Revitalization of the Lincoln School
Energy Performance Evaluations
3/7/2018

		Current Option- 2. Renovations of Existing	Current Option- 3. Renovation of Existing and Additions to Stretch Code	4. Stretch Code Plus - Additions and Renovations	5. Net Zero Ready /2030 ByLaw	6. Net Zero w/ solar	PV size	$ for PV
Existing EUI	65							
Repair Only								
Total Project Cost		**$49.1**						
Predicted EUI		**57**						
Renovation Only								
Total Project Cost		**$72.6**						
Predicted EUI		**57**						
Option A1.1A								
Total Project Cost			**$78.2**	**$82.3**	**$82.0**	**$84.1**	**850 kW**	**$2.1**
Predicted EUI			**53**	**38**	**23**	**0**		
Option A3.4								
Total Project Cost			**$88.5**	**$93.0**	**$91.8**	**$94.0**	**860 kW**	**$2.2**
Predicted EUI			**52**	**36**	**23**	**0**		
Option B6.1								
Total Project Cost			**$94.3**	**$96.7**	**$94.3**	**$96.2**	**770 kW**	**$1.9**
Predicted EUI			**47**	**35**	**23**	**0**		

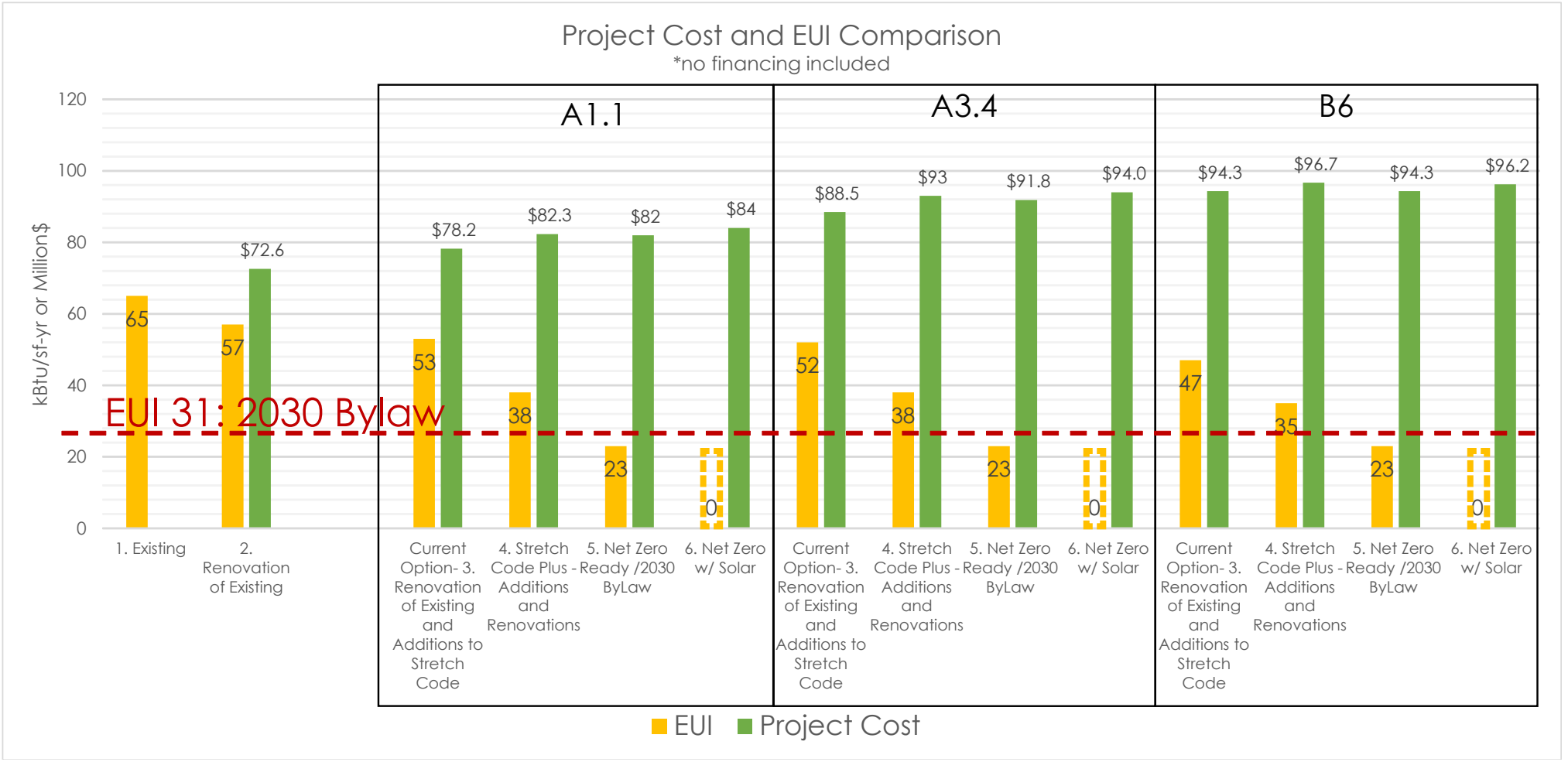
Note - Cost in millions and EUI in kBtu/sf-yr

