

Total Energy Model for Connected Devices

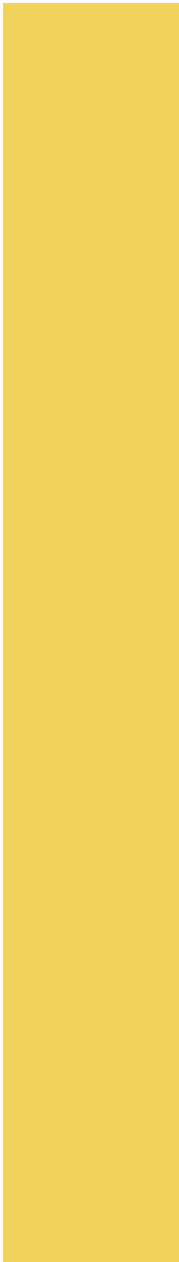
Paul Ryan, Anson Wu, Terence Smith

IEA Webinar Series, 28 April 2021

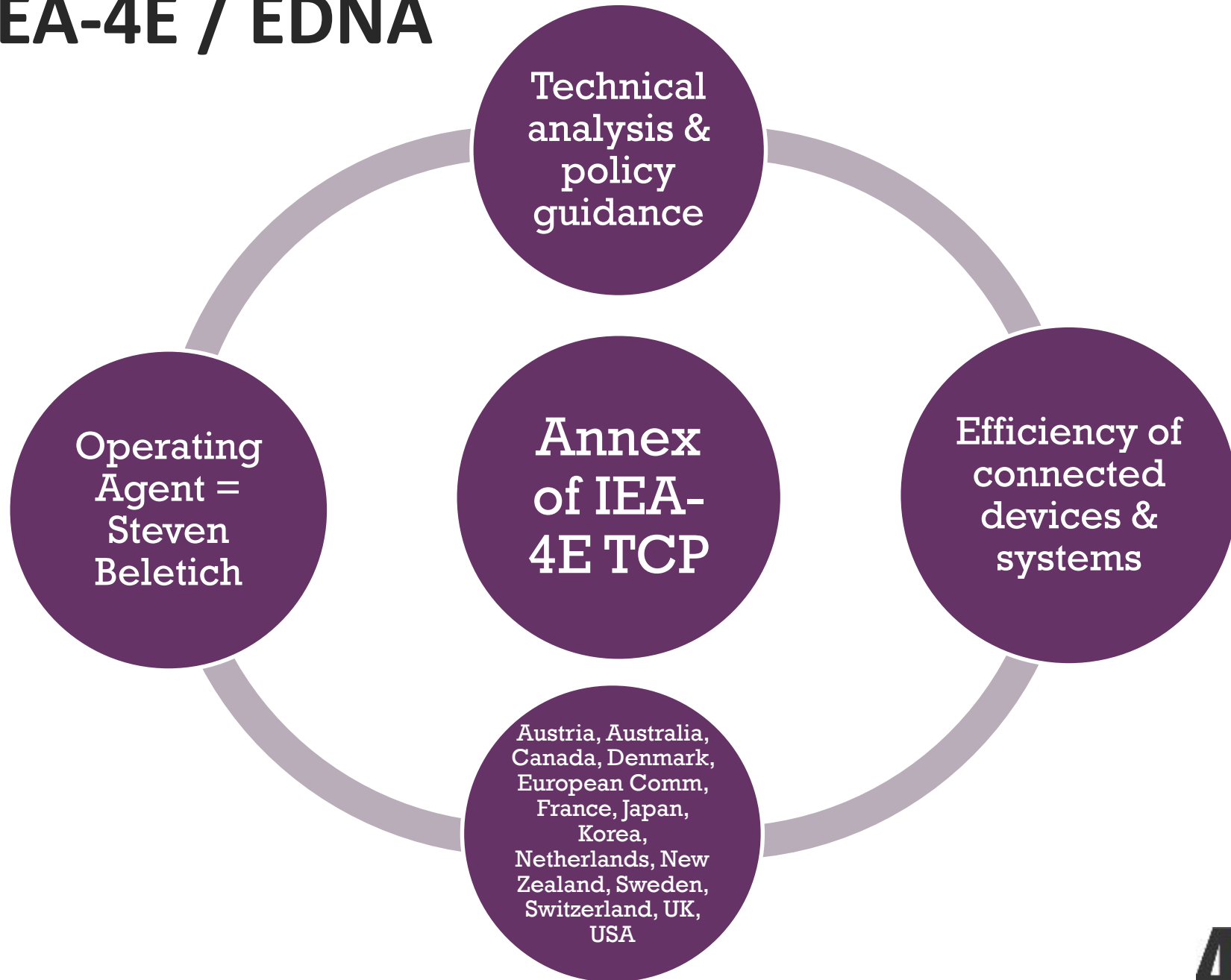
Contents

- Introduction to the IEA-4E TCP and EDNA
- Overview of Total Energy Model
- Demonstration of TEM Charts

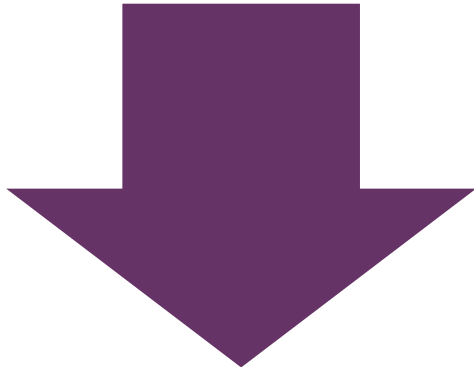
