

# Energy Codes & how Appliances can help your scores.

HOME ENERGY RATERS

## Some background.

## There is no grace period for the new code changes.

- ▶ The Massachusetts Residential Stretch Energy Code (2021 IECC w/ MA Amendments) changed as of **January 1, 2023** for residential buildings 3 stories or less. ~~4+ story residential buildings will remain on the current code until the 2023 Multi-Family & Commercial Code goes into effect on July 1, 2023.~~ def in Q&A
- ▶ The new Residential Stretch Energy Code brings some substantial updates/changes that may affect how your next build is budgeted.
- ▶ There is an overall push to remove fossil fuels from new buildings and to help that along, higher HERS ratings will be allowed for all-electric buildings. (take what lil' we get) Buildings over 12,000 sqft need to look at PHIUS or PHI (I suspect 1 or 2 of those are built on the Island a year) not judging...

## HIGHLIGHTS OF CHANGES through June 2024:

- ▶ HERS 52 is required if any propane is used in the building
- ▶ HERS 55 is allowed if the home is all-electric
- ▶ HERS 55 (Fuel + Solar) or HERS 58 (Electric + Solar) also allowed
- ▶ 1 EV-Ready parking space and wiring per home is required for 1 and 2-family dwellings and townhomes and the number of EV-Ready parking spaces for new multi-family parking areas increases from 10% to 20% of parking spaces.
- ▶ ERV or HRV will now be required. Bath fans no longer meet the requirement for whole-house mechanical ventilation. There are some models we recommend using (with lower wattage) that help the HERS rating, but you can use any brand you would like. You will still need to meet the required CFM of ventilation.
- ▶ HVAC duct leakage testing is now required for all systems by a HERS rater, even if all ducts are within the conditioned envelope (looking for 4 – 12% leakage depending on space conditioning & location) \*12% you paid too much,
- ▶ HERS ratings will be required for additions over 1,000 sq ft and/or over 50% of the original structure (Level 3 Alteration per IEBC). Additions that are 1,000 sq ft or less will continue to follow the base energy code. (VERY CONTROVERSIAL, leaving it at that)
- ▶ Starting **July 1, 2023**, municipalities can vote to approve the "Specialized Stretch Code" which will require Net Zero/Zero Energy, solar, and lower HERS Ratings. Municipalities that opt-in to this are likely to provide a 6-9 month grace period.

## UPCOMING 2024 ENERGY CODE CHANGES

- ▶ On **July 1, 2024**, HERS requirements drop to HERS 42 for buildings with any gas/fuel **or** HERS 45 for all-electric homes/buildings –
- ▶ **AGGRESSIVE INCENTIVES FOR AE**

To avoid some of the confusion or to add to it, for any builders working off-island: base code towns are still under the 2018 IECC 9<sup>th</sup> edition of the CMR, so a HERS rating is a good option but not required.

- So, it is very important for the Architect & ISD to ask the builder, who the HERS rater is on the project.

## MAXIMUM HERS INDEX SCORE (MODELED WITHOUT RENEWABLE ENERGY)

	New Construction		Alterations, Additions, and Changes of Use		
	Until 1/1/23	1/1/23 through 6/30/24	Until 1/1/23	As of 1/1/23	As of 7/1/24
Mixed-fuel Building	55	52	65	52	42
Mixed-fuel Building with Solar Electric Generation	60	55	70	55	42
All-Electric Building	60	55	70	55	45
All-electric Buildings with Solar Electric Generation	65	58	75	58	45

## The question of the Day/Night ???

- Do appliances affect the HERS compliance for that home?
  - Every house and model is different, some pass without issue, and some are by the skin of the teeth.

## Why are we all here today... Appliances

- ▶ What do we all think of when it comes to kitchen appliances:
- ▶ What are the on Island demands:
  - ▶ Propane
  - ▶ Electric flat top
  - ▶ Electric coil
  - ▶ Induction
  - ▶ Bio?

What is the expectation of designer, the homeowner, builder's budget...

And why or how does the stove affect the energy model?

What about a clothes washer and dryer?

How do these affect Indoor air quality???

Keep in mind the state of Mass is decarbonizing...

## What does indoor air quality have to do with appliances:

- ▶ Keep in mind the holistic approach to residential home construction. No one assembly is an Island...

- ▶ Yes, totally intentional...