31 80% reduction from New England School EUI - 2030 Bylaw (metric to meet by 2020)

Source: Andy Shapiro - CBECS data using New England school existing EUI data (baseline of 154 kBtu/sf-yr)
https://www.eia.gov/consumption/commercial/

Financial Assessment Assumptions

- 4% bond rate (per Buckner Creel Lincoln School)
- 30-year loan (per Buckner Creel Lincoln School)
- $2.50/watt solar financed at the same rates as above (per Steven Strong at Solar Design Associates: $1.75-$2 for that size system roof mounted, $2.25-$2.50 for ground mounted, and $2.75-$3.25 for carports)
- The Town of Lincoln Solar PV Analysis 8/9/16 by Solar Design Associates shows room on the existing roofs (excluding Reed Gym) is 461 kW and parking structures are an additional 433 kW for a total capacity of 894 kW on site, enough capacity for all options to be Net Zero.
- Option 6.*Net Zero with Solar* has no energy costs (assumes meters/connection charges the same for all options and 1 to 1 credit for each kWh produced)
- Electricity starts at $0.2208/kWh (per FY 17 commodity + utility delivery charges - per Buckner Creel Lincoln School)
- Natural Gas starts at $1.397/therm (per FY 17 commodity + utility delivery charges - per Buckner Creel Lincoln School)
- Fuel escalation 2%/yr
- Nominal inflation rate equals the nominal discount rate, therefore 0% used - 2018 dollars


Project Cost and EUI Comparison
*no financing included
A1.1
A3.4
B6
kBtu/sf-yr or Million$
120
100
80
60
40
20
0
EUI 31: 2030 Bylaw
65
57
$72.6
53
$78.2
38
$82.3
23
$82
0
$84
52
$88.5
38
$93
23
$91.8
0
$94.0
47
$94.3
35
$96.7
23
$94.3
0
$96.2
1. Existing
2. Renovation of Existing
Current Option- 3. Renovation of Existing and Additions to Stretch Code
4. Stretch Code Plus - Additions and Renovations
5. Net Zero Ready /2030 ByLaw
6. Net Zero w/ Solar
EUI
Project Cost

