

TNPL's Approach for Future-Ready Paper Manufacturing



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PRESENTATION ROADMAP

What We Will Cover



Industry Context

Why future-readiness matters for pulp & paper

01



The SEQPC Framework

Safety · Eco-Friendly · Quality ·
Productivity · Conservation

02



Product & Market Evolution

From newsprint to packaging &
tissue

03



Technology Convergence

Predictive monitoring, AI & digital
ecosystems

04



Conclusion

Key takeaways and the path to 2030

05



INTRODUCTION

An Industry at Transformation & Inflection Point

01

Environmental pressure

Regulations, climate concern and emissions scrutiny are reshaping compliance.

02

Resource constraints

Water use and dependence on virgin forest-based fibre are under strain.

03

Changing expectations

Customers demand sustainable packaging and plastic substitution.

04

Rapid technology shift

Digitalization and automation are redefining competitiveness.

Future competitiveness now depends on integrating policy alignment, sustainability and advanced technologies.

Five interdependent pillars – Resilience & Competitiveness



Safety

Building a
proactive
safety culture



Eco-Friendly

Circularity &
renewable
energy



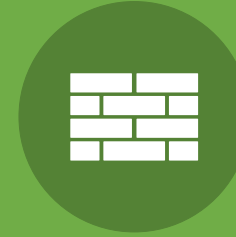
Quality

Nil customer
complaints, by
design



Productivity

Record output,
smarter assets



Conservation

Stewardship of
every resource

PILLAR S

S



Safety

SAFETY

Building a Proactive Safety Culture



“Safety is not an expense;
it is an
investment.”



Accident Prevention

A long-term investment in people,
not a cost center



Employee Well-Being

Embedded into daily operating
discipline



Workplace Excellence

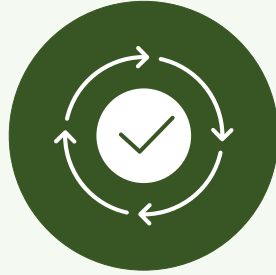
Recognized through certification &
continual audit

From Reactive to Predictive Safety



ISO 45001:2018 Certified

Occupational Health & Safety Management System implemented and certified within a short timeframe



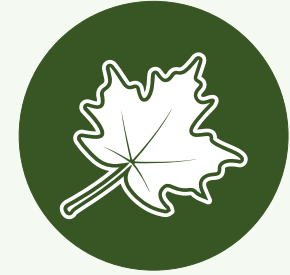
Internal Safety Audits

Periodic mill-wide audits evaluate workplace hazards, equipment safety, and procedural compliance



Near-Miss Reporting

Mill-wide reporting of near-miss events enables early hazard detection and shift from reactive to predictive safety



Unsafe Act / Condition Reporting

Frontline reporting of Unsafe Acts & Conditions drives employee participation and continual improvement.

