



TRANSPOWER

TempSense

*Real-Time Conductor Temperature
Monitoring for Transmission Line Sagging*

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Outline

- What is Sag — and Why Does It Matter?
- How I Got Involved
- Challenge and the Light-Bulb Moment
- Design Goals — What I Wanted TempSense to Achieve
- TempSense V1 — Turning an Idea into Reality
- From Trials to Insights — Real User Feedback
- TempSense V2 — Smarter, Stronger, More Practical
- Verdict — Impact and the Road Ahead

What is Sag — and Why Does It Matter?

Mechanical Integrity

- Ensure conductors and structures are within safe limits

Electrical Clearance and Safety

- Maintain safe distance to people, property, vehicles and vegetation

Grid Reliability

CONDUCTOR TEMPERATURE



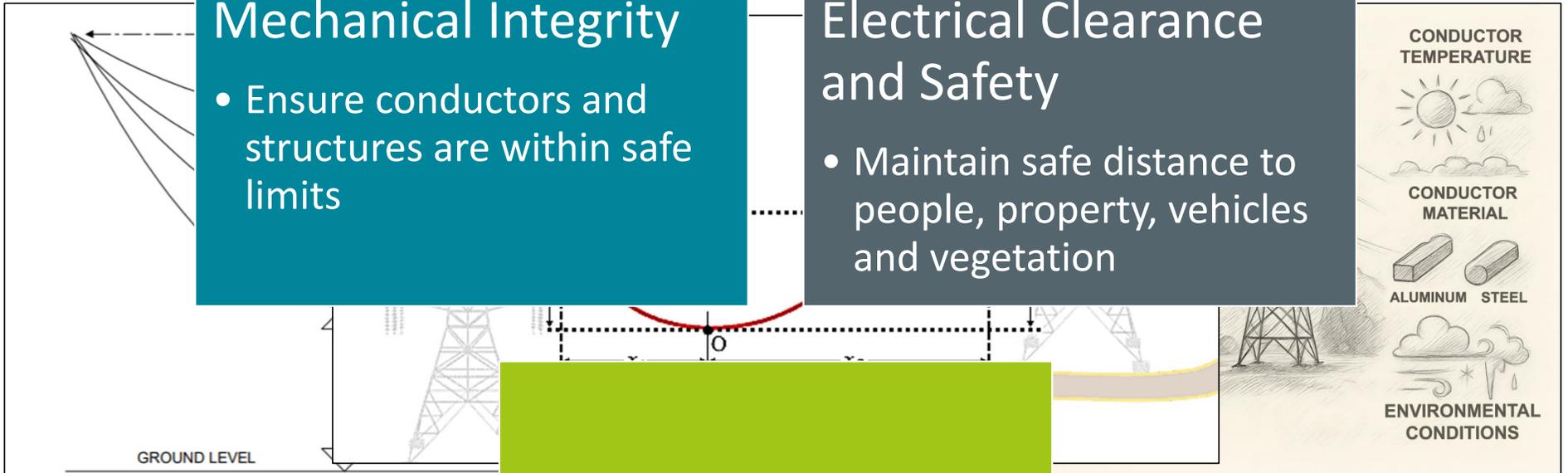
CONDUCTOR MATERIAL



ALUMINUM STEEL



ENVIRONMENTAL CONDITIONS



How I Got Involved

- Service provider placement – Northpower Hamilton
- Hautapu GXP transmission line sagging

