

# DOE Zero Energy Ready Certified Homes Florida Habitat for Humanity Affiliates



FLORIDA SOLAR ENERGY CENTER  
*Creating Energy Independence*



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Building America - Partnership for  
Improved Residential Construction

Building America  
Partnership for Improved  
Residential Construction

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## The BA-PIRC Team 2005-2015

Florida Solar Energy Center (Lead)  
Washington State University  
Northwest Energy Works

### New Construction

40 Production Builder  
30 Affordable Housing Builder  
25 Custom Builder  
19 Developer Partners  
35 Manufactured Housing

### Existing Homes

12 Non-profit Housing Renovation  
12 Local Government  
17 Existing Market Rate  
13 Designers And Engineers (13)  
27 Manufacturers & Suppliers

### Allied Industry Partners

18 Industry Associations  
15 Implementation Partners  
8 Research Organizations  
4 DOE National Labs  
31 Utilities  
6 Universities



**Building America  
Partnership for Improved Residential Construction**

Building America is an **industry-driven**, cost-shared research program to accelerate the development and adoption of advanced building energy technologies and practices in new and existing homes to **achieve zero energy and zero energy-ready homes**

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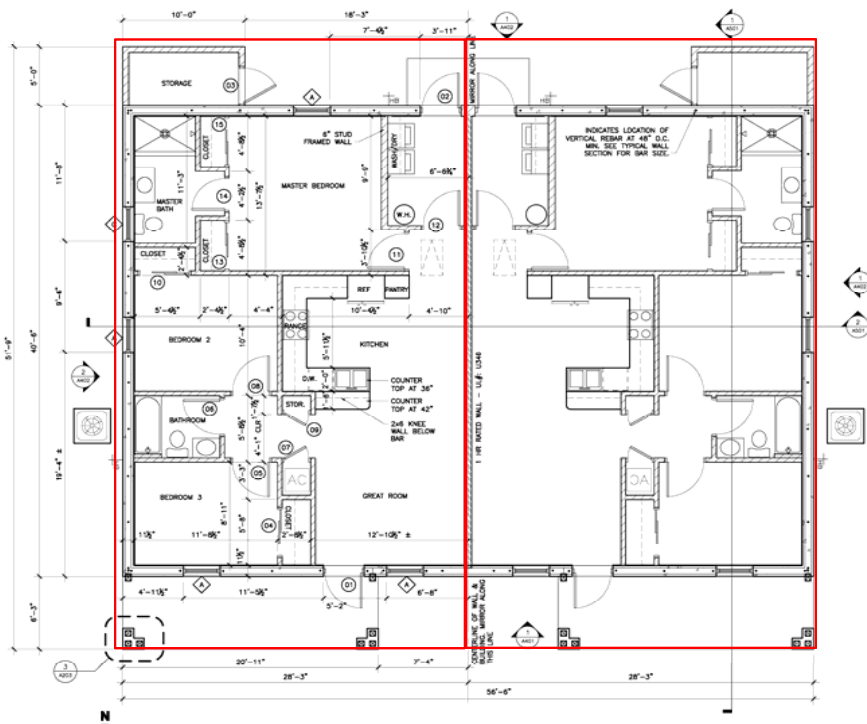




# Manatee County HFH: Hope Landing



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## Manatee HFH Challenge Home Vital Stats

HERS Index  
53 w/o PV; 23 with PV  
(Target = 60)

Predicted Annual Energy Cost  
\$295

Incremental Cost  
\$7,774 (no solar)  
\$17,008 with PV  
\$7,774 after incentives

First Year Cash Flow  
+\$36 no solar  
+\$382 with PV  
+\$690 after incentives

# South Sarasota HFH Laurel Gardens



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Rendering by: **LIGARTE**  
ARCHITECTURE





	Southeast Volusia County HFH	Manatee County HFH	South Sarasota HFH
<b>Interior Ducts</b>	Modified Truss Framing for Interior Duct Chase “Raised Ceiling”	Unvented Attic	Unvented Attic
<b>Return Air Paths</b>	Passive from bedrooms	Passive from bedrooms	Passive from bedrooms
<b>Mechanical Ventilation</b>	Energy Recovery Ventilator	6” outside air duct (with dedicated inlet, filter, and outlet in return plenum) controlled by motorized damper	outside air duct (with dedicated inlet, filter, and outlet in return plenum) controlled by motorized damper and coupled with a fan cyclor
<b>Dehumidification</b>	RH set point on thermostat	RH set point on thermostat	
<b>Heating &amp; Cooling</b>	1.5 ton, central split system SEER 15, HSPF 8 heat pump	Minimally ducted mini-split 0.3 to 1.2 Ton, 16 to 23 SEER	1.5-ton central, split system heat pump; HSPF 8.4, SEER 15

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Affiliates Made Incremental Improvement Over Time

HOWEVER

Economic Calculations compared to Florida Code  
NOT the Affiliate's Standard Practices