Introduction to the IEA-4E TCP and EDNA



IEA-4E / EDNA



Energy Implications of Device Connectivity



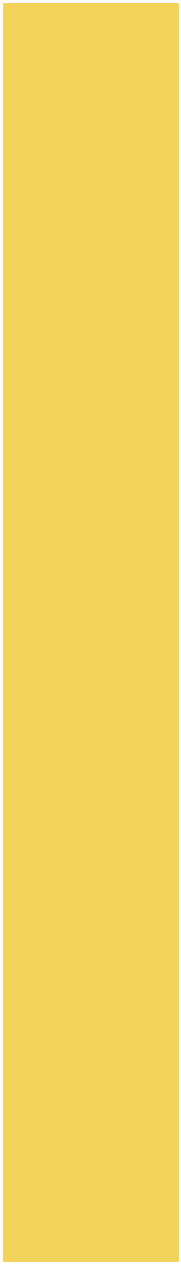
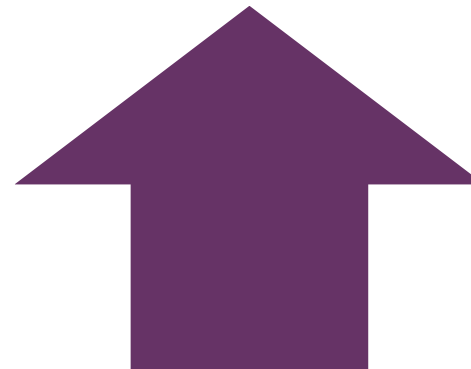
Energy Savings

- Digitalisation
 - Intelligent efficiency
 - Demand flexibility



Energy Cost

- Network standby
- Upstream energy



Overview of Total Energy Model (TEM)



