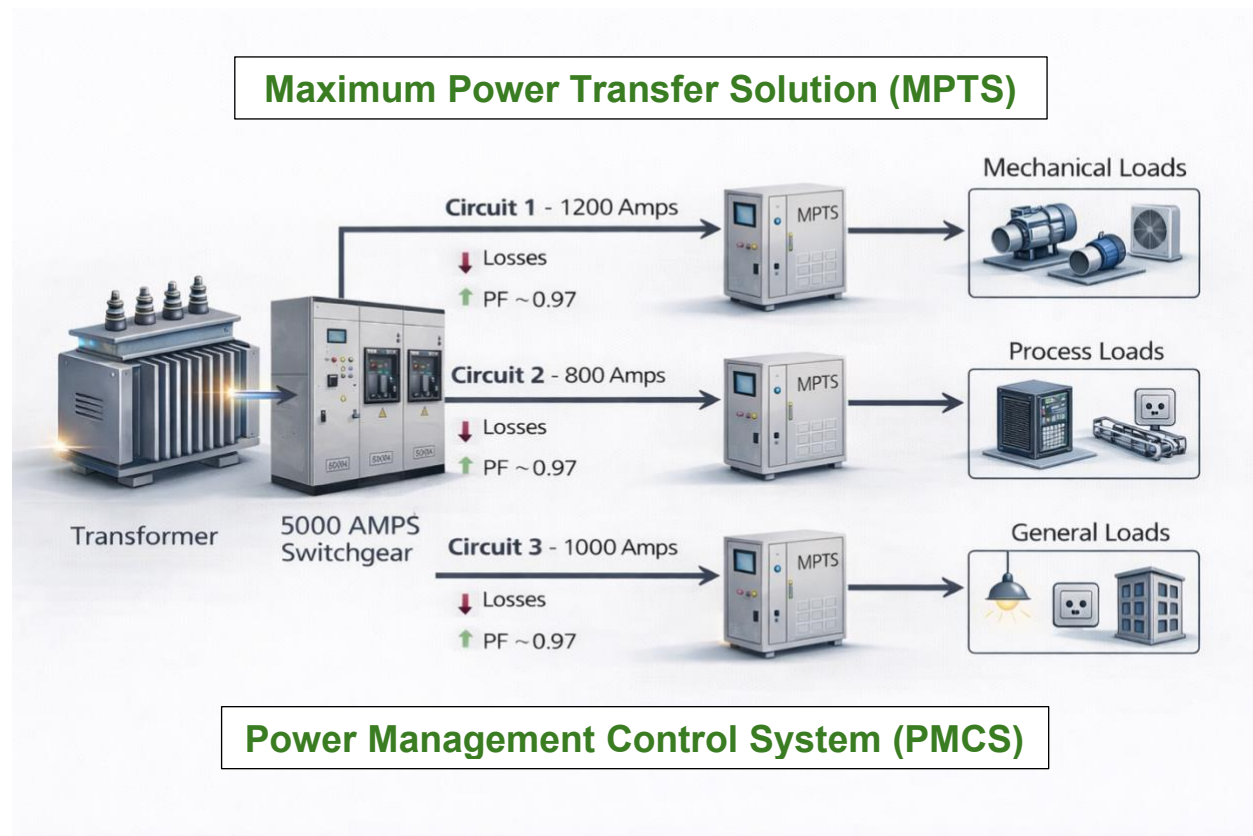


MPTS Financial Impact & ROI Assessment

1× and 2× Maximum Power Transfer Solution Deployment



NORAD

At 3,000' below in Cheyenne Mountain, very large compressors (one replaced annually) create pneumatic instead of conventional power because of the heat. Annual compressor replacement stopped after an MPTS 2015 installation, and none have been replaced since. At \$480,000+ per compressor, saved since 2015, the **CAPEX avoided = \$5,280,000** vs **\$240,000 MPTS cost**.

National Hospital

Prior to a chiller replacement in 2019, at a cost of \$1,000,080, due to poor, inefficient operation, MPTS was installed as a test to "clean the dirty power" and provide "as-per-design" operating conditions. The chiller is still operating. **CAPEX avoided = \$1,080,000** vs **\$240,000 MPTS cost**.

School District

An Arizona School District high school's I.T. building, with its associated server equipment and terminals, was hit with a 1,600V utility power surge. An MPTS unit installed in 2021 suppressed the surge without causing any damage. **CAPEX avoided = \$720,000** vs **\$120,000 MPTS cost**.

County Prison

The prison, also a nonstop-producing factory, achieved its MPTS 1-year ROI due to a 43% decline in preventive and emergency maintenance, enabling two technicians to be reassigned to the county courts rather than new hires. **CAPEX avoided \$120,000** vs **\$120,000 in MPTS cost**.

