

Multifamily Residential



Figure 4: Rendering of the multifamily housing
source: Huntington Homes

- 1,100 sf
- 2 bedroom
- 1.5 bath
- 3 occupants

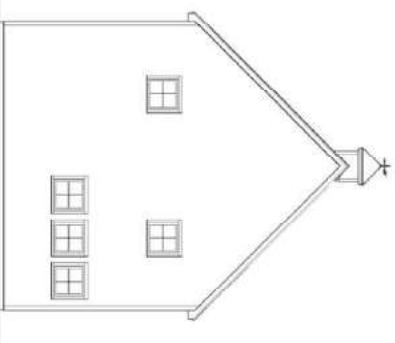


Figure 2.11: West elevation of the multifamily building
source: Huntington Homes

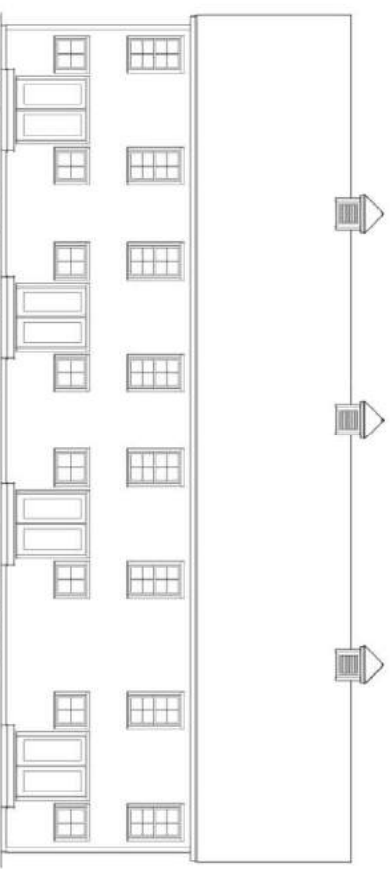
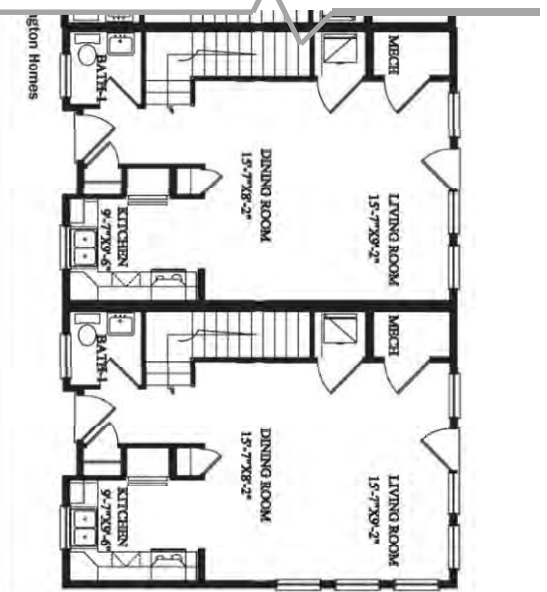
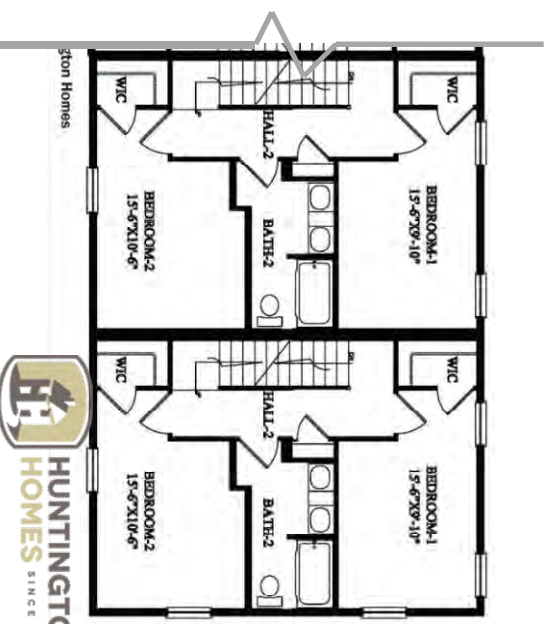


Figure 2.12: South elevation of the multifamily building
source: Huntington Homes



