

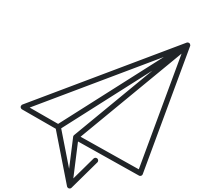


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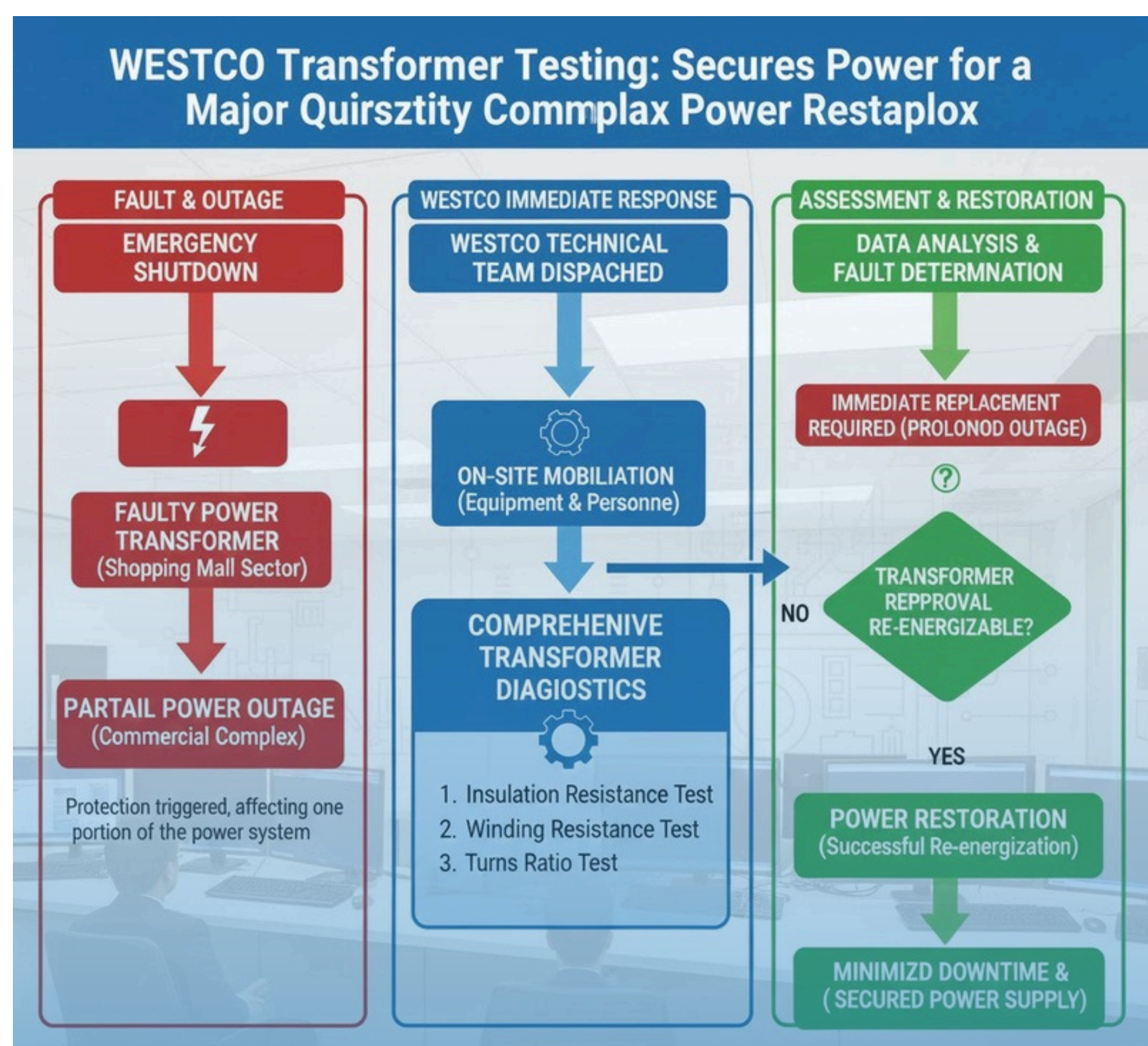
## WESTCO Electrical & Equipment Corp. Case Study

### Transformer Fault Management: The Proactive Decision Between Pullout and Re-energization



WESTCO's Transformer Testing Secures Power for a Major Quezon City Commercial Complex.

The following case study focuses on one of the largest shopping malls in Quezon City, where an emergency shutdown occurred due to a fault that triggers the protection of one of their power transformers. This incident has led to an immediate and complete power outage of one portion of their power system. The subsequent investigation focused on the critical question: Can the compromised transformer be safely re-energized, or did the extent of the damage require immediate replacement and a prolonged service interruption? This analysis will explore the nature of the transformer fault, the immediate operational response, and the technical assessment required before restoration of power.



Just as WESTCO guaranteed the business continuity of the largest malls in Quezon City by swiftly diagnosing a catastrophic transformer fault and safely facilitating a shutdown and rental replacement, WESTCO can transform your maintenance program from reactive firefighting to proactive failure prevention.

**Contact WESTCO now** to learn how our rigorous Transformer Testing expertise can reinforce the integrity of your critical infrastructure, turning maintenance from a necessity into a strategic advantage for continuous, reliable power.