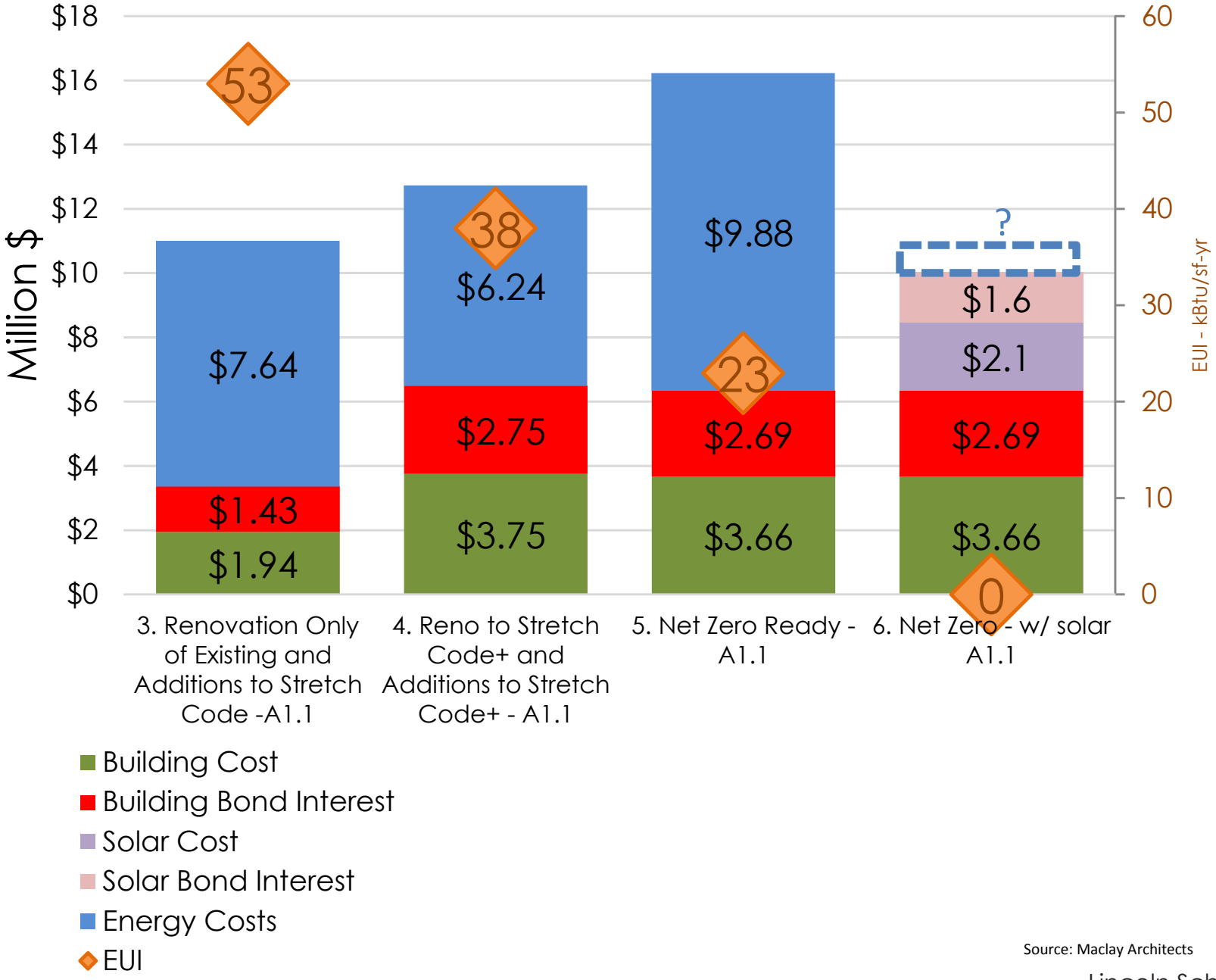
A1.1

30-year Present Value of Energy and Total Bond Costs w/ EUI

Source: Maclay Architects

