

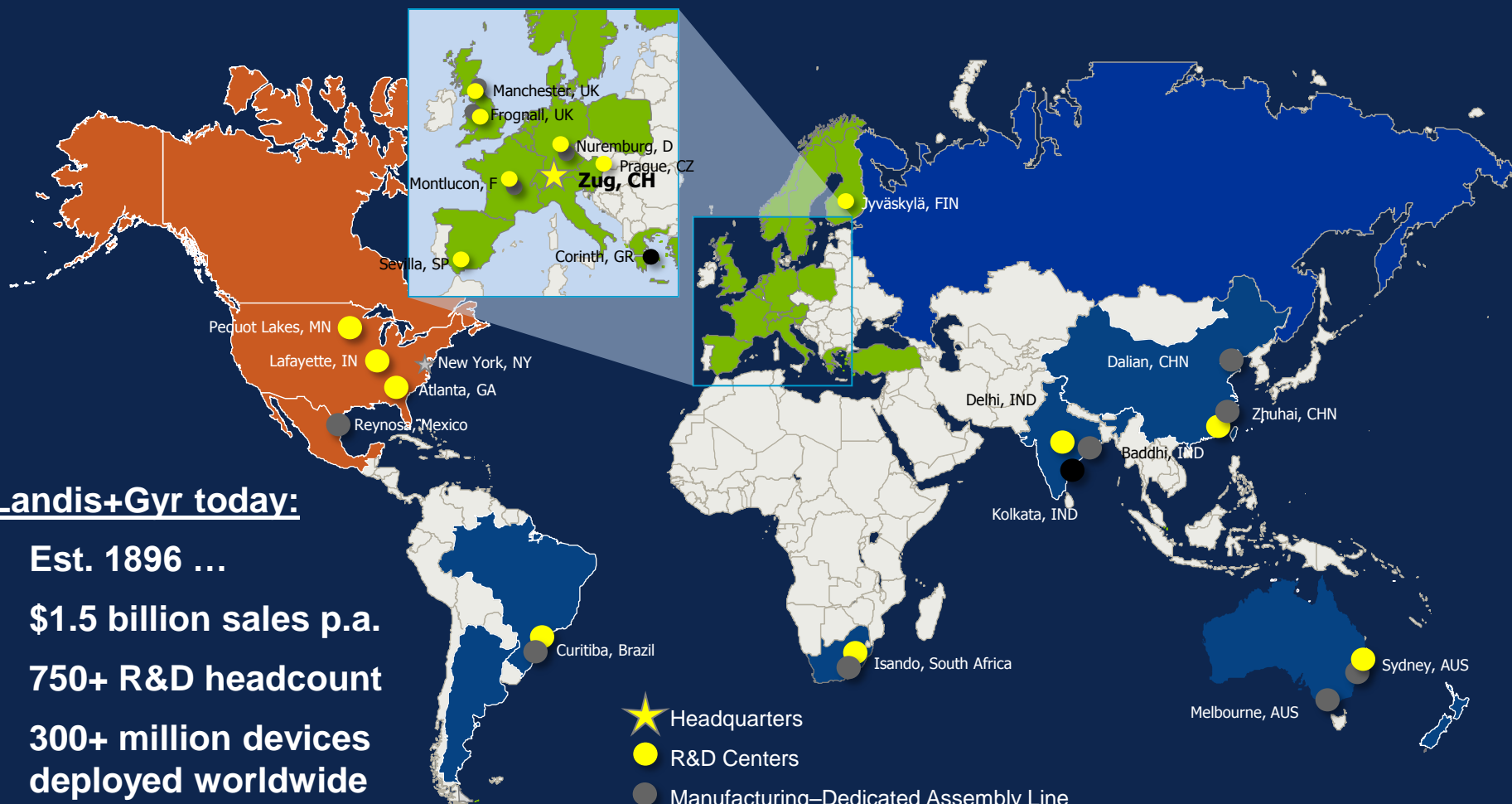


Panel Session: Smart Grids

Bill Lichtensteiger, Director Communication Technology



Who is L+G? Where is L+G?