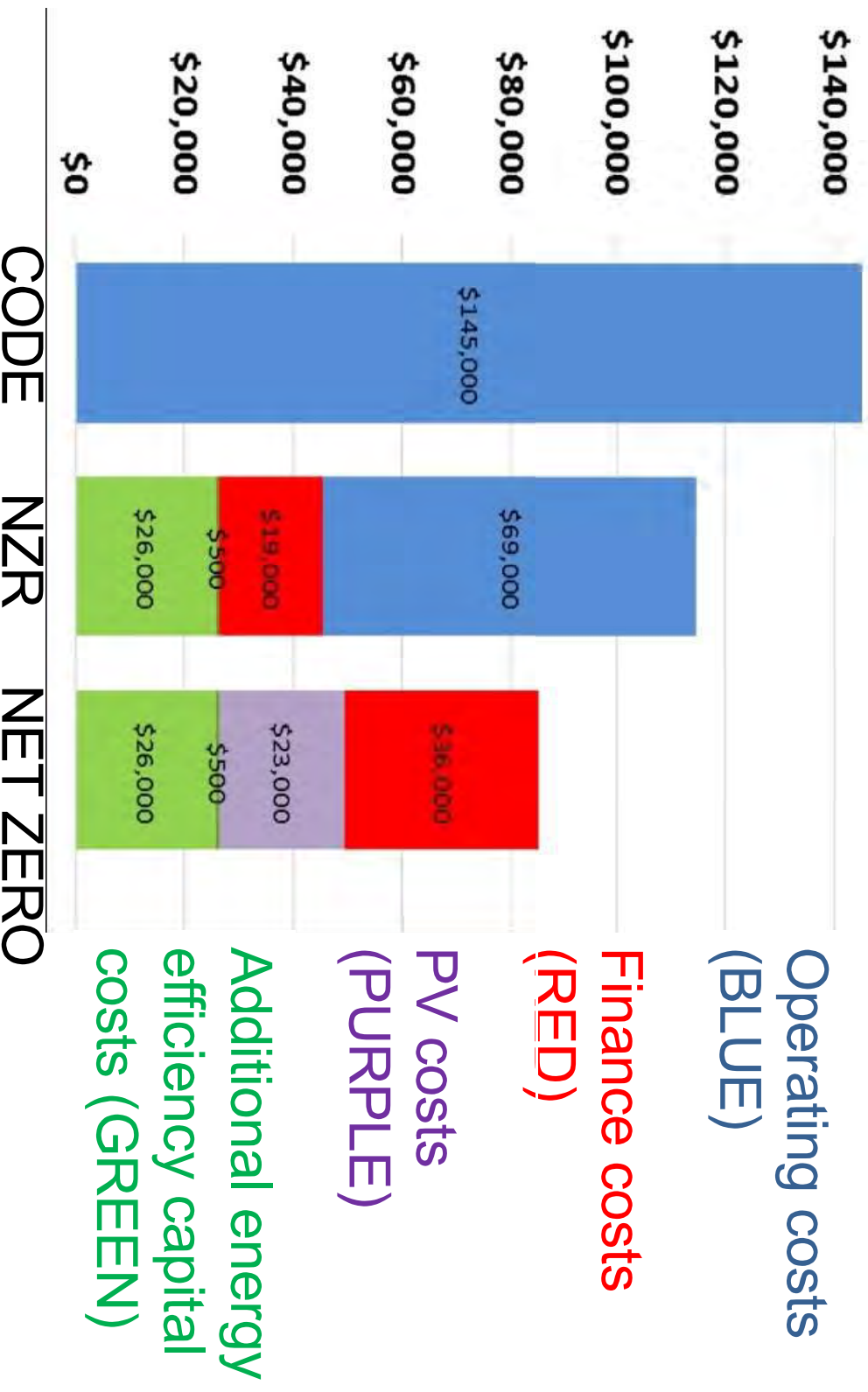
Huntington Homes



Huntington Homes

Key to Graphs

- Each building type is analyzed for Code, Net Zero Ready, and Net Zero





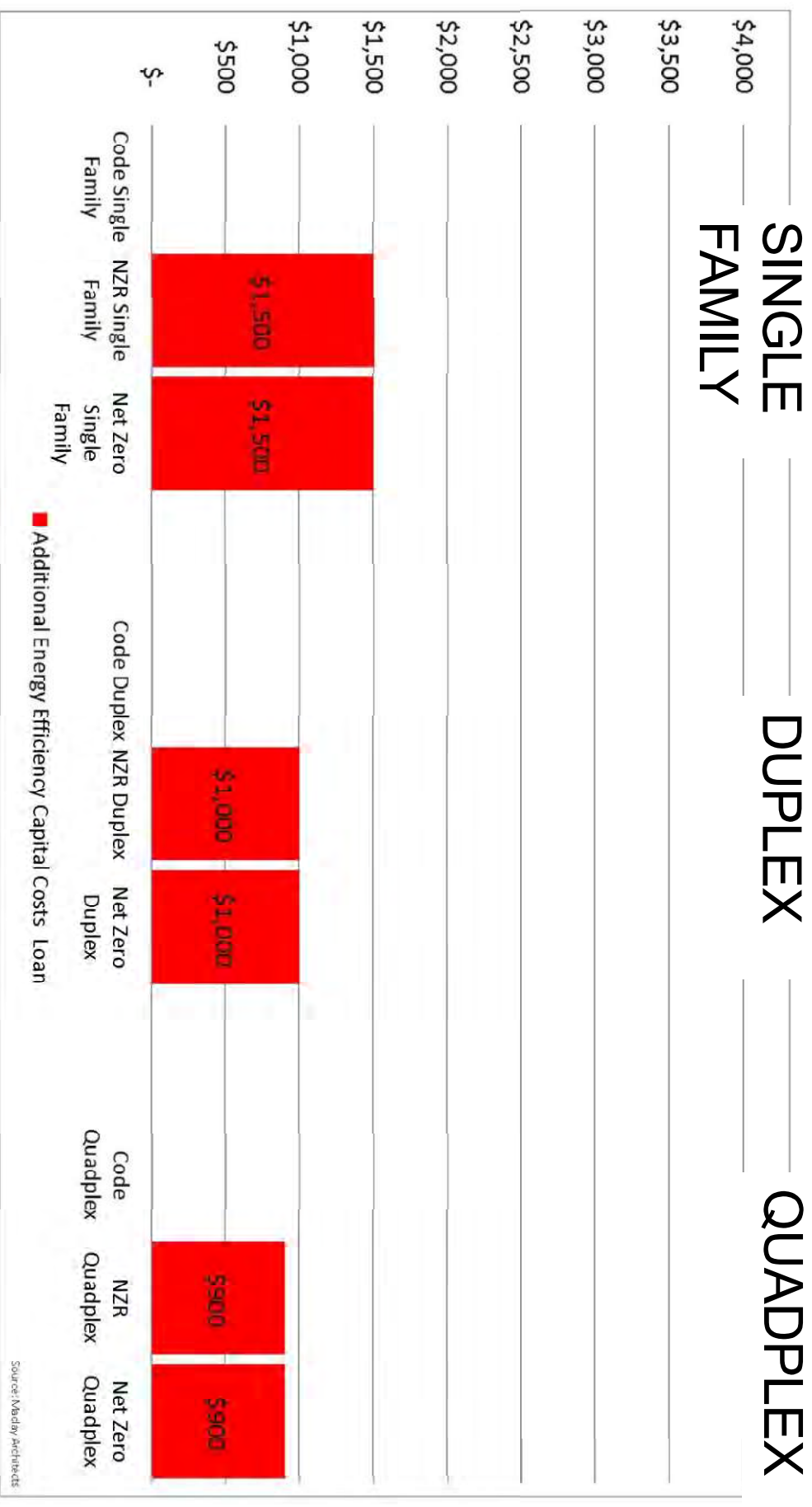
Residential 1st Year Costs

- Financing 30-year loan
- 4% fixed interest
- Photovoltaics financed at the same rates