A1.1

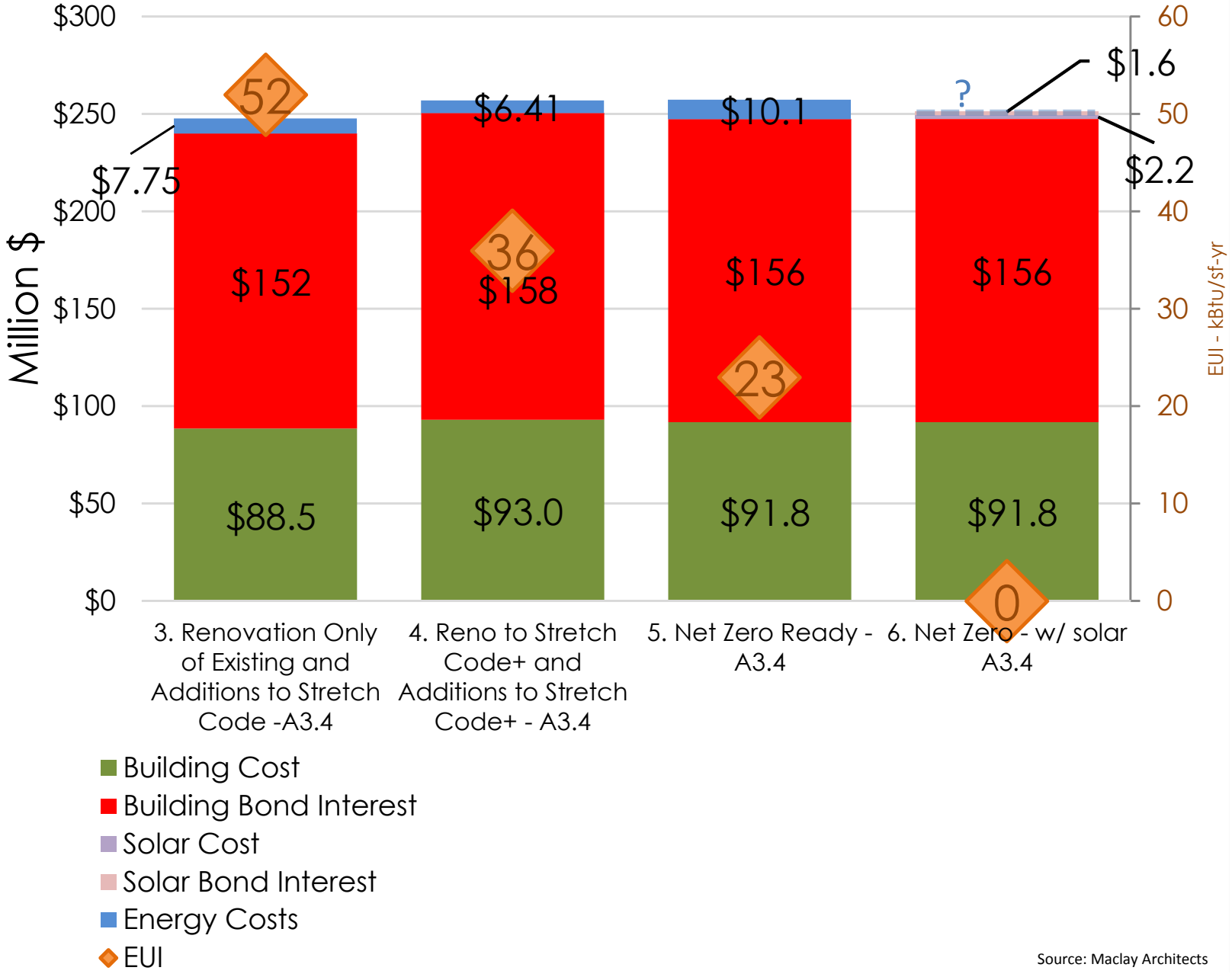
30-year Present Value of Energy and Incremental Bond Costs w/ EUI