PILLAR E

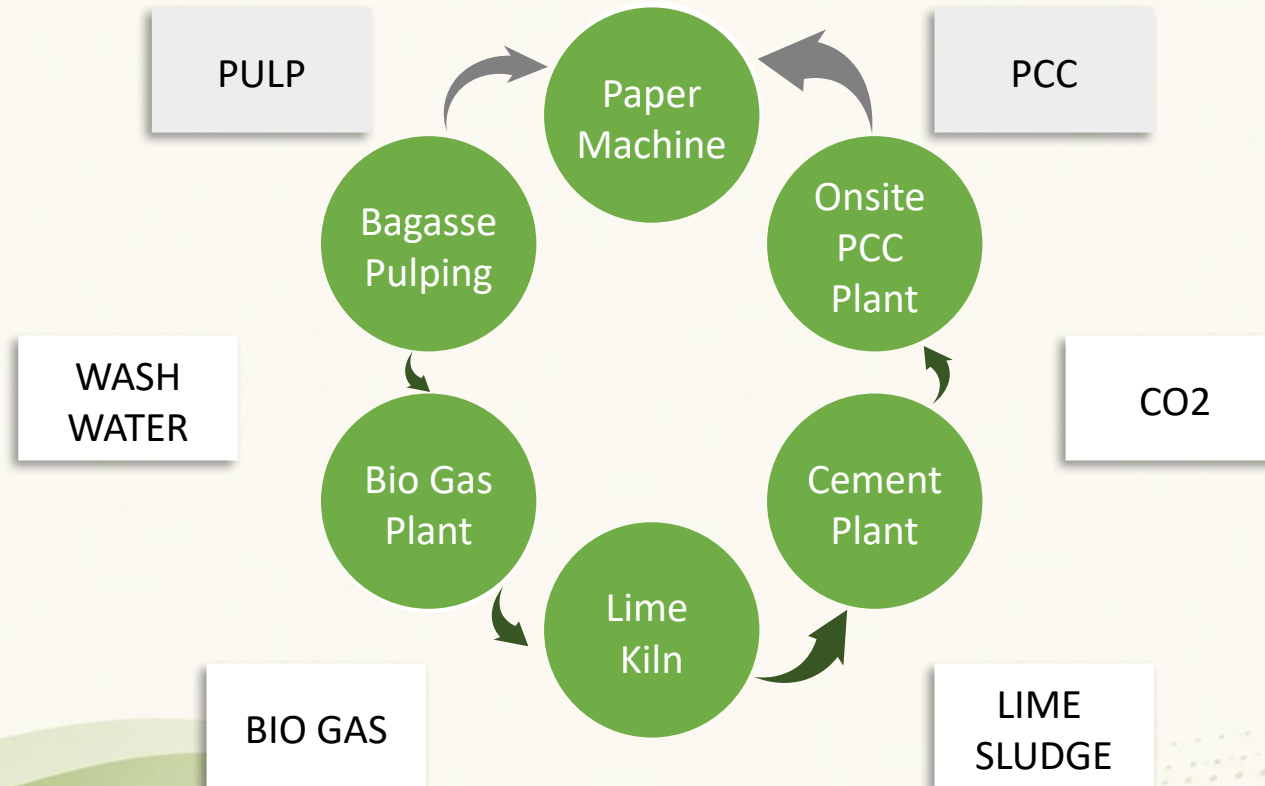
E



Eco-Friendly

ECO-FRIENDLY

Bagasse & the Circular Economy



ECO-FRIENDLY

Renewable Energy Integration

Wind Farm
400 Lakhs
kWh/Annum

Biogas 80
Lakhs
m³/Annum

Solar Power
2 MW Capacity



Eco-Friendly Practices & GHG Impact

Eco-Friendly Practice	GHG Reduction (t CO ₂ e / annum)
Thermal energy saved by bagasse pith	89,423
Furnace-oil saving via biogas in lime kiln	14,837
Limestone conserved (lime sludge in cement plant)	28,898
Thermal energy via CO ₂ sequestration in PCC plant	22,000
Biogas used in heating equipment	6,570

