

Adopt Current Building Energy Codes

Summary:

By making conscientious efforts to reduce building energy use through energy codes, we help improve the economy and reduce the impact of buildings on the environment. Under this plan, the Commonwealth would consistently adopt the latest version of the International Construction Code (ICC) or at least the International Energy Conservation Code (IECC). By adopting the 2015 IECC (~ 20% increase in energy efficiency compared to the 2009 IECC, the current code in the Commonwealth), Pennsylvania would be assured of maintaining a minimal incremental means of continuous building performance improvement. Building energy codes and standards are pivotal to a clean and sustainable energy future.

Background and Overview:

Building energy codes and standards are minimum energy efficiency requirements for the design and construction of new buildings and additions and renovations to existing buildings. Building energy codes are an integral part of building construction codes and regulations that govern all aspects of a building from structural integrity to electrical safety and fire protection.

The two most widely adopted forms of energy codes are the International Energy Conservation Code (IECC) and ANSI/ASHRAE/IEE Standard 90.1 (ASHRAE Standard 90.1). The IECC applies to all buildings and the ASHRAE codes apply only to commercial buildings. When adopted, these codes are required to be satisfied as a condition for building approval and occupancy. When adoption and compliance of these codes is achieved, buildings will use less energy, thus reducing energy demand and reducing associated GHG emissions.

Potential Implementation Strategies:

1.) State should, through the appropriate process, adopt the current building energy codes.

Building Energy Conservation Codes

Adoption of up-to-date building energy codes ultimately provides the single most cost effective and expeditious means of achieving reductions in energy-related greenhouse gas emissions in the building sector. Commercial and residential buildings account for approximately 41% of all energy consumption and 72% of electricity usage in the United States. Building energy codes and standards set minimum requirements for energy-efficient design and construction for new and renovated buildings, assuring reductions in energy use and GHG emissions over the life of buildings.

Pennsylvania established a statewide building code through Act 45 of 2005. The PA Uniform Construction Code (UCC) adopts the International Construction Code (ICC) family of codes, including the International Building Code (IBC), International Residential Code (IRC), International Plumbing Code (IPC), International Mechanical Code (IMC) and IECC. Although the original legislation called for automatic adoption of the latest triennial codes within a year of their publication, subsequent amendments resulted in Pennsylvania choosing not to adopt the 2012 ICC and, therefore, the 2009 ICC and IECC will be the state building code in the commonwealth until at least 2015.

The UCC Review and Advisory Council (RAC) was established by Act 106 of 2008. The RAC is charged with making recommendations to the Governor, the General Assembly and the Department of Labor and Industry regarding proposed changes to Act 45, The Pennsylvania Construction Code Act, and reviewing the latest triennial code revisions (2015, 2018, 2021...) issued by the International Code Council contained in the International Codes enforceable under the PA UCC. The RAC is required to submit a report to the secretary of Labor and Industry within 12 months following publication of the latest triennial codes specifying each code revision that is to be adopted as part of the UCC.

By consistently adopting the latest version of the ICC (or at least the IECC), Pennsylvania would be assured of maintaining a minimal incremental means of continuous building performance improvement, moving towards the goals set out in this work plan and playing a national leadership role in greenhouse gas reductions. Fourteen states (NY, MA, RI, DE, MD, VA, KY, MS, IL, IA, UT, CA, OR, WA and the District of Columbia) have already surpassed PA by adopting the 2012 IECC and are on track to adopt the 2015 IECC.

Key Assumptions:

- MWh consumption estimates from EIA AEO 2014
- Projected cost of electricity and NG from EIA AEO 2014
- 20% reduction in electricity and NG use for buildings adopting new codes vs. projected use
- 2.0% of buildings annually will be built to new code
- Cost of adopting new code = \$99 million (commercial) and \$140 million (residential) based on payback period (residential = 3.4 years, commercial = 4.2 years) estimated using Department of Energy analysis to adopt 2012 EICC.
- Projected GHG Emissions in Electricity assume .5% annual reduction from 2013 Pennsylvania value (1112 lb/MWh)

Commercial		2015	2030
	Projected Electricity Consumption (MWh)	42,915,282	43,459,194
	Projected Cost of Electricity (\$/MMBtu)	\$36.32	\$40.16
	Projected NG Consumption (Billion btu)	149,558	152,298
	Projected Cost of NG (\$/MMBtu)	\$8.38	\$11.65
	Energy Savings by adopting new codes	18.00%	18.00%
	% of buildings changing up to code	2.00%	2.00%
	Projected GHG Emissions Electricity (lb CO ₂ e/MWh)	1,101	1,021
	Projected GHG Emissions NG (Lb CO ₂ e/MMBtu)	117	117
	Emission Savings in MMtCO ₂ e	0.106	1.662
	Cost of adopting the code in million \$ (4.2 yr payback)	99.0	99.0
	Energy Savings in Million \$	23.66	403.23
	Net Cost of adopting the code in million \$	75.34	-304.23

Residential		2015	2030
	Projected Electricity Consumption (MWh)	51,632,590	51,085,560
	Projected Cost of Electricity (\$/MMBtu)	\$50.26	\$53.34
	Projected NG Consumption (Billion btu)	225,235	209,685
	Projected Cost of NG (\$/MMBtu)	\$11.55	\$15.21
	Energy Savings by adopting new code	18.00%	18.00%
	% of buildings changing up to code	2.00%	2.00%
	Projected GHG Emissions Electricity (lb CO ₂ e/MWh)	1,101	1,021
	Projected GHG Emissions NG (Lb CO ₂ e/MMBtu)	117	117
	Emission Savings in MMtCO ₂ e	0.136	2.088
	Cost of adopting the code in million \$ (3.4 yr payback)	140.0	140.0
	Energy Savings in Million \$	\$41.24	\$673.67
	Net Cost of adopting the code in million \$	98.76	-533.67

	2030 Annual			2030 Cumulative		
	Reductions (MMtCO ₂ e)	Cost (\$MM)	Cost-Effectiveness (\$/tCO ₂ e)	Reductions (MmtCO ₂ e)	Total NPV (\$MM)	Cost-Effectiveness (\$/tCO ₂ e)
Energy Codes	3.75	-838	- 223	32.2	-2,745	-85

Potential Overlap

- High Performance Buildings