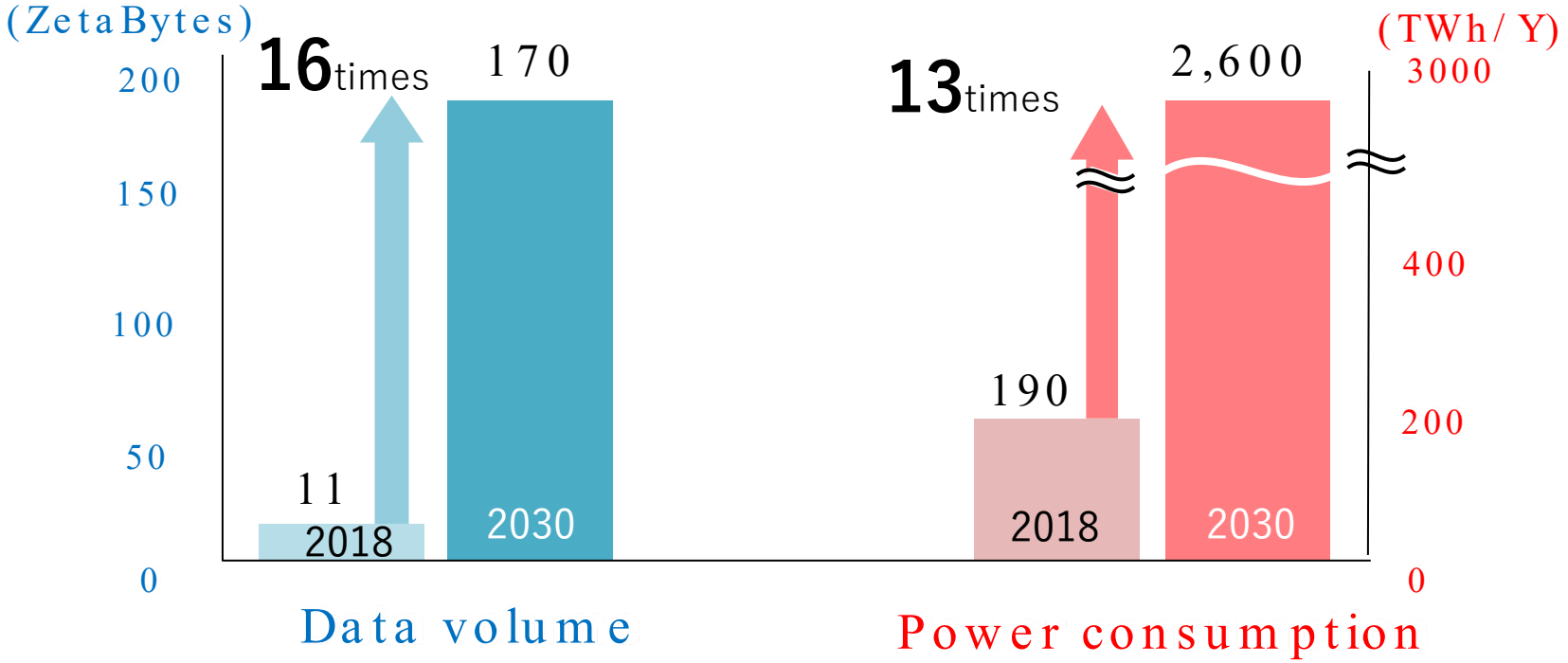
IOWN × IMT2030/6G

Kazuhide Nakajima

Access Network Service Systems Labs.,

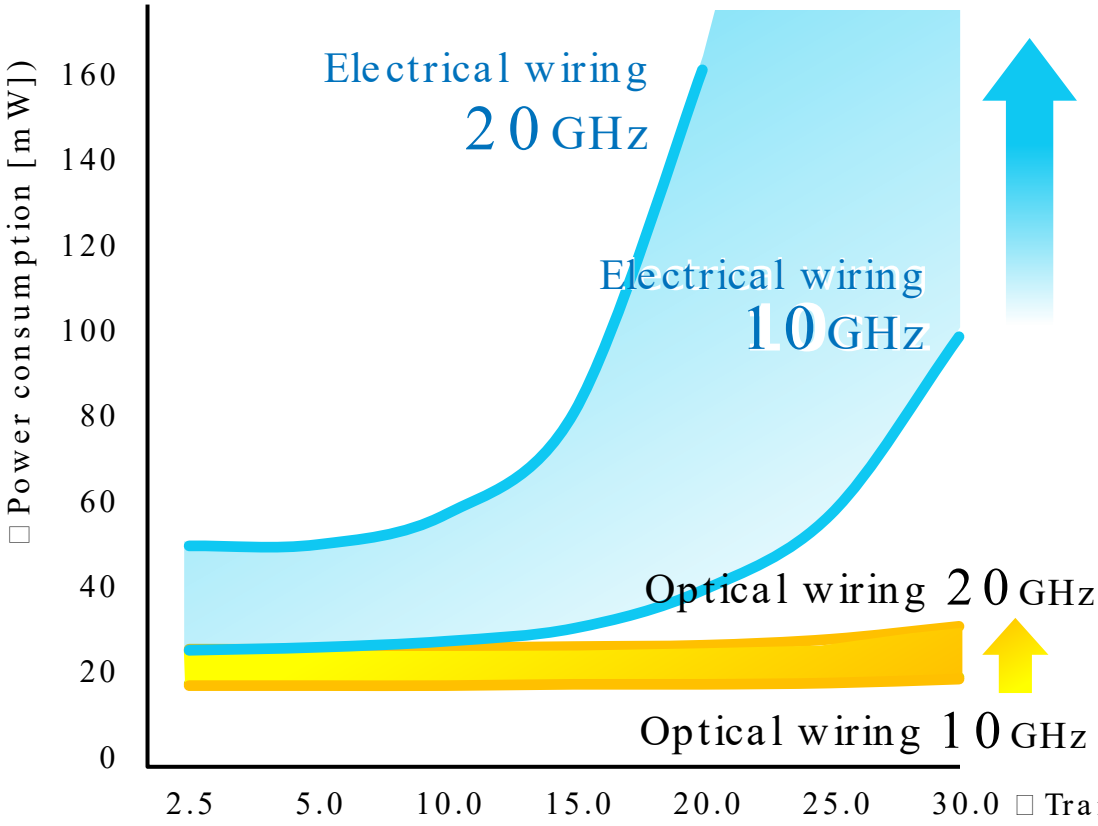
NTT Corporation

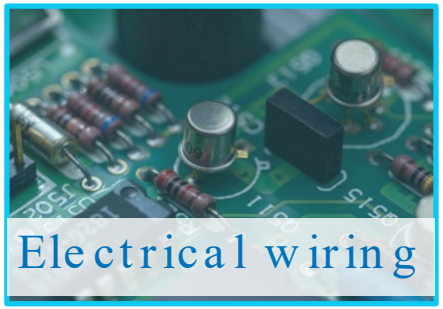