MPTS Financial Impact & ROI Assessment

1× and 2× Maximum Power Transfer Solution Deployment

Executive Summary

This report evaluates the return on investment for two deployment configurations of the Maximum Power Transfer Solution (MPTS): a single-unit (1× MPTS) at a fully installed cost of \$200K, and a dual-unit (2× MPTS) at a fully installed cost of \$400K. Both configurations are assessed across recurring OPEX savings, avoided capital expenditure (CAPEX), transformer asset recovery, and overall payback profile.

Both deployments address a critical infrastructure problem: power asset transformers operating beyond 100% capacity (the same applies to BESS, UPS, Gensets, and Solar). The MPTS resolves this by eliminating reactive power, reducing demand load, and recovering usable transformer capacity — deferring or eliminating the need for costly electrical infrastructure upgrades. **MPTS is first and foremost a Power Management Control System (PMCS).**

Deployment Comparison Overview

Metric	1× MPTS (\$200K)	2× MPTS (\$400K)
Capital Investment	\$200,000	\$400,000
Annual OPEX Savings	\$42,217 – \$60,297	\$85,754 – \$129,914
CAPEX Avoided	\$140K – \$310K	\$270K – \$540K
Transformer Loading	100%+ → 86%	100%+ → 77%
Reactive Power Eliminated	400 kVAR → -7	400 kVAR → -14
Payback Period: Both / OPEX / CAPEX	1-2 / 3-5 / 1-2 years	1-2 / 3-5 / 1-2 years

OPEX Assessment

Both deployment scenarios produce strong, recurring operational savings driven by four distinct mechanisms:

1. Energy Savings

The 2× MPTS (600 kVA / 450 kW / 400 kVAR / 0.75 PF) deployment eliminates 245,280 kWh annually, and the 1× unit (360 kVA / 300 kW / 200 kVAR / 0.83 PF) eliminates 122,640 kWh annually. At \$0.12/kWh, this yields annual energy savings of approximately \$29,434 and \$14,717 respectively — a direct, measurable reduction in utility consumption.

2. Demand Charge Reduction

Demand savings follow directly from the kVA reductions achieved. The 2× deployment recovers 136 kVA on a 600 kVA transformer, generating \$16,320–\$24,480 per year in demand savings. The 1× unit frees 51 kVA on a 360 kVA transformer, yielding a more modest \$5,100–\$9,180 annually.

3. Power Factor Penalty Elimination

Both configurations eliminate power factor penalties charged by the utility. At 2% of the annual utility bill, this adds a clean, predictable saving of \$9,000/year for the 2× configuration (\$450K annual utility) and \$5,400/year for the 1× (\$270K annual utility).

4. Transformer & Cooling Loss Reduction

Reduced electrical losses in transformers and associated cooling infrastructure, combined with lower mechanical stress on equipment, contribute an estimated \$16,000–\$32,000 annually (2×) and \$12,000–\$16,000 (1×), alongside operational and maintenance savings of \$15,000–\$35,000 and \$5,000–\$15,000 respectively.

OPEX Savings Category	1× MPTS / Year	2× MPTS / Year
Energy savings (kWh)	\$14,717	\$29,434
Demand charge reduction	\$5,100 – \$9,180	\$16,320 – \$24,480
Power factor penalty elimination	\$5,400	\$9,000
Transformer & cooling losses	\$12,000 – \$16,000	\$16,000 – \$32,000
Operational & maintenance	\$5,000 – \$15,000	\$15,000 – \$35,000
Total annual OPEX savings	\$42,217 – \$60,297	\$85,754 – \$129,914

CAPEX Assessment

The more significant financial argument is the deferral and avoidance of capital expenditure. Both scenarios address transformers operating beyond 100% rated capacity. The MPTS resolves this without physical infrastructure replacement, avoiding the following capital outlays:

Avoided CAPEX Item	1× MPTS	2× MPTS
Transformer replacement	\$30K – \$60K	\$75K – \$150K
Utility infrastructure upgrade	\$30K – \$75K	\$40K – \$80K
Backup capacity (GenSet/UPS)	\$50K – \$100K	\$80K – \$160K
Extended transformer service life	\$30K – \$75K	\$75K – \$150K
Total CAPEX avoided	\$140K – \$310K	\$270K – \$540K

The 2× deployment reduces transformer loading to ~77%, providing significantly greater headroom for future load growth compared to the 1× unit's ~86% loading. Both values represent safe operational targets versus the pre-deployment overload condition.

Payback & Risk-Adjusted View

The stated 1–2-year payback applies to both configurations and is credible if the CAPEX avoidance items are treated as near-term obligations rather than as hypothetical deferments.

Key considerations:

- If the transformer replacement, utility upgrade, or backup power generation has already been budgeted or is imminent, the ROI case is extremely strong, and the net payback may be achieved within the first year.
- If these expenditures remain discretionary, the OPEX-only payback of approximately 3–5 years remains a reasonable return for electrical infrastructure investment.
- The 2× deployment delivers approximately 2× the annual OPEX savings and 2× the CAPEX avoidance upside, meaning the incremental \$200K investment for the second unit carries the same ROI profile as the first — an unusual characteristic suggesting both transformers are equally stressed.
- Reactive power correction to a slightly leading condition (–7 to –14 kVAR) is an optimal operating point, providing a built-in voltage-stability margin.