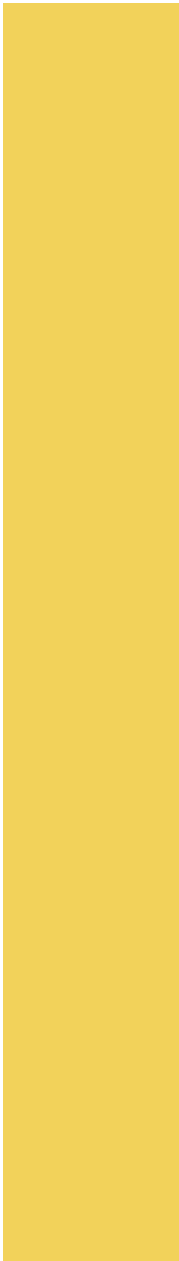
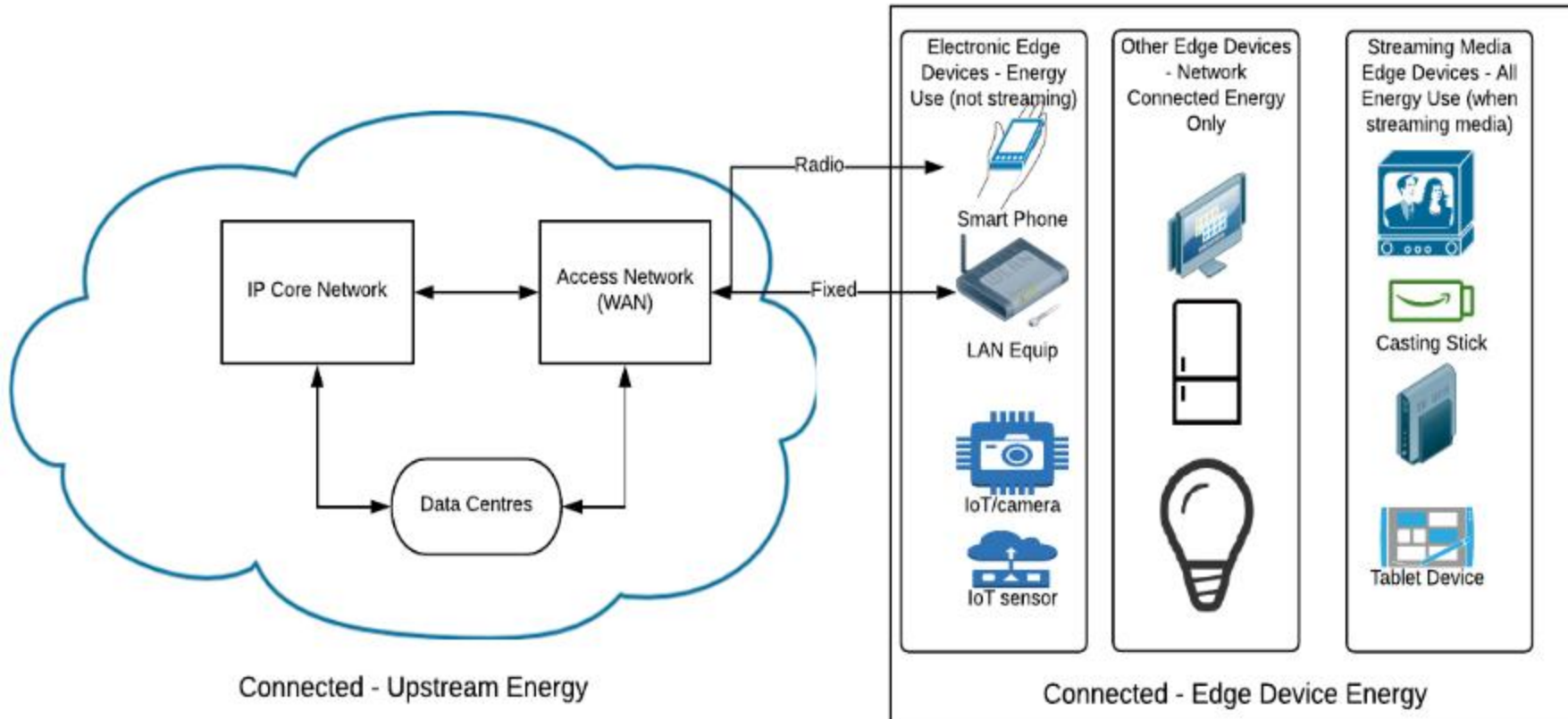
Please Note

- The TEM was commissioned by EDNA and authored by EnergyConsult. Its results do not reflect the views of the IEA, 4E, EDNA or their members
- The TEM is a desktop model, based on a wide range of assumptions, and therefore contains some uncertainty
- The EnergyConsult team includes:
 - Paul Ryan
 - Anson Wu
 - Terence Smith