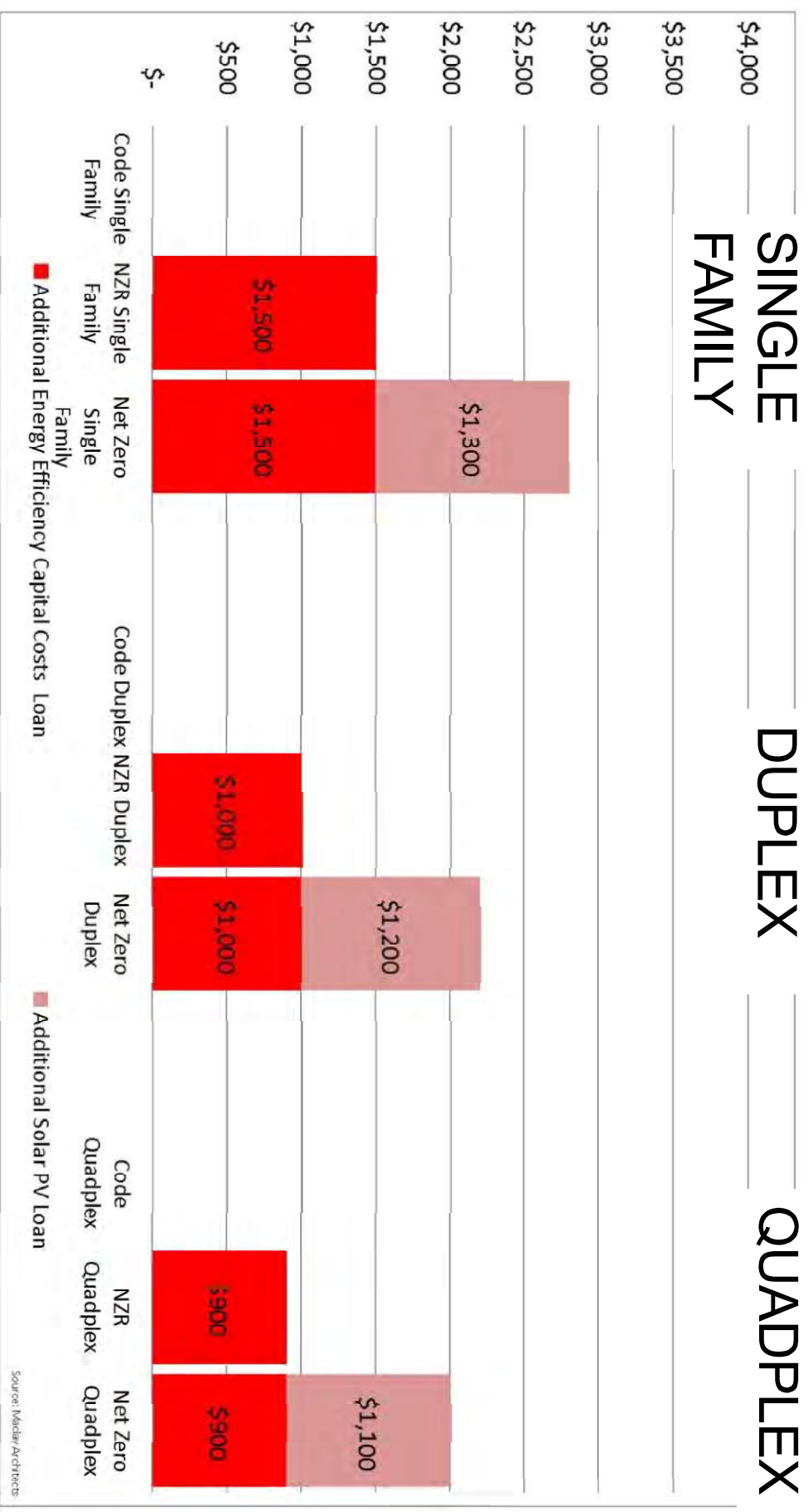
Residential 1st Year Costs

- Finance cost for energy efficiency



Residential 1st Year Costs

- Finance costs for PV



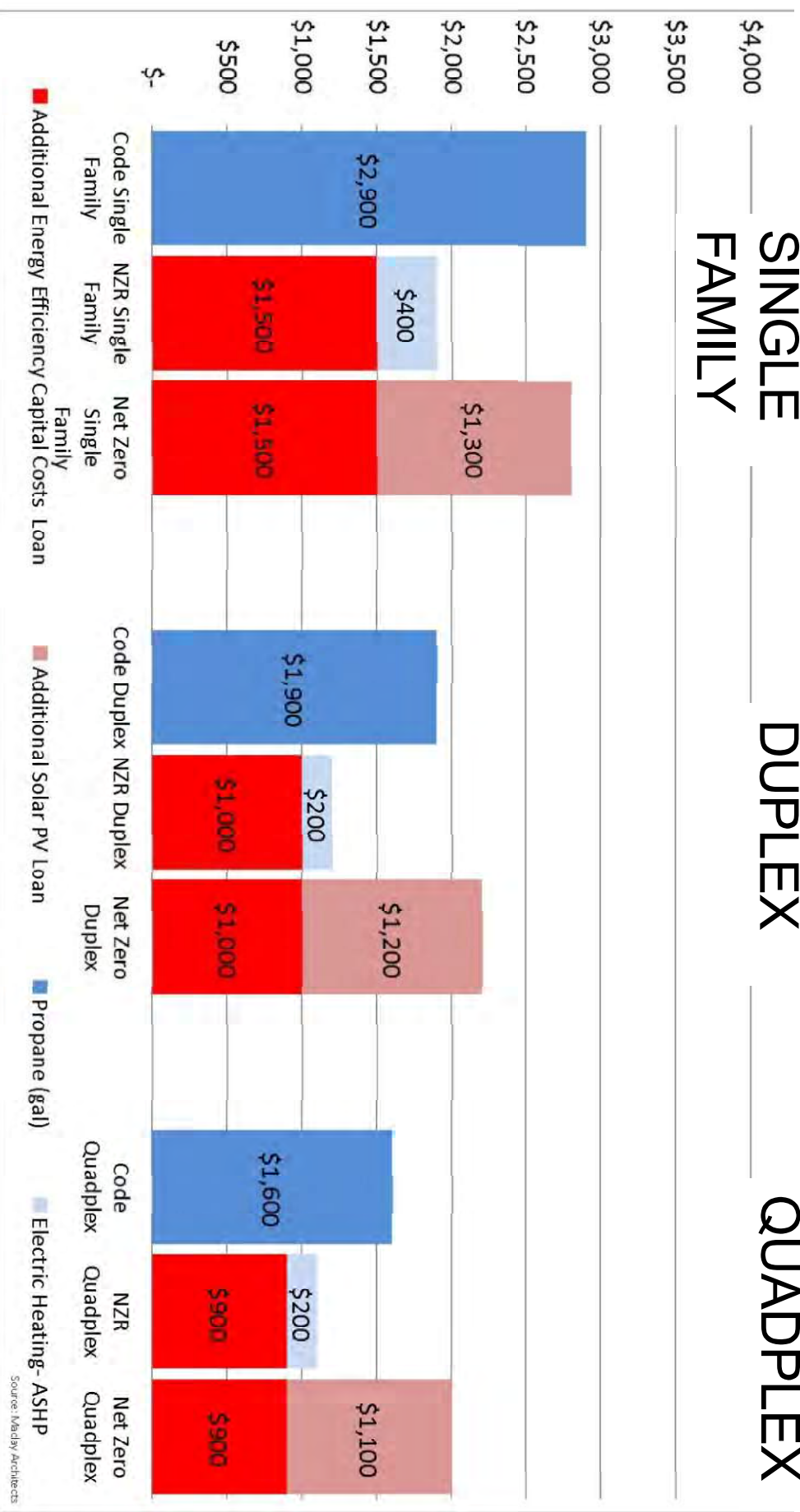
Residential 1st Year Costs

- Heating Costs

SINGLE FAMILY

DUPLEX

QUADPLEX



Source: Maday Architects

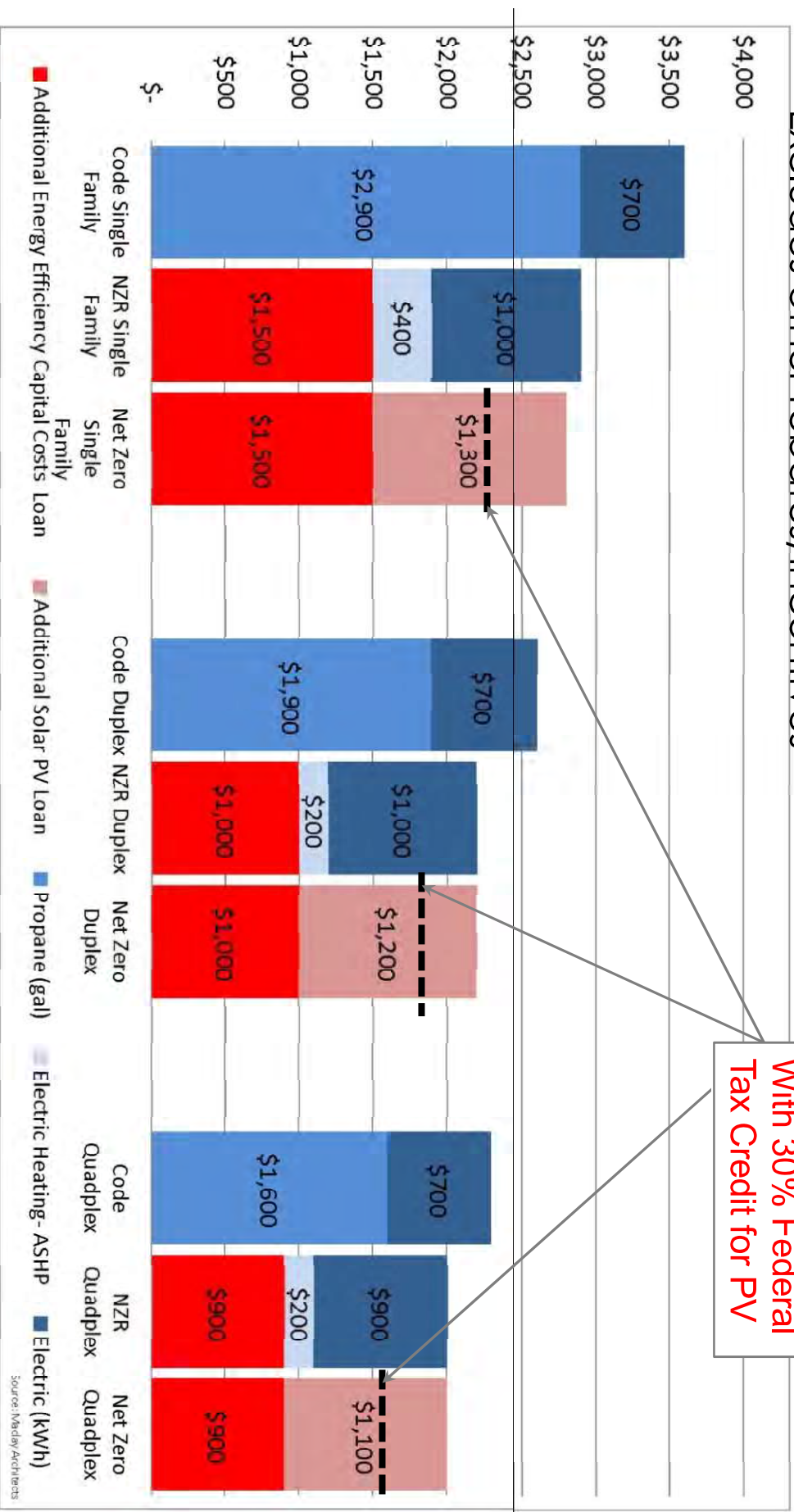
Residential 1st Year Costs

- 1st year operating costs



Residential 1st Year Costs

- 30% Federal tax credit for PV
- Excludes other rebates/incentives



With 30% Federal Tax Credit for PV

