



New Construction Guide and the 2030 Challenge

Architecture 2030 has endorsed a prescriptive path to meet the current 2030 Challenge target based on NBI's Advanced Buildings® *New Construction Guide*. With this path, design teams now have another tool when pursuing the 2030 Challenge.

Architecture 2030 issued the 2030 Challenge in 2006 to focus the building sector on energy reductions that will lead to a final goal of carbon neutrality in all new construction, development and major renovations by 2030. The 2030 Challenge has set a series of intermediate targets, using the state of the whole building stock in 2000 as the starting point. For 2010, the target was a 60% reduction in net energy use from the 2000 baseline. With 2015 comes a new target: a 70% reduction in net energy use.


The Advanced Buildings *New Construction Guide*

The Advanced Buildings *New Construction Guide* is NBI's prescriptive design guide for small commercial buildings. Built on tens of thousands of building energy simulations, the *Guide* offers a pre-assembled, whole-building integrated design package that delivers significant savings over the latest versions of ASHRAE Standard 90.1 and the International Energy Conservation Code (IECC). Progressively stringent tiers allow the *Guide* to deliver savings in a national landscape (where states and local jurisdictions have energy codes with drastically different levels of stringency) while also providing greater levels of energy efficiency to projects seeking higher performance.

The *New Construction Guide* is composed of three tiers. Tier 1 is a comprehensive approach to energy saving for areas where the energy codes are lagging. Tier 2 will achieve significant savings over current code baselines—such as the 2012 edition of the International Energy Conservation Code or the 2010 edition of ANSI/ASHRAE/IESNA Standard 90.1-2010—and is composed of Base and Enhanced Criteria. Achieving Tier 2 requires meeting all of the Base Criteria (2.1-2.17). Tier 3 is composed

of a series of Performance Pathways. These pathways represent broader design strategies with a more integrated and informed design approach. Achieving Tier 3 requires meeting one or more of these Pathways.

Tiers of Efficiency

 Increasing Energy Efficiency				Tier 4	Under Development Net-zero energy capable Requires: Tier 2 + Tier 3 + operations
	35-40% above ASHRAE 90.1-2007 /IECC 2009			Tier 3	Based On <i>New Construction Guide</i> Requires: Tier 2 + one or more Performance Pathway strategies
	25-35% above ASHRAE 90.1-2007 /IECC 2009		Tier 2		Based On <i>New Construction Guide</i> Requires: Design Process Strategies + Tier 2 Measures
	15-25% above ASHRAE 90.1-2007 /IECC 2009	Tier 1			Based on current versions of <i>Advanced Buildings Core Performance Guide</i> (1.1.2 and 2012 IECC Supplement) Requires: Design Process Strategies + Tier 1 Measures

Package	Office	Warehouse	Retail	School	Multifamily
Base Requirements	Tier 2 Bundle and Criteria 3.8: Plug Loads				
PLUS					
25% Renewable Energy Requirement	3.7 W OR 12.8 Btu per sq ft of conditioned space*	2.4 W OR 8.2 Btu per sq ft of conditioned space	4.8 W OR 16.4 Btu per sq ft of conditioned space	5.4 W OR 18.5 Btu per sq ft of conditioned space*	5.6 W OR 19.3 Btu per sq ft of conditioned space
PLUS ONE OF THE FOLLOWING OPTIONS					
Advanced Envelope Option	Criteria 3.2: Advanced Envelope	Criteria 3.2: Advanced Envelope PLUS Criteria 2.20: Enhanced LPD PLUS Criteria 3.3 Advanced Daylighting	Criteria 3.2: Advanced Envelope	Criteria 3.2: Advanced Envelope	NA
Advanced Daylighting Option	Criteria 3.3: Advanced Daylighting	Criteria 3.3 Advanced Daylighting PLUS Criteria 2.20: Enhanced LPD PLUS Criteria 3.2: Advanced Envelope	Criteria 3.3: Advanced Daylighting	Criteria 3.3 Advanced Daylighting PLUS Criteria 2.18: Enhanced Opaque Wall PLUS Criteria 2.20: Enhanced LPD	NA
Energy Recovery Ventilation Option	NA	NA	Criteria 2.22: Energy Recovery Ventilation	Criteria 2.22: Energy Recovery Ventilation PLUS Criteria 2.20: Enhanced LPD	NA
Demand Control Ventilation Option	Criteria 2.23: Demand Control Ventilation	NA	NA	Criteria 2.23: Demand Control Ventilation	NA
Advanced Office Lighting Option	Criteria 3.4: Advanced Office Lighting	NA	NA	NA	NA
Advanced HVAC Option	Criteria 3.6: Variable Capacity Heat Pump OR Criteria 3.7: Radiant Heating & Cooling	NA	NA	Criteria 3.6 Variable Capacity Heat Pump	NA
2% Additional Renewable Energy Option	0.5 W OR 1.7 Btu per sq ft of conditioned space	0.9 W OR 2.9 Btu per sq ft of conditioned space	0.7 W OR 2.4 Btu per sq ft of conditioned space	0.7 W OR 2.4 Btu per sq ft of conditioned space	0.8 W OR 2.8 Btu per sq ft of conditioned space

* If pursuing the Advanced HVAC option with Criteria 3.6: VCHP, the 25% Renewable Energy requirement is reduced to 19% (2.8 W OR 9.7 Btu per sq ft of conditioned space).

Using the *New Construction Guide* for the 2030 Challenge

NBI’s “70% Solution” for the 2030 Challenge combines the *New Construction Guide* with limited onsite renewable energy. Leveraging the Guide’s inherent flexibility, the 70% Solution includes a series of design options. Each option is based on a strong energy efficiency strategy that could include advanced daylighting, superinsulation, advanced lighting design or advanced HVAC system selection. This allows design teams to choose the strategy that best suits the needs of each individual project.

The *New Construction Guide* 70% Solution is composed of a combination of prerequisites and one of a series of options (see Table 1 on the next page). Prerequisites include Tier 2 and Plug Load Controls from Tier 3 in addition to the installation of an onsite renewable energy system meeting 25% of the building’s energy load. Each building project must then also comply with one of the options listed above in Table 1: Advanced Envelope, Advanced Daylighting, Energy Recovery Ventilation, Demand Control Ventilation, Advanced Office Lighting Design, Advanced HVAC or Additional Renewable Energy. Some options are comprised of a single criteria from the Guide, and some are from a combination of criteria; not all options are available for all building types.

The onsite renewable energy requirement is based on the prescriptive sizing methodology from section 406 of the IECC. Renewable energy systems have a system rating, the peak output that the system can produce. Each project needs to be provided with a renewable energy system with a system rating based on the conditioned floor area of the building. Simply multiply the factor in the table (in either watts/sf or Btu/sf) by the conditioned floor area of the building to size the renewable energy system. Since different building types use energy differently, the sizing per sq ft varies by building type.



Learn more:

advancedbuildings.net/newconstruction