## The Solution

The need for the specified tests arises from the following uncertainties inherent after a major fault:



**Assessing Internal Damage:** A fault or sudden shutdown suggests a severe internal issue. Without opening the unit (which is time-consuming), tests like the Sweep Frequency Response Analysis (SFRA) and Short Circuit Impedance Tests are the only way to nondestructively check for winding deformation, core movement, or shorted turns.



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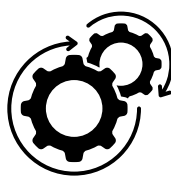
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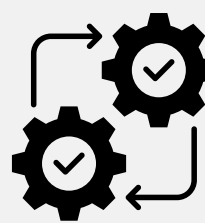
## The Challenge

-  The emergency shutdown due to the transformer fault immediately presents a high-stakes dilemma:
  -  **Safety Risk:** Re-energizing a failed transformer poses a significant safety hazard (e.g., fire, explosion) to property and personnel.
  -  **Operational Urgency:** The mall cannot function without power, creating immense **commercial pressure** to restore service quickly.



The essential challenge is to bridge the gap between this urgency and the safety imperative. This requires **diagnostic testing** to achieve a definitive answer, which is the sole focus before taking action.



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 **Evaluating Insulation Integrity:** An electrical fault can severely degrade the internal insulation system. The Overall Insulation Power Factor (IPF) Tests are necessary to quantify the health of the insulation, which is vital for preventing immediate catastrophic failure upon re-energization.



- 
 **Confirming Mechanical Integrity:** The Leakage Reactance / Impedance Test is critical because any significant deviation from the factory (nameplate) value indicates a likely change in the coil geometry—a telltale sign of physical damage or movement inside the tank.



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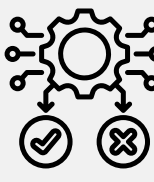
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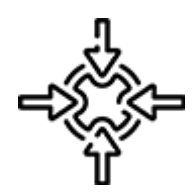
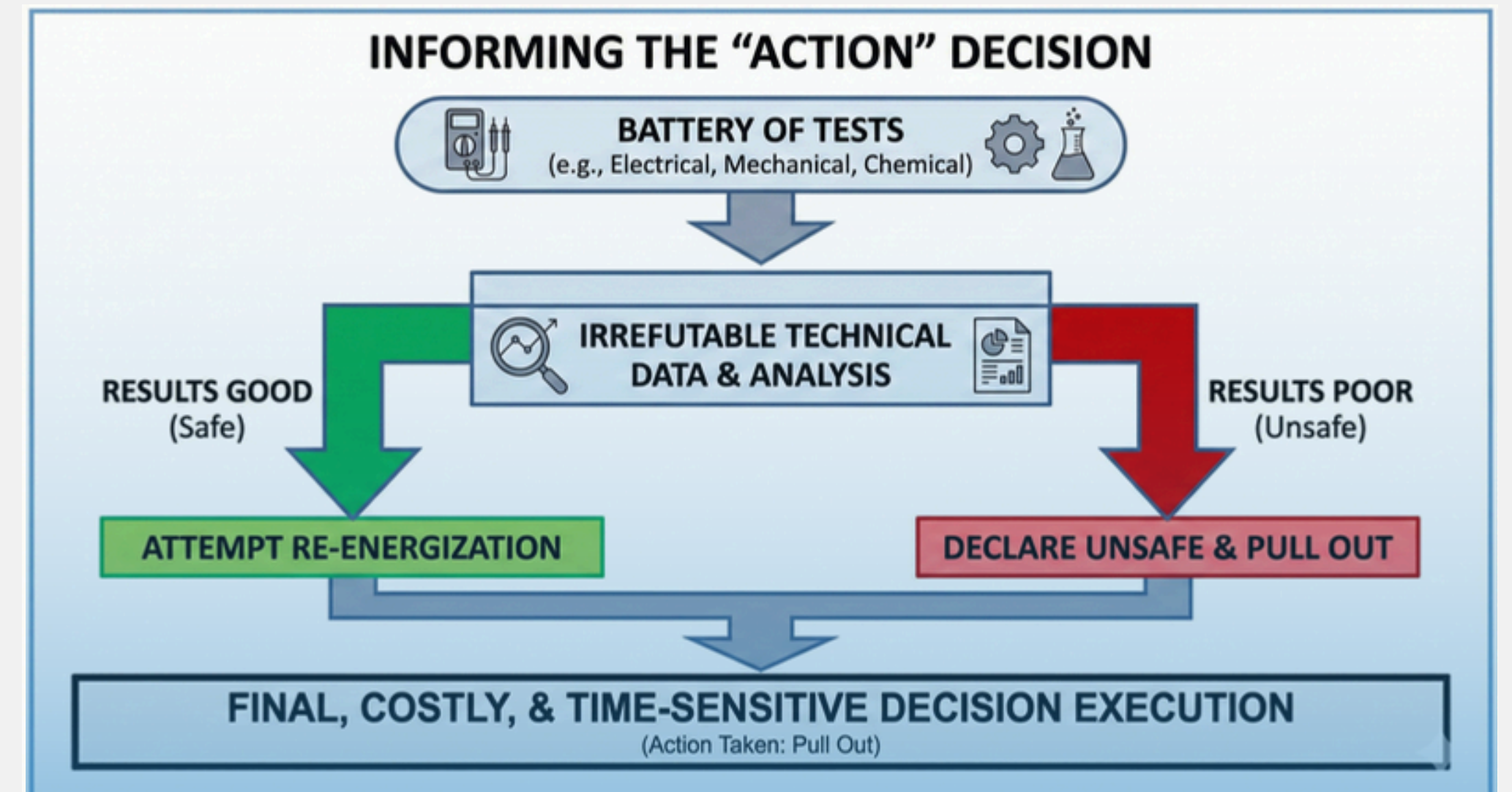
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- ✓  **Informing the "Action" Decision:** Ultimately, the battery of tests is required to provide the irrefutable technical data that supports the final, costly, and time-sensitive decision: either to attempt re-energization (if results are good) or to declare the unit unsafe and pull it out (as was done here).




