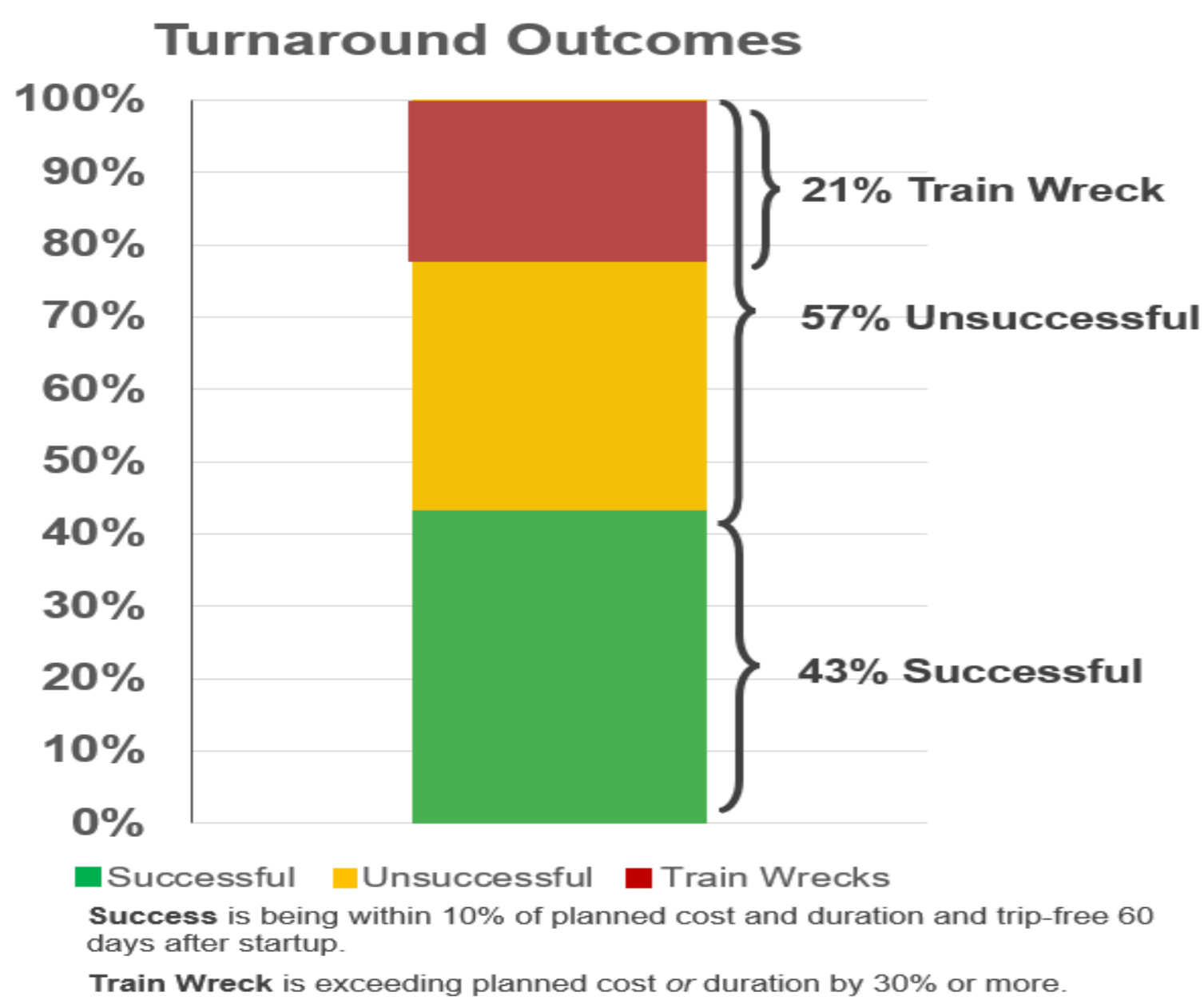


1. PLANT STO EVENTS IMPACT ON THE BUSINESS

Shutdowns, Turnarounds and Outages (STO) are the periodic planned events of a facility to perform maintenance work and install new capital projects. They impact the bottom line through the cost of the event, the Lost Profit Opportunity (LPO) due to the facility being offline, and the potential harm to plant reliability if the STO performed poorly — not to mention significant safety and environmental risks.

