

## Meeting House Place Energy Production Assessment

The following provides the quantities, clarifications and design guidelines of the estimated average power consumption for homes located at Meeting House Place.

<b>Annual Solar Energy Production</b>	
(1) Smartflower per home	5,065 kwh/a
(1) Smartflower or equivalent roof top solar per home	5,065 kwh/a
Energy Production per Home per year	10,130 kwh/a
<b>Energy Production for (28) homes</b>	<b>283,640 kwh/a</b>
<b>Full Year Occupancy Energy Consumption</b>	
(1) Two story 3,800 sf home	7,548 kwh/a
Energy Consumption per Home per year	7,548 kwh/a
<b>Energy Consumption for (28) homes</b>	<b>211,344 kwh/a</b>
Excess Energy Production per Home per year	2,582 kwh/a
<b>Excess Energy Production for (28) homes</b>	<b>72,296 kwh/a</b>
Optional additions	
(1) 400 sf additional bedroom above the garage (optional)	530 kwh/a
(1) In ground pool with high efficiency pool pump (optional)	864 kwh/a
Optional Energy Consumption per Home	1,188 kwh/a
Excess Energy Production with options per Home per year	1,394 kwh/a
<b>Excess Energy Production with Options for (28) homes</b>	<b>39,032 kwh/a</b>
<b>Seasonal Occupancy</b>	
Seasonal Energy Consumption per Home per year	2,314 kwh/a
Seasonal Excess Energy Production per Home per year	7,816 kwh/a
<b>Total Net Energy Production for (28) Seasonal Homes</b>	<b>218,848 kwh/a</b>
<b>Townhome Energy Consumption</b>	
(4) One-bedroom units at 2,706 kwh/a	10,824 kwh/a
(10) Two-bedroom units at 3,070 kwh/a	30,070 kwh/a
<b>Total Townhome Energy Consumption</b>	<b>40,894 kwh/a</b>
<b>MHP Energy Production including Townhomes</b>	<b>31,402 kwh/a</b>
<b>MHP Energy Production with Optional additions including Townhomes</b>	<b>(1,862) kwh/a</b>
<b>MHP Energy Production for Seasonal Use including Townhomes</b>	<b>177,954 kwh/a</b>

Based on the calculations provided above, Meeting House Place including the Townhomes will produce excess energy of **31,402 kwh/a** if all homes are occupied year-round. Meeting House Place will effectively be **net energy neutral** requiring 1,860 kwh/a of energy if all homes include the optional additions and will produce excess power production of **177,954 kwh/a** if the homes are occupied on a seasonal basis (120 days/year).

## Meeting House Place Energy Production Assessment

### Clarifications

1. The homes will meet Energy Star 3.1 and Massachusetts Stretch Code requirements.
2. A two-car garage is included in the power consumption total.
3. Exterior lighting is included in the power consumption total.
4. The heat source for the homes is propane.

### Meeting House Place Sustainable Design Guidelines

Sustainable Design is an important part of the Meeting House Place project. The following items will be required for design and construction of homes at Meeting House Place to address the issue of energy conservation.

#### ENERGY STAR 3.1

All homes will be required to be Energy Star 3.1 V9 certified. In order to achieve certification, the following items are required:

#### General

1. Completion of the National Rater Design Review Checklist.
2. Completion of the National Rater Field Checklist.
3. Completion of the National HVAC Design Report.
4. Completion of National HVAC Commissioning Checklist.
5. Completion of National Water Management System Builder Requirements
6. Raters and field inspectors are required to complete Energy Star training.
7. Builders are required to sign and Energy Start Partnership Agreement.
8. HVAC contractors are required to be credentialed EPA recognized quality, installation, training and oversight organization,

Partial requirements of items 1-5 listed above include the following:

#### Insulation

Fenestration U-Factor	0.27
Skylight U-Factor	0.55
Ceiling R-Value	R49
Wood Frame Wall R-Value	R20 or 13+5
Mass Wall R-Value	R13/17
Floor R-Value	30
Basement Wall R-Value	R15/19
Slab R-Value and Depth	R10, 2ft.

## **Meeting House Place Energy Production Assessment**

### **Air Infiltration/Envelope Tightness**

1. Air sealing is required at all penetrations and locations in the building envelope where air infiltration may occur including light fixtures, vent fans, electrical boxes, plumbing penetrations, chases, blocking and sheathing, knee walls, attic access, etc.
2. A blower door test is required to ensure envelope tightness and must achieve a rating of 3ACH50.

### **HVAC Systems**

1. AC units to be achieve 20 SEER
2. Gas boilers to achieve 90AFUE Energy Star rating (eg)
3. A programmable thermostat is required for each furnace/boiler in the system.
4. Duct tightness testing is required by a DET Verifier and achieve a maximum of 4% total leakage.
5. Ducts must be insulated as follows:
  - a. R8 in attic
  - b. R6 in other unconditioned space
  - c. Not required inside building envelope
6. Whole house ventilation system is required.

### **Plumbing Systems**

1. R3 pipe insulation provided on all hot water supply lines.
2. 50-Gal Gas Water Heater to achieve .59 EF (eg)

### **Electrical Systems**

1. Energy Star light bulbs modeled in 90% of ANSI/ResNet/ICC Standard 301 qualifying light fixture locations

### **Appliances**

1. Energy Star refrigerators, dishwashers and ceiling fans to be included.

### **Renewable Energy**

1. Solar energy production will be a requirement for each single-family house at Meeting House Place.
2. Installation of one Smart Flower per lot plus equivalent output amount on roof mounted solar will be required or approved equal alternate as approved by the homeowner's association. Two Smart Flowers can be used or one Smart Flower minimum plus appropriate placed additional, properly oriented and HOA approved roof mounted panels with equivalent output to one Smart Flower. All locations of solar panels must be pre-approved by the Homeowners Association Architectural committee prior to

## **Meeting House Place Energy Production Assessment**

construction of the home and must be shown on the plans at the time of Homeowners Association plan review.

3. Each Smart Flower and other solar installations will be connected to the grid for net metering.
4. The above requirements should provide approximately 10,000 KWH/yr which should result in a net zero power consumption for each home in the subdivision. Energy use from the power grid would be net zero.