≈ 161,728
 tonnes CO₂e avoided
 per year across the
 five practices

PILLAR Q

Q



Quality

QUALITY

Quality as a Strategic Differentiator



33+

Physical paper
properties evaluated
across the deckle

12

Testing modules in
one integrated
platform

<30 min

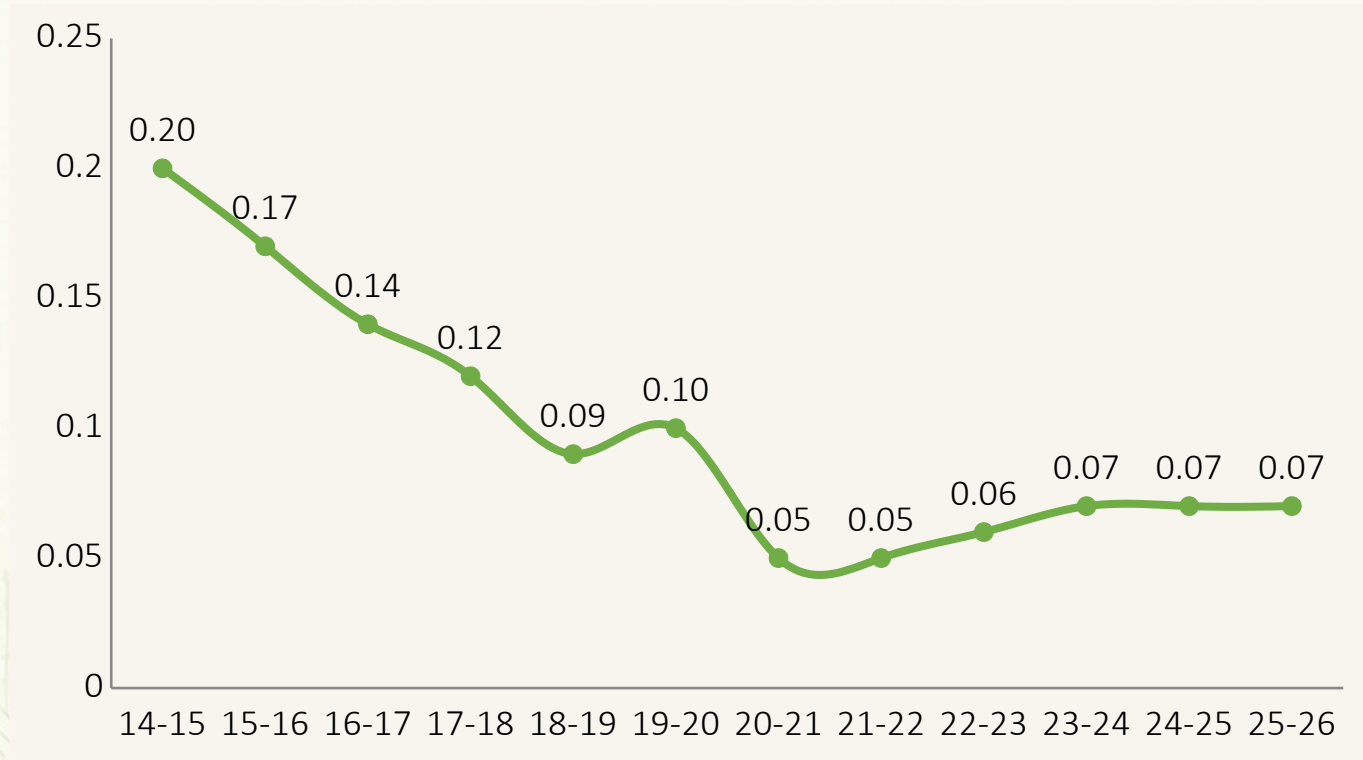
To evaluate output
from all three paper
machines

