Practical Experiences with Sustainability Insights and POWEFF

IETF 123, GREEN WG Meeting

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https://datatracker.ietf.org/doc/draft-almprs-sustainability-insights/
https://datatracker.ietf.org/doc/draft-opsawg-poweff/

What got done @Hackathon

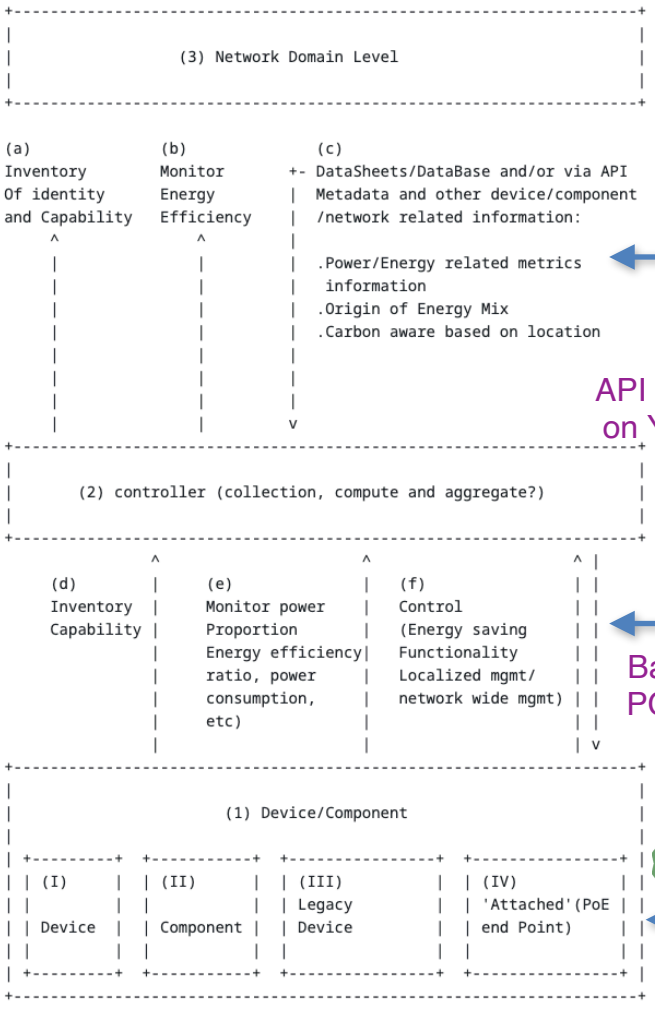
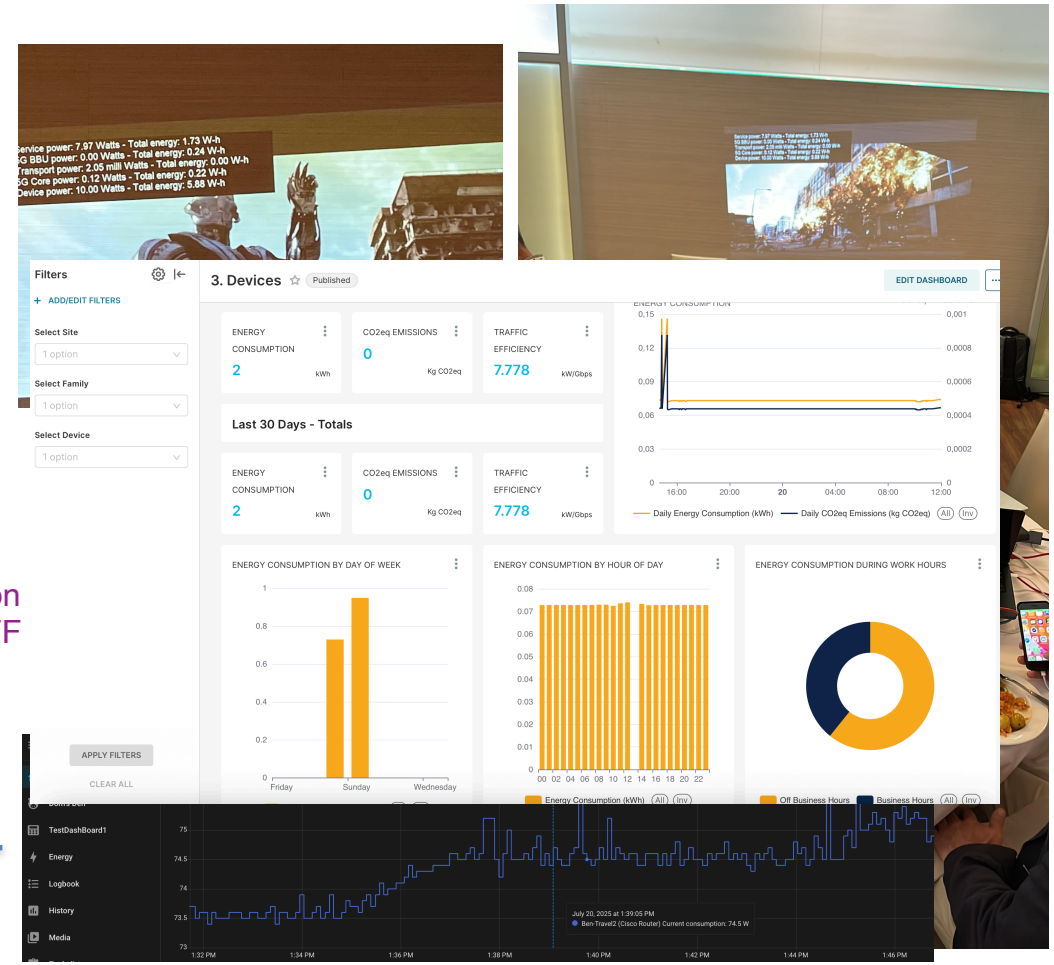