Source: Maclay Architects

A3.4

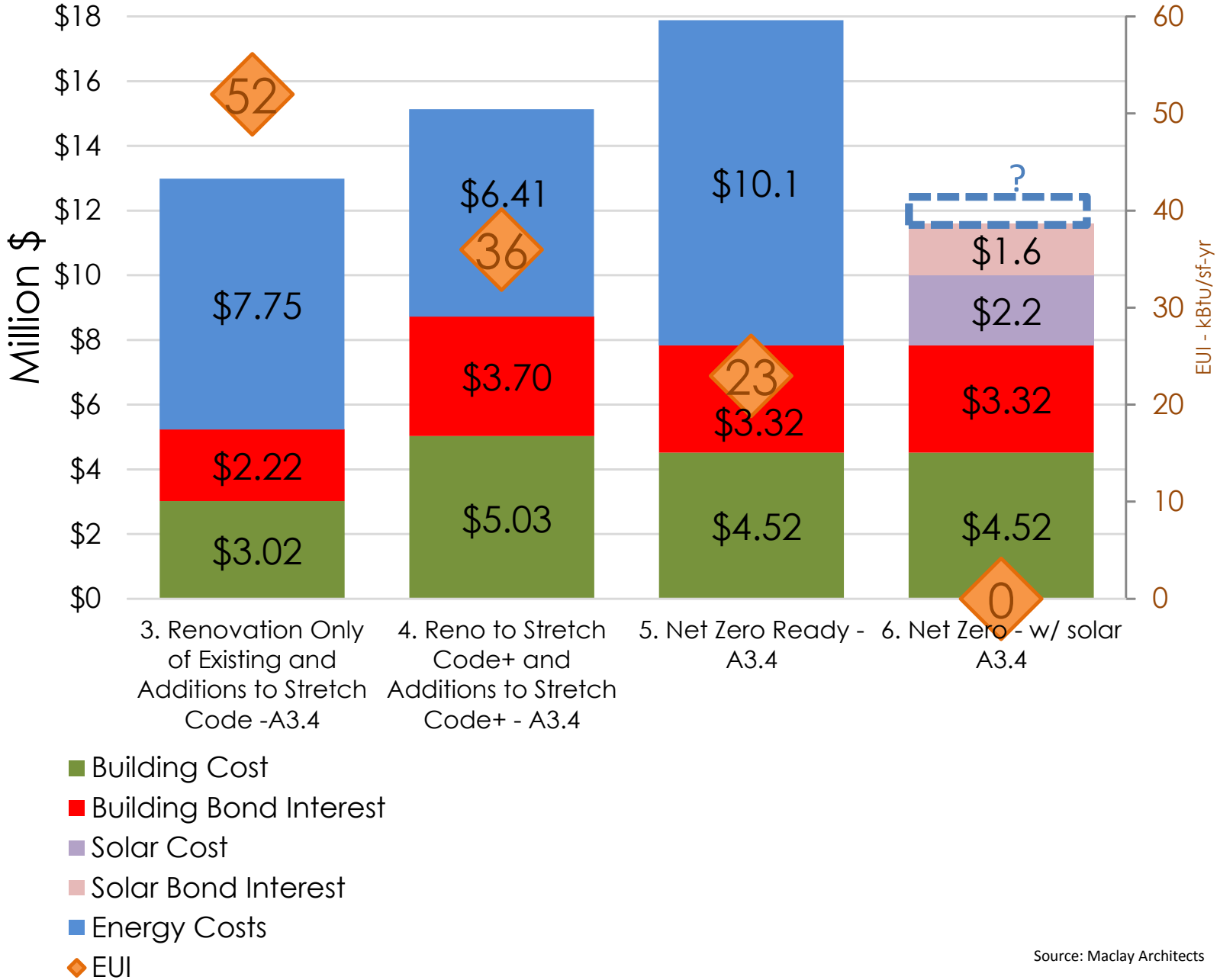
30-year Present Value of Energy and Total Bond Costs w/ EUI



