



EXISTING HVAC SYSTEM OVERVIEW

Background on the existing building equipment and constraints

LOWER LEVEL

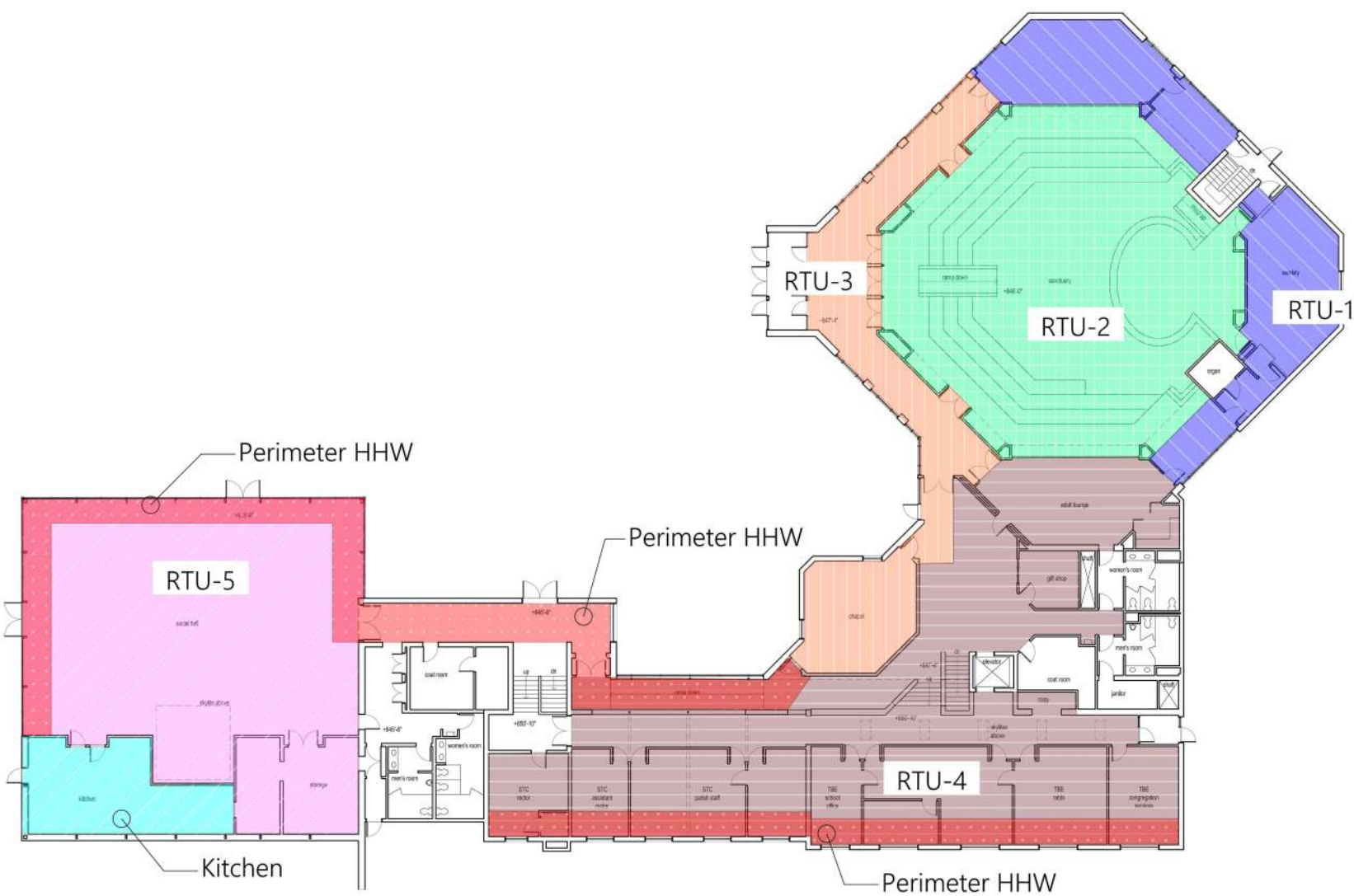
The lower religious classrooms are conditioned by 4 forced air furnaces in the basement mechanical room. Two of the furnaces are twinned together as one. Only FAF-1 has a cooling coil. The Montessori school uses the northeast rooms on the lower mezzanine level. An outdoor, packaged, air handling unit (AHU-1) serves the space. There are fin tube radiators along the outer wall but their thermostat is set to off. The remaining classrooms and Youth Lounge on the lower mezzanine are heated with fin tube radiators. The area under the Sanctuary has drop ceiling and a standard sized ceiling plenum. The lower mezzanine has drop ceiling in the Montessori space and corridor. The plenum is very shallow in the corridor and has conduit and pipe runs. The Montessori area has a shallow plenum and duct is routed between the ceiling joists. The remaining classrooms have hard ceilings.