Global Datacenter

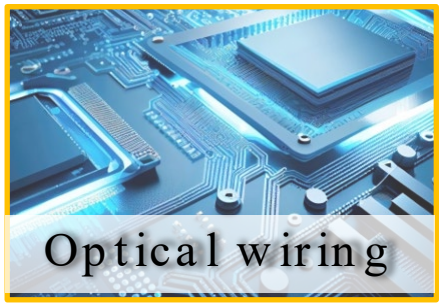


※Center for Low Carbon Society Strategy, Japan Science and Technology Agency

Optics







IOWN APN

Energy efficiency by **100x**

Higher transmission capacity by **125x**

Lower end-to-end latency by **200x**

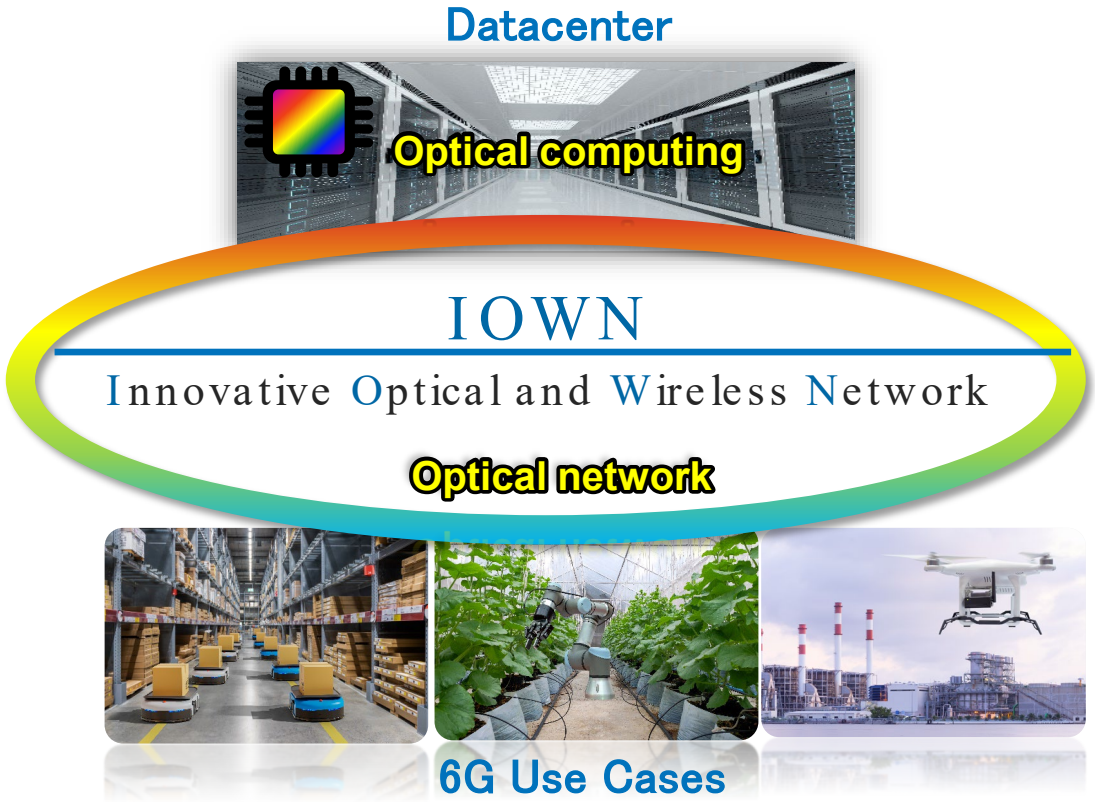
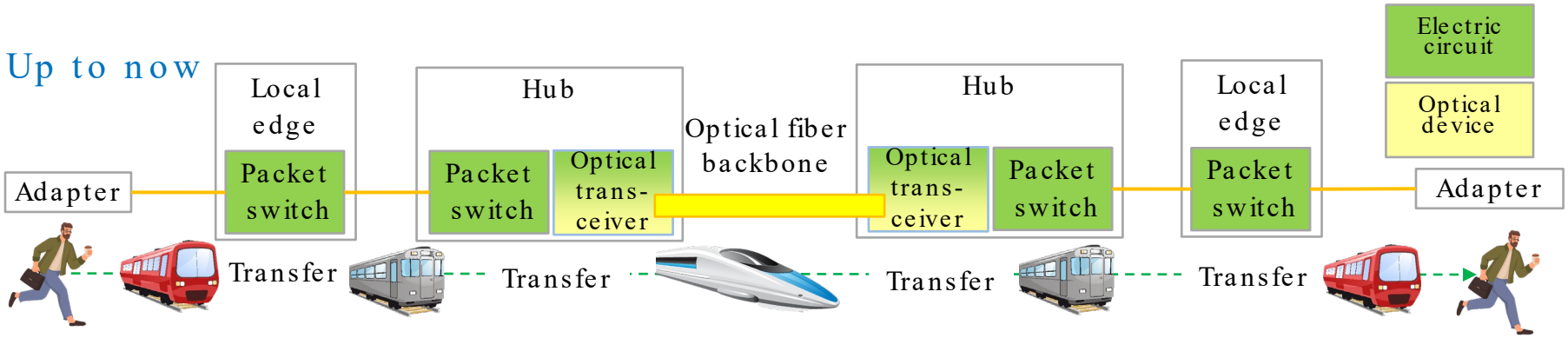
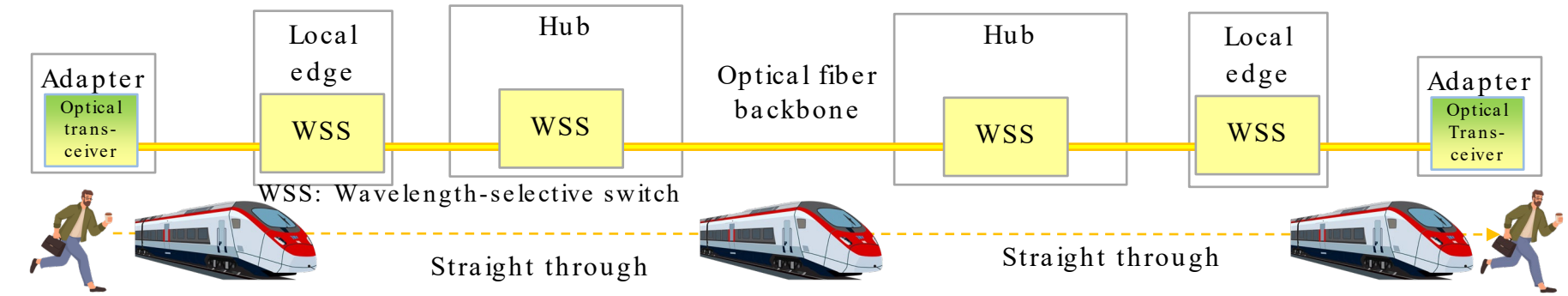


