

Manhattan Commercial Office Building

\$5 Million HVAC Modernization Feasibility Study

START HERE

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Purpose and alternatives

I evaluated whether HVAC savings justify capital spending over ten years for a hypothetical 500,000 ft² Manhattan office with 1,200 tons of cooling. This is an independent student study.

A: Continue operating the existing system.

B: Full modernization, \$5,000,000.

C: Partial upgrade, \$1,669,000.

Software and methods

Excel links cooling-load bins and equipment electricity estimates to an itemized CapEx budget, depreciation and dated after-tax cash flows. NPV, XIRR, payback and scenario/sensitivity analysis compare the alternatives.

Main financial conclusion

At an 8.5% discount rate, ten-year base NPV is **-\$1,754,620 for B** and **+\$68,531 for C**. C merits further investigation. Neither upgrade warrants unconditional approval until costs, performance, repair needs and ownership of savings have stronger support.

Recommended viewing order and folder guide

1. Executive Investment Summary - 01_START_HERE

Read the one-page findings and recommendation first. This folder also contains this README.

2. Seven-slide presentation - 02_PRESENTATION

Editable slides with speaker notes explain the engineering and financial case.

3. Engineering analysis - 04_ENGINEERING_ANALYSIS

System schematic, electricity calculations and engineering limitations.

4. Excel financial model - 03_FINANCIAL_MODEL

Nine linked worksheets with editable assumptions and financial results.

5. Supporting evidence - 05_RESEARCH_AND_VALIDATION

Assumptions validation, the original model audit and the Step 2 correction report.

Extract the ZIP before opening files. Source contents are unchanged. Some internal references retain earlier filenames. Operating data and installed costs remain estimates.