LOWER LEVEL EXISTING ZONING PLAN

GROUND LEVEL

The ground level is primarily divided between 5 rooftop units (RTUs). RTU-1 and 3 serve the exteriors spaces surrounding the Sanctuary. RTU-2 serves the core area of the Sanctuary. RTU-4 serves the church and temple offices and a few other spaces. All these RTUs are located on the east roof, south of the sanctuary. RTU-5 serves the Social Hall and is located on the Social Hall high roof. The Social Hall Kitchen is served by exhaust fans and a makeup air unit. The makeup air unit is currently not functioning. Heating Hot Water (HHW) fin tube radiators provide heat to the perimeter zones of the Social Hall, connecting corridor, ramp, and offices.



GROUND LEVEL EXISTING ZONING PLAN

EXISTING HVAC SYSTEM OVERVIEW

Background on the existing building equipment and constraints

EXISTING EQUIPMENT USEFUL LIFE AND AGES

Evaluating Replacement Timing

There is a wide range of ages in the existing mechanical equipment in the building. The adjacent chart shows the equipment age plotted over the range of that type of equipment’s expected useful life. For example, an electric water heater has an expected useful life of 10-15 years. You can see that the Montessori unit, at 10 years old, is passing from the gray zone to the red.

IMMEDIATE NEEDS

The timing of when this plan’s tasks should be completed was based on when equipment was likely to fail based on reaching the end of its expected useful life. There are a few pieces of mechanical equipment that need immediate replacement. The Social Hall Kitchen makeup air unit is dead and so is the domestic hot water recirculation pump. The commercial kitchen range and ovens at 29 years old have surpassed their expected useful lives and the gas water heaters are nearing the end of theirs. All these items are covered under Task 3 - Domestic Hot Water Improvements and Task 6 - Kitchen Electrification. We recommend starting both of these tasks in 2023.

Task 5 - Boiler Room Piping is a precondition to Task 6, assuming a hot water MAU is desired, and is also scheduled to begin in 2023 on the timeline on the following page.

The basement classrooms do not have a functional ventilation system. Indoor air quality is a priority for Genesis and so Task 4—Basement Ventilation also begins in 2023. The split system in the adult lounge is nearing the end of its expected useful life and its replacement is included in Task 4.