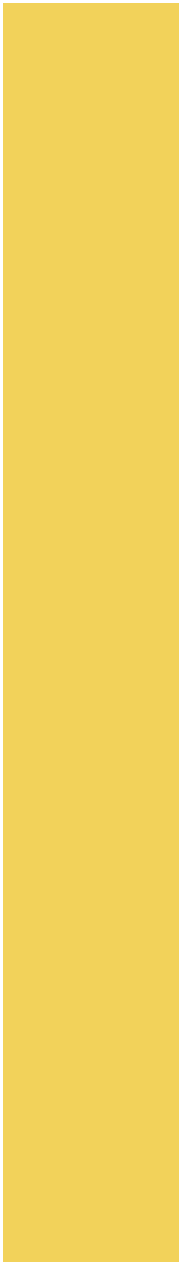
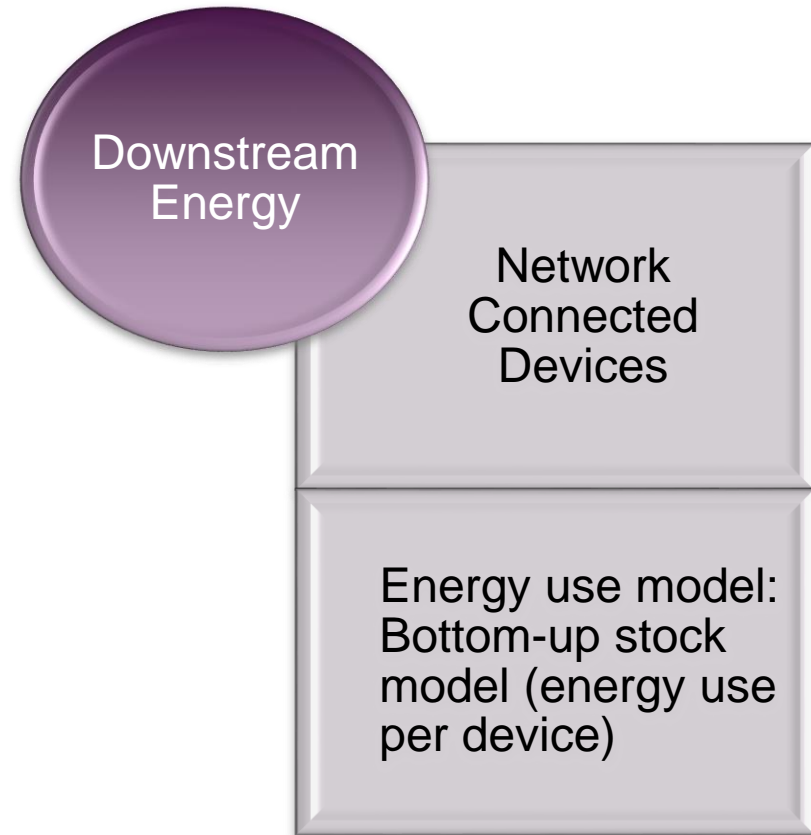
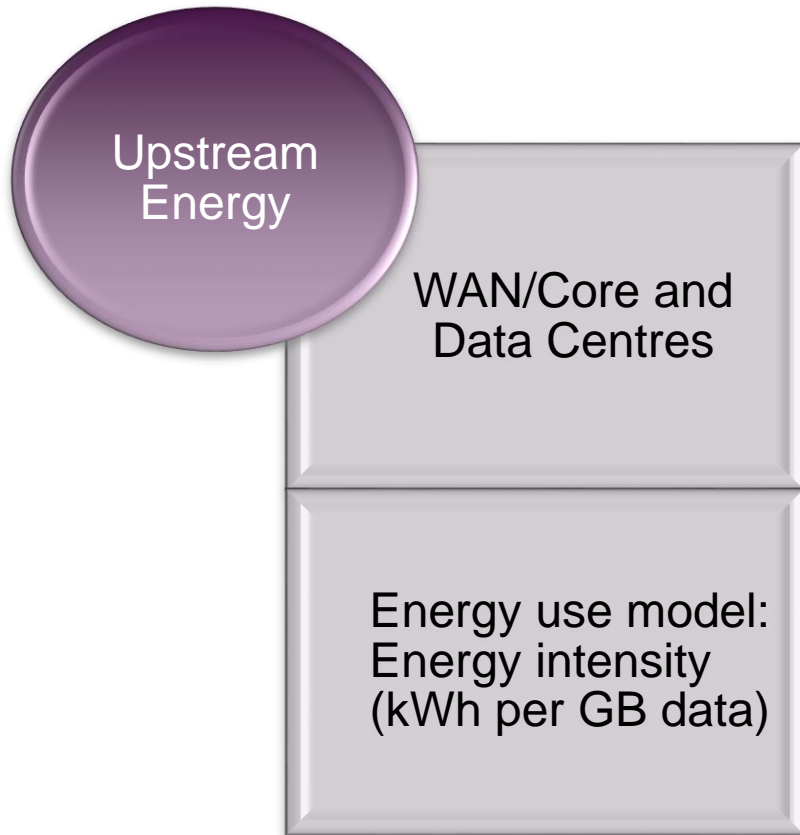
Context