Strategic Asset Impact

Beyond the financial metrics, both deployments unlock operational and growth-oriented benefits:

- Eliminates infrastructure bottlenecks and overload risk without capital construction
- Enables facility growth without requiring new electrical service or transformer upgrades
- Improves power reliability, equipment longevity, and energy efficiency
- Frees 23% of transformer capacity (2×) or 14% (1×) for future load allocation
- Extends the useful service life of existing transformer assets

Terminology Reference

Acronym	Definition
MPTS	Maximum Power Transfer Solution
PMCS	Power Management Control System
OPEX	Operating Expenditure — recurring operational costs
CAPEX	Capital Expenditure — one-time infrastructure investment
kVA	Kilovolt-Ampere — measure of apparent power
kVAR	Kilovolt-Ampere Reactive — measure of reactive power
kWh	Kilowatt-Hour — measure of energy consumption

This assessment is based on vendor-provided financial modeling and validated operational savings data. All figures should be verified against site-specific utility contracts and capital project budgets.

**MPTS Financial Impact Summary
(1 x MPTS Deployment \$200K (All-inclusive))**
Annual Savings Breakdown
Energy Savings

~122,640 kWh reduced annually

≈ **\$14,717 / year (\$0.12 / kWh)**

Demand Savings

51 kVA reduction

≈ **\$5,100 – \$9,180 / year (\$10 – \$15 / kW)**

Power Factor Penalty Elimination

2% of \$270K per annum

≈ **\$5,400 / year (2% of \$450K)**

Reduced Transformer losses & Cooling

≈ **\$12,000 – \$16,000**

Operational Efficiency & Maintenance Reduction:

Lower losses, cooling, and equipment stress

≈ **\$5,000 – \$15,000 / year**

Total Verified Savings:

\$42,217 – \$60,297 per year

Strategic Asset Impact

14% Transformer Capacity Recovered

51 kVA freed on a 360 kVA transformer

Loading Reduction:

100%+ overloaded → ~86% optimized operation

Reactive Power Eliminated:

400 kVAR → ~ -7 (slightly leading optimal condition)

Financial Interpretation
Avoided / Deferred Capital Expense

Transformer replacement avoided: **\$30K – \$60K**

Utility upgrade: **\$30K – \$75K**

Backup capacity (GenSet/UPS): **\$50K – \$100K**

Extended transformer service life: **\$30K – \$75K**

Total CAPEX Avoided: \$140K – \$310K

Executive Takeaway

\$200K capital investment (1 x MPTS)

\$42K – \$60K recurring annual OPEX savings

\$140K – \$310K CAPEX avoided

Payback: ~1–2 years (OPEX / CAPEX included)

Eliminates infrastructure bottlenecks \$ overload risk

Enables growth **without electrical upgrades**

Improves reliability, efficiency, and asset life

**MPTS Financial Impact Summary
(2 x MPTS Deployment \$400K (All-inclusive))**
Annual Savings Breakdown
Energy Savings

~245,280 kWh reduced annually

≈ **\$29,434 / year (\$0.12 / kWh)**

Demand Savings

136 kVA reduction

≈ **\$16,320 – \$24,480 / year (\$10 – \$15 / kW)**

Power Factor Penalty Elimination

2% of \$450K per annum

≈ **\$9,000 / year (2% of \$450K)**

Reduced Transformer losses & Cooling

≈ **\$16,000 – \$32,000**

Operational Efficiency & Maintenance Reduction:

Lower losses, cooling, and equipment stress

≈ **\$15,000 – \$35,000 / year**

Total Verified Savings:

\$85,754 – \$129,914 per year

Strategic Asset Impact

23% Transformer Capacity Recovered

136 kVA freed on a 600 kVA transformer

Loading Reduction:

100%+ overloaded → ~77% optimized operation

Reactive Power Eliminated:

400 kVAR → ~ -14 (slightly leading optimal condition)

Financial Interpretation
Avoided / Deferred Capital Expense

Transformer replacement avoided: **\$75K – \$150K**

Utility upgrade: **\$40K – \$80K**

Backup capacity (GenSet/UPS): **\$80K – \$160K**

Extended transformer service life: **\$75K – \$150K**

Total CAPEX Avoided: \$270K – \$540K

Executive Takeaway

\$400K capital investment (2 x MPTS)

\$86K – \$130K recurring annual OPEX savings

\$270K – \$540K CAPEX avoided

Payback: ~1–2 years (OPEX / CAPEX included)

Eliminates infrastructure bottlenecks \$ overload risk

Enables growth **without electrical upgrades**

Improves reliability, efficiency, and asset life