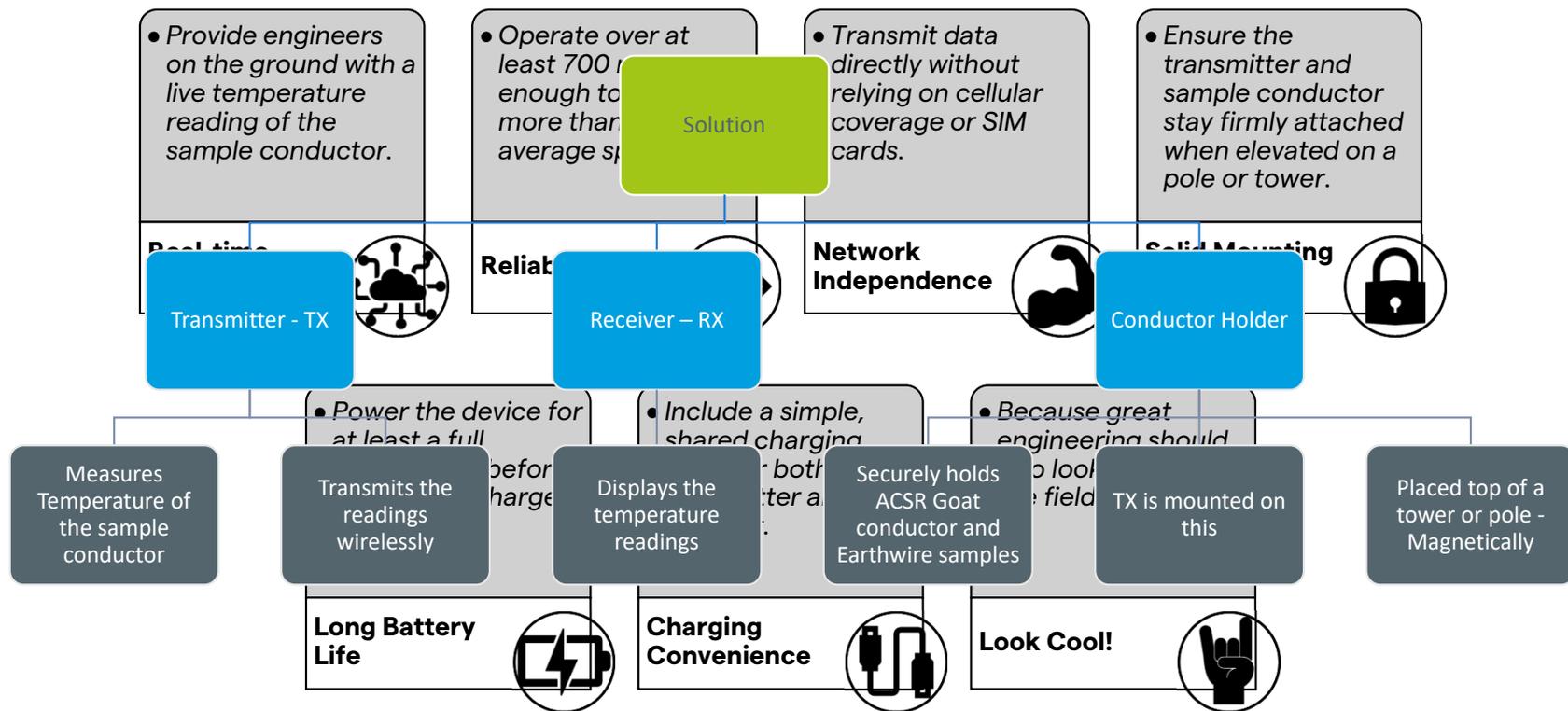


Challenge and the Light-Bulb Moment

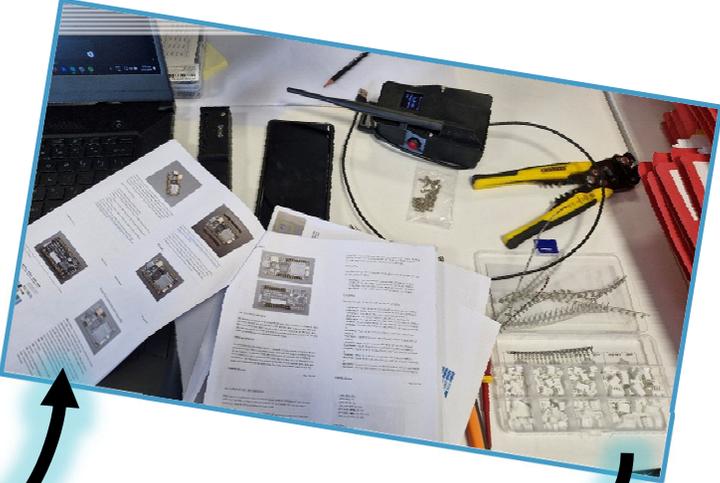
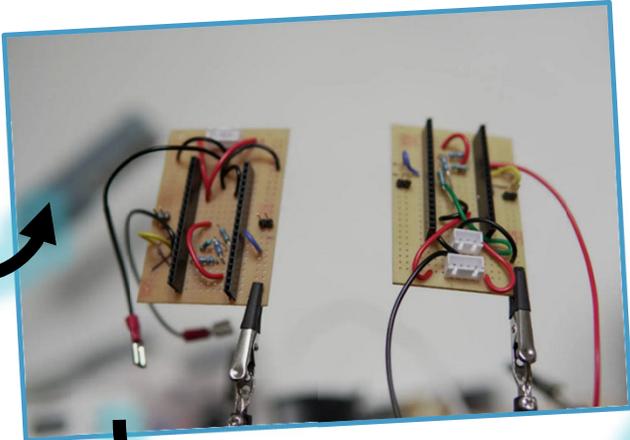
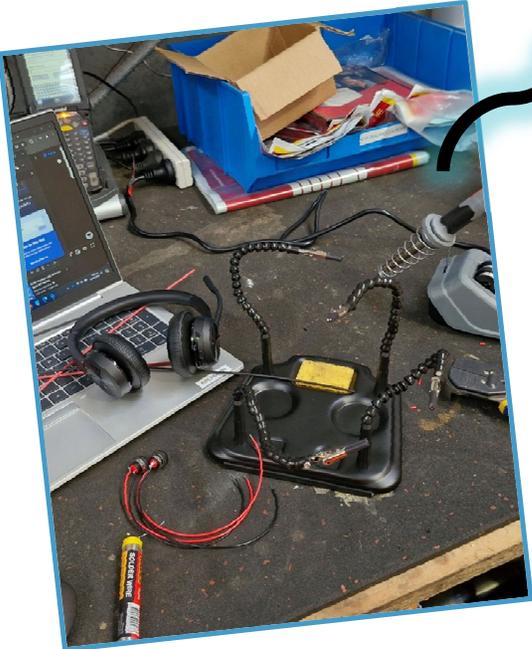
- Engineer's role
 1. Calculate the sag of the span
 2. Identify adjustment needed
 3. Direct the crew to achieve desired sag
- Traditional method
 - BBQ temp probe taped to a sample conductor
 - Walkie-Talkie comms
 - Manual and needed an improvement!
- Pitching the idea



