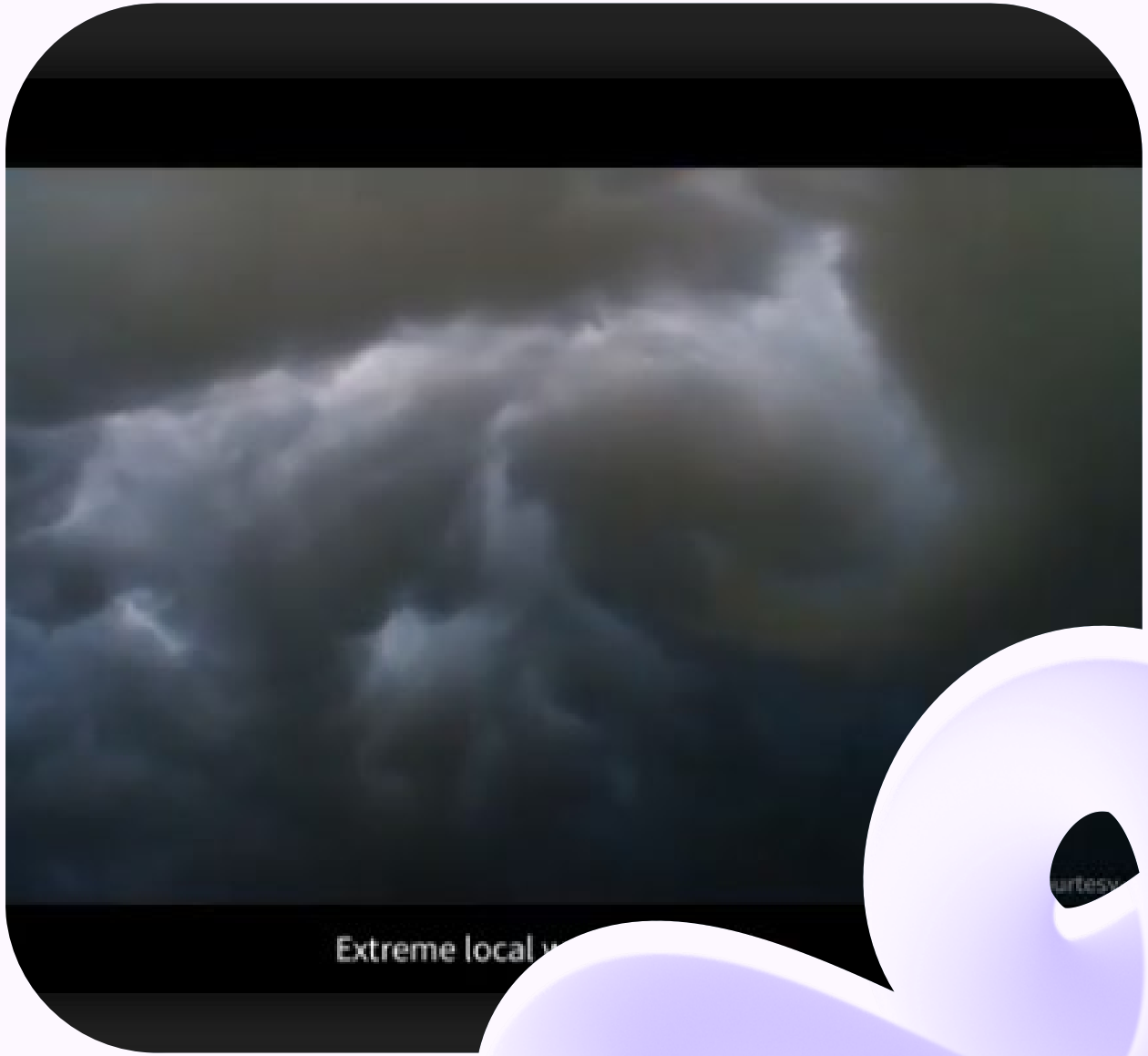
Industrial Heating Electrification – CFO Executive Pitch

Strategic benefits of electrifying industrial heating systems

Cost of Inaction = $’s lost + bad health outcomes



Asset Loss

Minimum $51 up to $3000 per ton of CO_2eq emitted

Note to CFO: This memo evaluates replacing existing fossil-fuel industrial heaters (~50% efficiency) with electric and plasma-based heating systems (92–98% efficiency).

Possible assumptions for a random example to calculate returns.