- Total Energy Model
 - V1.0 finalised in 2019
 - V2.0 expanded on V1.0 and was finalised in 2020 (published in March 2021)
- Scope, from 2010 to 2019, and forecast to 2030
 - Network connected energy use:
 - Downstream - Energy used to create and maintain network connections, and stream video/audio
 - Upstream - Energy used in the data centres (DC) and wide area network (WAN)

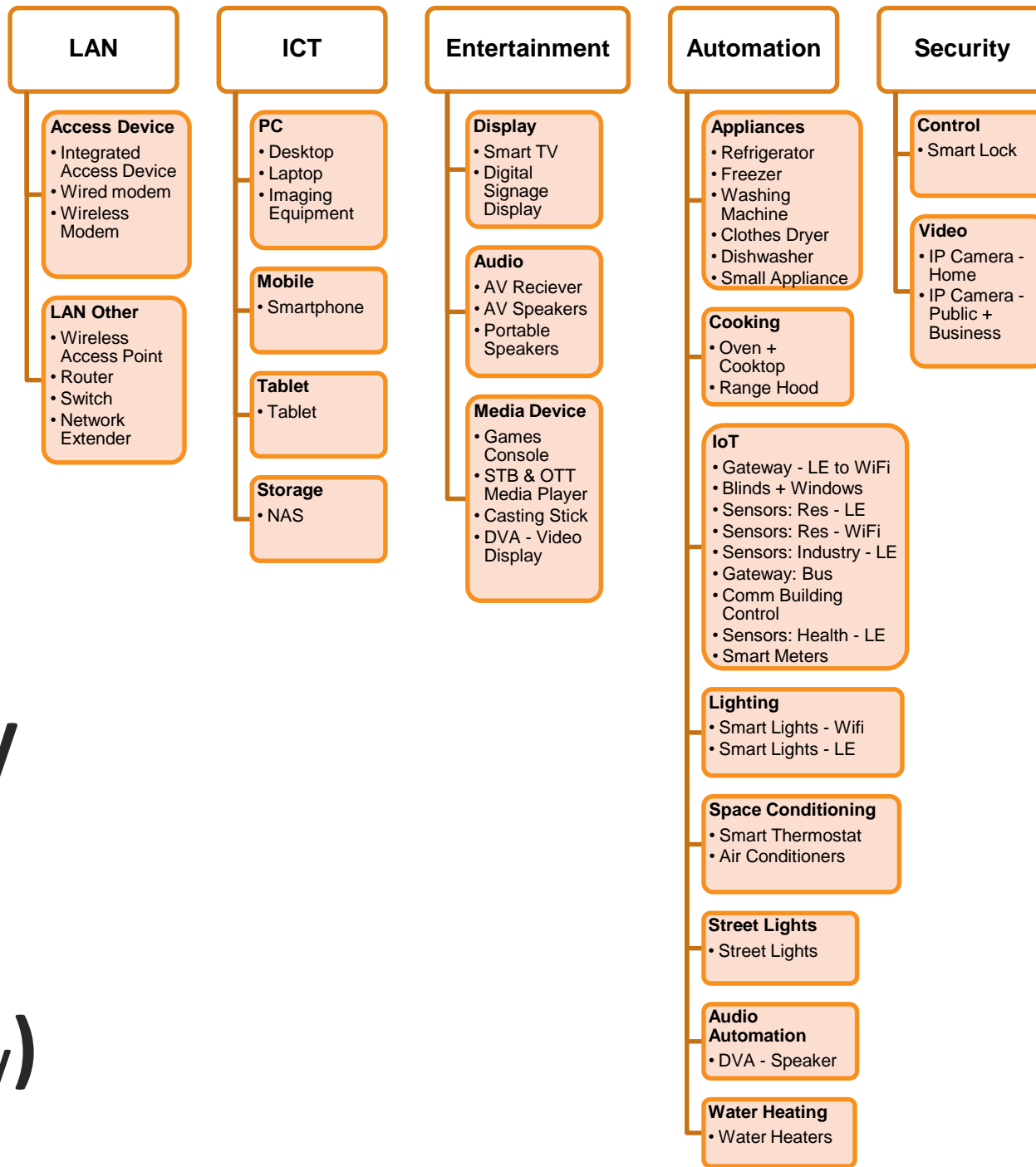
Scope



The TEM Model

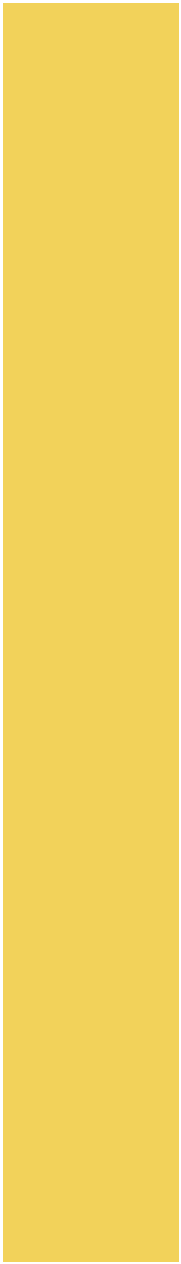


Devices by Category and Group (sub-category)



Energy consumption categories

- Downstream
 - Network standby
 - Network active
 - Media Streaming
- Upstream
 - Media streaming
 - Non-media



Additional segmentation

- Regions x 8 (based on supplied shipment forecasts – sourced from Juniper Research)

