

BUILD A HOME

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SCI 218

INTRODUCTION

My plan is for building a zero-emission home. Currently, my carbon emissions are the largest from this component of my life, and living in an apartment, I have very little opportunity to change that. Building a green home could make a significant reduction to my carbon footprint.

HISTORY

HEALTH IMPACTS

Bringing things like cooking indoors initially also brought pollution into the home. (Yorke, 2015)

CONSERVE ENERGY

Features such as awnings to block the sun from overheated windowed buildings were employed by the 19th century. (Natural Stone Institute, n.d.)

SQ FT PER PERSON

Fewer people live in each home. No longer multi-generational (Yorke, 2015).

LOCAL RESOURCES

Using local resources can reduce cost and increase sustainability (Yorke, 2015).

STANDARDS

Green building began to develop national standards in the United States, including LEED certification (Yorke, 2015).

ENERGY CRISIS

Energy crises and climate change support the use of renewable energy. (Yorke, 2015).

RECENT HISTORY



1970S

Energy crisis sparks interest in renewable energy



1990S

LEED Certification developed for public and corporate buildings



1990S

Climate change starts to become an increasingly urgent concern



TODAY

Solar power costs less than fossil fuels



SOLUTION

LOCAL RESOURCES

Using local plants also reduces water use (DEL-COLLE, et al., 2019).

COST SAVINGS

Technologies have become much less expensive so that there is no need to increase costs to reap the benefits (Rivera Greens, n.d.).

EFFICIENCY

Using energy efficient appliances and improved insulation along with modern heating technologies can reduce energy usage (DEL-COLLE, et al., 2019).

EASY TO USE

Including solar panels and battery storage on site can reduce utility costs and improve reliability (Rivera Greens, n.d.).



IMPROVED TECHNOLOGIES

Improved technologies for making energy, conserving energy and storing energy are essential to reducing impacts on the environment.

A landscape of rolling green hills under a cloudy sky. The foreground is dominated by tall, green grasses. In the middle ground, there are several rows of crops, possibly corn, planted in a field. The background shows more rolling hills and a few trees. The sky is overcast with grey clouds. A yellow rectangular box is superimposed over the center of the image, containing the text "STEPS TO TAKE" in a bold, yellow, sans-serif font.

STEPS TO TAKE



KEY STRATEGIES

BATTERY STORAGE

IMPROVED HEAT PUMP
TECHNOLOGIES

USE NATURAL MARKET
CYCLES TO REPLACE
EQUIPMENT IN EXISTING
BUILDINGS TO INCORPORATE
MORE ENERGY EFFICIENT
TECHNOLOGIES LIKE WATER
HEATERS

INCORPORATE HIGH VALUE
WORK EARLY

TAKE ADVANTAGE OF LOCAL
GOVERNMENT INCENTIVES
WHEN AVAILABLE.

(Hewitt & Coakley, 2019)

INCREASE RESILIENCY

#1

Replace grass with native plants to reduce water usage

#2

Adopt strategies to reduce excess energy use like closing blinds in the summer and using LED lights

#3

Use devices that cut off power to appliances and devices when not in use/fully charged.





GOALS OF THE BUILD

WANTS (AT LEAST ONE OF)

Near to work

Access to public transportation

Good sun exposure

Use local plants in landscaping

CHALLENGES

Possible upfront costs associated with net-zero energy goals

Trade-offs in design, style, access

Can I even get a home loan with my current student loan debt?

FINANCIALS

NATALE "NET ZERO/GREEN" HOME (Based on standard 2,000 sq/ft home - family of 4)

| | |
|---|-----------------------|
| Interest Rate | 4% |
| Principle Value | \$290,000.00 |
| Gas Bill | \$1.00 |
| Electric Bill | \$1.00 |
| Loan Duration (years) | 30 |
| Your Household Total Monthly Payment (Mortgage + Utilities) | \$1,387 |
| | (Rivera Greens, n.d.) |



FINANCIALS

COMPETITORS CONVENTIONAL HOME (Based on standard 2,000 sq/ft home - family of 4)

| | |
|--|-----------------------|
| Interest Rate | 4% |
| Principle Value | \$290,000.00 |
| Gas Bill | \$200.00 |
| Electric Bill | \$100.00 |
| Loan Duration (years) | 30 |
| Your Household Total Monthly Payment (Mortgage + Utilities) | \$1,698 |
| | (Rivera Greens, n.d.) |



COMPARISON OF COSTS

Forecasting for success

Cost Savings

| BENEFITS OF NET ZERO/GREEN | |
|--|-----------------|
| The Natale Home Saves You | \$311 per month |
| <ul style="list-style-type: none"> Natale Homes have a higher resale value than conventional homes You can get \$40,000 more in options vs. conventional homes and still have a lower monthly payment More comfortable home with no drafts No Utility bill surprises... ever No fear of rising utilities Lower maintenance costs | |
| Total household savings (over 30 years) (Rivera Greens, n.d.) | \$111,960 |

