# Battery Energy Storage Systems

## Presentation to the Manitoba Public Utilities Board

Integrated Resource Planning and Major New Facilities Proceeding

August 31, 2026

NRSTOR INC

# Background: NRStor and Jason Rioux

- NRStor:
  - Leading Canadian energy storage developer, owner, and operator
  - Active across spectrum of BESS projects: large, medium, small, and batteries aggregated into virtual power plants
  - Recently completed one of the largest Canadian BESS projects ahead of schedule and under budget (Oneida)
  - Large development pipeline & actively proposing projects Canada-wide
- Jason Rioux
  - Chief Development Officer: lead development, construction, & operation
    - Including lead on costing and proposals
  - Over 25 years in energy generation sector, including 10+ with Ontario Power Generation and 10+ with NRStor

# Capital cost of BESS facilities

- See appendix for full costing by size, duration
  - Shows some economies of scale for larger & longer-duration batteries
  - 400 MW, 8-hour duration: $699 million
  - 750 MW, 8-hour duration: $1,311 million
- Costing details
  - Latest information based on bids made in past year (incl. 5+ in past 6 months) & Ontario competitive procurement results
  - All-in costs (incl. financing, contingency, batteries, balance of plant, etc.)
  - Based only on reliable suppliers/vendors (e.g. cheapest batteries excluded)
  - Based on contracted MWs (excludes buffer capacity installed to backstop contractual obligations – i.e. nameplate capacity is higher)
  - Cost factors that vary based on location are small proportion of overall costs
  - Typically based on 20- or 25-year contracts

# Capital cost declines

- Dramatic BESS cost declines in recent years due to:
  - More competition, economies of scale, declining input costs, & efficiencies
  - E.g. new gigafactories online, increasing scale and decreasing margins
  - E.g. drop in lithium price
- Current cost: approx. 50% of the Oneida project (in service in 2025)
- Ontario's June 2026 competitive procurement for electricity capacity
  - No successful gas-fired power generation bids
  - 100% winning proposals were BESS facilities (640 MW)
  - Large decline in cost since recent Ontario capacity procurements
  - Results consistent with dramatic cost declines noted above
- Prices appear currently stable, likely to decline in medium and long term

# Deployment lead time

- 24-30 months from contract award/notice to proceed to operation
- Primary schedule constraints
  - Interconnection equipment (transformers, switchgear)
  - Not the batteries, inverters, or containers, which have substantially shorter lead times
- Examples:
  - Oneida (250 MW): 24-month construction schedule, completed in ~22 months
  - Hagersville (300 MW): ~18 months from financial close to operations

# Cold climate suitability

- Can be designed to operate in the coldest climates (-40°c or lower)
- Well-suited for winterization
  - Small enclosures
  - No need for heated space for human operators
  - Easy to insulate
  - Easy to heat
- Heating costs minor
  - Auxiliary heat generally not needed when cycling (cycling generates heat)
  - High battery cycling likely in cold weather conditions and for price arbitrage

# Reliability

- Highly reliable
- BESS facilities operate even if some battery packs are offline
  - Battery packs typically 1 MW
  - Outage in several battery packs has trivial impact
  - Increases reliability via diversity
- Better protected from transmission and distribution outages
  - Sited closer to loads, minimizing T&D reliance
- Buffer between nameplate capacity and contract capacity
  - Developer guarantees contract capacity operability
  - E.g. Oneida BESS – ~280 MW nameplate; 250 MW contract
    - Costing based on contract capacity, not nameplate

