IAB workshop on Environmental Impact of Internet Applications and Systems

Mobile Networks

Raffaele Bolla, Roberto Bruschi, Franco Davoli,
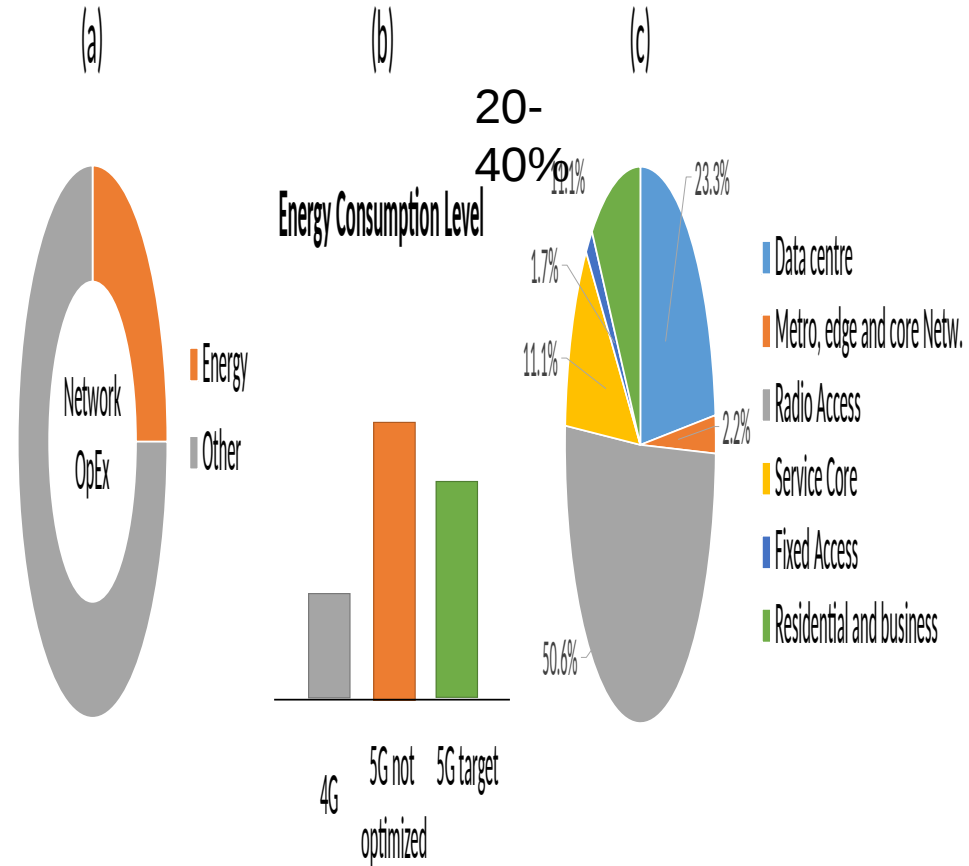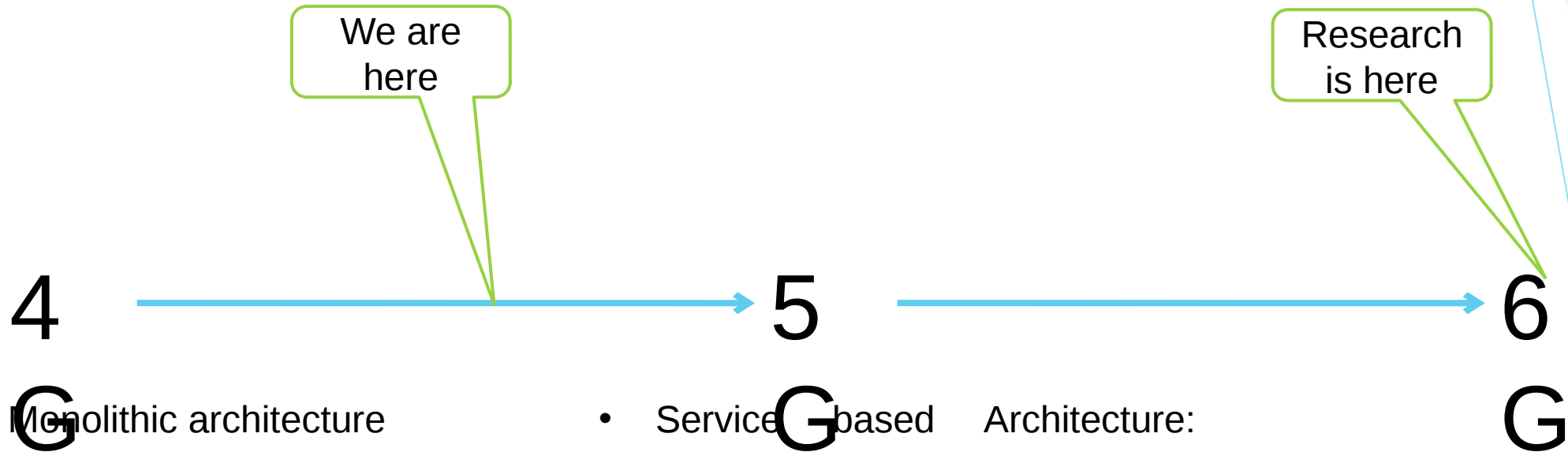Chiara Lombardo, **Beatrice Siccardi**