2023 COMBINED PROJECT

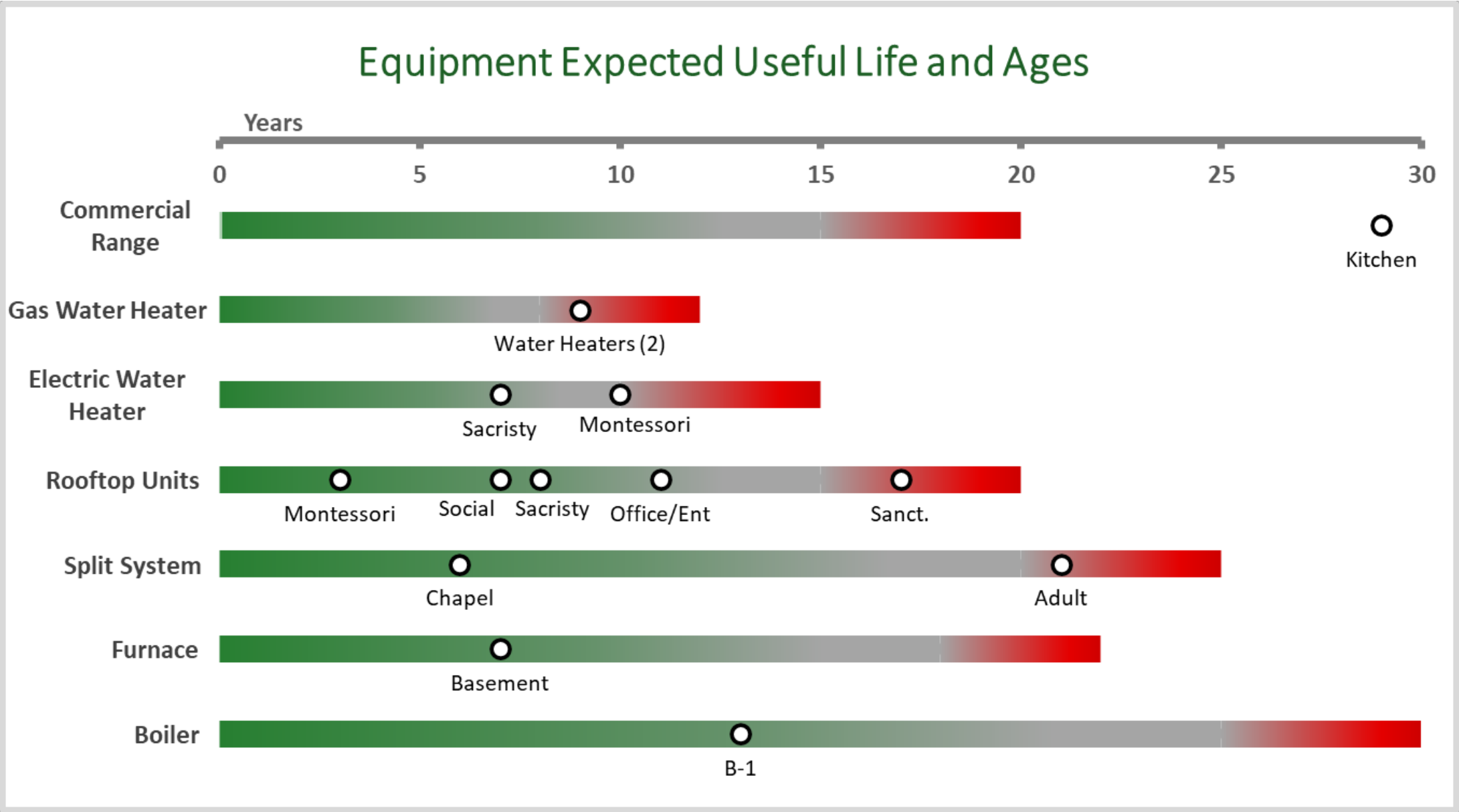
Cost savings and project efficiencies would result from combining the initial group of tasks above into one project. Both the design team and contractors would have reduced project management from one project compared to separate projects. A combined project may also simplify financing and qualify for green financing options.

NEAR TERM TASKS

The Sanctuary rooftop unit (RTU-2) at 17 years old is operating near the end of its expected useful life range. Its replacement, Tasks 7.2, is scheduled for 2024.

LAST EQUIPMENT TO REPLACE

The basement furnaces, boiler, and Montessori air handling unit have the most time left in their expected useful lives. These are the pieces of equipment planned to be replaced last.



Several of the existing pieces of mechanical equipment are approaching the end of their expected useful lives. Chart was made in February of 2023.

ELECTRIFICATION TIMELINE

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