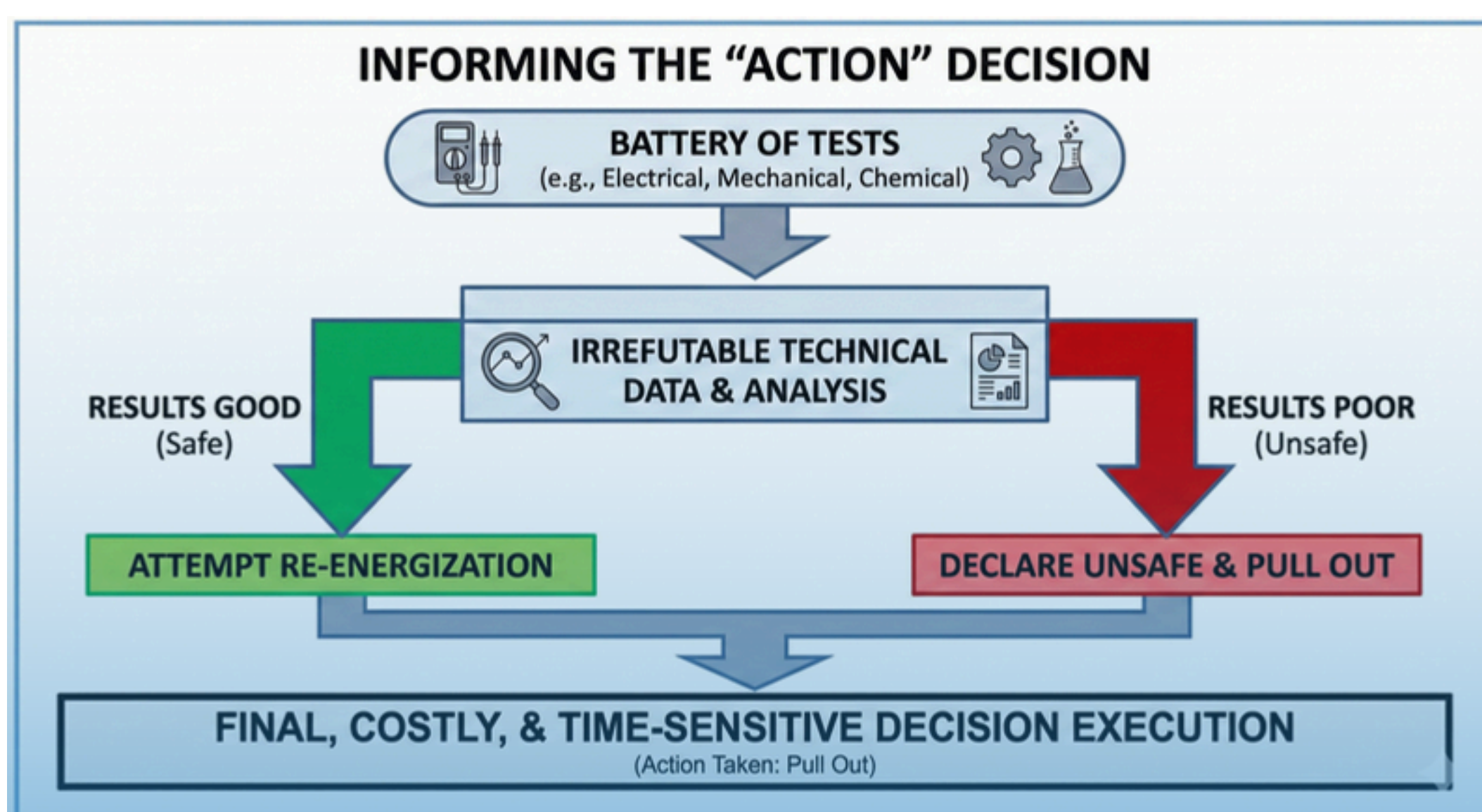
### The Impact

The tests provided critical, non-intrusive diagnostic data that accurately assessed the transformer's internal condition, leading to a safe and timely decision to decommission the unit.