7–9 min

Time to evaluate full
property set per
sample

QUALITY

Customer Complaint Index — A Decade of Decline



0.07

Complaints per 1,000 MT in
2025–26 — down from
0.20 a decade ago

PILLAR P

P



Productivity

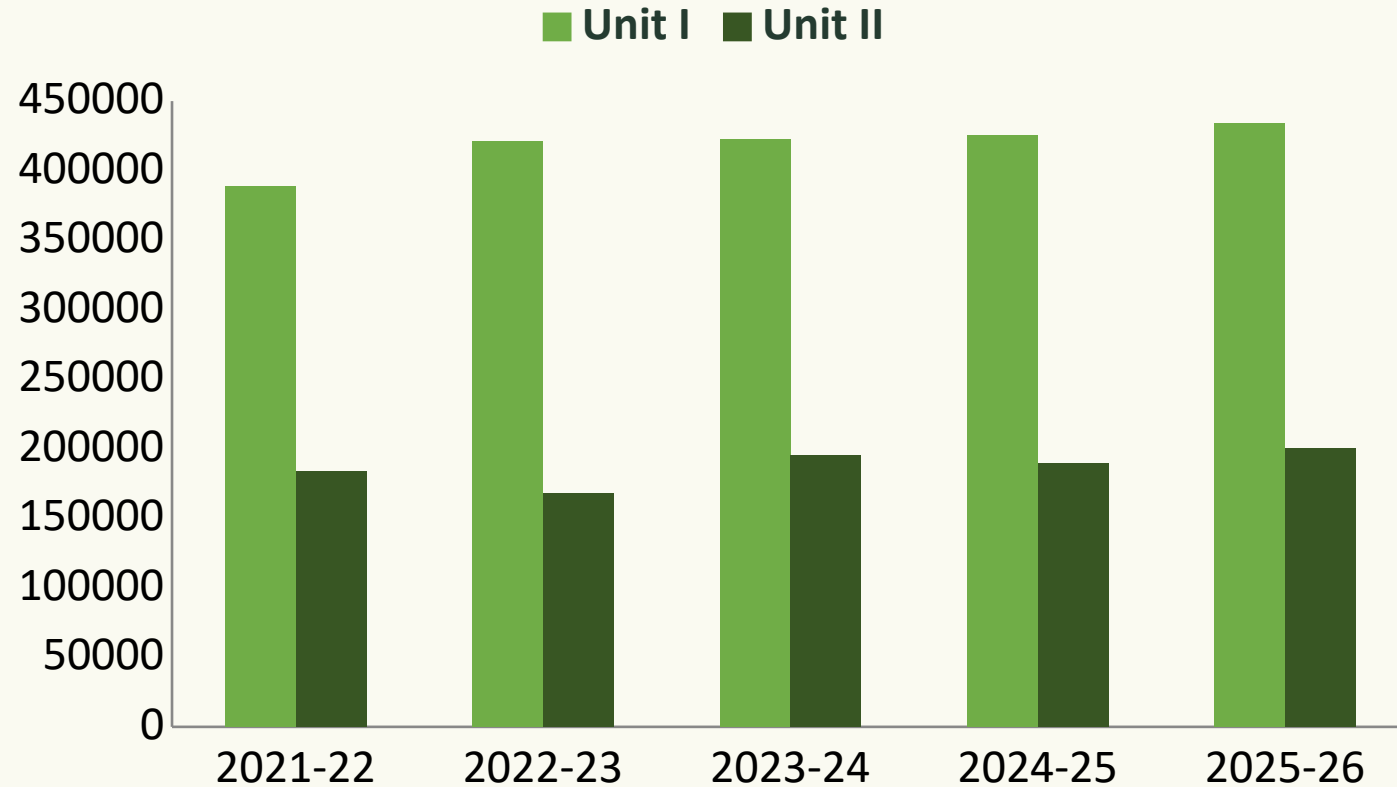
PRODUCTIVITY

Productivity: Driving Operational Excellence

- **Record output-** Highest-ever paper and board production across Unit I and Unit II.
- **Disciplined operations-** Efficient resource use and technology-enabled process optimization.
- **Asset utilization-** Maximized throughput while holding quality and sustainability standards.
- **Reliability excellence-** Higher equipment uptime and fewer process interruptions.
- **Continuous improvement-** Data-driven decisions and employee-led innovation