Image of APN



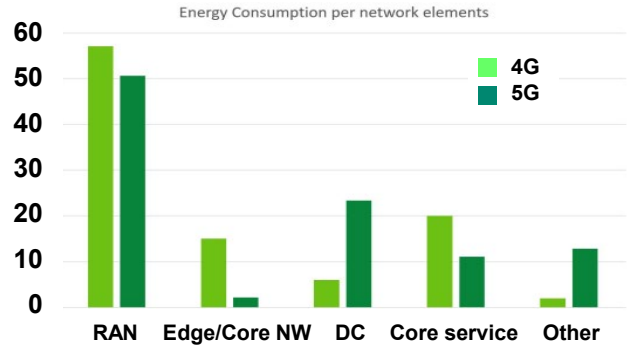


APN IOWN1.0 Mar. 2023

1.Latency is 1/200 of existing services
2.No delay jitters
3.Any delays visualized and adjusted

	Ciena	Fujitsu	NEC	Mitsubishi	Cisco
APN-T	Ciena5166 	1Finity T series 	WX-T series 	Open-MF T series 	SP Router series 
APN-G	Ciena6500/S8 	1Finity L series 	WX-A/WX-S series 	Open-MF G series 	NCS1k series 

Energy Consumption (Mobile)



Radio Access Network accounts for **more than 50%.**

Green G: The Path Towards Sustainable 6G, Next G Alliance

of Base Stations


Full length article

Carbon emissions and mitigation potentials of 5G base station in China

Yongxue Ding [a], Huabo Duan [a], Minghui Xie [b], Ruichang Mao [c], Jiajia Wang [a], Wenbo Zhang [d]

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https://doi.org/10.1016/j.resconrec.2022.106339 Get rights and content

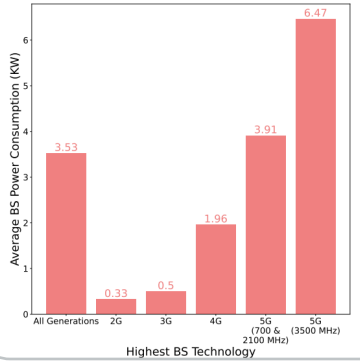
Highlights

- This study quantifies the carbon emissions of the 5G base station by using LCA.
- A comparison between the micro and macro base station has been conducted.
- If measured at national level, the total carbon emissions were

x 1.4 to 2
from 4G to 5G

Carbon emissions and mitigation potentials of 5G base station in China, Y. Ding et al, Resources, Conservation, and Recycling, July 2022