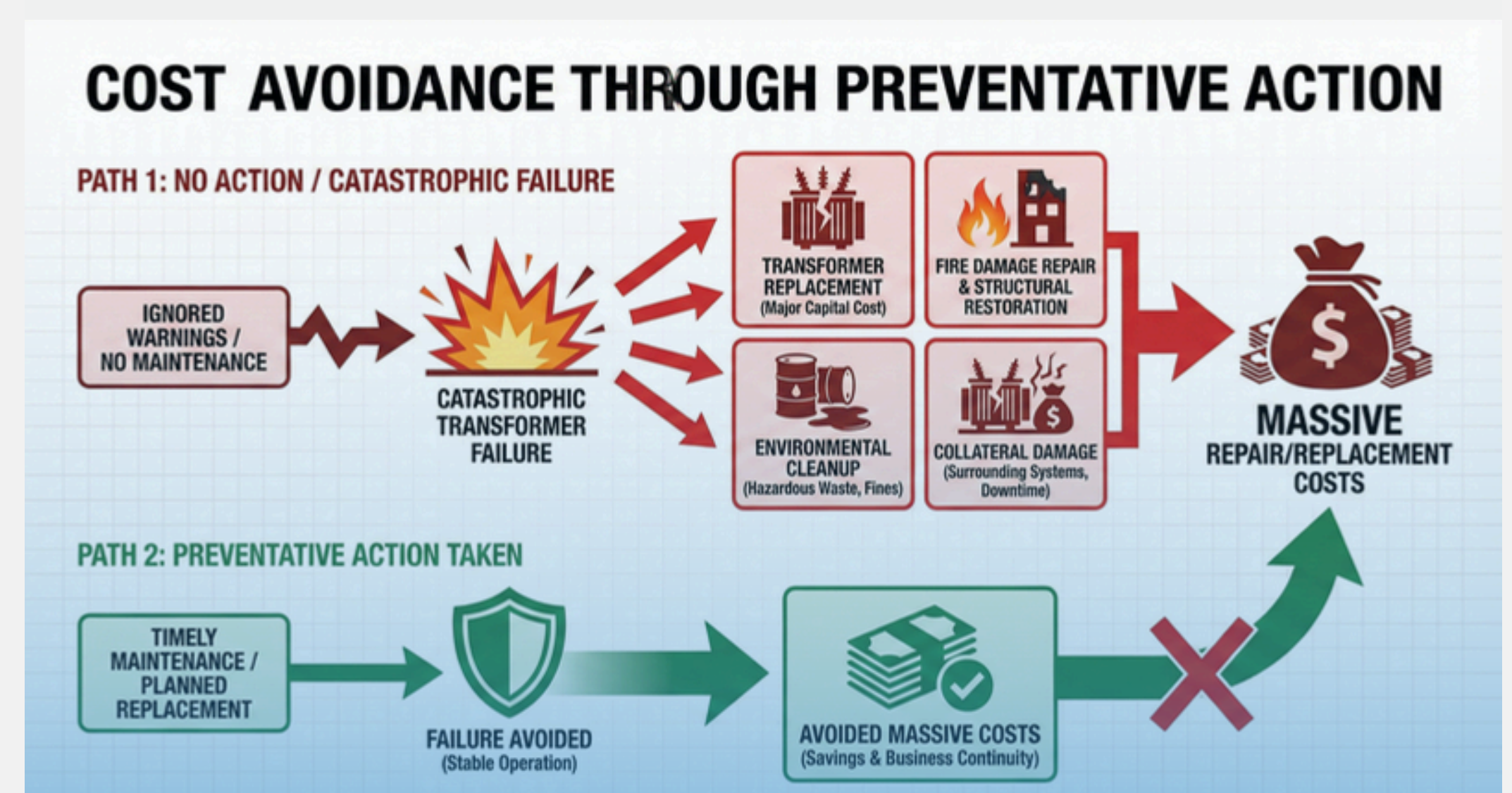
### Technical Result:

- ❖  **Safety:** The immediate and most significant technical impact was the prevention of a major in-service failure (e.g., a massive internal short circuit, fire, or explosion) which would have been highly dangerous to personnel and equipment if the Transformer was re-energized without testing.



### Business Result:

-  **Cost Avoidance:**
- ❖  The action avoided the **massive repair/replacement costs** associated with a catastrophic failure, which often involves replacing the transformer and repairing fire damage, environmental cleanup, and collateral damage to the surrounding building.



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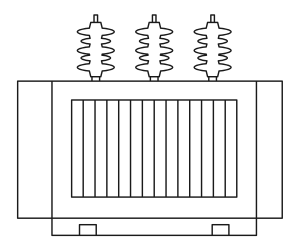


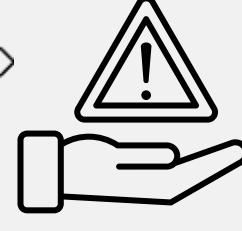
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❖  **Accurate Diagnosis of Internal Damage:** The combination of tests pinpointed the severity and nature of the damage:

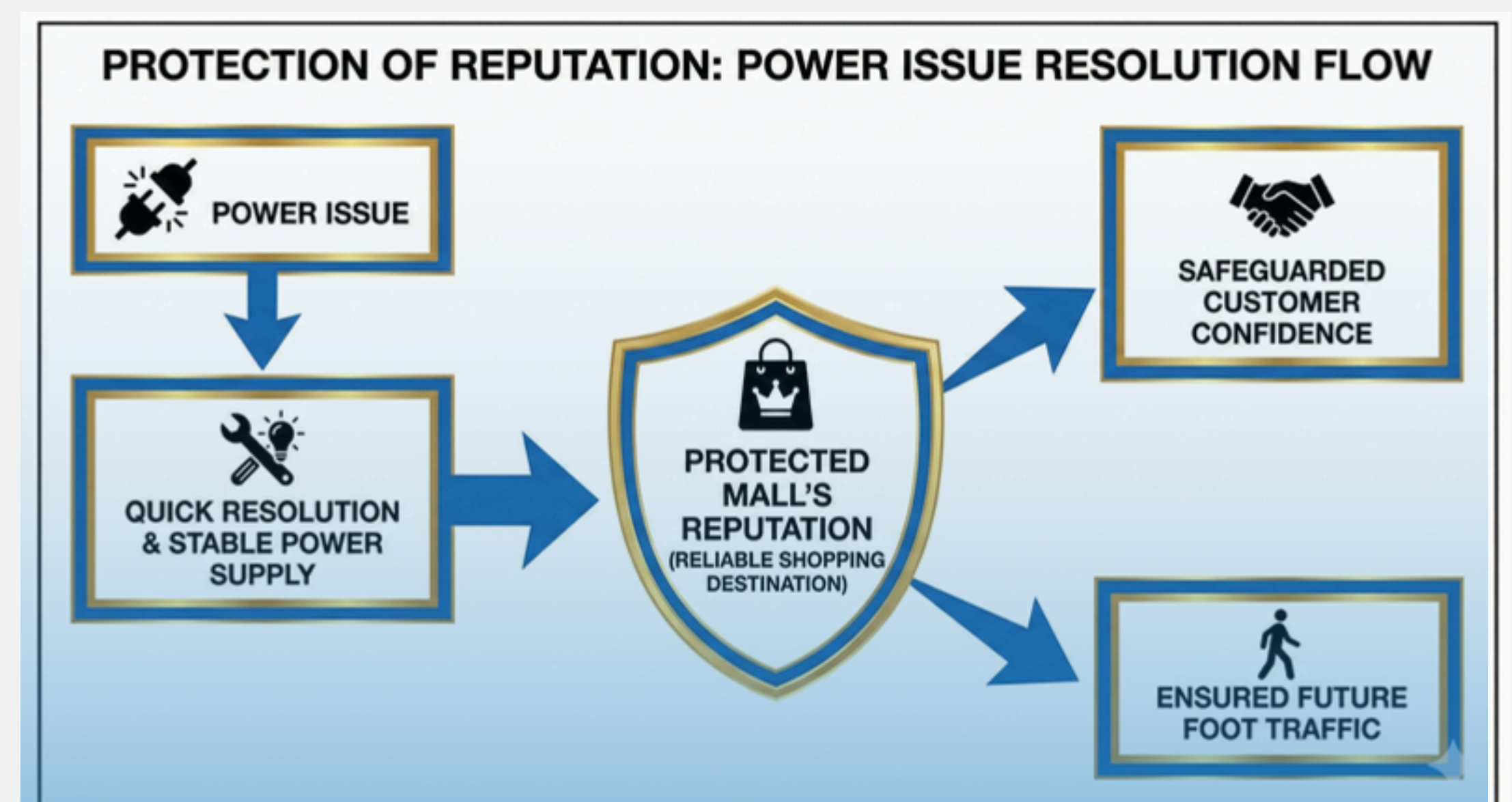
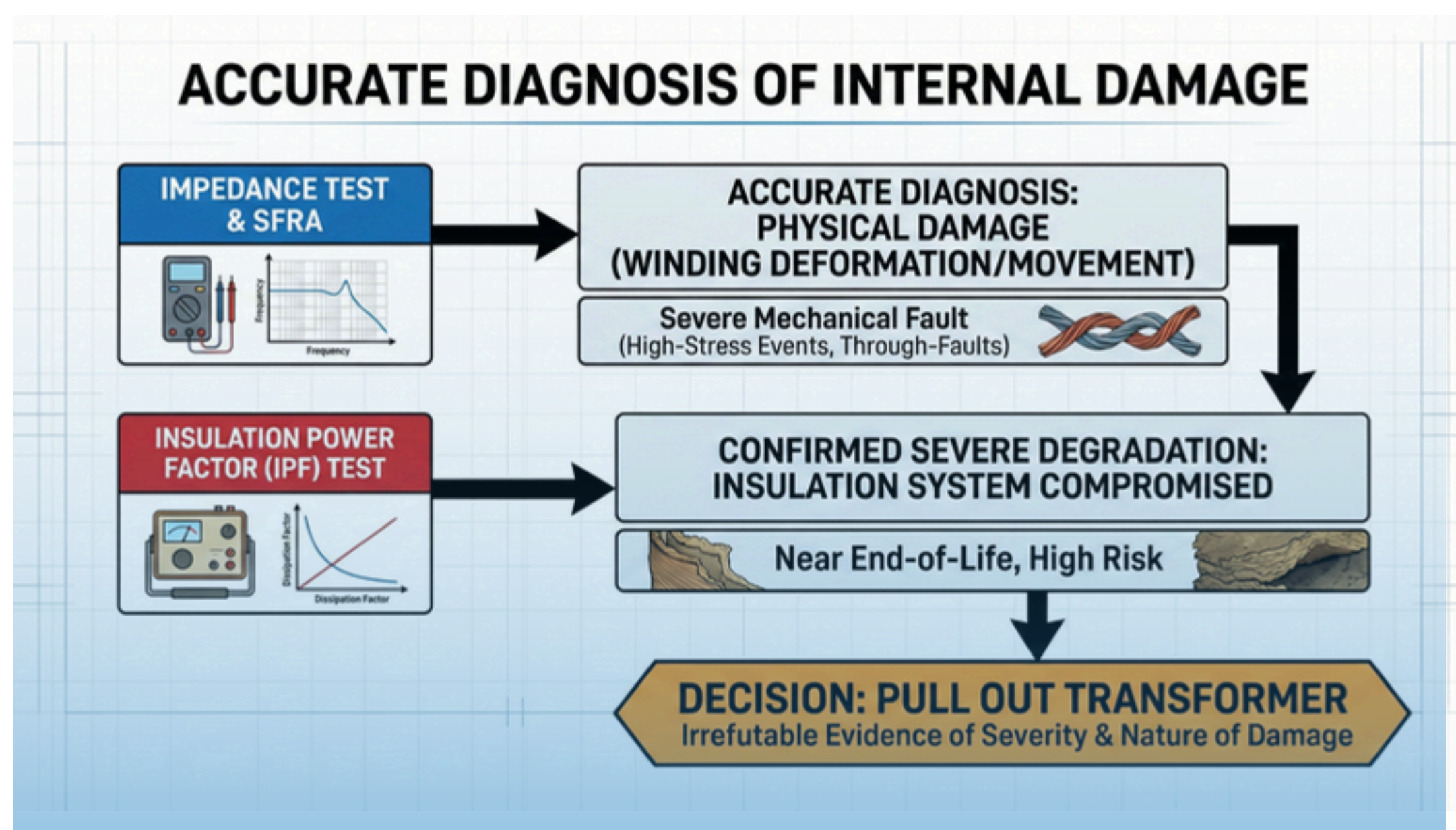
❖  **Impedance Test and SFRA:** Accurately diagnosed physical damage, specifically winding deformation/movement, which is a severe mechanical fault often caused by high-stress events like through-faults.