PRODUCTIVITY

Record Production Performance



4,34,294 MT

Unit I record output
in 2025-26

2,00,075 MT

Unit II record output
in 2025-26

PILLAR C

C



Conservation

CONSERVATION

Conservation: Resource Stewardship



Water

Conserved through
reuse and recycling
systems



Steam

Efficiency gained via
heat recovery &
process integration



Power

Conserved through
energy-efficient
operational practice



Raw Materials

Optimized
consumption
reducing input
intensity

Sustainability Through Product Evolution



Newsprint

TNPL's founding product line



**Copier,
Writing & Printing**

Diversified to meet customer demand



**Packaging
Boards**

Capturing the sustainable packaging shift



**Sublimation
Paper**

Expanding into specialty grades



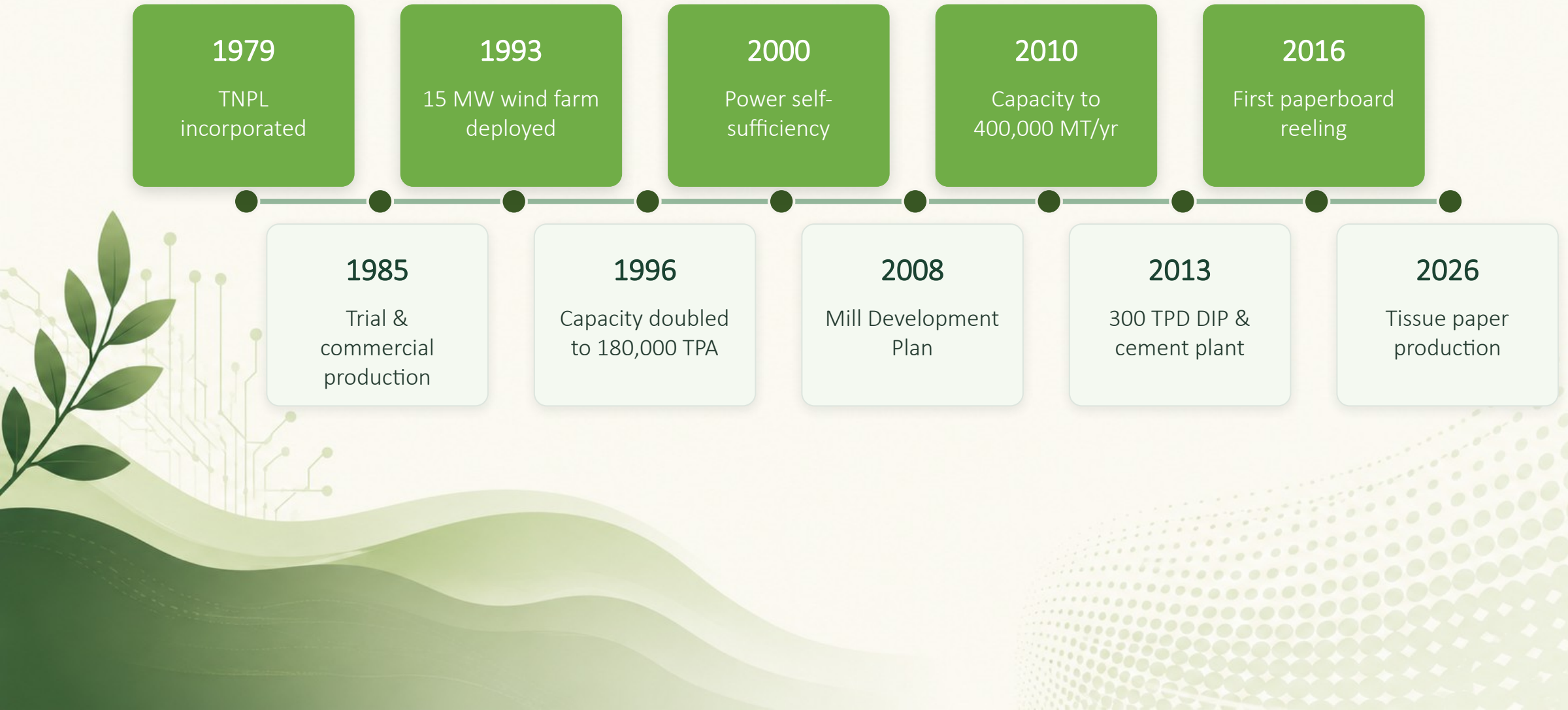
**Tissue
Paper**

The newest frontier in Hygiene Paper

From a single newsprint line to a diversified portfolio
Responsive to changing market expectations

FOUR DECADES OF GROWTH

Milestones Toward Future Readiness



Technology-Integrated Convergence

Manual Monitoring

Periodic manual vibration checks; infrequent data, delayed fault detection



Online Monitoring

Continuous monitoring, but reliant on extensive cabling and complex installs



Wireless Real-Time

Tri-axial vibration, temperature & bearing noise — transmitted wirelessly, analyzed by AI/ML in real time