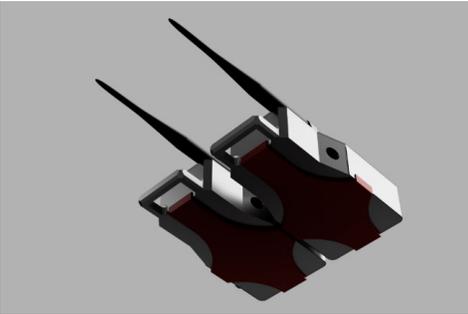
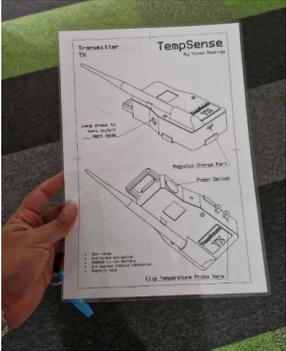
Design Goals — What I Wanted TempSense to Achieve



TempSense V1 — Turning an Idea into Reality



TempSense V1 — Turning an Idea into Reality



From Trials to Insights — Real User Feedback

Hand over to Northpower engineering team

(Nov 2024 → Apr 2025)

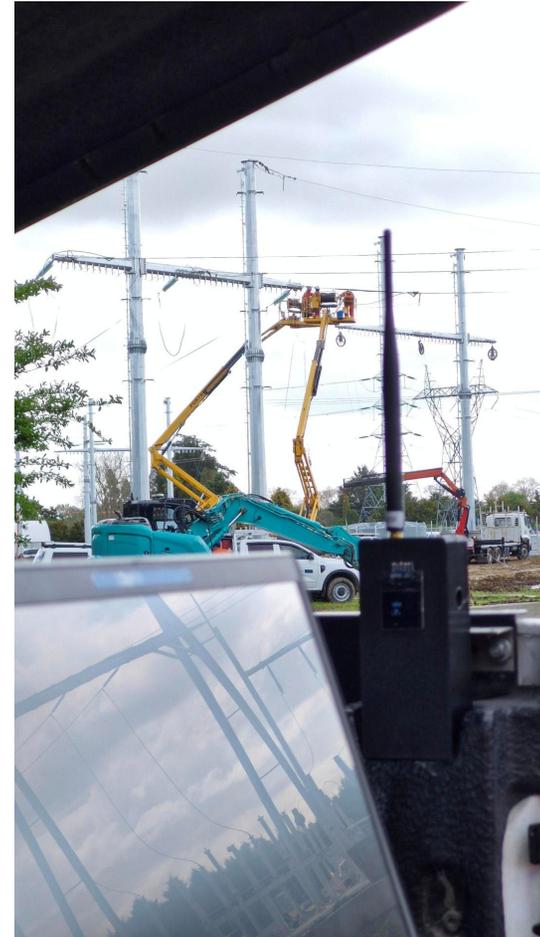
Used for multiple sagging jobs around the region

Innovation was well appreciated!

