

Potential Cost Impacts of Energy Code Updates



Option 1: No change

Keep the 2018 IECC: 0% improvement in energy efficiency

Additional up-front cost	\$0
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Additional mortgage cost	\$0
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Annual utility cost savings	\$0
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Total utility cost savings over 75 years	\$0
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Simple payback period (average cost)	N/A
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Option 2: Stay the Course

Adopt the 2024 IECC + minor appendices: *15% improvement in energy efficiency*

Additional up-front cost	\$4,300 - \$14,900 (\$9,700 average)
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Additional mortgage cost	\$24 - \$119 monthly
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Average utility cost savings	Year 1: \$250	\$21 monthly
	Year 12: \$350	\$29
	Year 30: \$600	\$50
	Year 75: \$2,250	\$188

Average utility cost savings over 75 years	\$68,700
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Simple payback period	11 – 33 years (<i>national estimate for Flagstaff's climate zone: 16.7 years</i>)
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Option 2 Costs: Stay the Course

Code Section	Upfront Cost	Cost Savings
2024 Residential IECC Base Code	\$3,300 - \$14,900	Potential for utility cost savings from a 15% reduction in energy use
95% efficiency gas furnace amendment	\$0*	<ul style="list-style-type: none"> - Can reduce natural gas utility cost by 5% - Helps avoid \$1,000s in costly retrofits
Cold climate heat pump amendment	\$0*	<ul style="list-style-type: none"> - Can reduce electricity costs by installing high efficiency heat pumps
Solar-ready appendix	(\$100)**	<ul style="list-style-type: none"> - Helps avoid \$1,000s in costly retrofits - Already in Flagstaff code
EV charging appendix	(\$650)**	<ul style="list-style-type: none"> - Helps avoid \$1,000s in costly retrofits - Already in Flagstaff code
Electric-ready appendix	\$1,000	Helps avoid \$1,000s in costly retrofits

*Cost already included in the IECC base code.

**Standard is in Flagstaff’s current code.

Option 3: Progress to Net-Zero

Adopt the 2024 IECC + minor appendices + Stretch Code Appendix:
24% improvement in energy efficiency

Additional up-front cost	\$7,300 - \$19,300 (\$13,300 average)	
Additional mortgage cost	\$39 - \$154 monthly	
Average utility cost savings	Year 1: \$350	\$29 monthly
	Year 12: \$500	\$42
	Year 30: \$850	\$71
	Year 75: \$3,150	\$263
Average utility cost savings over 75 years	\$96,300	
Simple payback period	16 – 27 years	

Option 3 Costs: Progress to Net-Zero

Code Section	Upfront Cost	Cost Savings
2024 IECC + minor appendices	\$4,300 - \$14,900	<ul style="list-style-type: none">- Potential for lower utility costs- Savings from avoiding costly retrofits
Stronger solar-ready requirements	\$600	Helps avoid \$1,000s in costly retrofits
Stretch Code Appendix	\$2,400 - \$3,800	Potential for utility cost savings from a 24% reduction in energy use

Option 4: Net-Zero Ready

Adopt the 2024 IECC + minor appendices + Net-Zero-Ready Appendix:
31% improvement in energy efficiency

Additional up-front cost	\$8,550 – \$27,400 (\$18,000 average)	
Additional mortgage cost	\$64 - \$175 monthly	
Average utility cost savings	Year 1: \$500	\$42 monthly
	Year 12: \$700	\$58
	Year 30: \$1,150	\$96
	Year 75: \$4,350	\$363
Average utility cost savings over 75 years	\$133,050	
Simple payback period	13 - 30 years	

Option 4 Costs: Net-Zero-Ready

Code Section	Upfront Cost	Cost Savings
2024 IECC + minor appendices	\$4,300 - \$14,900	<ul style="list-style-type: none">- Potential for lower utility costs- Savings from avoiding costly retrofits
Stronger solar-ready requirements appendix	\$600	Helps avoid \$1,000s in costly retrofits
Net-zero-ready appendix	\$3,600 – \$12,000	Potential to lower utility costs from a 31% reduction in energy use