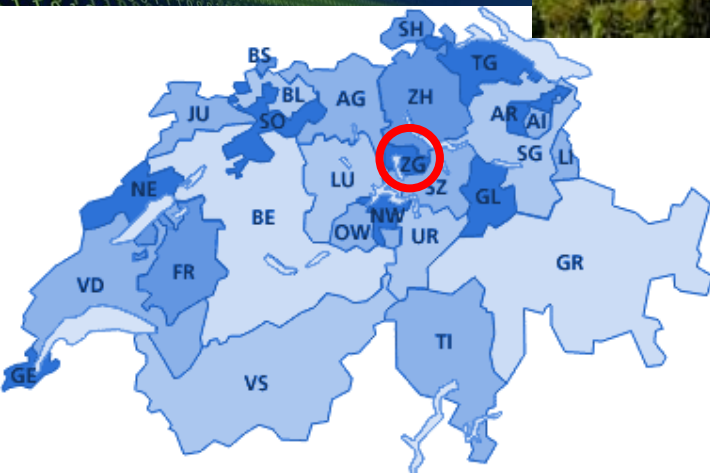
Landis+Gyr today:

- > Est. 1896 ...
- > \$1.5 billion sales p.a.
- > 750+ R&D headcount
- > 300+ million devices deployed worldwide
- > Presence in 30+ countries

- ★ Headquarters
- R&D Centers
- Manufacturing–Dedicated Assembly Line
- Manufacturing–High Volume

(Colored Countries Represent Sales Offices)

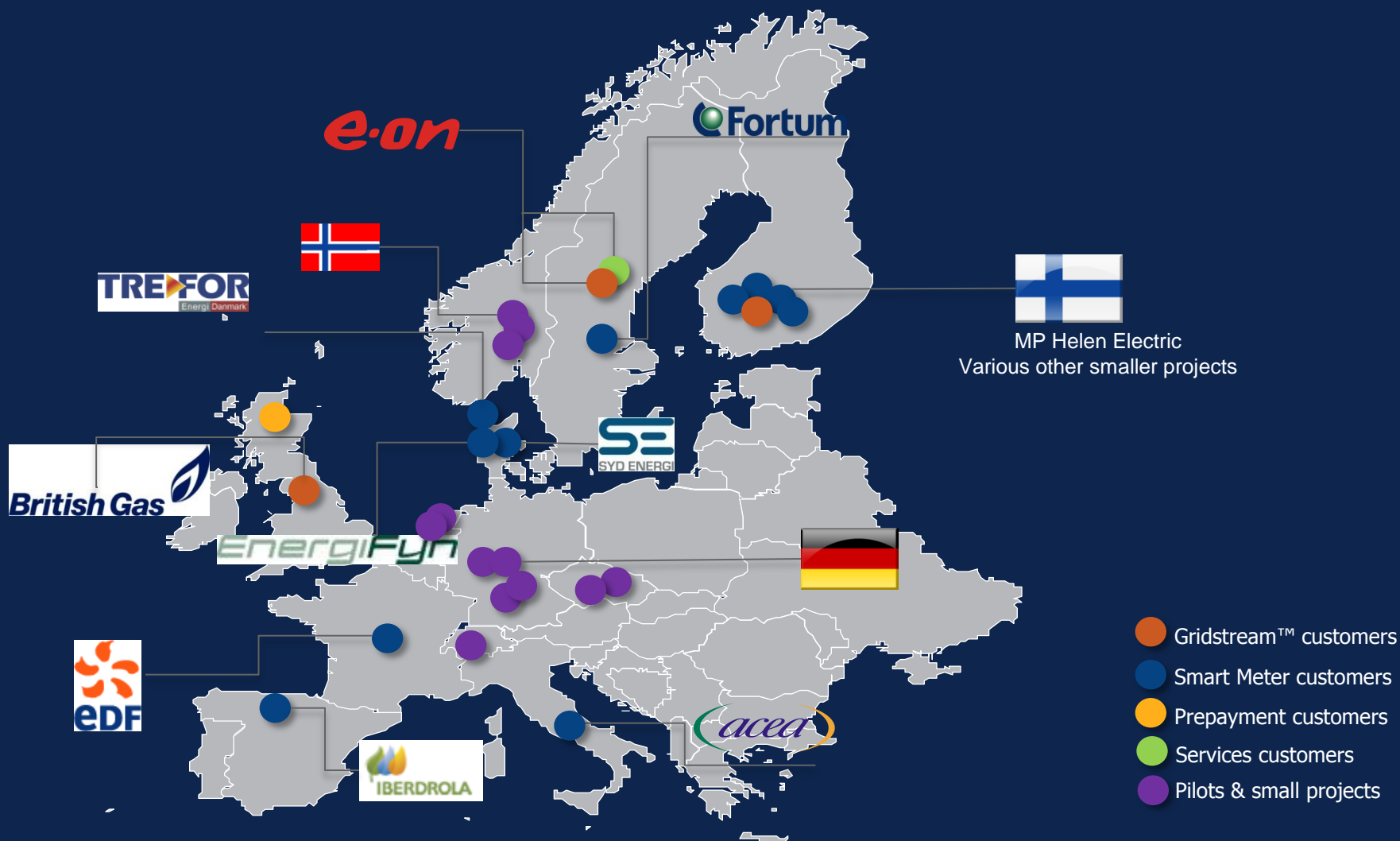
Headquartered in Zug, Switzerland ...