Residential 30-year Costs

- Additional energy efficiency capital costs

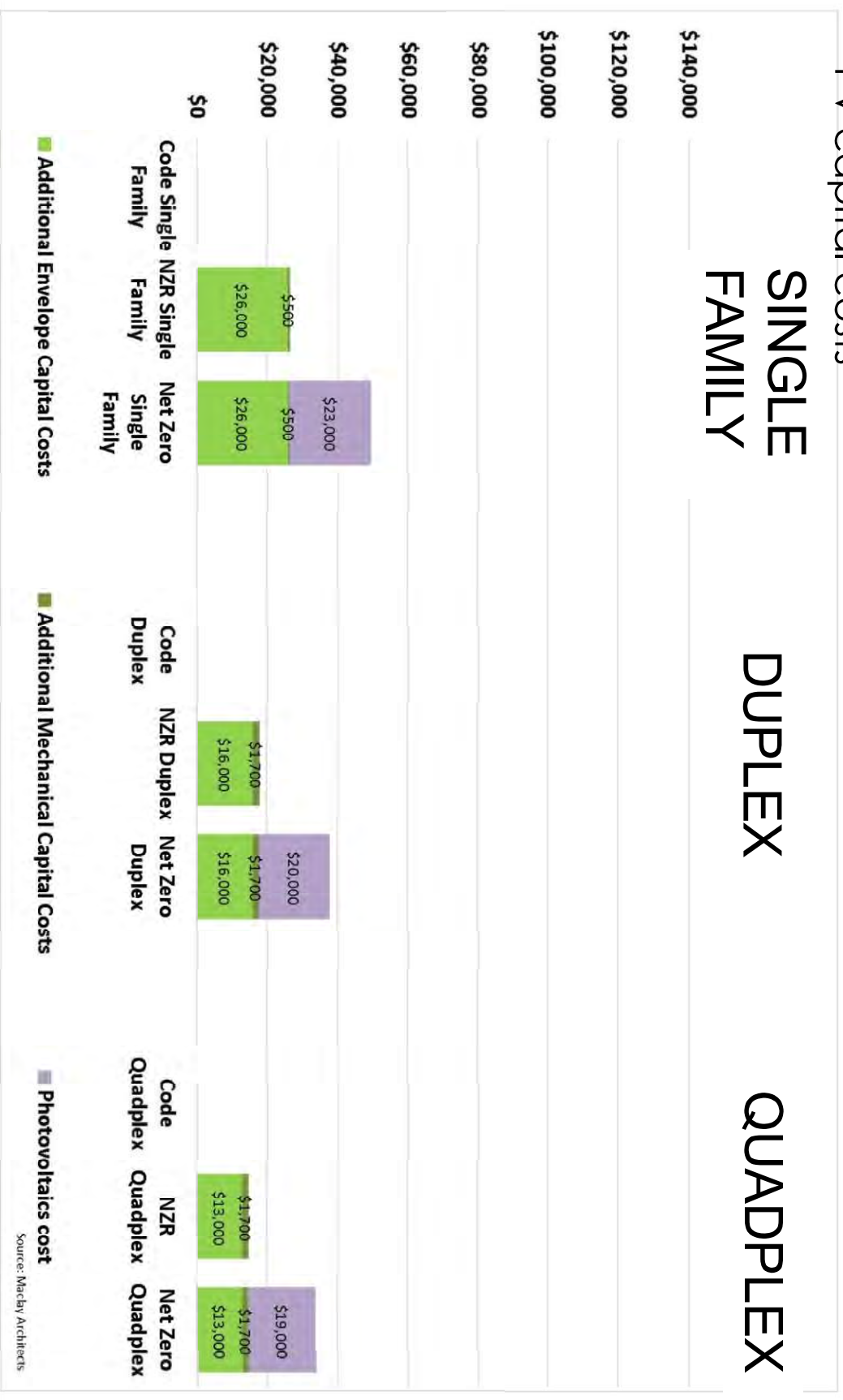
SINGLE DUPLEX QUADPLEX
FAMILY



Source: Macby Architects

Residential 30-year Costs

- PV capital costs



Source: Mackay Architects

Residential 30-year Costs

- 30-year cumulative financing interest

SINGLE FAMILY

DUPLEX

QUADPLEX

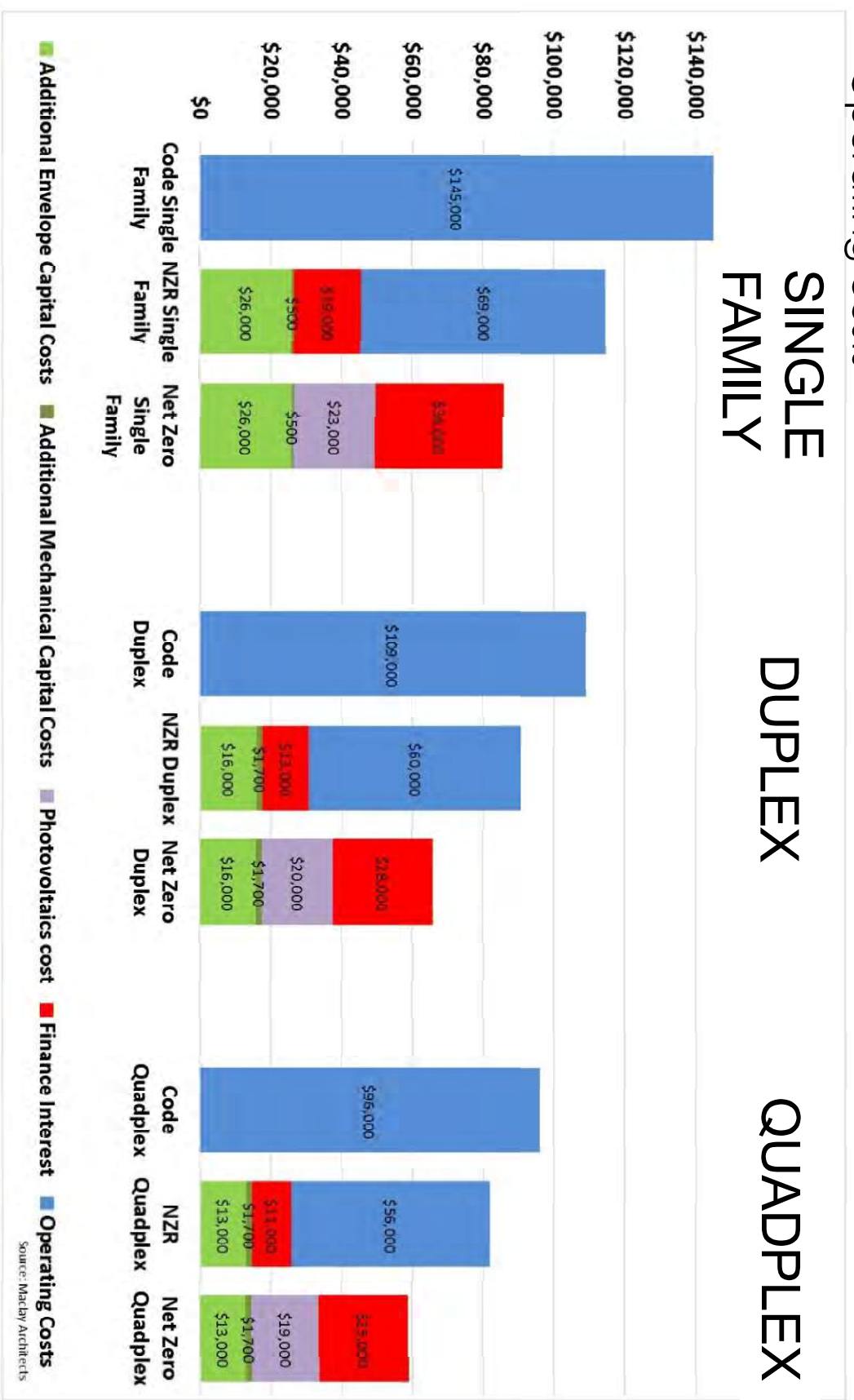


■ Additional Envelope Capital Costs
 ■ Additional Mechanical Capital Costs
 ■ Photovoltaics cost
 ■ Finance Interest