Figure 1: GREEN Reference Model



Product Carbon Footprint (PCF)

ISO 14040:44 LCA standard – Cradle to Cradle

PCF is an estimated value that represents the total GHG emissions caused directly and indirectly by an asset over it's full lifecycle.

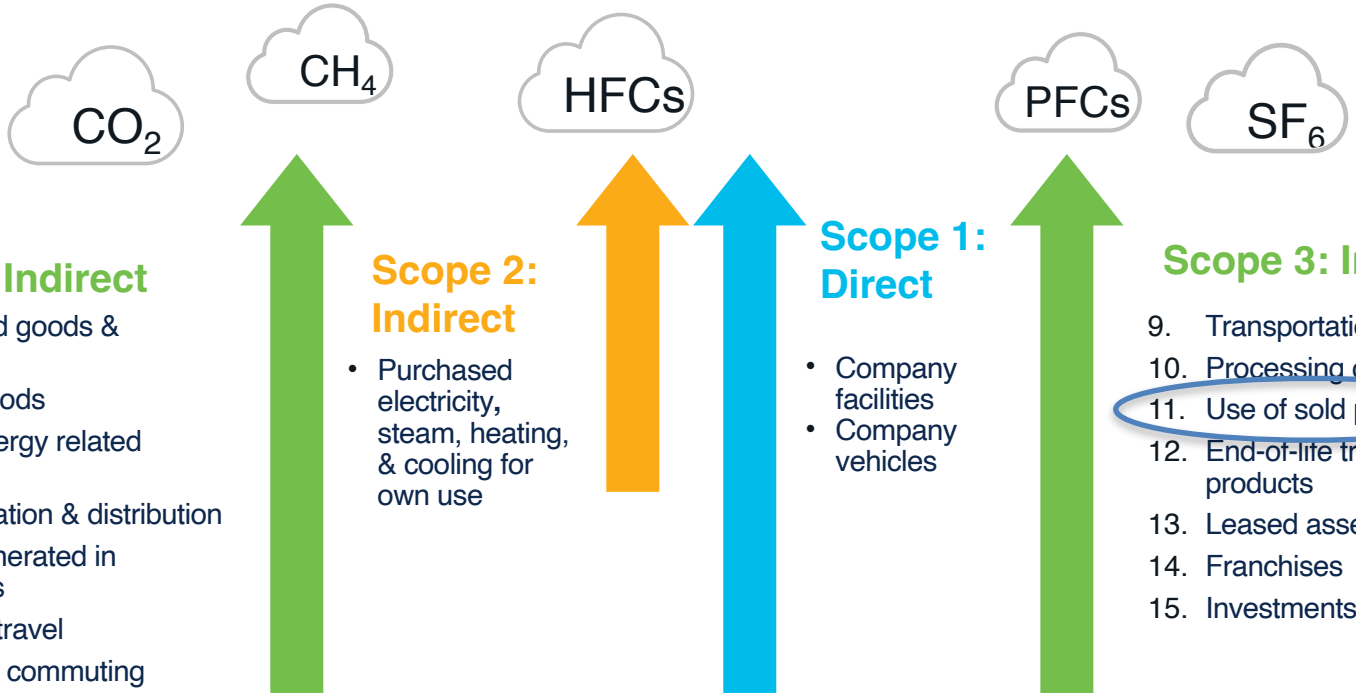
$$PCF_{Cradle\text{-}Gate} + PCF_{Transport} + \mathbf{PCF_{In\text{-}Use}} + PCF_{End\ of\ Life}$$