❖  **Insulation Power Factor (IPF) Test:** Confirmed severe degradation of the insulation system, indicating the transformer was near end-of-life or compromised, further supporting the decision to pull out.

❖  It **reduced potential liability** associated with a catastrophic failure.



○  **Protection of Reputation:** Quickly resolving the power issue and ensuring a stable power supply **protected the mall's reputation** as a reliable shopping destination, safeguarding customer confidence and future foot traffic.



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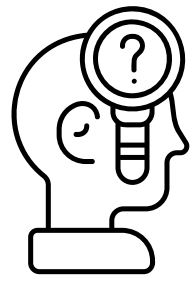
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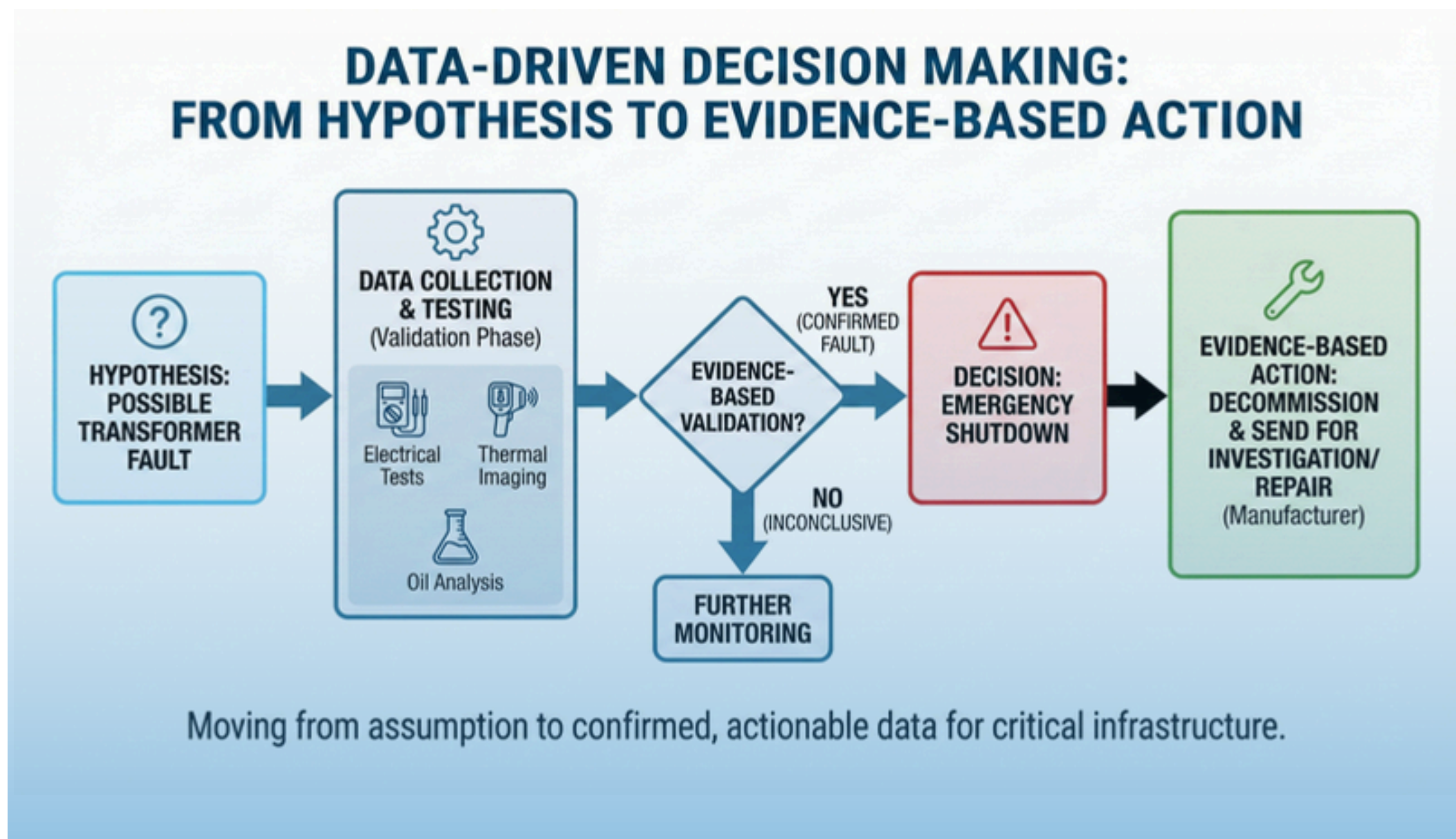