## What is my most asked question???



### ▶ What's the best?

- ▶ In reality, an impossible question for one individual human to answer for another human...
- ▶ example
  - ▶ I would say that a frozen Mallomar is the best cookie in the history of all cookies. I challenge anyone to disagree! It goes for anything...



## It starts with understanding the User-defined Reference Home. WTH is that?

- ▶ REULLA = Reference Home end use loads for lighting, appliances and MEPs as defined by Section 4.2.2.5.1, converted to MBtu/yr, where  $MBtu/yr = (kWh/yr)/293 \dots$

- ▶ Ya, it's okay I don't either... thank you software

▶ what it comes down to is this, you need to be 15% better than what you are doing today.

#### 4.1.2. Calculating the HERS Index. Determine the HERS Index using

$$HERS\ Index = PE_{frac} * (TnML / TRL) * 100$$

where:

$$TnML = nMEUL_{HEAT} + nMEUL_{COOL} + nMEUL_{HW} + EULLA\ (MBtu)$$

$$TRL = REUL_{HEAT} + REUL_{COOL} + REUL_{HW} + REULLA\ (MBtu/yr).$$

and where:

$$EULLA = \text{Rated Home end use loads for lighting, appliances and MEPs as defined by Section 4.2.2.5.2, converted to MBtu/yr, where } MBtu/yr = (\text{therms/yr})/10, \text{ as appropriate.}$$

$$REULLA = \text{Reference Home end use loads for lighting, appliances and by Section 4.2.2.5.1, converted to MBtu/yr, where } MBtu/yr = (\text{therms/yr})/10, \text{ as appropriate.}$$

and where:

$$PE_{frac} = (TEU - OPP) / TEU$$

$$TEU = \text{Total energy use of the Rated Home including all rated and r features where all fossil fuel site energy uses are converted to Electric Energy by multiplying them by the Reference Electr Efficiency of 40\%}$$

$$OPP = \text{On-Site Power Production as defined by Section 5.1.1.5 of tl}$$

## Just get the “Best” Appliances:

- ▶ A basic scenario: Slightly better than average appliance package. 1666 sqft SF LR modeled to sub-52. \* 2x4 wall with HDF.

- ▶ HERs score is 51.89 (hers52) to 49.84 (hers50) -

Energy star washer /dryer CEF in the high 2's IMEF same.

convection + induction

Fridge 560 kWh/yr (single unit)

Dishwasher 240 kWh (The dishwasher is also affected by the performance of the water heater.)

- ▶ Almost 2 Hers point

- ▶ Reducing the attic insulation from R49 to R44
- ▶ From a .24 u window to a .28 - (remember, small house with fewer windows)
- ▶ HERs 51.14

How much did you save or make because of the better appliances?

- ▶ What is the Best marketing tool? You should say insulation, But we all know better...
  - ▶ high-end kitchen over insulation and windows. The view out a .09 u window is the same as a .29.

## Let's look at a few of those options: W/ Kam

### BENEFITS OF INDUCTION COOKING

Induction cooktops heat up ~50% faster and are substantially more energy efficient than gas and conventional electric stoves.



All super cool - I am sold!

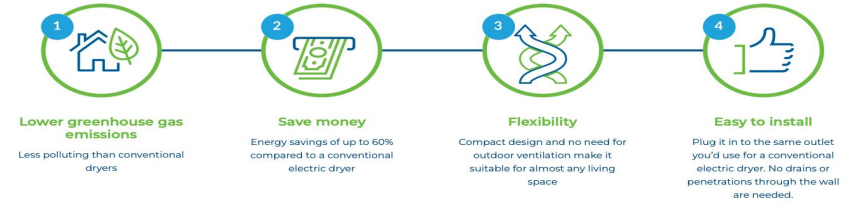
## Clothes washing/Drying

Electrification always requires more capacity!

Installing a heat pump clothes dryer may require upgrading your electric outlet to 240-volt. If all-new wiring isn't an option, some manufacturers offer 120-volt models. Most existing conventional electric dryers already require a 240-volt outlet.

### BENEFITS OF HEAT PUMP CLOTHES DRYERS

Heat pump clothes dryers extract moisture from your clothes by circulating warm air within a self-contained system, eliminating the need for an exhaust vent.