It's ALL about Power Consumption(currently based on Data-sheets/Benchmarking methods).

It's not representing realtime metrics from the "*running operations*".

It's not considering "*resource utilization*".

What Are Scope 1, 2, & 3?



Scope 3: Indirect

1. Purchased goods & services
2. Capital goods
3. Fuel & energy related activities
4. Transportation & distribution
5. Waste generated in operations
6. Business travel
7. Employee commuting
8. Leased assets

Scope 2: Indirect

- Purchased electricity, steam, heating, & cooling for own use

Scope 1: Direct

- Company facilities
- Company vehicles

Scope 3: Indirect

9. Transportation & distribution
10. Processing of sold products
11. Use of sold products
12. End-of-life treatment of sold products
13. Leased assets
14. Franchises
15. Investments

Upstream activities | **Reporting companies** | **Downstream activities**

Based on: Greenhouse Gas Protocol, Technical Guidance for Calculating Scope 3 Emissions

Accuracy & Precision of Measurement

Present Methods:

- ATIS TEER 0600015032016

  TEER does not provide a way to accurately measure system component power.

  TEER allows the tester to define the best use cases for the test.

- ETSI 203136v010201p

  ETSI defines some basic test implementations, but still suffers the same normative concerns as ATIS TEER identified above.

6 Key Factors Influencing Measurements

- Setup & Method
- Temperature
- Traffic
- Real vs Apparent Power
- Power Efficiency Effects
- Current Sharing Assumptions

Collected Device Data and Sensor Information

Device/Component Inventory	Power/PSU (as Timeseries)	Interface (as Timeseries)	Vitals (as Timeseries)
Device Name	Input Power per PSU	Data Input per Interface	Inlet Temperature State
Site	Output Power per PSU	Data Output per Interface	CPU
Family	Power Efficiency per PSU	Interface Utilization	Memory
Device Part PID	Device Total Input Power	Device Total Data Input	
Device Part Name	Device Total Output Power	Device Total Data Output	
Device Part PID	Device Total Power Efficiency		
Device Part LDOS status	Device Total Available Power		
PSU PID	Device Total Power Loading		
PSU Name			

Energy Object (IVY WG)