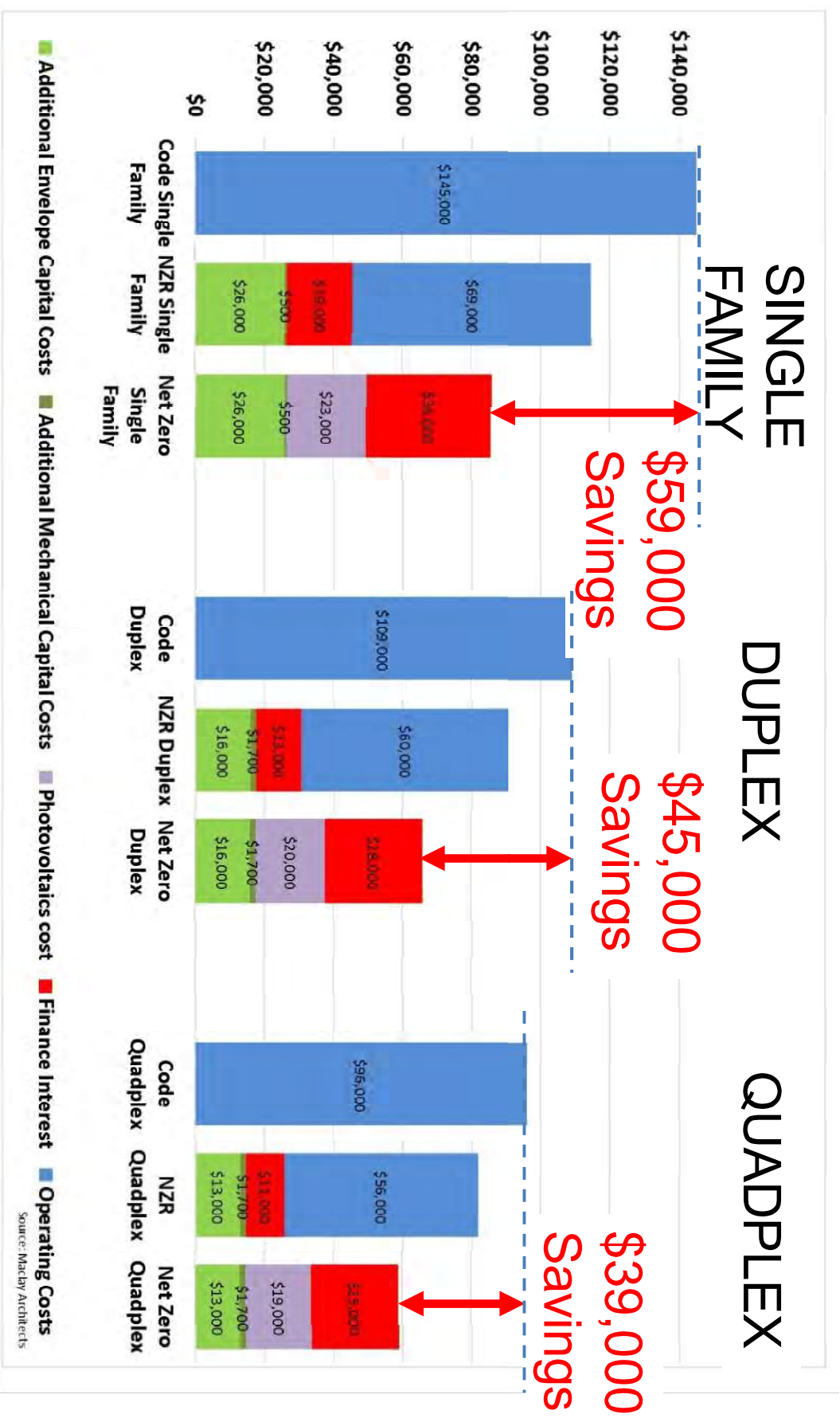
Source: Mackay Architects

Residential 30-year Costs

- Operating costs

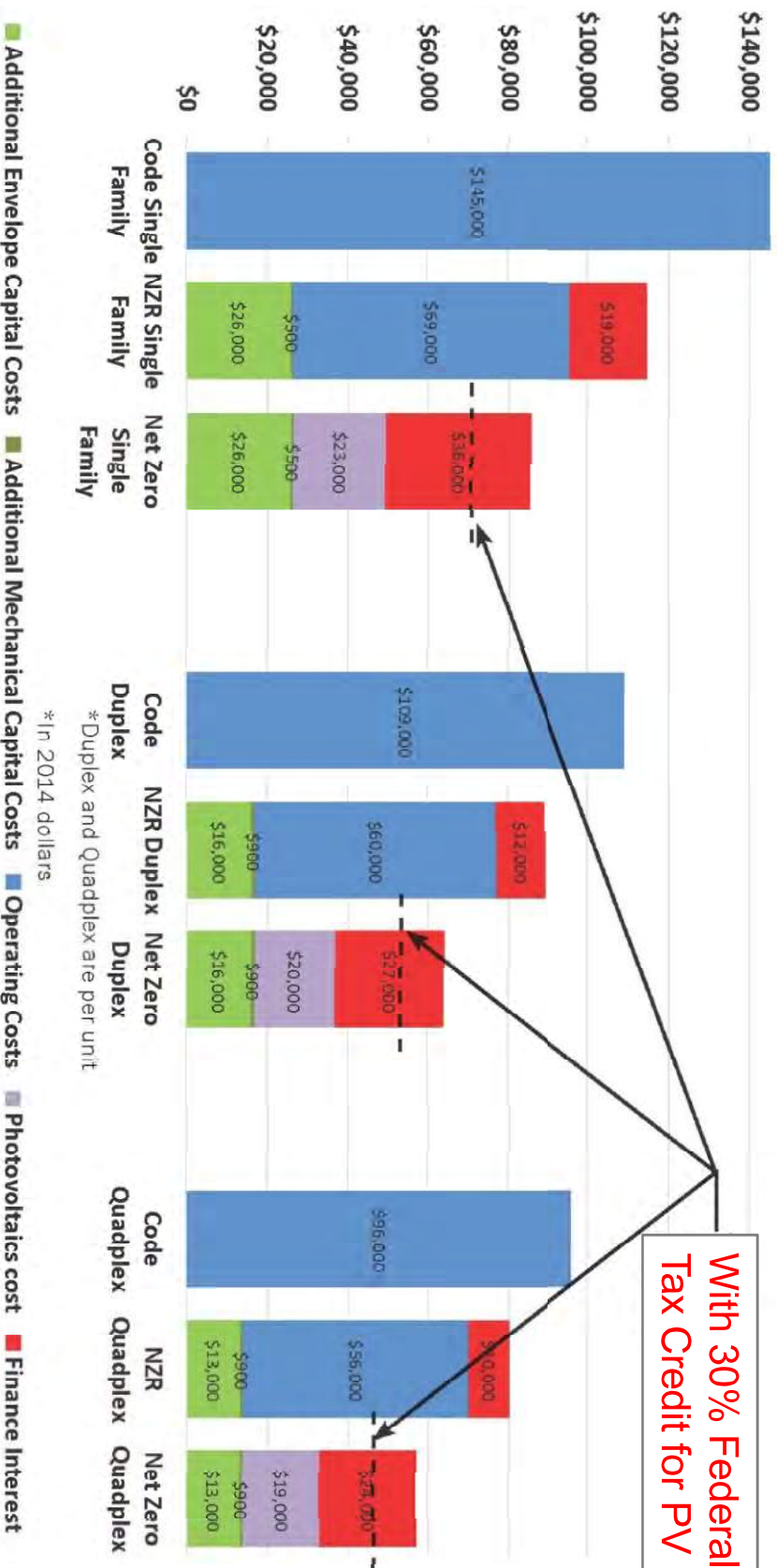


Residential 30-year Savings



Residential 30-year Costs

- 30% Federal tax credit for PV
- Excludes other rebates/incentives



With 30% Federal Tax Credit for PV

Residential Financial Analysis

- Net Zero Financed

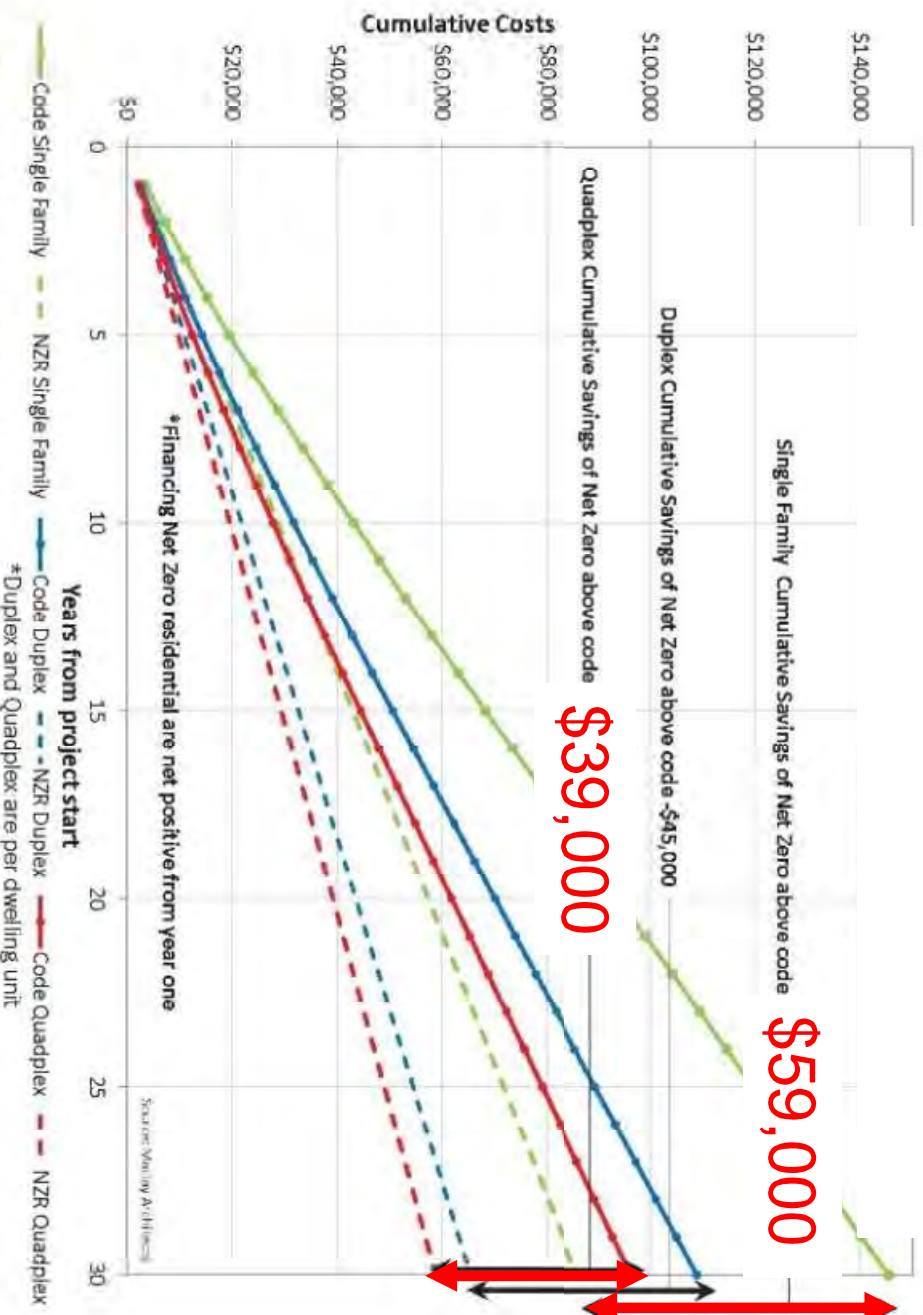


Figure 7.4: Cumulative energy costs and finance costs for net zero

Residential Financial Analysis

- After loan period

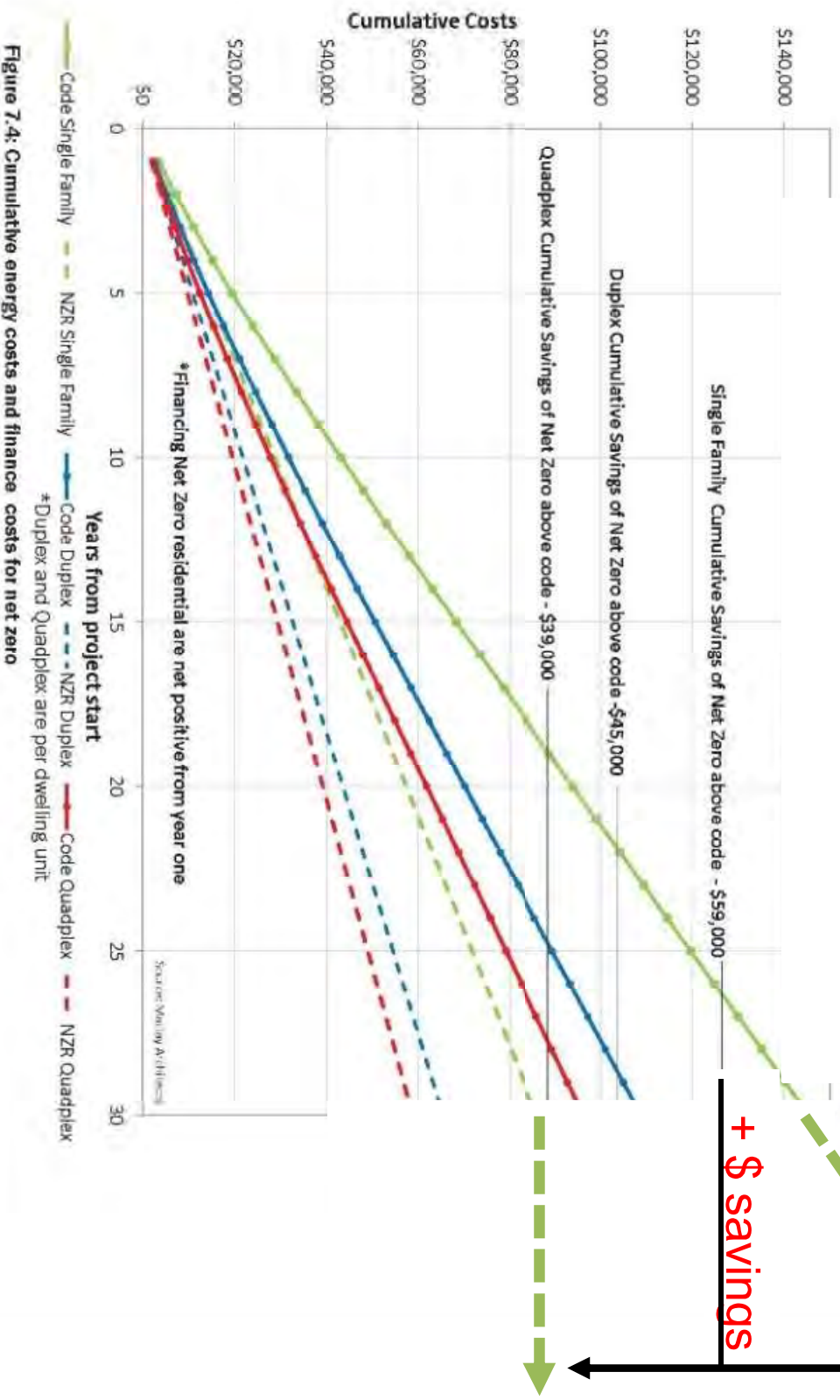


Figure 7.4: Cumulative energy costs and finance costs for net zero

Residential Finance Options

- Efficiency Vermont Database:
 - <https://www.efficiencymont.com/For-My-Home/Financing/Financing-Overview>)
- Northfield Savings Bank – Energy Improvement Loans (<https://www.nsbyt.com/borrow/energy-improvement-loans/>)
- VSECU – Vgreen – Energy Savings Loan Program (www.vsecu.com/vgreen) Unsecured and Home Equity Loans