2. INDUSTRY STRUGGLES TO DELIVER PREDICTABLE OUTCOMES

As seen in the chart below, the Industry performance for STO has been especially poor with less than half of STO meeting their planned goals.

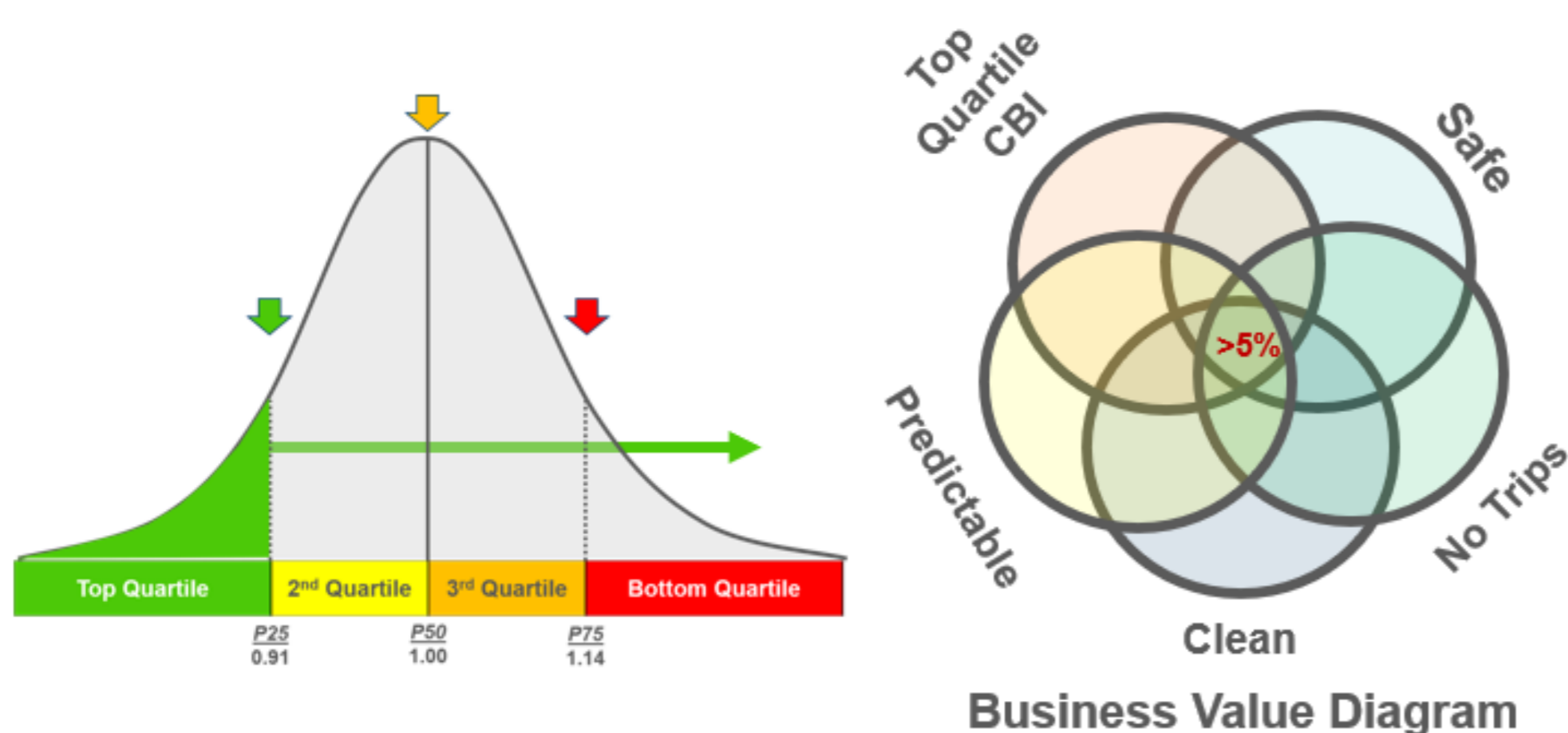


Source: AP-Networks TINC (Turnaround Industry Network Conference) 2021

3. WHAT IS STO EXCELLENCE

- Safe:** No recordable incidents
- Zero Environmental Impact:** No reportable incidents
- Cost to Business:** Low turnaround cost and low Lost Profit Opportunity
- Predictable:** Both cost and schedule less than 10% over plan
- Operable:** No trips post startup

Our data below shows that fewer than 5 percent of STO events achieve all targets in the Business Value Chain.



4. HOW TO PROVIDE VALUE TO BUSINESS

- Deliver Safe Turnarounds