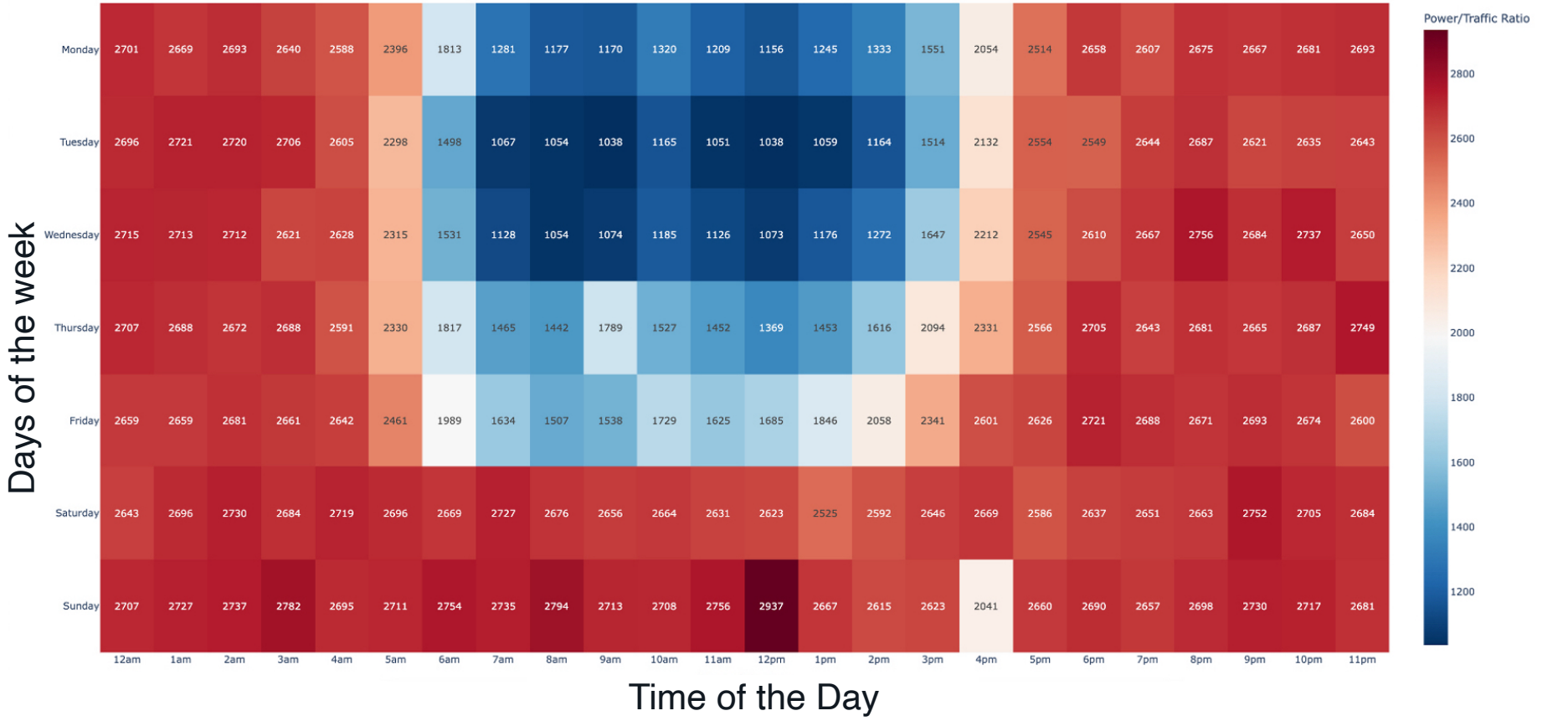
Resource Utilization

Smart PDU, Sensor, Smart Plug, … they don't correlate the use of the resources

Ask to the GREEN WG:

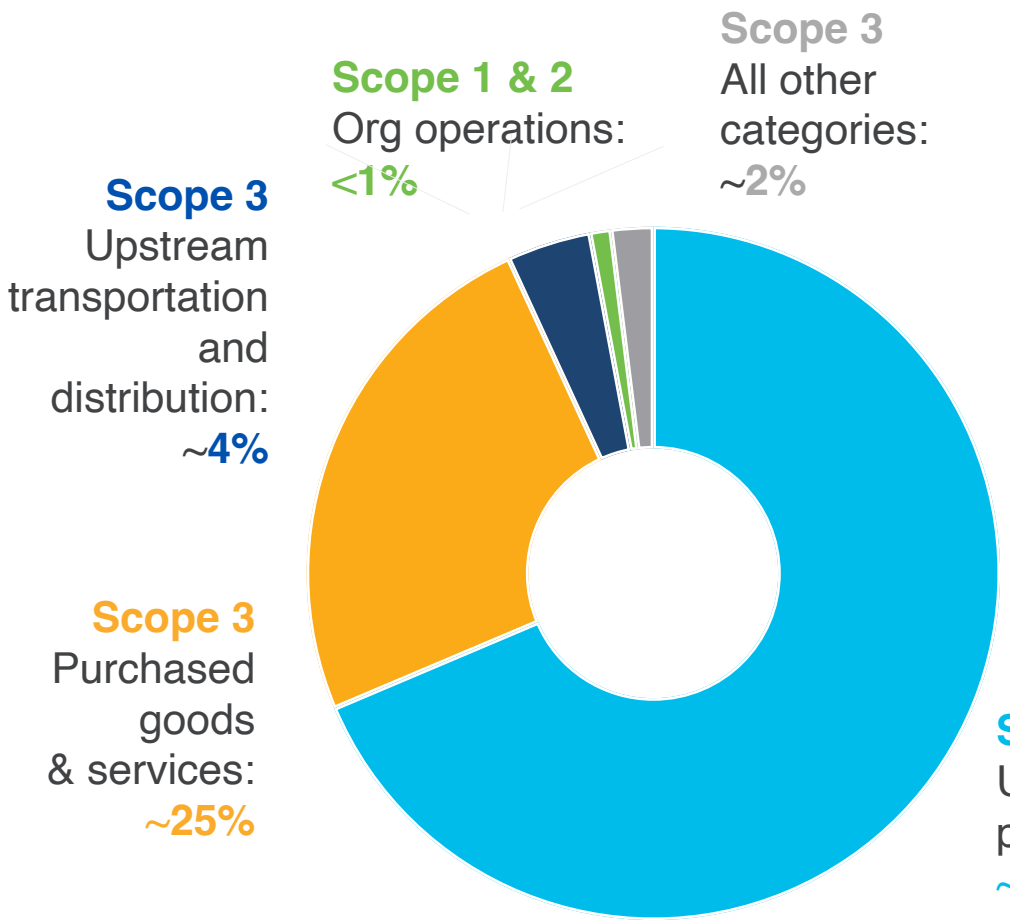
To be considered as part of the GREEN base model