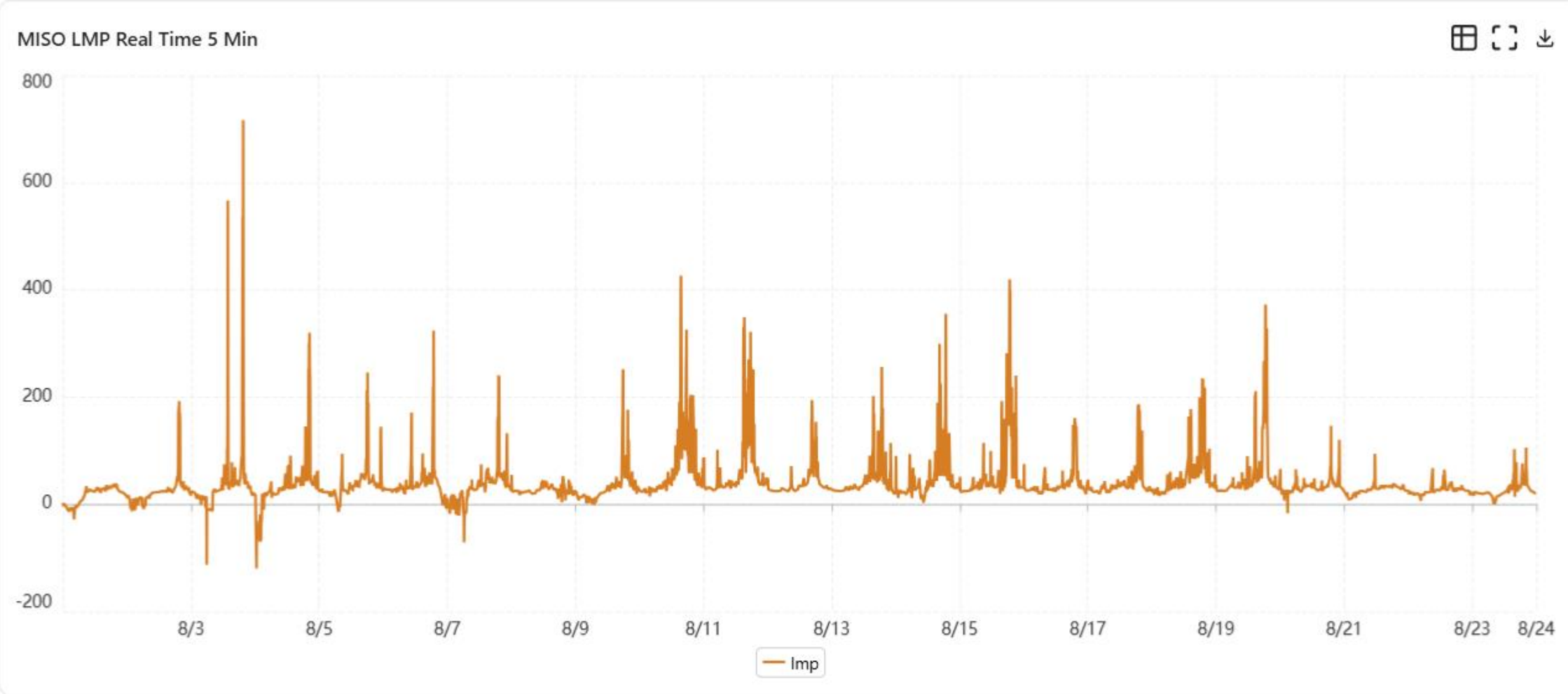
# Operational costs and savings

- Value streams examples:
  - Capacity value
  - Ancillary services (e.g. frequency regulation & voltage control)
  - Price arbitrage (charge with low cost power, discharge at high cost times)
  - Low-cost operating reserve provision (vs. gas & hydro, esp. with freshet)
  - Transmission and distribution capital cost savings/ deferral (siting close to load)
  - Transmission and distribution loss reductions (siting close to load)
  - Renewable energy integration (e.g. wind)
  - Congestion and water management
  - Improved system reliability
  - Avoided generation costs (e.g. fuel costs)
- Main costs: power consumption (no fuel costs), maintenance, software and control system support

# Price arbitrage – significant value available in Manitoba

## Price at the MISO-Manitoba Interchange

August, 2026, 5-minute interval, locational marginal price






MISO data; chart created with gridstatus.io

# Appendix 1: Capital cost

| Table 1: Capital Cost for 4-hour Duration BESS (CAD $M) | | | | |
|---|---|---|---|---|
| **Capacity** | Energy | CAPEX | ITC | CAPEX net of ITC |
| **50 MW** | 200 MWh | $90M | $22M | $68M |
| **100 MW** | 400 MWh | $145M | $35M | $110M |
| **400 MW** | 1600 MWh | $540M | $130M | $410M |
| **750 MW** | 3000 MWh | $1,015M | $244M | $771M |