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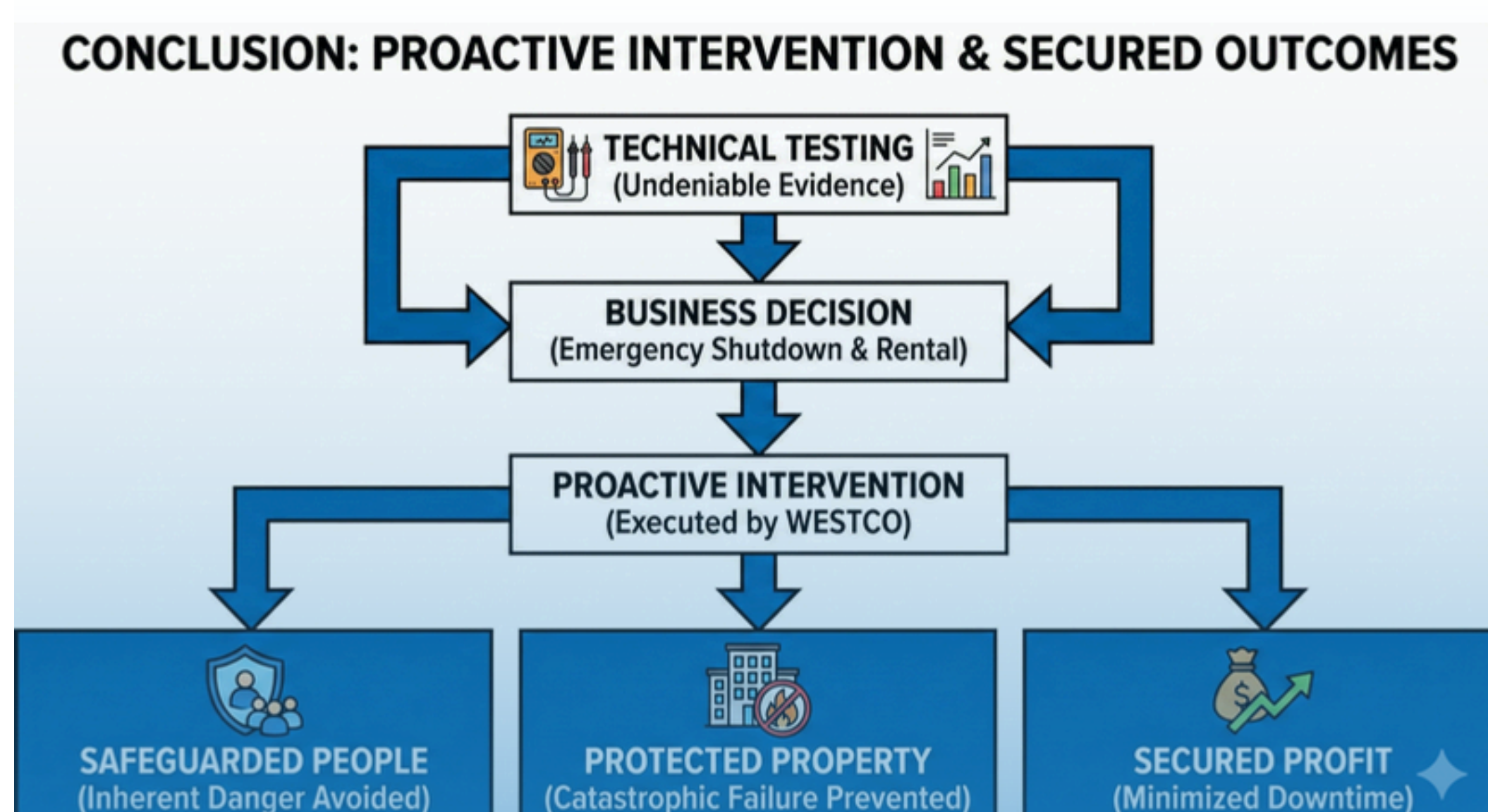


**Data-Driven Decision Making:** The tests validated the "Emergency / Shutdown" decision, moving from a hypothesis of a fault to an **evidence-based** action of decommissioning the Transformer and sending it back to the manufacturer for internal investigation and repair.