 - Unsecured:
 - 5 yr fixed 4.9% maximum \$10,000
 - 15 yr fixed 5.9% maximum \$30,000
 - Home Equity Loans:
 - 5 yr fixed 2.74%
 - 15 yr fixed 4.5%

Office Building

- 13,000 sf
- 2 floors

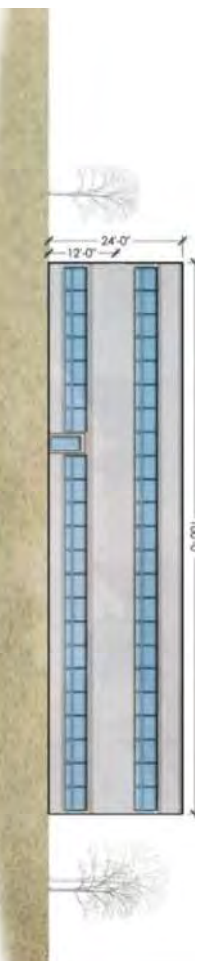


Figure 3.5: Code office north and south elevation

source: MacLay Architects

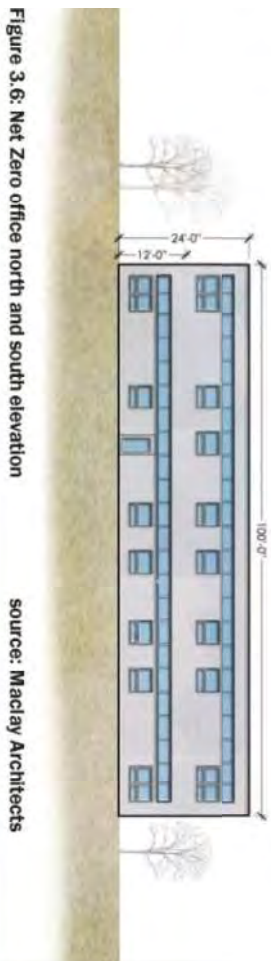


Figure 3.6: Net Zero office north and south elevation

source: MacLay Architects



Four office configurations:

- Net Zero Ready open office
- Net Zero Ready closed office
- Code open office
- Code closed office

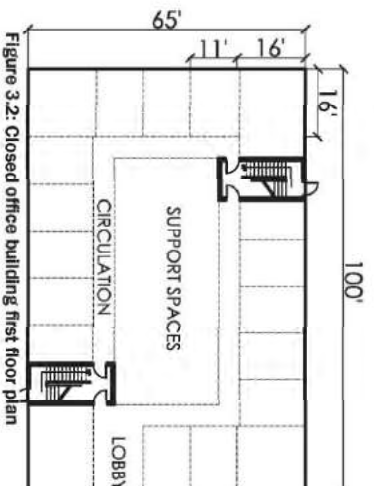


Figure 3.2: Closed office building first floor plan

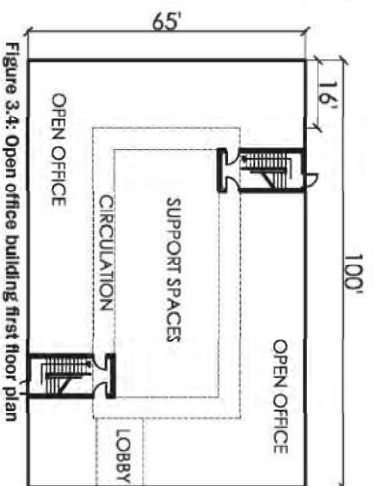


Figure 3.4: Open office building first floor plan



Office/Manufacturing Building

- 27,000 sf total
- 1st floor manufacturing/ warehouse space 17,000 sf
- 2 floors of office along the south 10,000 total sf