Source: Maclay Architects

A3.4

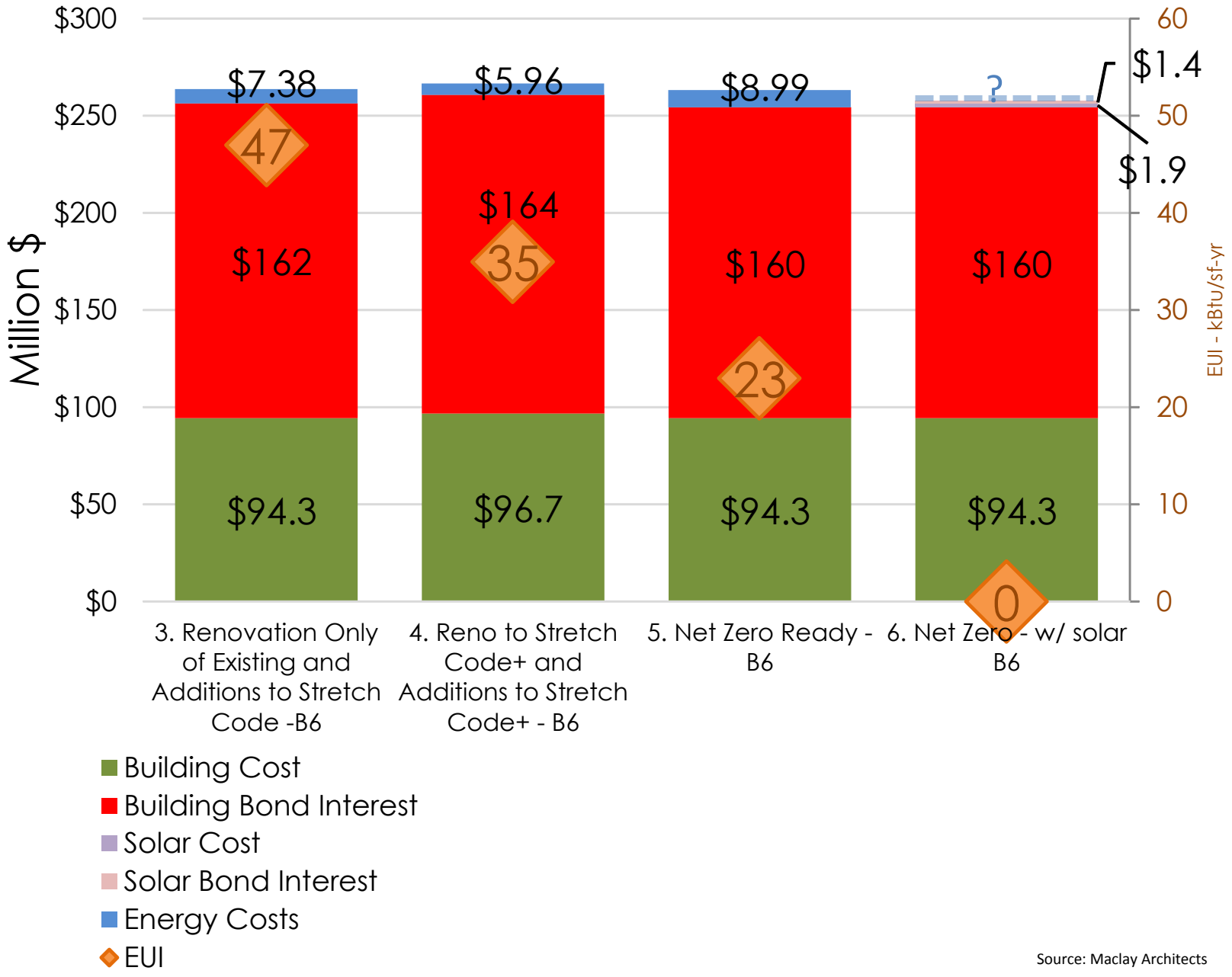
30-year Present Value of Energy and Incremental Bond Costs w/ EUI