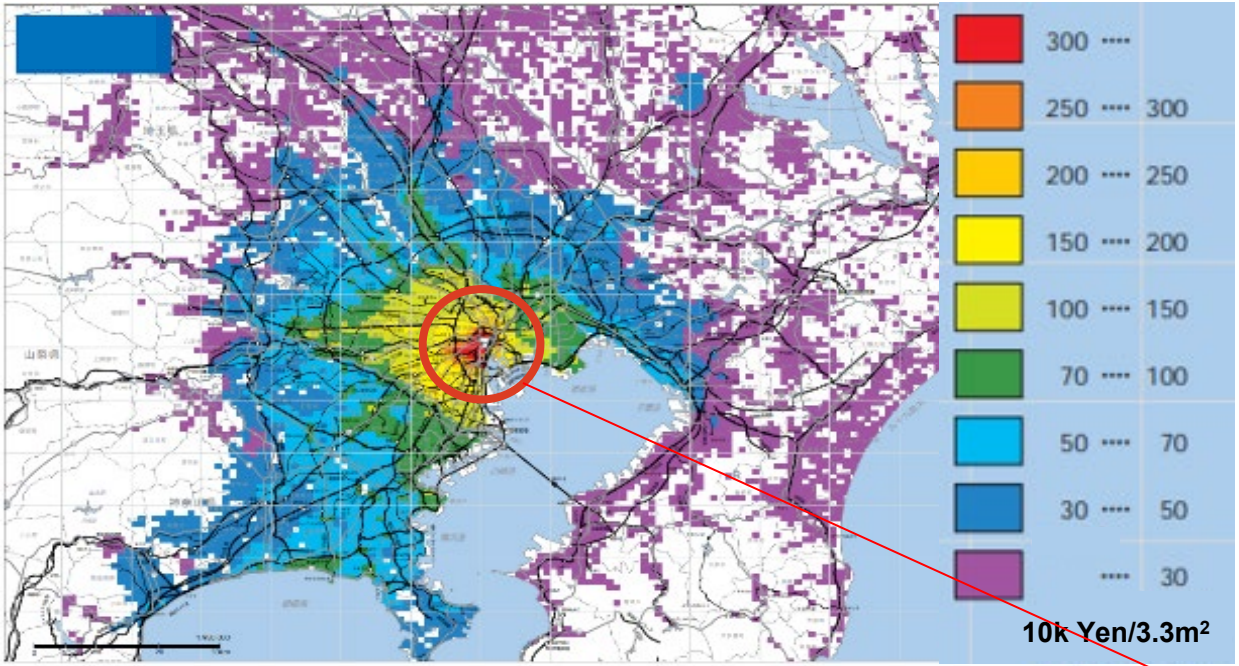
Base Station's Power Consumption



x 2 to 4
from 4G to 5G

The Long Road to Sobriety: Estimating the Operational Power Consumption of Cellular Base Stations in France, Arsalan Ahmed, Universite de Lorraine and Marceau Coupechoux, Telecom Paris