Assumed Key Inputs (Random Ohio Facility):

- Annual useful heat demand: 16,000 MWh
- Natural gas price (delivered): $10/MMBtu
- Electricity price delivered: $0.14/kWh
- Carbon risk valuation: $100/ton $CO2_{eq}$ (CFO risk metrics only – not from any carbon tax)

Findings

- Fossil heating total risk-adjusted cost: ~$3.36M/year
- Electric heating cost: ~$2.3–2.4M/year
- Net annual financial improvement: approximately ~ $1.0M

Financial Outcome: • Estimated incremental capital: $3–4M • Simple payback: 3–4 years

ASSUMPTIONS WILL CHANGE FOR SPECIFIC INSTALLATIONS

Current Fossil Heating Risks and Costs.

Energy Inefficiency

Old Industrial heating systems could operate at only 50% efficiency, wasting half of the energy purchased through heat loss.

High Operating Costs

For example, Annual fuel and maintenance costs exceed $1.27 million, driven by natural gas prices and system upkeep.

Carbon Emissions Risk

CO_2 emissions total about 21,000 metric tons annually, posing $2.1 million in potential carbon liabilities.

Regulatory and Sustainability Challenges

Rising energy prices, tightening regulations, and increased water use increase operational risks and complicate sustainability efforts.

Cost of Inaction

- 50% energy efficiency
- $1.3M fuel + O&M cost
- $2.1M carbon risk exposure
- Total: **$3.36M / year**

Electrify & Stabilize

Why Electrify?

High Efficiency and Cost Predictability

Electric and plasma heating achieve 92–98% efficiency, reducing energy losses and enabling predictable electricity costs.

Carbon Emission Reduction

Electrification eliminates carbon exposure and combustion maintenance, reducing annual carbon liability by $2.1 million for a multi-megawatt operation.

Operational and Process Benefits

Near-zero water use, faster thermal response, and improved process control enhance product quality and reduce scrap.

Strategic and Financial Advantages

Electrification offers 3-4 year payback, mitigates regulatory risk, and strengthens sustainability credentials.

“Electrification converts an uncontrollable commodity risk into a controllable operating cost. Even without a carbon tax, this is a hedge against volatility.”

Electrify: Avoid the Cost of Inaction

Legal / Finance Disclaimer: “Carbon values shown represent internal risk-management assumptions for scenario analysis and do not reflect any current statutory tax or regulatory charge.”

✓ Consistent with peer CFO practice

Electrification Outcome

- ✓ 92–98% efficient heat
- ✓ $2.3–2.4M predictable

OPEX Benefits

- ✓ Zero combustion emissions
- ✓ $1.0M annual improvement
- ✓ 3 to 4 year payback

Gas-Price Shock Sensitivity

Fuel markets are volatile and geopolitically exposed

At **$15/MMBtu gas**: **+~$550k/year** fossil cost

At **$20/MMBtu gas**: **+~$1.1M/year** fossil cost

Electric heating largely insulated from fuel shocks

Electrification stabilizes long-term operating costs

High-Temperature Electrification — Total Cost of Ownership (TOC) Matrix. One arrow indicates similar. 4 arrows indicate much higher. All benefits are only estimated

Application	Temperature (°C)	Capex (Electric vs Fossil Fuel Equipment). Includes ancillary equipment (e.g., piping, blowdown machines, or similar), as well as specialized labor and certifications.	Ongoing energy operating cost (Electricity vs Fossil Fuel).	Non-Energy Value Benefit (Electricity vs Fossil Fuel). Includes the reduction of pollution. Includes cycle time reduction.	Typical Payback. Estimate only. Depends on the discount rate.
Food and Beverage	100-350	↑	↑	↑↑↑	1–4 yrs
Productivity Enhancement in Mid-Temperature Metal and Non-metal Processing	200-800	↑	↑	↑↑↑	1–3 yrs
Beneficiation	200-1000	↑	↑	↑↑↑	1–4 yrs
Chemical Processes	400-1200	↑	↑	↑↑↑	1-4 yrs
Carbon-Related Steam Conditioning.	400–900	↑	↑	↑↑↑↑	2–4 yrs
Innovation Market	100-1200	↑	Unknown or specific process dependent.	↑↑↑↑	1–4 yrs
Semiconductor diffusion / Test Stands	700–1,200	↑	↑	↑↑↑↑	Unknown
Specialty glass melting (hybrid)	700–1,600	Unknown	↑	↑↑↑↑	Unknown
Electric mineral calciners	600–1,000	↑	↑	↑↑↑	2-4 yrs
Electric cracking / reforming	700–1,000	Unknown	Unknown	↑↑↑	2-4 yrs
Lime kilns (retrofit)	900–1,200	Unknown	Unknown	↑↑↑↑	Unknown
Cement clinker kilns	1,400–1,500	Unknown	Unknown	↑↑↑↑	Unknown