Source: Maclay Architects

B6

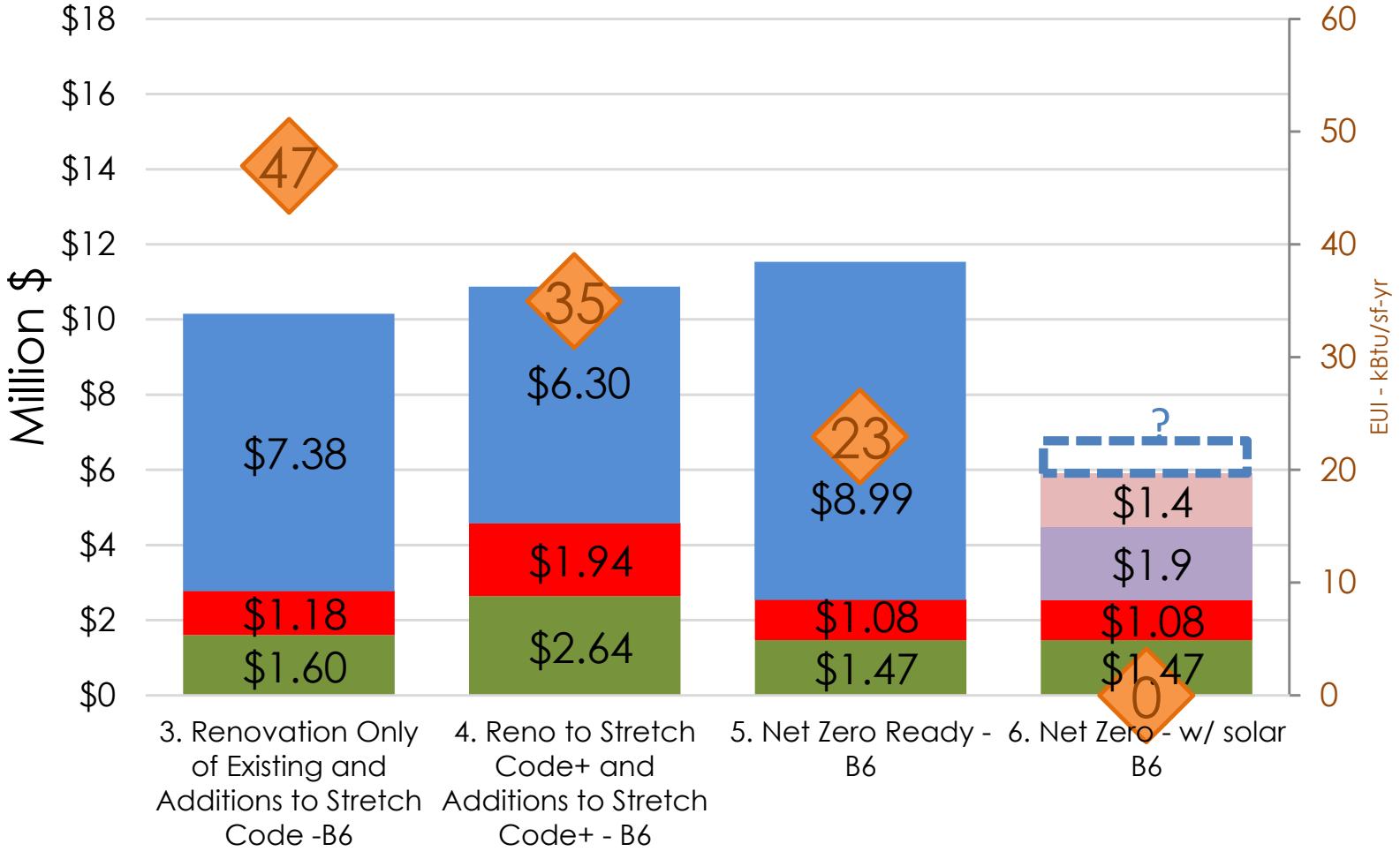
30-year Present Value of Energy and Total Bond Costs w/ EUI



Source: Maclay Architects

B6

30-year Present Value of Energy and Incremental Bond Costs w/ EUI



Source: Maclay Architects