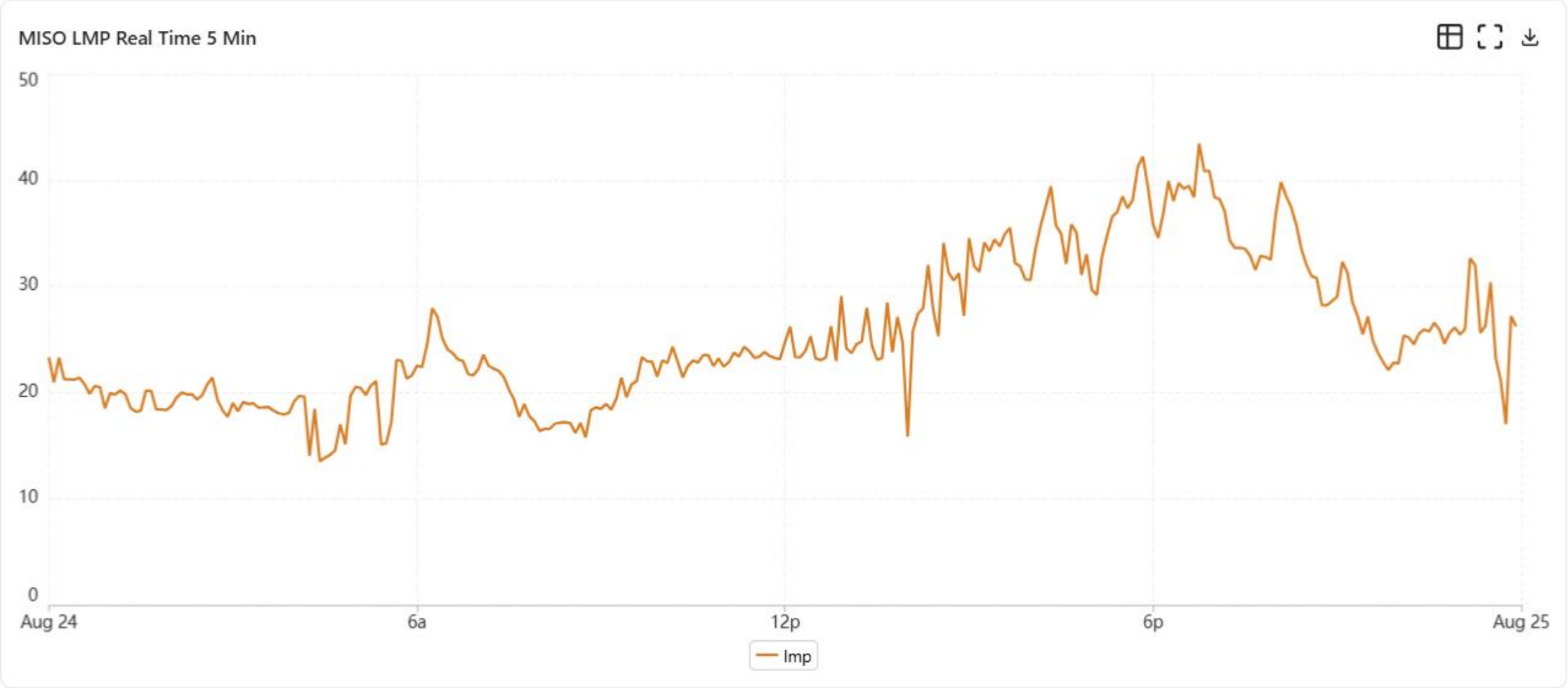
# Appendix 1: Capital cost

| Table 2: Capital Cost for 8-hour Duration BESS (CAD $M) | | | | |
|---|---|---|---|---|
| **Capacity** | Energy | CAPEX | ITC | CAPEX net of ITC |
| **50 MW** | 400 MWh | $135M | $32M | $103M |
| **100 MW** | 800 MWh | $230M | $55M | $175M |
| **400 MW** | 3200 MWh | $920M | $221M | $699M |
| **750 MW** | 6000 MWh | $1,725M | $414M | $1,311M |