Power/Traffic Ratio



Backup Slides

Net zero GHG emissions across the value chain by 2040

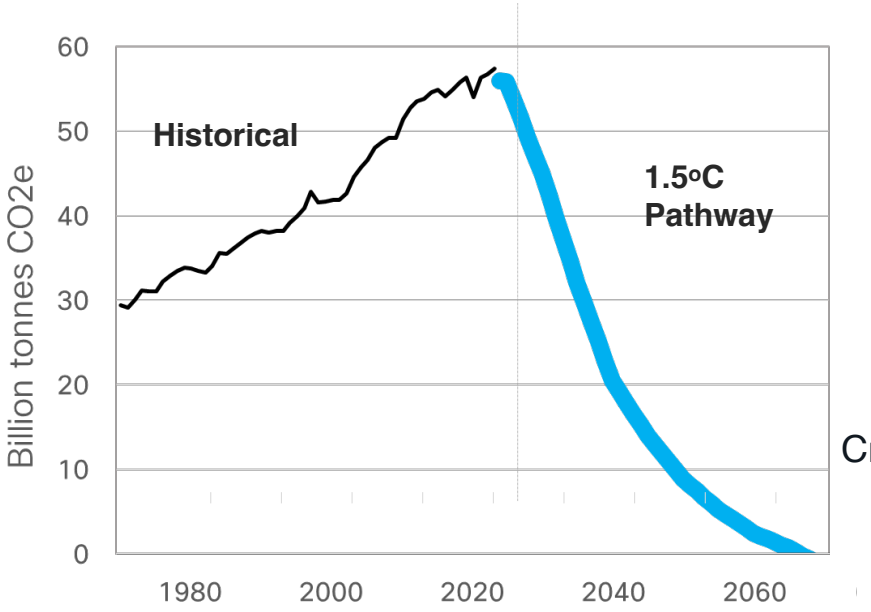


Source: Cisco's Fiscal Year 2024 ("FY 24") Scope 1, 2, and 3 GHG emissions

Putting IT in perspective

Total GHG emissions

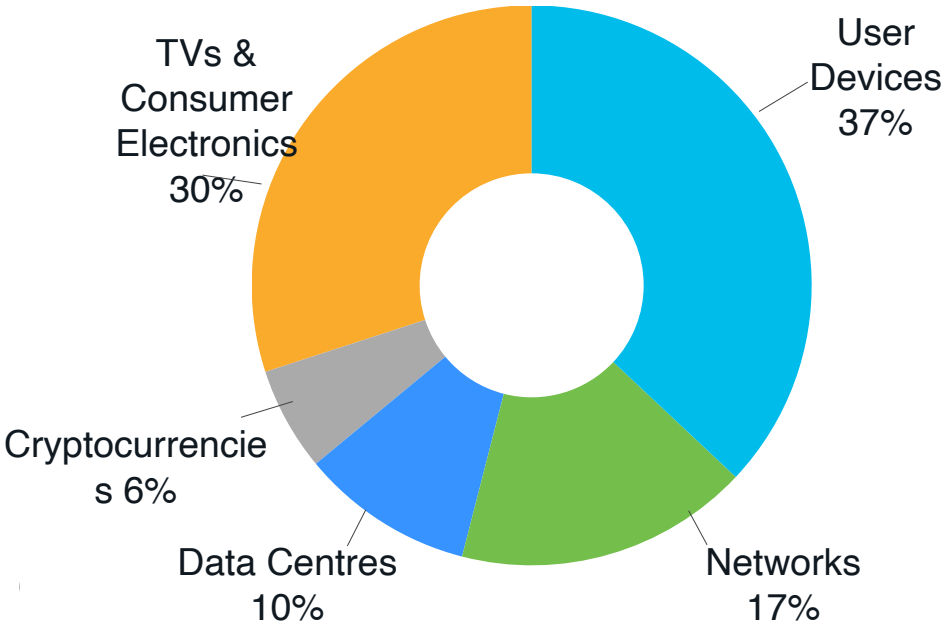
~60 Billion tonnes CO2e



Based on data from: EDGARv2024, Friedlingstein et al. 2023, IIASA (AR6 Scenario database)