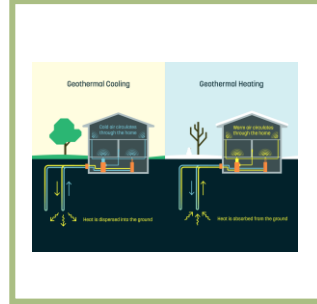
Tax Breaks

| GEOTHERMAL / SOLARTHERMAL HEATING & AIR CONDITIONING | |
|--|--|
| Geothermal Upgrade Cost | \$23,500.00 Cost w/air exchanger Up front cost out of pocket or put in mortgage |
| Est. Federal Tax Credit | \$9,900.00 30% of \$33,000-(retail pricing) |
| Est. NYS Tax Credit | \$5,000.00 |
| Cash back after first year | \$14,900.00 |
| Est. Homeowner Pays | \$8,600.00 left over/start recouping right away |
| Interest Rate | 4.0% |
| Principal Value | \$20,090.00 |
| Loan Duration (years) | 30 |
| Monthly Payment | |
| Utility Savings | \$95.91 |
| Monthly Income | \$220.00 per month |
| (Rivera Greens, n.d.) | \$124.09 pays you! |

FEATURES TO INCORPORATE



HIGH EFFICIENCY HEATING



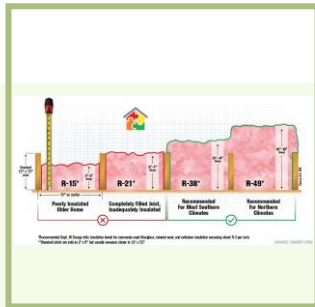
GEOTHERMAL



ENERGY SAVING OUTLETS



TANKLESS WATER HEATER



BETTER INSULATION



LOCAL PLANTS FOR LANDSCAPING



SOLAR PANELS



BATTERY STORAGE

STEPS TO TAKE

#1

Financial Condition
Pay off bills, better job

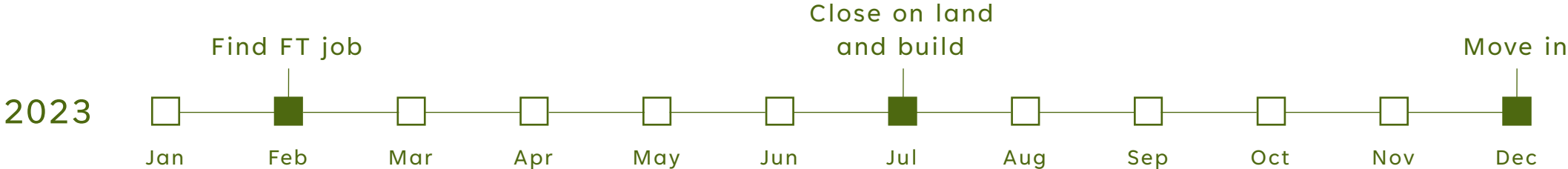
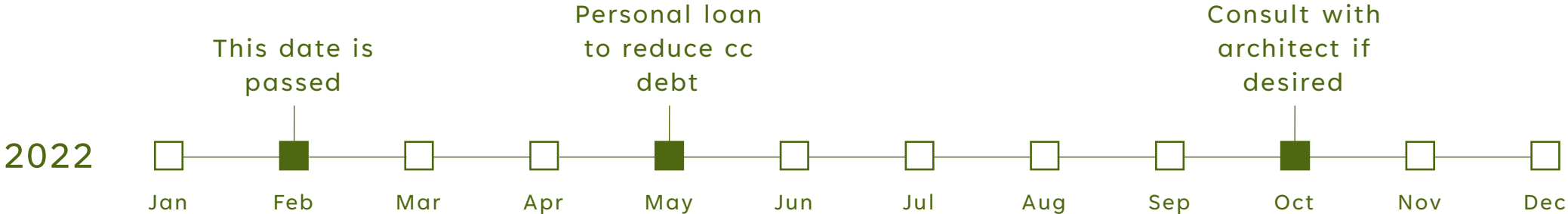
#2

Select property and
build

#3

Move in

2-YEAR ACTION PLAN



GLOBAL IMPACT

Make improvements around the world

SOLAR
PANELS

Can provide electricity resources even if a region lacks large electrical infrastructure. Even used by the Amish. (McCauley, 2008)

EUROPE

The US and Europe contribute the most to CO2 emissions and so can have the biggest impact. (Redlarski, Piechocki, & Dąbkowski, 2013)

GEO-
THERMAL

Like many green technologies, cost is coming down, and you don't need to live near a volcano to use geothermal energy. (Rivera Greens, n.d.)



OWNING A HOME: MORE OPPORTUNITIES



BACKYARD GARDENING

Grow your own veggies



COMPOSTING

I can't compost if I don't have a garden.



HARVESTING RAINWATER

Or using grey water technologies



GREEN ROOFING

Produces less heat

PLANNED ACTIONS

Taking planned actions can improve CO2 emissions. My biggest contribution comes from my living situation. Living in an apartment, I don't make many decisions about appliances, yard work, etc. and I'm banned from doing things like collecting water in a rain barrel. Building my own home will give me the opportunity to reduce my impact. (<https://www3.epa.gov/carbon-footprint-calculator/>)

View Your Annual Estimated CO₂ Emissions (lbs) from...

Home Energy Transportation Waste

Your Current Total



★ Your CO₂ Emissions are lower than the U.S. average. *Keep up the good work!*

New Total After Your Planned Actions



U.S. Average



SUMMARY

The US is the biggest per capita contributor to climate change. It's our responsibility to do better or we risk truly catastrophic impacts, some of which are already happening. We helped to create this problem, and so we have the responsibility of making a change to bend the curve toward avoiding the worst scenarios. And with improved technologies, we don't have to sacrifice a comfortable standard of living to do it.

THANK YOU

Betsy McCall

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