We'd love to use it on concrete poles

Can you add a charging indicator?

Long external antenna can be a weak point



TempSense V2 — Smarter, Stronger, More Practical

- ✓ Internal antenna
- ✓ Improved charger
- ✓ Temperature plot
- ✓ Signal Strength indication (RSSI)



TempSense V2 — Smarter, Stronger, More Practical

- ✓ Concrete pole compatible
(Modified handle for ratchet-straps)
- ✓ Secure attachment to
conductor holder
- ✓ Cable Gland for Temp Probe
interface.

Improved ingress protection

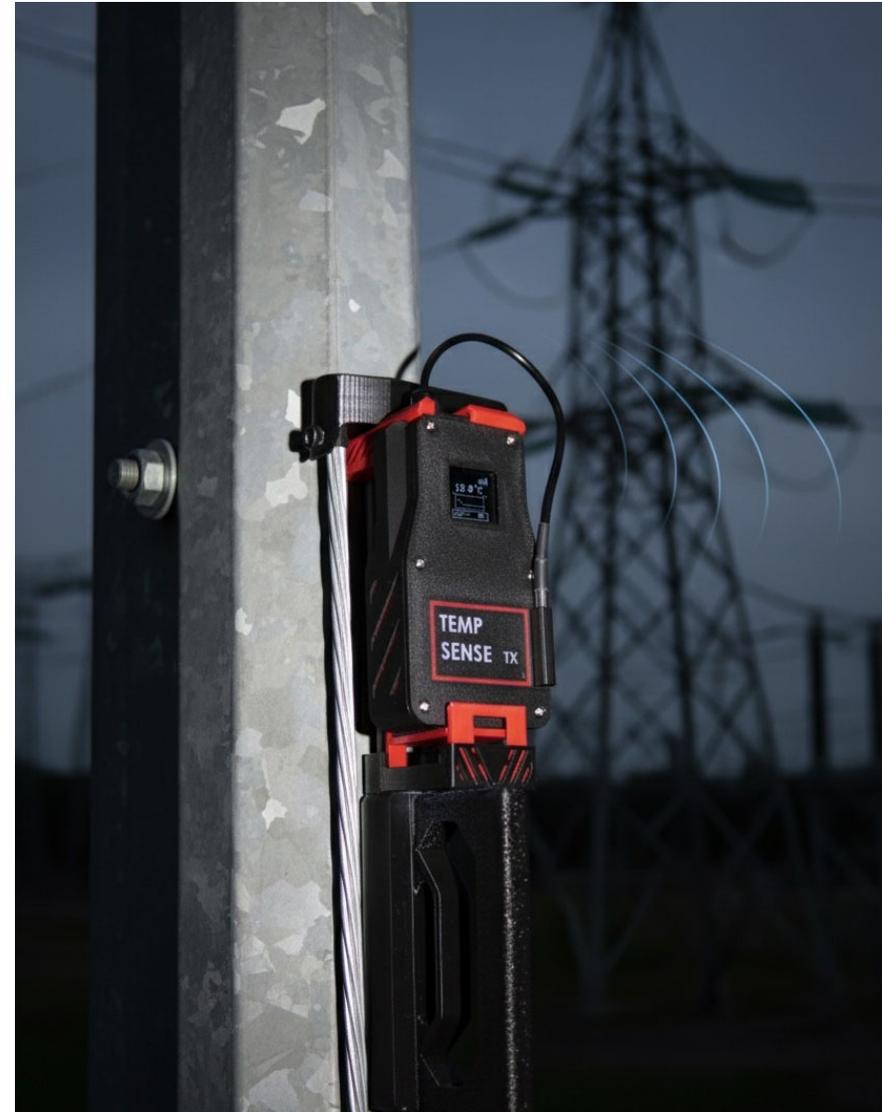


Verdict — Impact and the Road Ahead

- Time savings, improved safety, easier operations
- Tū Mai Aotearoa Award (Q2 2024)
- Future expansions – digital temp report, Wind condition monitoring

TempSense isn't just about technology — it's about what happens when young engineers are given the chance to question the way things have always been done.

To me, that's what engineering tomorrow's energy future is all about





Thank you

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