# Appendix 2: MISO-MB price data

## Price at the MISO-Manitoba Interchange

August 24, 2026, 5-minute interval, locational marginal price

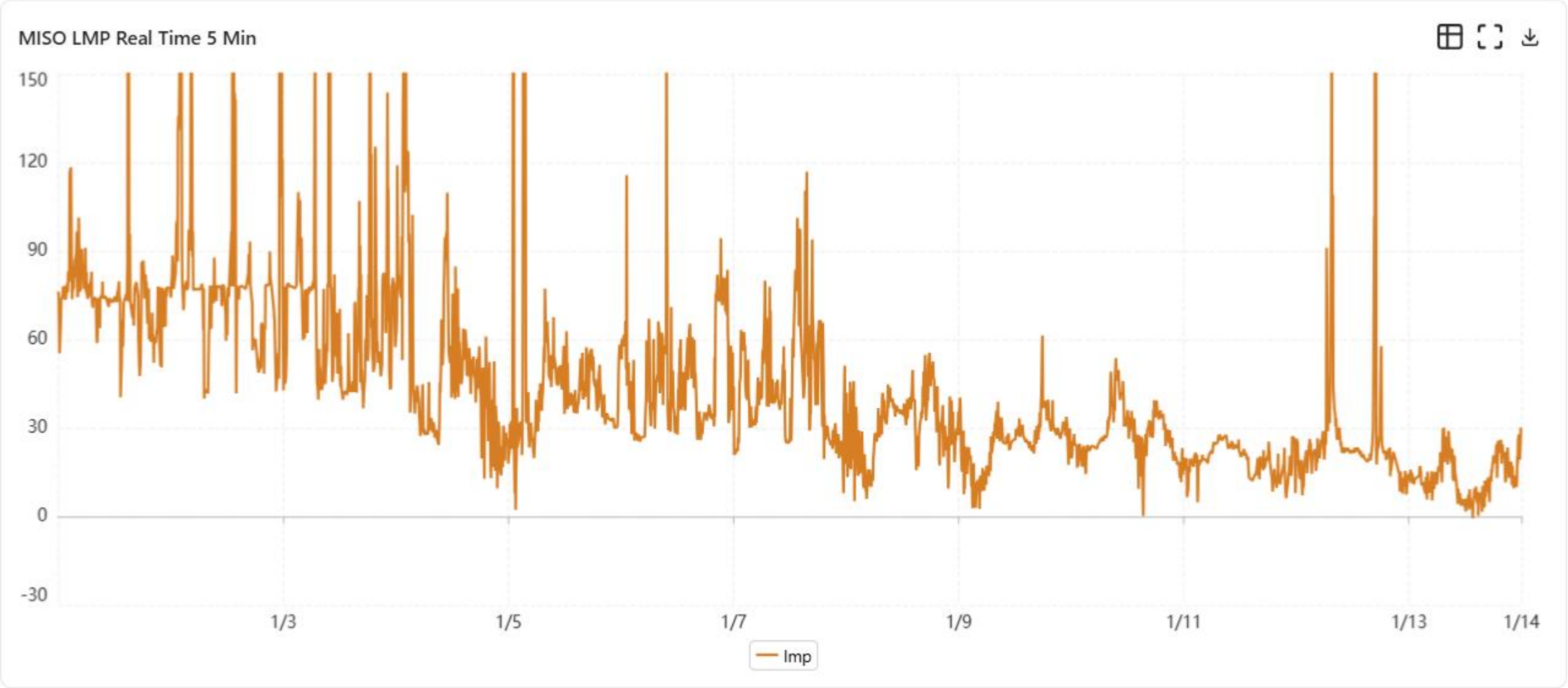



MISO data; chart created with gridstatus.io

# Appendix 2: MISO-MB price data 2

## Price at the MISO-Manitoba Interchange

January 1-14, 2026, 5-minute interval, locational marginal price