SMART MAINTENANCE

Wireless 24x7 Online Vibration Monitoring



No Extensive Cabling

Wireless data transmission replaces complex wired installs



Tri-Axial Sensing

Vibration, temperature & bearing noise monitored together



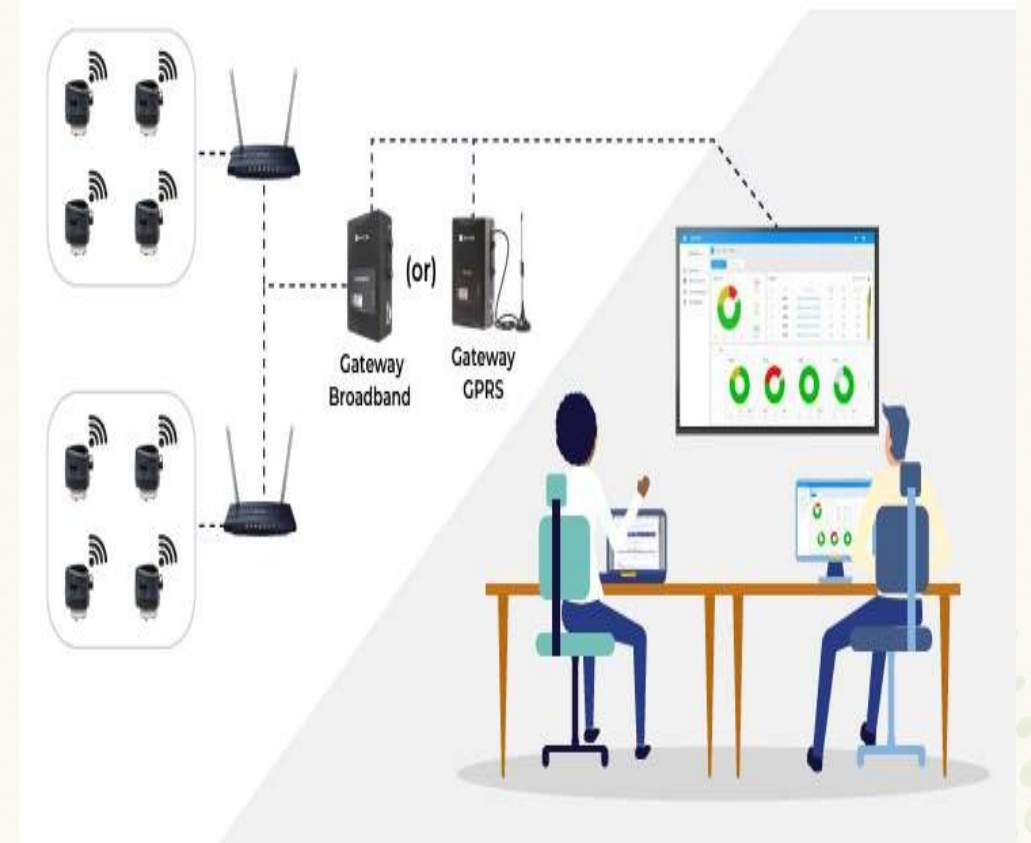
AI/ML Thresholds

Algorithms auto-configure ISO thresholds & flag early defects



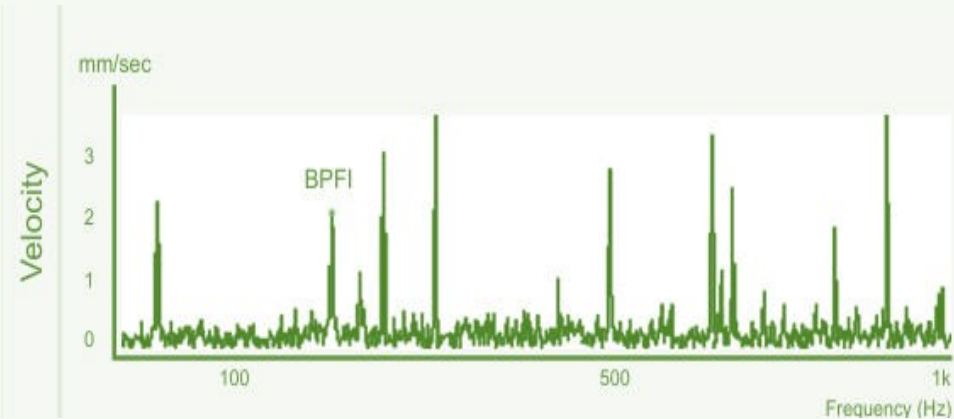
Guided Accuracy