Figure 3.11: Code and net zero office/manufacturing building north elevation

source: Macity Architects

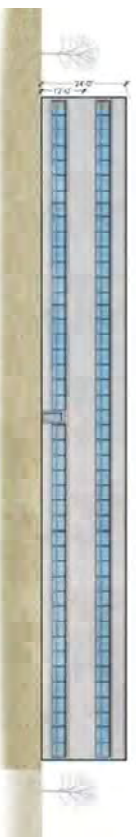


Figure 3.12: Code office/manufacturing building south elevation

source: Macity Architects



Figure 3.13: Net zero ready office/manufacturing building south elevation

source: Macity Architects



Figure 3.14: Office/manufacturing east elevation

source: Macity Architects



Figure 3.15: Office/manufacturing west elevation

source: Macity Architects





Commercial Finance

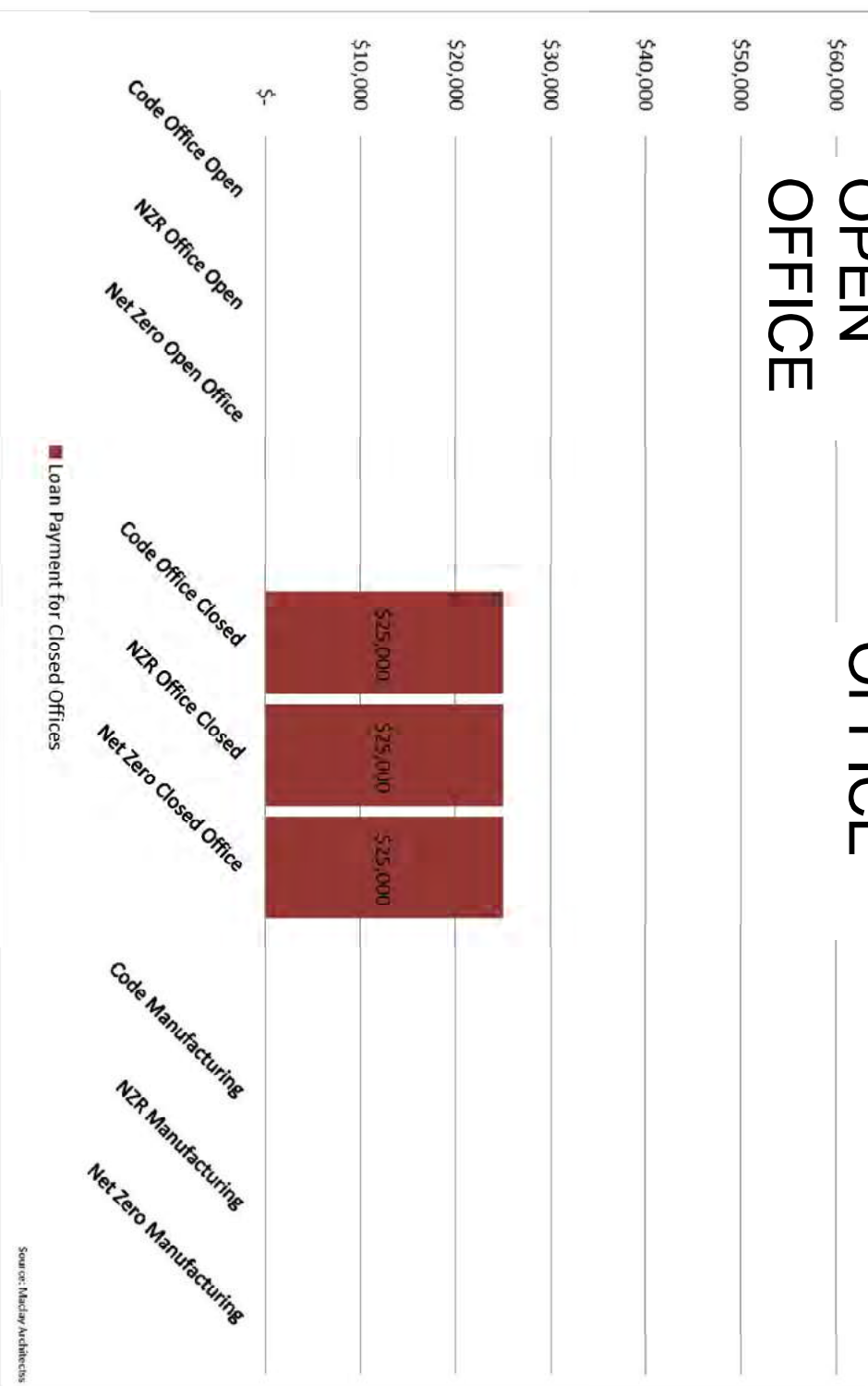
Assumptions

- 20-year variable loan rate to finance the incremental capital costs
- Starting at 4.61% and increases by 2% every 5 years
- Photovoltaics financed at the same rates



Commercial 1st Year Costs

- Closed office cost an additional \$320,000 = **OFFICE/ MANUFACTURING**
- \$25,000 / year when financed **CLOSED OFFICE**
- \$70,000 **OFFICE**

