

# **Weld County Justice Center** ***Mechanical Systems Analysis —*** ***Executive Summary***

DATE

April 29, 2026

# Executive Summary

## Recommendation

**Pursue Option 1** – Water-cooled chillers + condensing gas-fired boilers, 4-pipe. Option 1 has the lowest operating cost of any option and recovers its first-cost premium compared to Option 2 in ~13 years. Over a 30-year lifecycle, it is essentially tied with Option 3 within modeling precision. Because cost favors Options 1 and 3 nearly equally, the recommendation rests on non-cost factors: acoustic performance in courtroom spaces, expected equipment service life over the analysis period, the pathway to future electrification, and alignment with the County facilities team’s in-house capabilities.

**Fallback Option 2** - Air-cooled chillers + condensing gas-fired boilers. Option 2 is the recommended alternate if the site constraints preclude the exterior equipment footprint required by Option 1.

## 4-Option Comparison (700-ton plant, 280,000 SF – averaged contractor pricing)

Metric	Opt. 1 Water-Cooled (Recommended)	Opt. 2 Air-Cooled (Fallback)	Opt. 3 DX RTUs + Boilers	Opt. 4 Gas RTUs + Reheat
Acoustics (NC 25-30)	★★★★	★★★	★★	★
First cost (\$/SF, avg)	\$101.00	\$97.75	\$91.62	\$83.00
First cost (total)	\$28.3M	\$27.4M	\$25.7M	\$23.2M
Year 1 operating	\$235K	\$300K	\$340K	\$485K
30-yr LCC (NPV)	<b>\$34.0M</b>	<b>\$34.9M</b>	<b>\$34.0M</b>	<b>\$35.2M</b>
vs. Option 1	<b>Baseline</b>	<b>+\$900K</b>	<b>+\$0K</b>	<b>+\$1.2M</b>
Equipment life	20-30+ yrs	15-20 yrs	15-20 yrs	~15 yrs
Replacements in 30 yrs	0-1	1	1-2	2
Courthouse fit	Yes – best	Yes (w/ mitigation)	Marginal	No

## Key Points

- **Option 1 ties for lowest life cost cycle (LCC) and has lowest operating cost.** 30-year LCC of ~\$34.0M is essentially tied with Option 3 (~\$34.0M) within modeling precision. Year 1 operating cost of ~\$235K is the lowest of all options – saves ~\$72K/yr vs. Option 2, ~\$108K/yr vs. Option 3, ~\$250K/yr vs. Option 4. Operating savings compound with electric rate escalation; over 30 years Option 1 saves ~\$3.3M in operating cost vs. Option 2.
- **Option 1's first-cost premium pays back in 13 years.** ~\$900K premium vs. Option 2 recovered through operating savings within the first half of the building’s life, with savings continuing through year 30. Appropriate payback period for a 30-50 year institutional building (private-sector benchmarks of 5-10 years don’t apply to municipal infrastructure).
- **Cost rules out Option 4.** Despite the lowest first cost (~\$23.2M), Option 4 has the highest 30-year LCC (~\$35.2M) – ~\$1.2M worse than Option 1 – driven by 2x replacement cycles and the highest operating cost (~\$485K/yr Year 1).
- **Non-cost factors decide between Options 1 and 3.** Option 3 (DX RTUs) is the closest cost competitor to Option 1, with 30-year LCC essentially tied within modeling precision. The differentiators between Options 1 and 3: courtroom acoustic performance (Option 3 is marginal against NC 25-30 targets), replacement events over 30 years (1-2 for Option 3 vs. 0-1 for Option 1), alignment with Colorado’s electrification trajectory, and temperature control precision in chambers.
- **Mid-life replacement disruption matters.** Options 2-4 require 1-2 equipment swaps in an occupied courthouse – each event carries \$80-\$150K in temporary cooling rental, plus security re-coordination, crane access, and operational disruption that the net present value (NPV) doesn't capture.

- **Water cost is real but manageable.** Option 1 uses ~4M gal/yr at Greeley's 2026 rate = ~\$45K/yr Year 1. This is less than half of what a typical 280K+ SF commercial building consumes annually, and a small fraction of comparable Colorado water uses like golf courses or tunnel car washes.
- **Future electrification.** Colorado's trajectory (Energize Denver benchmarks, IECC 2024) will pressure fossil fuel use. Option 1's boiler can be converted to heat pump loop at mid-life; Option 4 requires complete system replacement.

## Scoring Summary at a Glance

Condensed view of the qualitative scoring matrix, rolled up to the six evaluation categories. *Full criterion-level scoring appears later in the report.*

Category	Opt. 1 WC	Opt. 2 AC	Opt. 3 RTU	Opt. 4 Gas
Performance (acoustics, IAQ, control)	Best	Better	Good	Good
Energy & Sustainability	Best	Better	Good	Good
Project Fit (courthouse, ops)	Best	Better	Good	Good
Lifecycle Cost	Best	Better	Best	Good
Maintainability	Good	Better	Best	Best
Constructability	Good	Better	Better	Best