# DOE Zero Energy Ready Certified Homes Southeast Volusia County HFH



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		Compared to Florida Energy Code:					
		CH Renewable Ready (With <b>Heat Pump Water Heater</b> )		CH With Solar ( <b>Hot Water Only</b> ) <b>No Incentives</b>		CH With Solar ( <b>Hot Water Only</b> ) <b>With Incentives</b>	
<b>Incremental First Cost</b>		\$4636		\$8736		\$8736	
<b>FPL Utility Renewable Energy Rebates</b>		NA		NA		\$4,700	
<b>In-Kind Donation</b>		\$612		\$612		\$612	
<b>Adjusted First Cost</b>		\$4024		\$8124		\$3424	
<b>Modeling Software</b>		EnergyGauge USA	BEopt 2.1	EnergyGauge USA	BEopt 2.1	EnergyGauge USA	BEopt 2.1
<b>0% Interest, 30 Years MCHFH Mortgage</b>	Incremental annual mortgage cost	\$134	\$134	\$271	\$271	\$114	\$114
	Annual energy cost savings	\$348	\$203	\$509	\$365	\$509	\$365
	<b>Projected first year cash flow</b>	<b>\$214</b>	<b>\$69</b>	<b>\$238</b>	<b>\$94</b>	<b>\$395</b>	<b>\$251</b>
<b>7% Interest, 30 Years Market Rate Mortgage</b>	Incremental annual mortgage cost	\$374	\$374	\$704	\$704	Utility incentive available for low-income housing only	
	Annual energy cost savings	\$348	\$203	\$509	\$365		
	Projected first year cash flow	-\$26	-\$171	-\$195	-\$339		

# DOE Zero Energy Ready Certified Homes Manatee County HFH



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		Compared to Florida Energy Code:					
		CH Renewable Ready (no solar)		CH With Solar (PV + Hot Water) No Incentives		CH With Solar (PV + Hot Water) With Incentives	
Incremental First Cost Over Florida Code Minimum House		\$7,774		\$17,008		\$17,008	
FPL Utility Renewable Energy Rebates		NA		NA		\$9,234	
Adjusted First Cost Over Florida Code Minimum House		\$7,774		\$17,008		\$7,774	
Modeling Software		EnergyGauge USA	BEopt 2.1	EnergyGauge USA	BEopt 2.1	EnergyGauge USA	BEopt 2.1
MCHFH Mortgage Terms (0% - 30 Years)	Incremental Annual Mortgage Cost	\$259	\$259	\$567	\$567	\$259	\$259
	Annual Energy Cost Savings	\$295	\$239	\$949	\$801	\$949	\$801
	<b>Projected First Year Cash Flow</b>	<b>\$36</b>	<b>-\$20</b>	<b>\$382</b>	<b>\$234</b>	<b>\$690</b>	<b>\$542</b>
Market Rate Mortgage Terms (7% 30 Years)	Incremental Annual Mortgage Cost	\$626	\$626	\$1,371	\$1,371	Utility incentive available for low income housing only	
	Annual Energy Cost Savings	\$295	\$239	\$949	\$801		
	Projected First Year Cash Flow	-\$331	-\$387	-\$422	-\$570		

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	Southeast Volusia County HFH	Manatee County HFH	South Sarasota HFH
<b>Construction Director</b>	Ray Allnut	Bruce Winter	Michael Sollitto
<b>Home Energy Rater and Technical Assistance Partner</b>	Patrick Gillis Home Audit Technologies LLC	Karl White Energy & Sustainability Consultants, LLC	Dennis Stroer Calcs-Plus

For more pictures, analysis, and guidance, check out these case studies and the research report:

Southeast Volusia: [http://www.ba-pirc.org/habitat/pdf/DOE\\_ZEH\\_Volusia\\_Habitat.pdf](http://www.ba-pirc.org/habitat/pdf/DOE_ZEH_Volusia_Habitat.pdf)

Raised Ceiling Interior Duct Method: [http://www.ba-pirc.org/casestud/pdf/Fur-Up\\_CaseStudy\\_.pdf](http://www.ba-pirc.org/casestud/pdf/Fur-Up_CaseStudy_.pdf)

Manatee County: [http://www.energy.gov/sites/prod/files/2013/11/f5/hiawinner\\_manatee\\_habitatforhumanity\\_100213.pdf](http://www.energy.gov/sites/prod/files/2013/11/f5/hiawinner_manatee_habitatforhumanity_100213.pdf)

South Sarasota: [http://www.ba-pirc.org/habitat/pdf/DOE\\_ZEH\\_Sarasota\\_Habitat.pdf](http://www.ba-pirc.org/habitat/pdf/DOE_ZEH_Sarasota_Habitat.pdf)

Achieving Zero Energy Ready Certification\* in Affordable Housing in the Hot Humid Climate:

<http://www.fsec.ucf.edu/en/publications/pdf/FSEC-CR-1983-14.pdf>

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