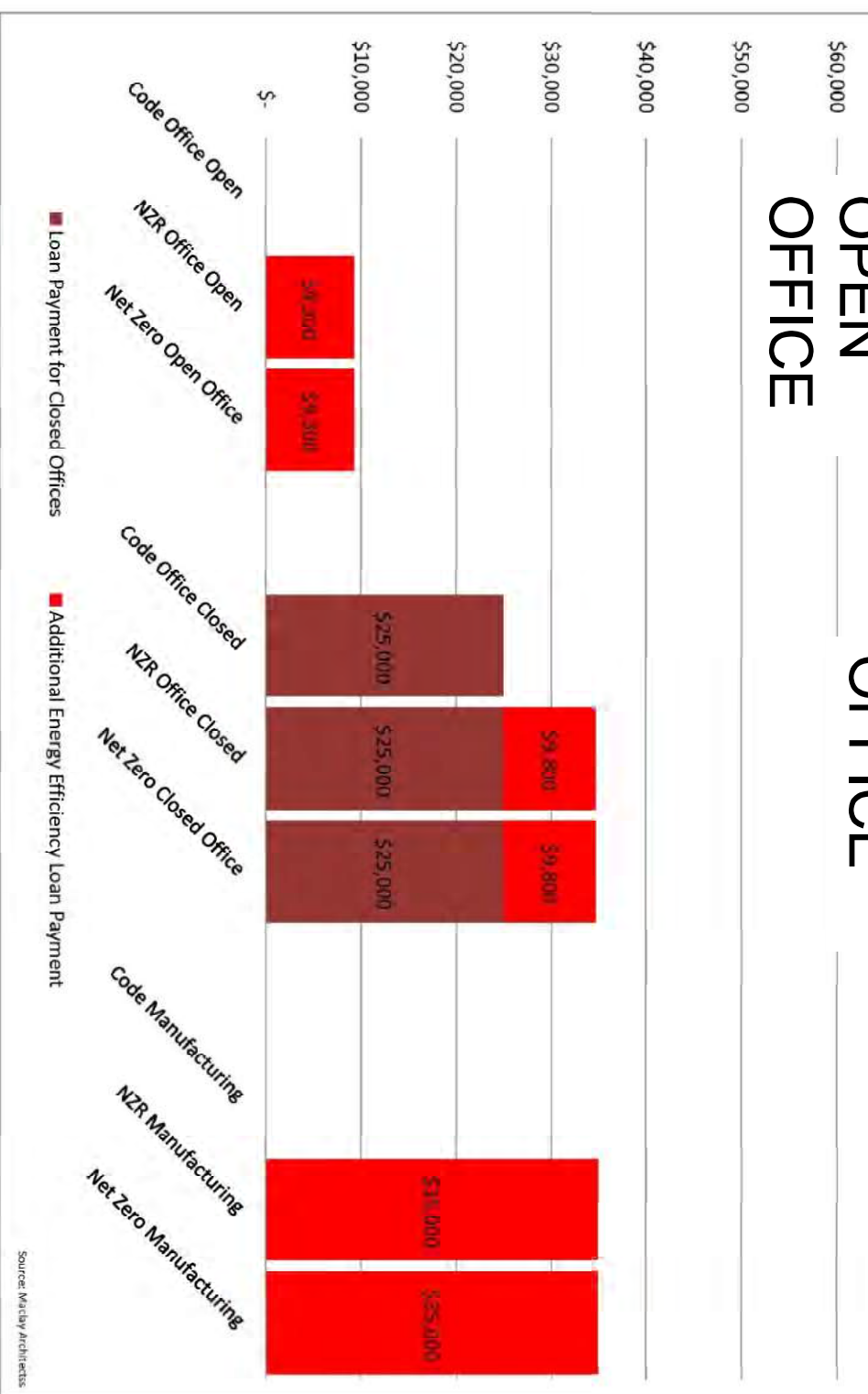


Source: MacLay Architects

Commercial 1st Year Costs

- Additional energy efficiency finance costs

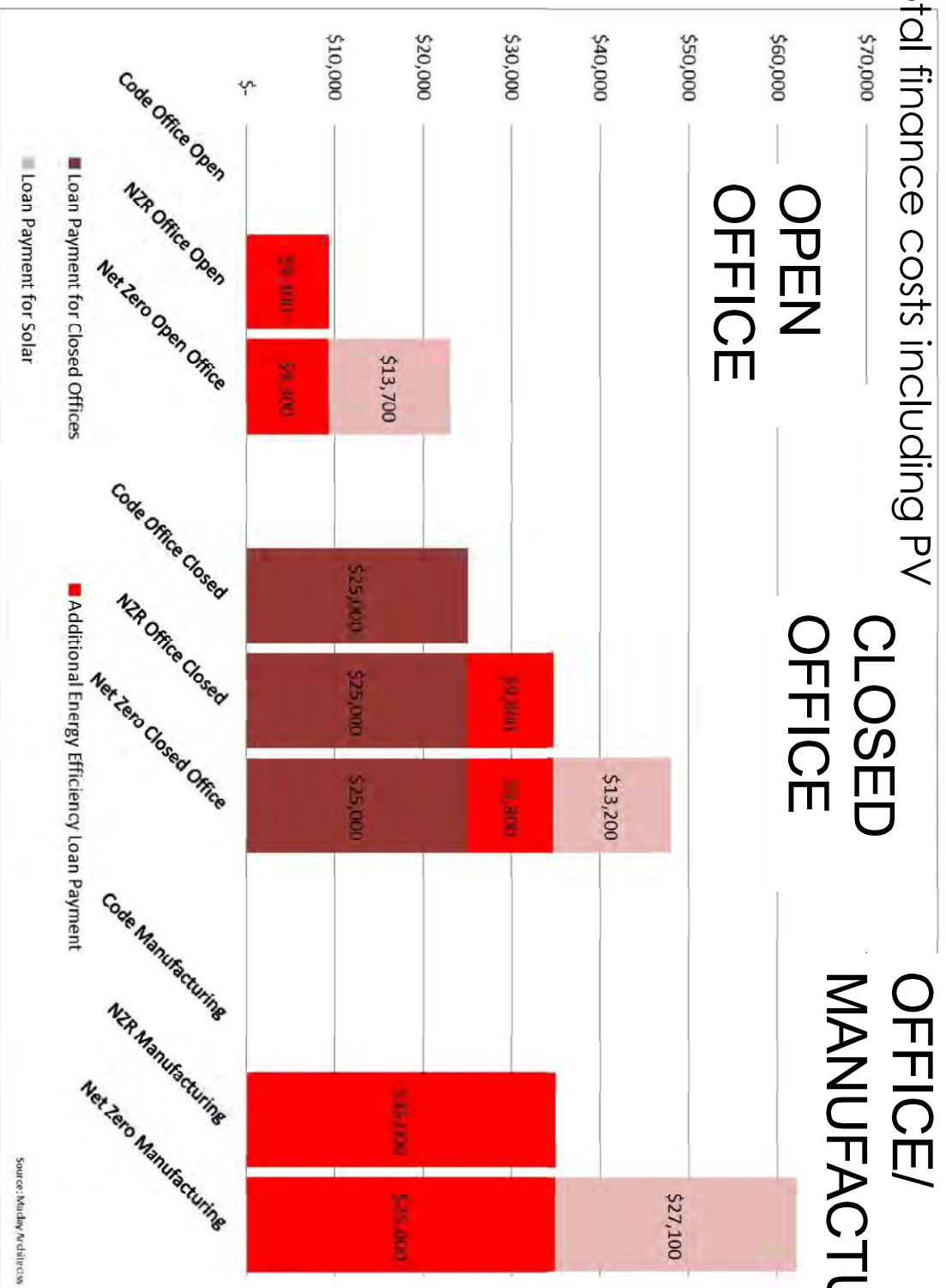
OFFICE OFFICE OFFICE/
OFFICE OFFICE MANUFACTURING



Source: Marley Architects

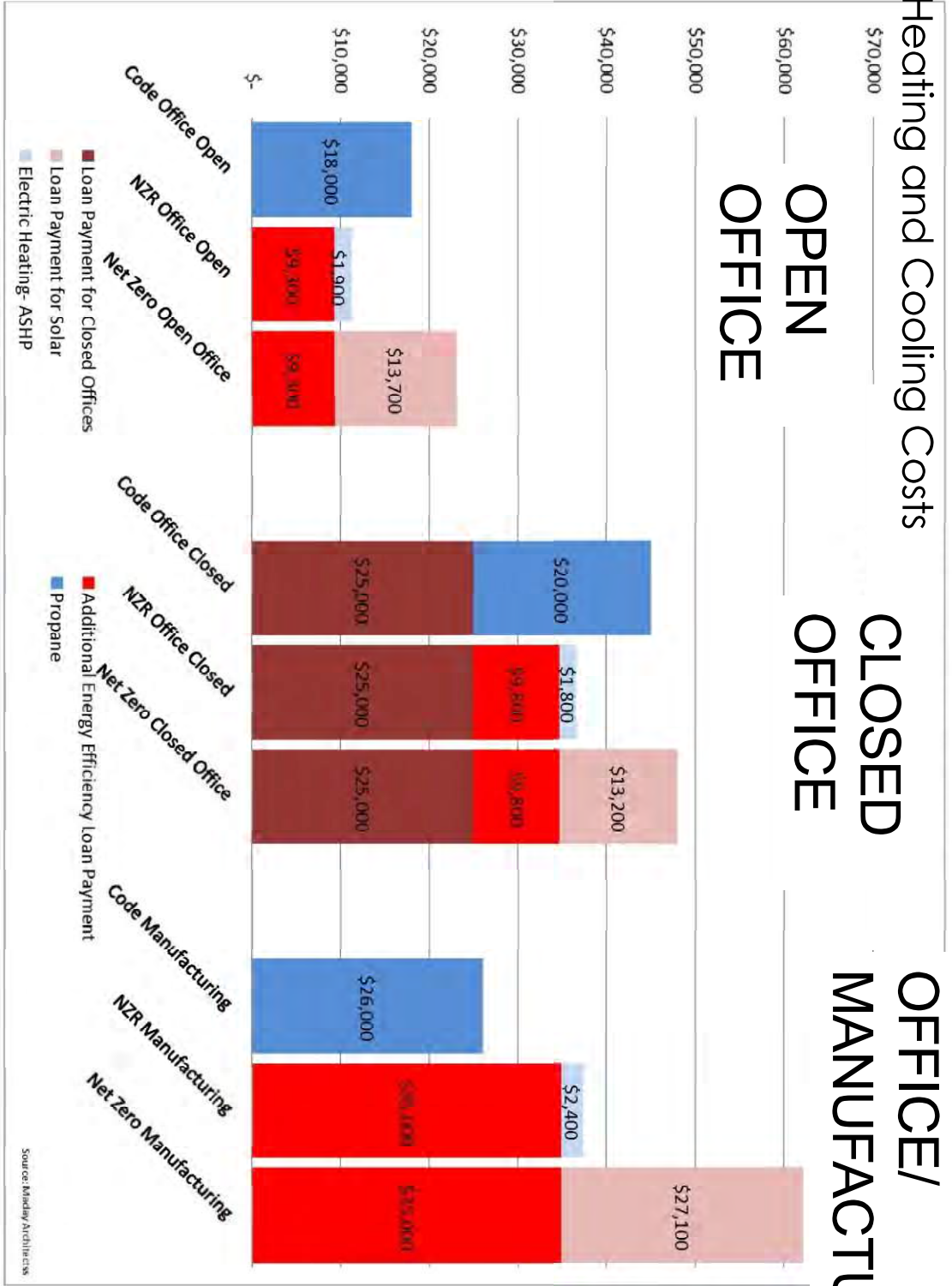
Commercial 1st Year Costs

- Total finance costs including PV



Commercial 1st Year Costs

- Heating and Cooling Costs



Source: Mandley Architects