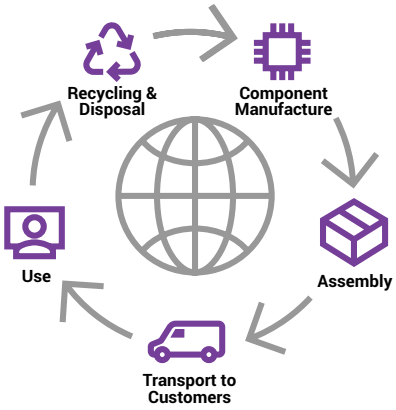
LIFE CYCLE ASSESSMENT OF

Ribbon NPT 1100 Router



Ribbon is committed to reducing the environmental impacts of our products, covering all stages of the lifecycle. We use lifecycle assessment to find the most significant contributors to the environmental impact of our products and inform our sustainability strategies at the product and corporate level.

What is an LCA?

A life cycle assessment is the compilation and evaluation of the inputs, outputs and potential environmental impacts of a product system throughout its life cycle. (ISO 14040: 2006, sec 3.2.)

Product Chosen

A Ribbon NPT 1100 aggregation router was chosen for this study to support Ribbon's engagement with key customers. The NPT 1100 is designed for communications service providers and large enterprises for access edge and pre-aggregation. The NPT1100 300Gbps packet switching and a port fan-out of 582G with and 100G interfaces in a 1RU form factor. The chosen configuration represents the most frequently purchased option. The mass includes packaging, power cords and accessory kits.

Study Parameters	
Lifetime of the product	15 years
Use location	India
Cards	2 x 100G, 4 x 10G
Memory	8 GB
Storage	16 GB eMMC
Power Supplies	1 + 1 redundancy
Mass	13.31 kg

Results Summary

The impact categories assessed as part of the LCA concentrated on global warming potential over a hundred-year time horizon (GWP100). Global warming potential is also known as a "product's carbon footprint". The results show that 95% of the lifetime impacts are from the in-use phase via electricity consumption. India has a high carbon impact per kWh of electricity, which means that in most other nations the use phase impact will be proportionally lower. For example, deployment on the NPCC electrical grid, which supports New York and other major US north eastern cities, would see the overall impact reduce to 3,700 kgCO2e over the product lifetime with 87% from in-life energy usage. Transportation and end-of-life management are smaller contributors to the overall footprint.

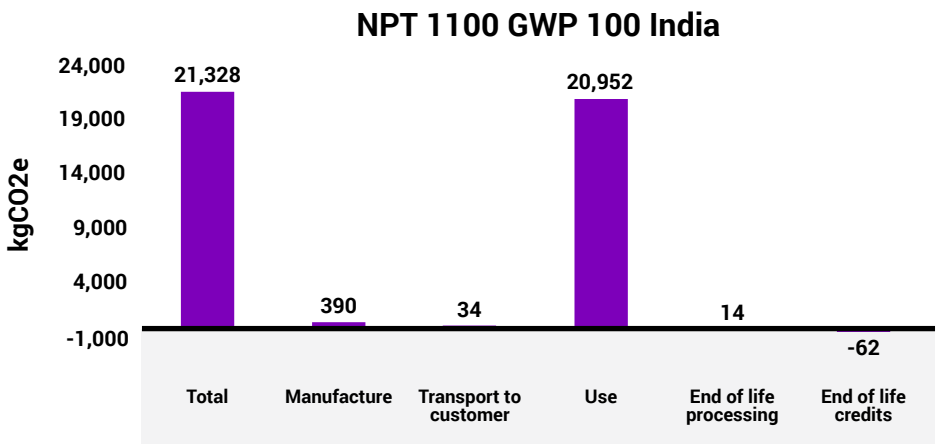


Figure 1. Lifecycle stage contribution to the GWP100 impact of a Ribbon NPT 1100 deployed in India.

The manufacturing stage represents 5% of the lifecycle impact in India and 25% if installed in New York. The largest of the manufacturing stage impacts come from the printed circuit board in the main unit and cards. The next largest contributors are the PCBA assembly process and integrated circuit production, each accounting for 8% of the manufacturing impact. The production of the heaviest items of the NPT 1100, such as the chassis, is outweighed by the energy intensity of printed circuit board and electronic component production.

Conclusion

The environmental impact of the NPT 1100 in its most commonly purchased configuration is equivalent to 10.3 Indian citizens' annual footprint in 2023 (link). The impact of all lifecycle stages except use can be mitigated by extending the unit's lifecycle from 15 to 20 years.

Key Facts

- The use phase contributes to 98% of the lifetime emissions in India and decreases in countries with lower carbon intensity electricity networks
- The manufacturing stage represents 1.8% of the product carbon footprint in India, rising to 11% in New York.
- Printed Circuit Board production is the greatest source of emissions in the manufacturing stage
- The transport stage's impact is dominated by the air freight transport leg, which accounts for 99% of the transport emissions. This is due to air freight covering the longest distances, as well as being the most intensive transport mode used.
- Recycling of the products resulted in a reduction in the lifecycle footprint of 48 kgCO2e.
- The largest gains from recycling come from the recycling of metals. Gold is the single largest contributor, followed by the recovery of aluminium. Avoiding virgin silver and steel production further enhances the recycling credits attributed to the product system.

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