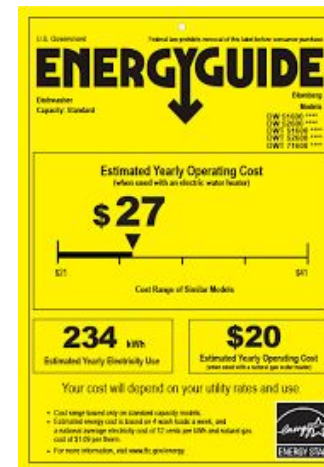


## Choosing the right "BEST" appliance:

### Types of Clothes Dryers

	HOW IT WORKS	VENT TO OUTDOORS?
Heat pump clothes dryer	Extracts moisture from clothes within a closed-loop system using heat pump technology—the most energy-efficient option	No
Hybrid heat pump clothes dryer	Uses a mix of heat pump technology and electric coils, which speeds up drying time but is not as efficient	No
Combined condensing washer/dryer	Washes and dries in a single cycle in a single appliance	No
Conventional electric dryer	Generates heat using electric resistance and expels hot air through an exhaust vent	Yes
Conventional gas dryer	Burns fossil fuels to heat the air inside the dryer and expels hot air through an exhaust vent	Yes

What is the performance expectation?  
Many loads in a short time - probably not a heat pump.



- We are looking for a low kWh #
- Most are 269 or 270

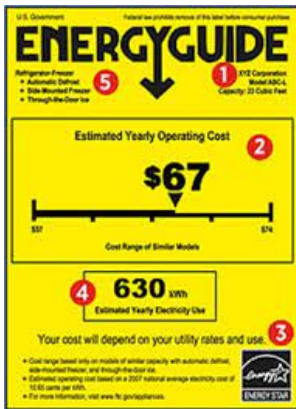
Washing dishes - my fav!



You use up to 27 gallons per load by hand versus 3 gallons with an ENERGY STAR-rated dishwasher. National Resources Defense Council

Your island draws its water from a single aquifer. Arguably one of the best in the world. Sustainable? Will the recharge rain again as it has been in the past? It's Holistic

Hats off to Wannacomet Water Co. for their dedication and hard work.



### This goes for any E-Star label:

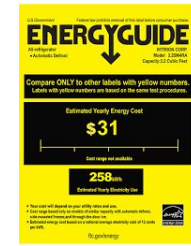
The EnergyGuide label for this refrigerator shows that it is estimated to use 630 kWh/yr (approximately 1.7 kWh per day) based on a standard test procedure

the lower the kWh the better?

The more you have the larger that number grows.

### Wine fridge - Beer Fridge - Micro fridge all add up!

- A bit of math:
    - kitchen fridge used 301
    - Freezer uses 448
    - The beer/soda fridge uses 258
    - the wine fridge uses 262
- 301  
448  
258  
262
- Plus a kegerator? = 270  
1539 kWh



### What does it look like in an energy model:

Integrated Modified Energy Factor, IMEF, is the energy

Energy Star uses Combined Energy Factor

### If you take nothing else away from this, the most important two (2) things:

1. Leave the energy star tags with appliances until the HERs rater has been through.
2. Reach out to the HERS rater to ask if appliances make a difference in the score of your home.
3. Logistically backward I know But I want you ask 1<sup>st</sup> so it's last



#### EXAMPLE COST

Cost after incentives is estimated by subtracting Mass Save rebate from up-front cost.  
Cost after incentives may be substantially lower if your household qualifies for income-scaled Federal rebates.

Example up-front cost before  
incentives  
**\$2,000**

Example cost after  
Massachusetts incentives:  
**\$1,500**

We can help you  
navigate the  
confusion:

## INCENTIVES AND FINANCING



### MASS SAVE®

**Induction Cooking Rebate:** \$500 on your purchase of an induction cooktop when switching from a gas or propane stove



### MUNICIPAL LIGHT PLANT

If you live in a town served by a **Municipal Light Plant (MLP)** check your MLP's website for incentives and rebates.



### FEDERAL REBATES

Inflation Reduction Act: Up to \$840 depending on your household size and income.

## WE ARE HERE TO HELP

Our team is here to help you meet these new code requirements. Please call our office at **508-833-3100** or send us an email to **Office@energycodehelp.com** to schedule a time to review your upcoming 2023 projects. We will work with you to help value-engineer your projects and maximize any available incentives.

### ADDITIONAL CONTACT INFO:

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HERS Rater #2223008 | Passive House US+Flater #2912 | NEHERS Board  
Embodied Carbon Chair | RESNET Emerging Leadership Council

## Q&A time

- ▶ I invited Laura Langelier - Broan-Nutone Ventilation.
  - ▶ Indoor air quality - ERVs
  - ▶ Kitchen Hoods
  - ▶ Make-up air options