Going Further: Net-Zero

100% improvement in energy efficiency over Flagstaff's current code

Additional up-front cost	\$25,800 - \$44,550 (\$35,200 average)	
Additional mortgage cost	\$151 - \$356 monthly	
Average utility cost savings	Year 1: \$1,150 – \$1,700	\$96 - \$140 monthly
	Year 12: \$1,600 – \$2,450	\$134 - \$204
	Year 30: \$2,750 – \$4,400	\$229 - \$366
	Year 75: \$10,450 – \$17,550	\$872 – 1,461
Utility cost savings over 75 years	\$318,900 – \$521,950 (\$420,400 average)	
Simple payback period	12 – 25 years	

Beyond Option 4 Costs: Net-Zero

Code Section	Upfront Cost	Cost Savings
2024 IECC + minor appendices	\$4,300 - \$14,900	<ul style="list-style-type: none">- Potential for lower utility costs- Savings from avoiding costly retrofits
Net-zero-ready appendix	\$3,600 – \$12,000	<ul style="list-style-type: none">- Prepares homes to be net-zero with the addition of solar panels
Solar Panels	\$13,000 - \$23,750	<ul style="list-style-type: none">- 100% improvement in energy efficiency = extremely low utility costs (starting at \$30 month)

The sums of the low and high costs on this slide do not match the range provided on the previous slide due to different solar PV system sizes needed to offset annual energy use and differences in costs to improve energy efficiency across building fuel types.

Cost Estimates for All Energy Code Options

Option	Average Additional Construction Costs	Additional Monthly Mortgage Costs	Average Monthly Utility Cost Savings (over 30 years)	Average Total Utility Cost Savings (over 75 years)	Simple Payback Period (Years)
Option 1	\$0	\$0	\$0	\$0	N/A
Option 2	\$9,700	\$24 - \$119	\$45	\$64,800	11 – 33
Option 3	\$13,300	\$39 - \$154	\$47	\$96,300	16 – 27
Option 4	\$18,000	\$64 - \$175	\$65	\$133,050	13 – 30
Beyond Option 4	\$35,200	\$145 - \$349	\$195	\$420,400	12 – 25

Additional Information on Costs Estimates

- Construction cost and utility savings estimates are for **single-family homes** because more data are available
- Provided as a **range** when multiple data points are available
- Should be taken as **ballpark estimates**, due to large variation in construction costs and utility cost savings based on:
 - Building type, heating and cooling system types, available utility rate plans, actual future utility rate increases, building occupant behavior, other external factors
 - Actual utility rate increases

Data Sources

- Local and national data sources:
 - *Analysis of the Costs, Benefits, and Barriers to Building Highly Energy-Efficient and All-Electric Residential Homes in Flagstaff, Arizona* – (data from 13 local builders and energy modeling)
 - Capstone Homes
 - U.S. Department of Energy (DOE)
 - Energy Information Administration
 - Pacific Northwest National Laboratory
 - National Association of Homebuilders (NAHB)
 - Rocky Mountain Institute (RMI)

Staff will continue to update cost estimates when additional data are available.

Utility and Mortgage Rate Assumptions

- Approximate home size: 2,000 – 2,500 sq ft
- Utility costs from recent Flagstaff *Energy Efficiency Costs, Benefits...* study
- Utility rate increases – based on industry standard & EIA projections
 - 2026 increase: 3.5% (electricity), 5% (natural gas)
 - 3% annual increase after 2026
 - Do not account for pending APS and UniSource rate increase ACC cases
- Mortgage rate assumptions
 - Low: 3% interest, 20% downpayment (based on lowest construction cost)
 - High: 6% interest, 10% downpayment (based on highest construction cost)
- Simple payback period
 - Time it takes for utility cost savings to offset additional construction costs

Commercial IECC Costs Notes

- Costs are not provided because there is **very little data**
- Often constructed and occupied by same company
 - **Owner benefits directly** from investments in energy efficiency through lower utility costs
- Commercial buildings often **last longer** than residential
 - Utility cost savings can accrue over a longer period
- Out of state commercial developers work with building codes across the country, including codes stronger than Flagstaff's