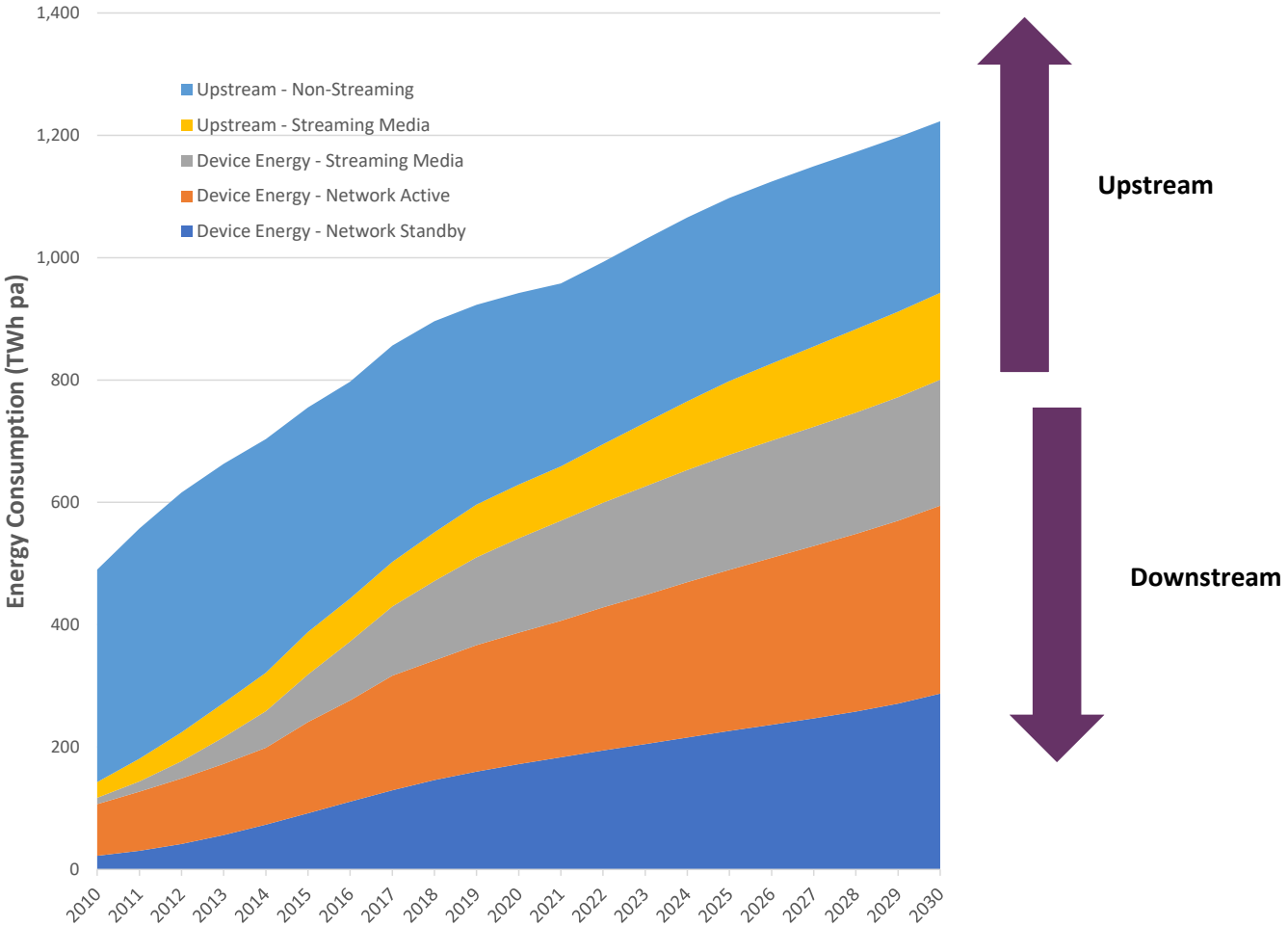
North America
West Europe
Central & East Europe
Far East & China
India Subcontinent
Rest of Asia Pacific
Latin America
Africa and Middle East
Global

- IP Global traffic type (as defined by CISCO)