Concentrated Datacenter

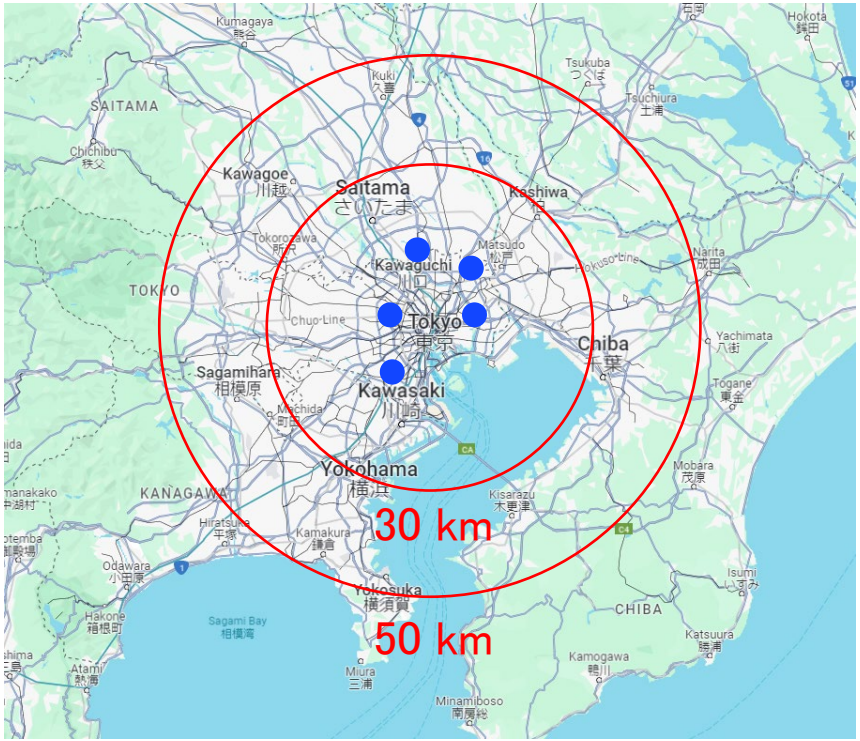


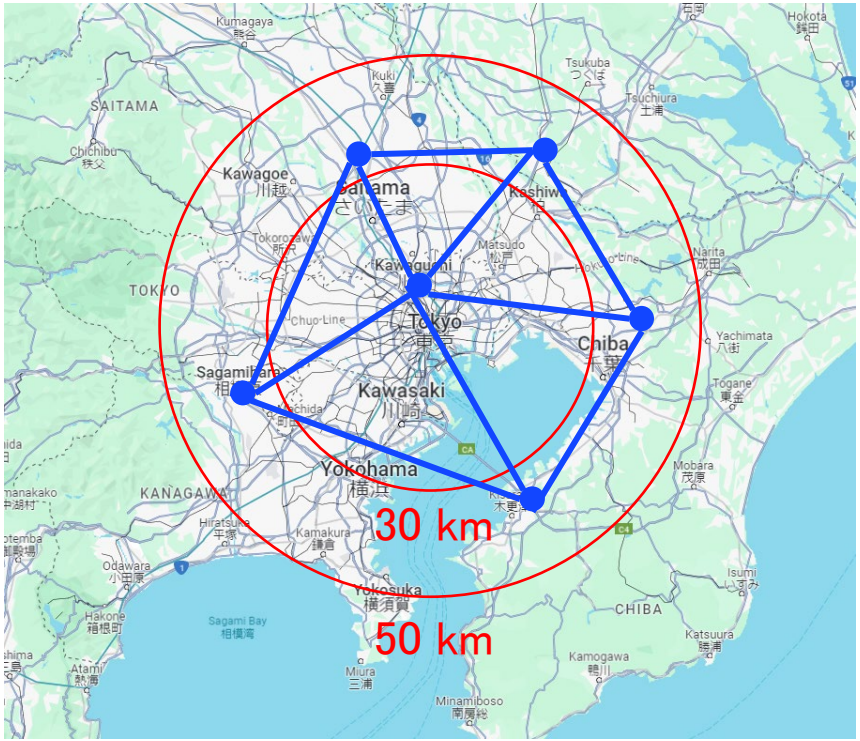
https://www.misawa-mrd.com/data/pdf/b_shuto.pdf