Synchronous measurement & guided sensor positioning



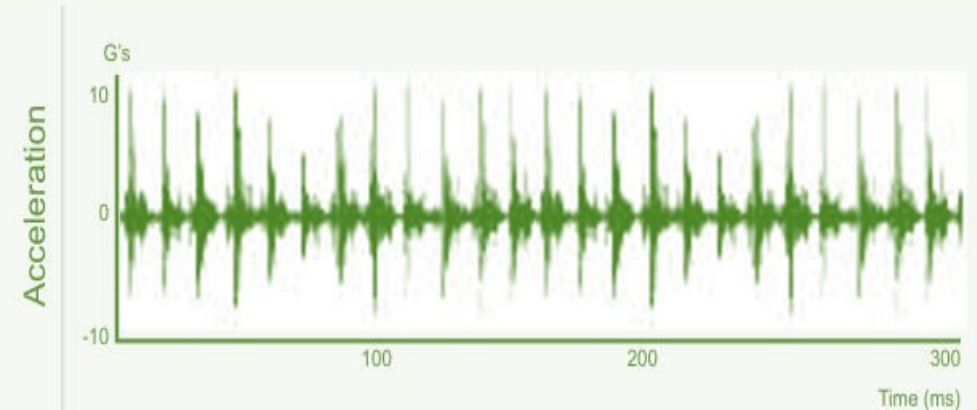
Catching Defects Before They Become Failures

TWF Signature showing BPFI Defect



Velocity spikes in the time-waveform reveal a recurring impact pattern consistent with inner-race bearing damage.

FFT Spectrum showing BPFI Defect



Frequency-domain analysis isolates the defect signature from background noise for confident diagnosis.

OUTCOME:

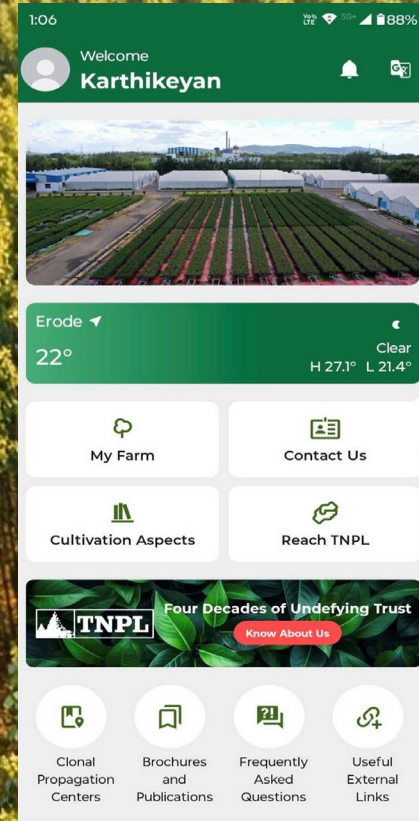
EARLY FAULT DETECTION → PLANNED INTERVENTION → REDUCED UNPLANNED DOWNTIME

Digital Dealer & Supply-Chain Ecosystem

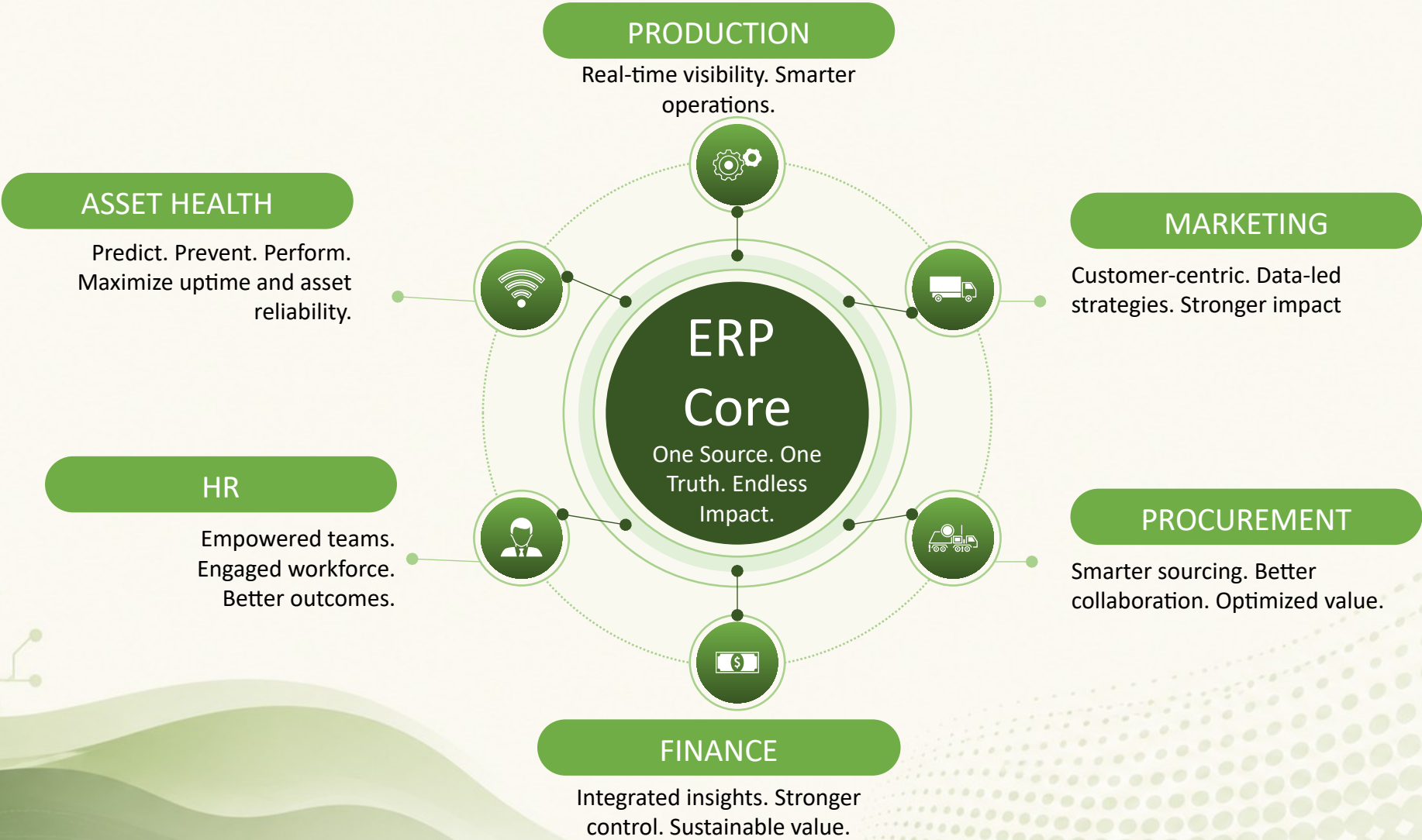
90% +

End-to-end procurement digitisation via e-tendering & e-auction

- **Marketing.** Unified dealer platform for orders, invoices and complaints; GSTN/NIC e-invoicing and e-way bills.
- **Procurement.** Transparent e-tendering and e-auction lift supplier competitiveness.
- **FARM CONNECT.** Mobile app manages pulpwood from plantation to harvest, improving traceability.



One Connected- Data-Driven Ecosystem



Story Behind Broadsheet size of Newspaper



CONCLUSION

A Blueprint for Future-Ready Paper Manufacturing

- Integration wins - Sustainability, circular economy, operational excellence and smart manufacturing, combined.
- SEQPC + Digital - The framework and digital transformation reinforce resilience and competitiveness.
- Future-ready - Product diversification positions TNPL for long-term, sustainable growth.

Thank You

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