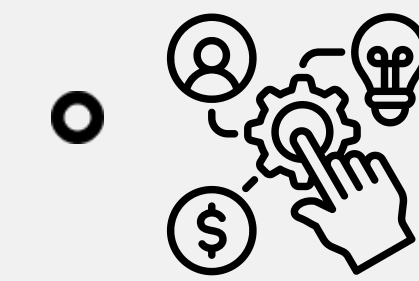
## Conclusion

The technical testing provided the undeniable evidence (high Impedance deviation, SFRA movement, high IPF) needed to make the correct business decision (emergency shutdown and rental). This **proactive intervention**, executed by a competent service provider like **WESTCO**, was critical, as it **safeguarded people** from the inherent danger of an imminent electrical fault, protected property from catastrophic failure and resulting collateral damage, and ultimately secured **profit** by minimizing disruptive, lengthy downtime for the commercial establishment.

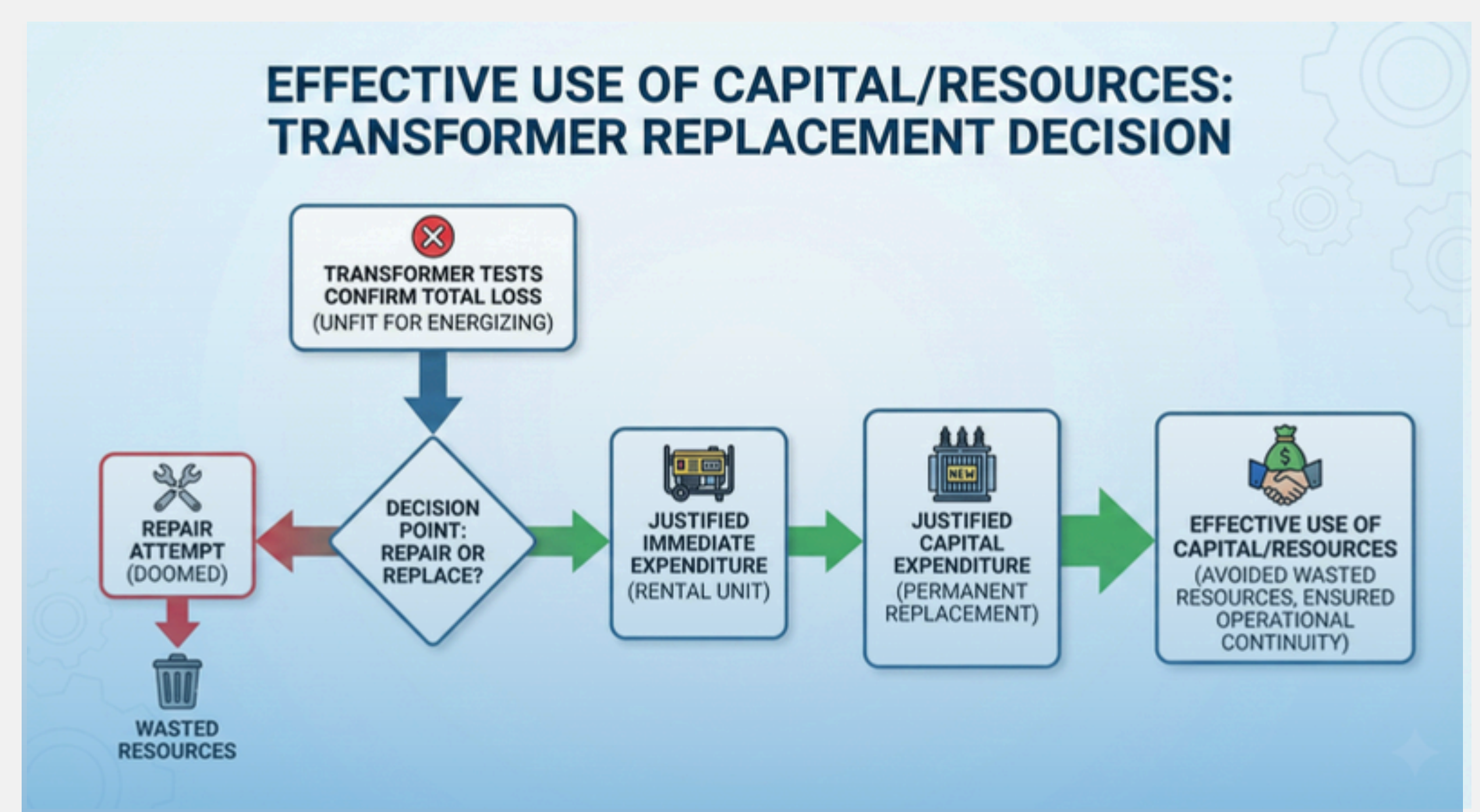


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**Effective Use of Capital/Resources:** The tests confirmed the transformer was a total loss (unfit for energizing), justifying the immediate expenditure for a **rental unit** and the capital expenditure for a **permanent replacement**, ensuring resources weren't wasted on a doomed repair attempt.



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