Expensive

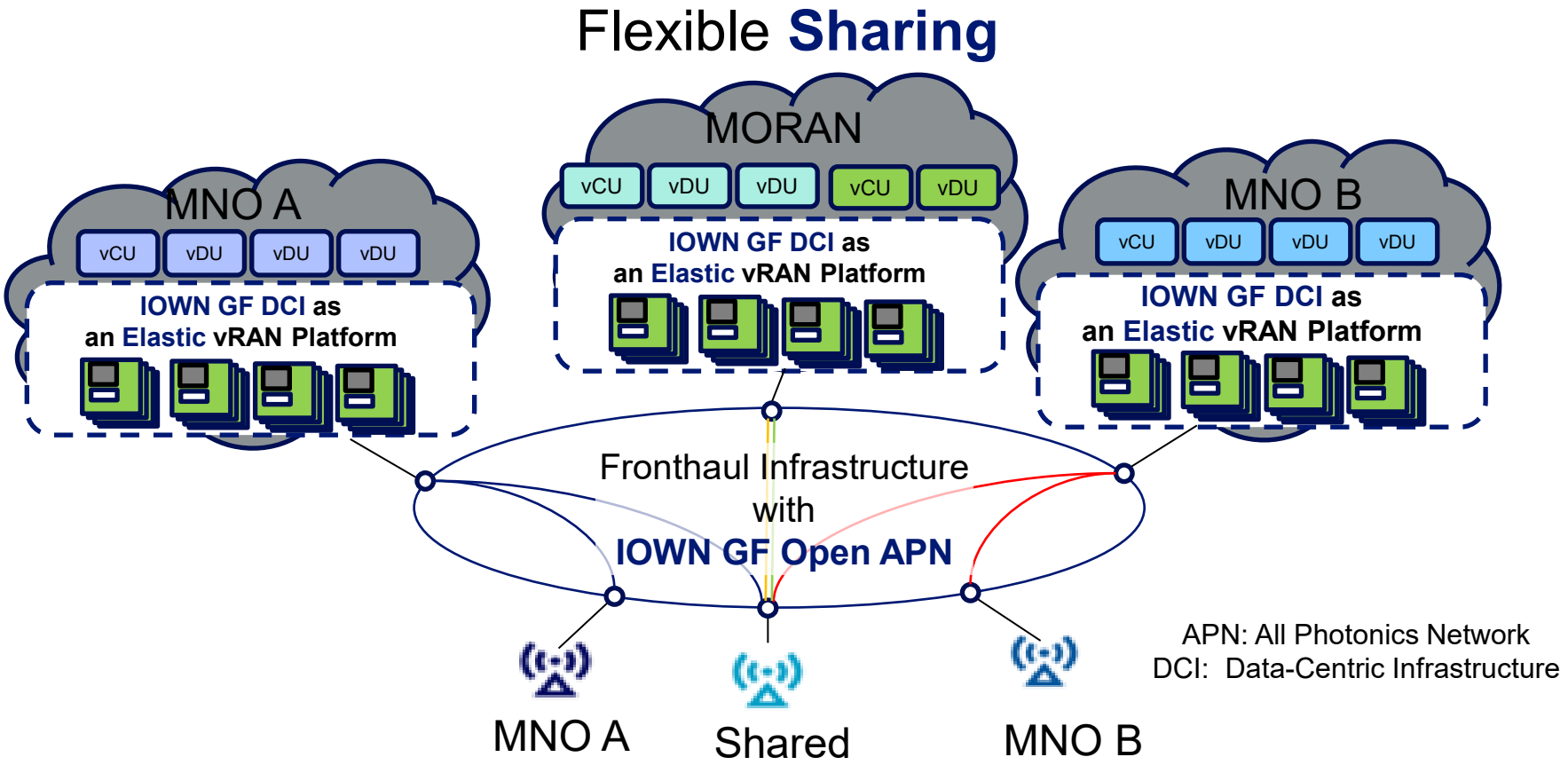
Cheap

APN × Distributed Networks



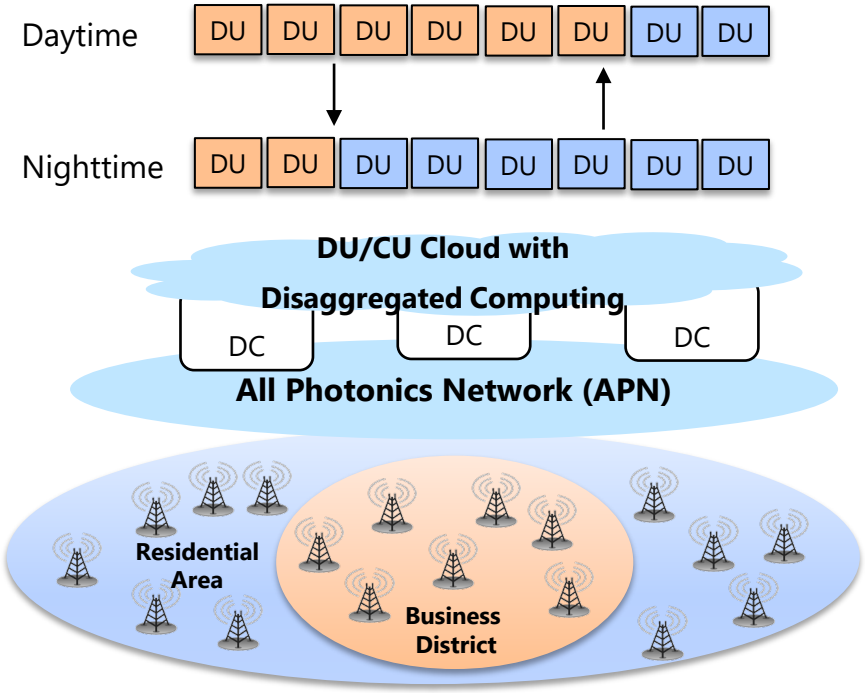


5G/6G Mobile Network

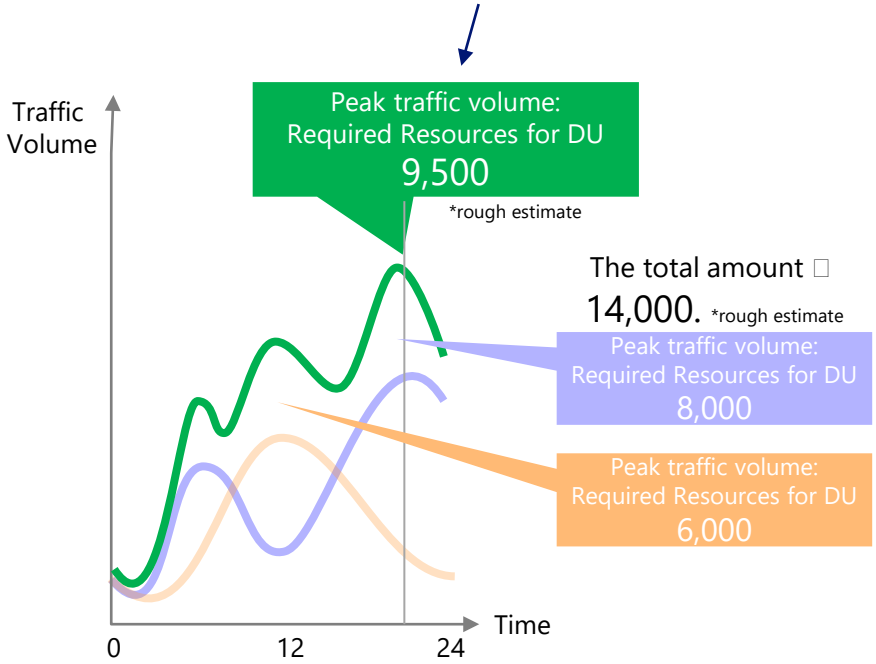


APN: All Photonics Network
DCI: Data-Centric Infrastructure

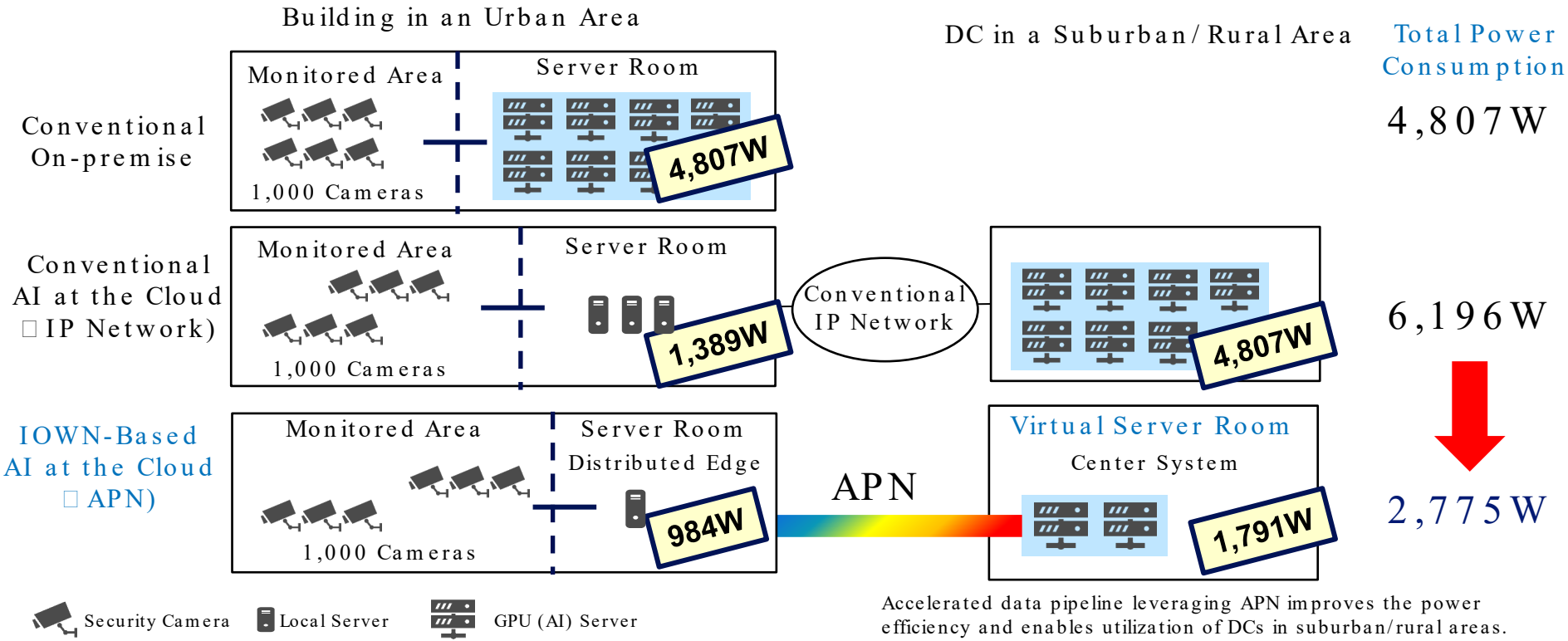
RAN Energy and TCO Saving with 30km-Scale Cloudification



30+% CAPEX/OPEX reduction (rough estimate)



RedHat, Fujitsu, NVIDIA, and NTT PoC for AI-enabled Smart Area Management



Accelerated data pipeline leveraging APN improves the power efficiency and enables utilization of DCs in suburban/rural areas.

Summary

- IOWN APN
  - Higher energy efficiency
  - Lower latency
  - Larger capacity
- Sustainable growth of IMT2030/6G