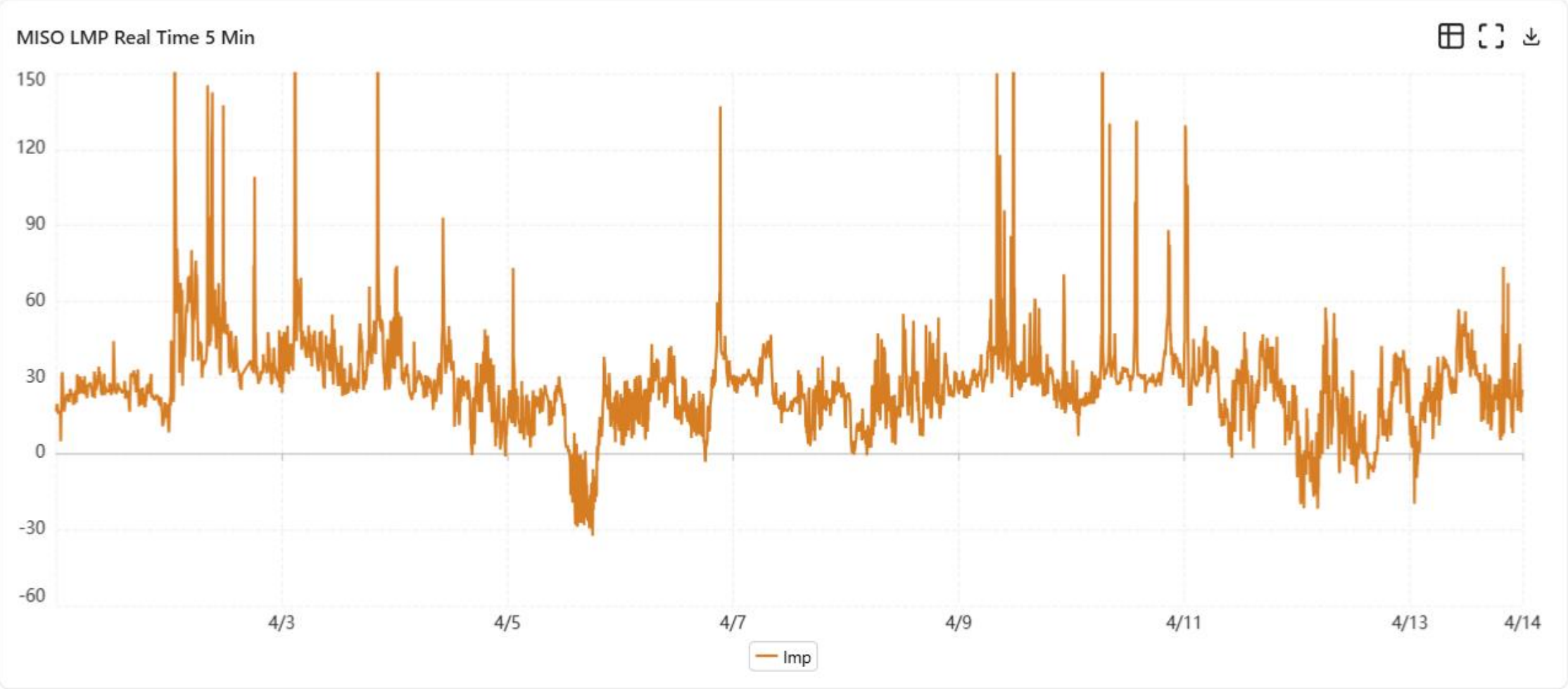



MISO data; chart created with gridstatus.io
Y-axis max set to 150

# Appendix 2: MISO-MB price data 3

## Price at the MISO-Manitoba Interchange

April 1-14, 2026, 5-minute interval, locational marginal price




MISO data; chart created with gridstatus.io
Y-axis max set to 150