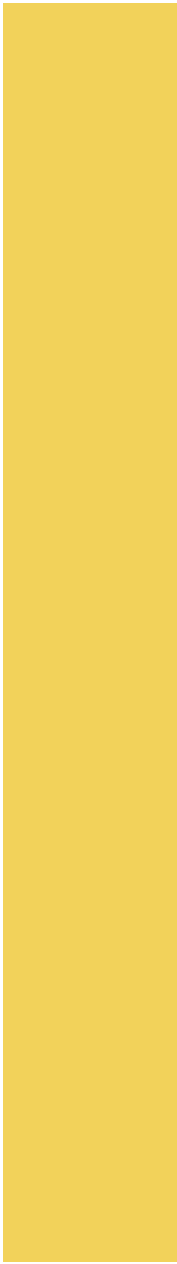
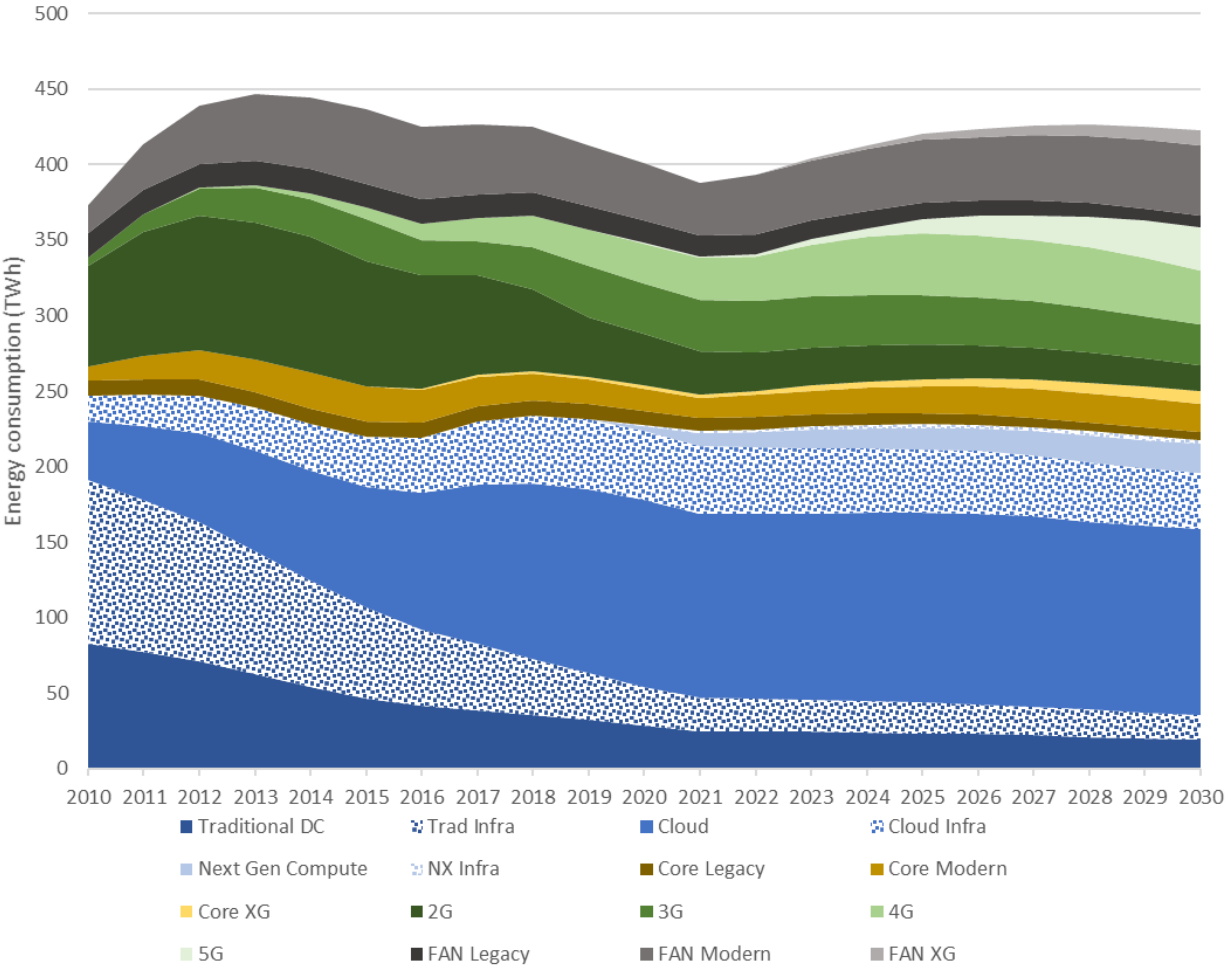
PC
TV
SmartPhone
Tablets
M2M
Non-Smart Phone
Other



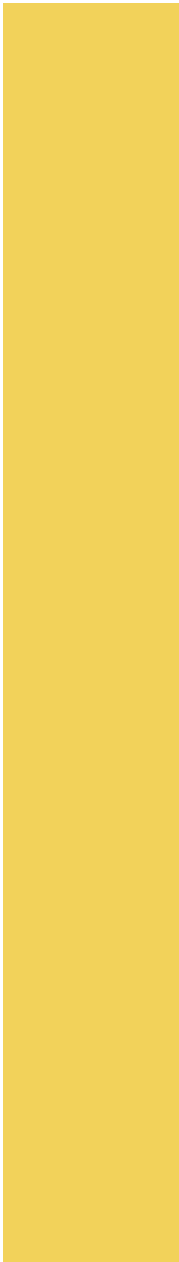
Overview of Connected Energy Consumption



Detailed Upstream Energy Consumption



Demonstration of TEM Charts



Demonstration of TEM Charts

- Explain the chart items and features
- Examples of what can be examined for each of the chart tabs
 - Base Case
 - Scenarios:
 - Edge device network standby,
 - LAN,
 - Upstream