Digital GHG emissions

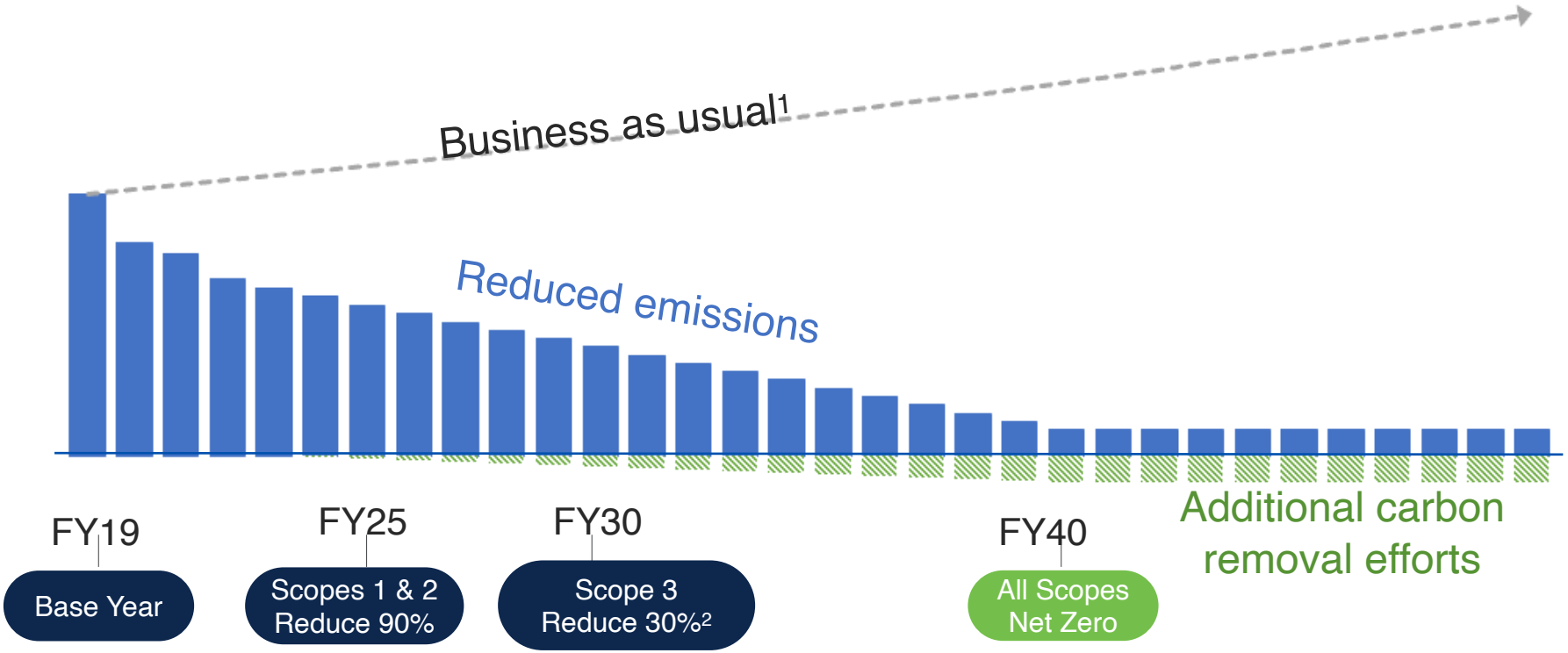
~1.2 Billion tonnes CO2e (~2.1% Total)



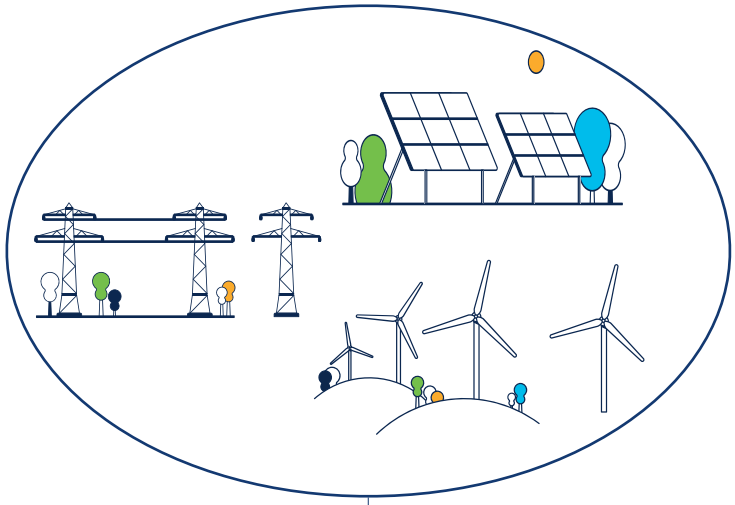
Source: Malmodin et al (2023, 2024)

Digital = ICT + Entertainment & Media

Net Zero Emissions Roadmap



“Power” Types



Use Power
Required to run the application and service
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Customer(s)/Tenant(s)

Services / Solutions

Idle Power

Software:
Applications, Capabilities & Virtual HW

Real Power

Apparent Power

HW Infrastructure

Typical Power

Maximum Power