UNIVERSITÀ DEGLI STUDI
DI GENOVA

cnit

I A B

Energy consumption of Mobile Networks

Source: https://www.gsma.com/futurenetworks/wiki/energy-efficiency-2/

Where are we?
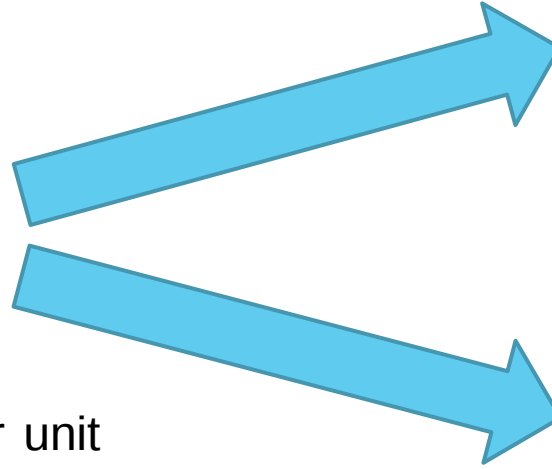
We are here

Research is here

4G
- Monolithic architecture

5G
- Service-based Architecture: NFs.
- Virtualization: NFs are VMs or containers
- Open RAN (split into DUs and CU)
- Edge Computing

6G

I A B

Next steps

Observability
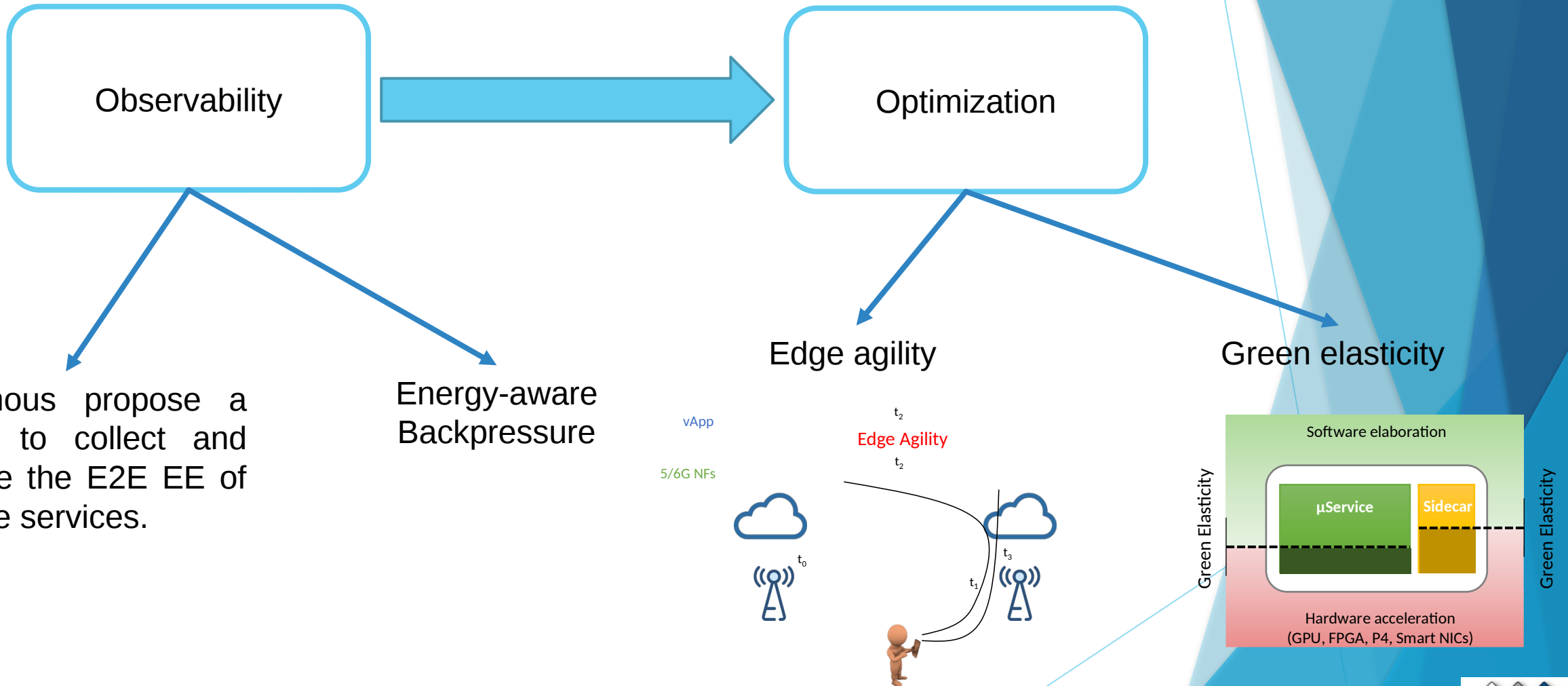
Energy/Carbon-awareness

- Economic incentives

Optimization

- Artificial Intelligence

- Which metrics? Energy per unit of traffic (see Anonymous paper)?
- How do we relate energy metrics to individual vertical applications? (see Anonymous paper)

I A B

Proposed solutions

Observability → Optimization

Observability

Anonymous propose a method to collect and calculate the E2E EE of the edge services.

Energy-aware Backpressure

Optimization

Edge agility

Green elasticity

vApp

5/6G NFs

t_2

Edge Agility

t_2

t_0

t_3

t_1

Green Elasticity

Software elaboration

µService | Sidecar

Green Elasticity

Hardware acceleration (GPU, FPGA, P4, Smart NICs)

I A B

Thank you for your attention!

Any questions?