- Achieve Environmental and Regulatory Targets
- Enable Reliable Operations
- Provide Predictable Cost and Schedule Performance to Support Business Planning
- Deliver Cost-Effective STO – i.e., Cost Less Than Peers**
- Deliver Fast STO to Minimize Lost Profit Opportunity (LPO)**

Successful execution of STO is one of the value drivers for Business. Therefore we need to way where Site Leadership can measure and quantify the value of STO to their Business.

5. HOW TO QUANTIFY VALUE TO BUSINESS

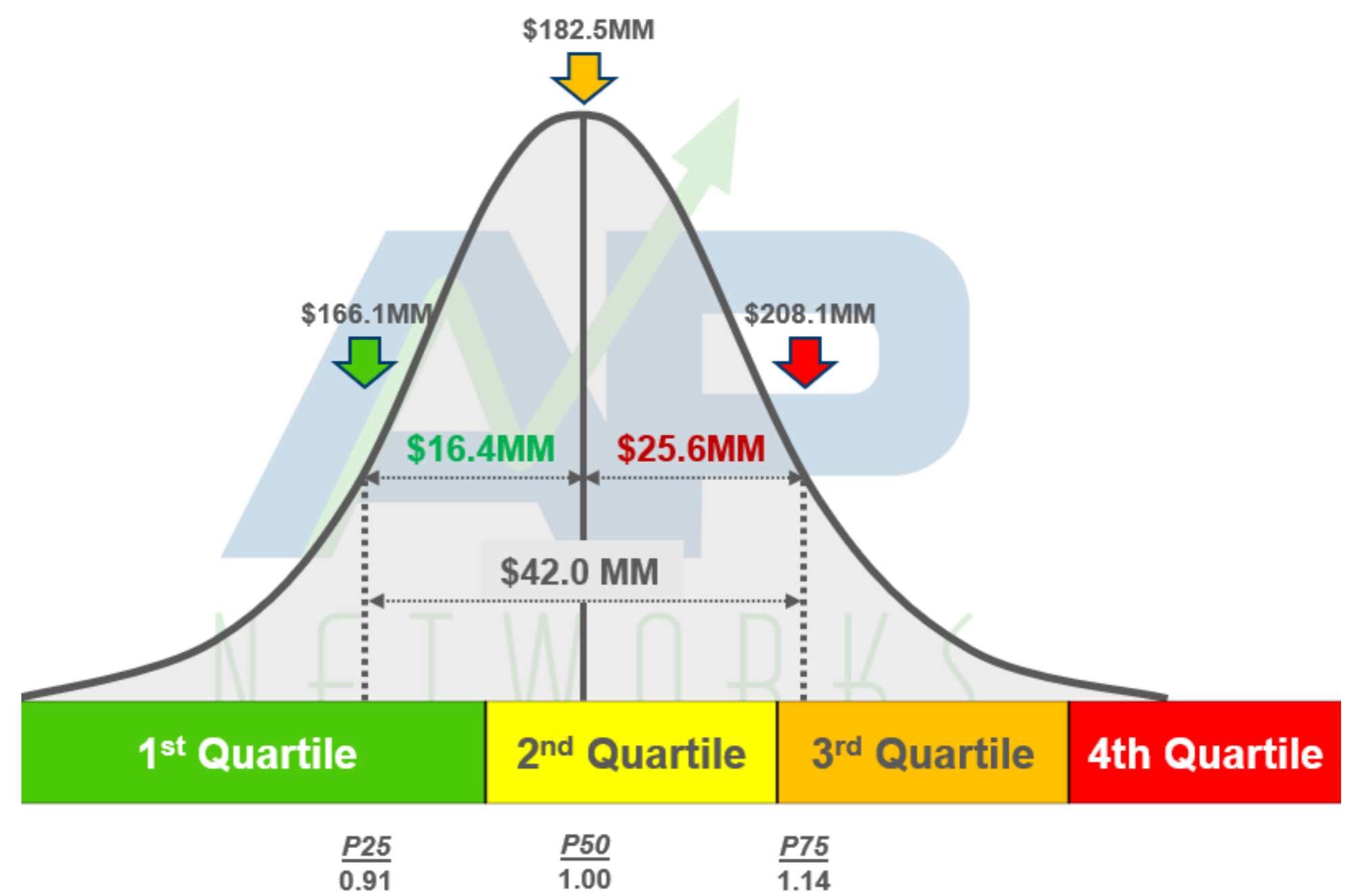
AP-Networks develop our proprietary metric, the **Cost to Business Index (CBI)** to measure the impact of STO to Business. This metric measures Cost to Business. In other words, it seeks to measure the cost of the event plus the cost of LPO by:

- Quantifying the STO Cost + Execution Duration * (LPO / day)
- Benchmarking the combined cost and LPO performance of an individual STO.

$$\text{Cost to Business Index (CBI)} = \frac{\text{Turnaround Event Cost} + \text{Event Duration} * \text{LPO/Day}}{\text{Industry Average Event Cost} + \text{Industry Duration} * \text{LPO/Day}}$$

6. HOW MUCH VALUE ARE THE TOP PERFORMING COMPANIES DELIVERING?

Effective STO saves both cost and schedule (or Lost Profit Opportunity). Our benchmarking data shows that 1) moving from bottom to top quartile saves more than 20 percent on cost, while 2) moving from bottom to top quartile reduces shutdown days by more than 30 percent.



Using the above illustration as example:

- Industry average CBI (1.00) cost to business is \$182.5MM
- Top Quartile average CBI (0.91) cost to business is \$166.1MM (i.e., **\$16.4 MM savings**)
- Bottom Quartile average CBI (1.14) cost to business is \$208.1MM (i.e., **\$25.6 MM** in additional cost to business)
- Gap between Top and Bottom Quartile is **\$42.0 MM**, 23% of the industry average CBI.

In other words, the value proposition in going from Bottom Quartile to Top Quartile is **\$42.0 MM** in monetary savings.

7. KEY TAKEAWAY

- The 4 S's matter – Safety, Schedule, Spend, and Scope - these are four important performance and success criteria for every STO.
- Across the business, everyone needs to be engaged and invested in the success of the STO - use your tools such as the high-level plan to plan (e.g., NaviTrack) to ensure you engage with all stakeholders.
- You have to understand the true cost to the business for a STO - that includes Lost Opportunity from delayed or curtailed production due to misses surrounding the STO.
- If you aren't conducting STO to support the business, why are you doing that STO?

Asset Performance Networks (AP-Networks) is the trusted leader for improving asset and operational performance in refining, petroleum, chemical, and manufacturing companies worldwide. AP-Networks works with the client's most critical assets—their people, processes, and production facilities—in order to help them achieve safe, competitive, predictable outcomes on their high-risk events—namely capital projects and STOs.