Smart Metering Deployments for 25m EP's ... of which 14m are managed by us



Major European Customers



Some Smart Science ...

Smart Metering (SM) \neq Smart Grid (SG)

$SM \in SG = \{ \underline{SM}, DA, PEM, EV, DER, CO_2, \$\$, \dots \}$

Since 120+ years, the Meter connects the Customer to the Grid ...



Today, the Smart Meter enables the Smart Customer to benefit from the Smart Grid



Which CTs could be used for Smart Grid?

PLC: a central option based on momentum from first phase of smart metering developments; and provides an 'in-house' option for utilities and access to 'difficult' premises

Fibre/ ethernet: a promising solution as broadband rolls out across EMEA; where ethernet and meters are co-located

Satellite: roll outs continue but likely to be in-fill rather than primary option in most geographies

Long Range Radio: a number of cost-effective technology options for widespread coverage of basic requirements; needs centralised investment

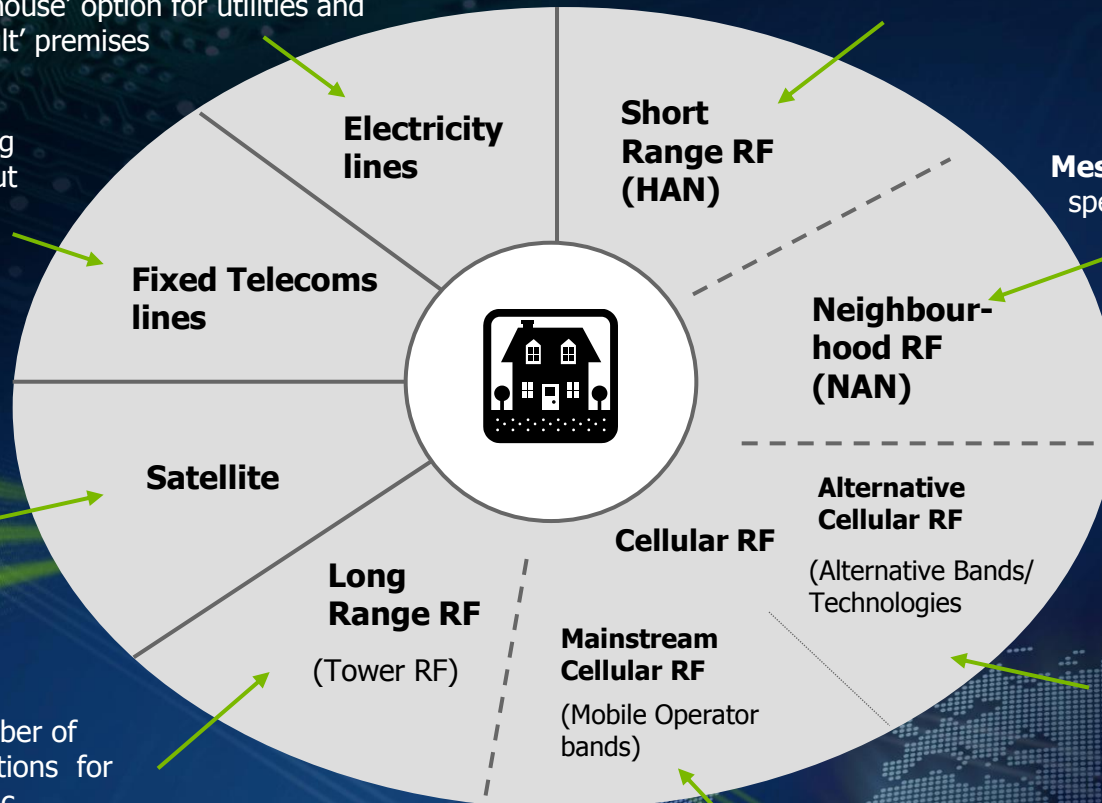
Cellular mobile: readily available but coverage limits in most geographies; GPRS obsolescence concern ~2020, LTE for differentiation but costly, WiMAX options

E.g. ZigBee and Wireless MBUS

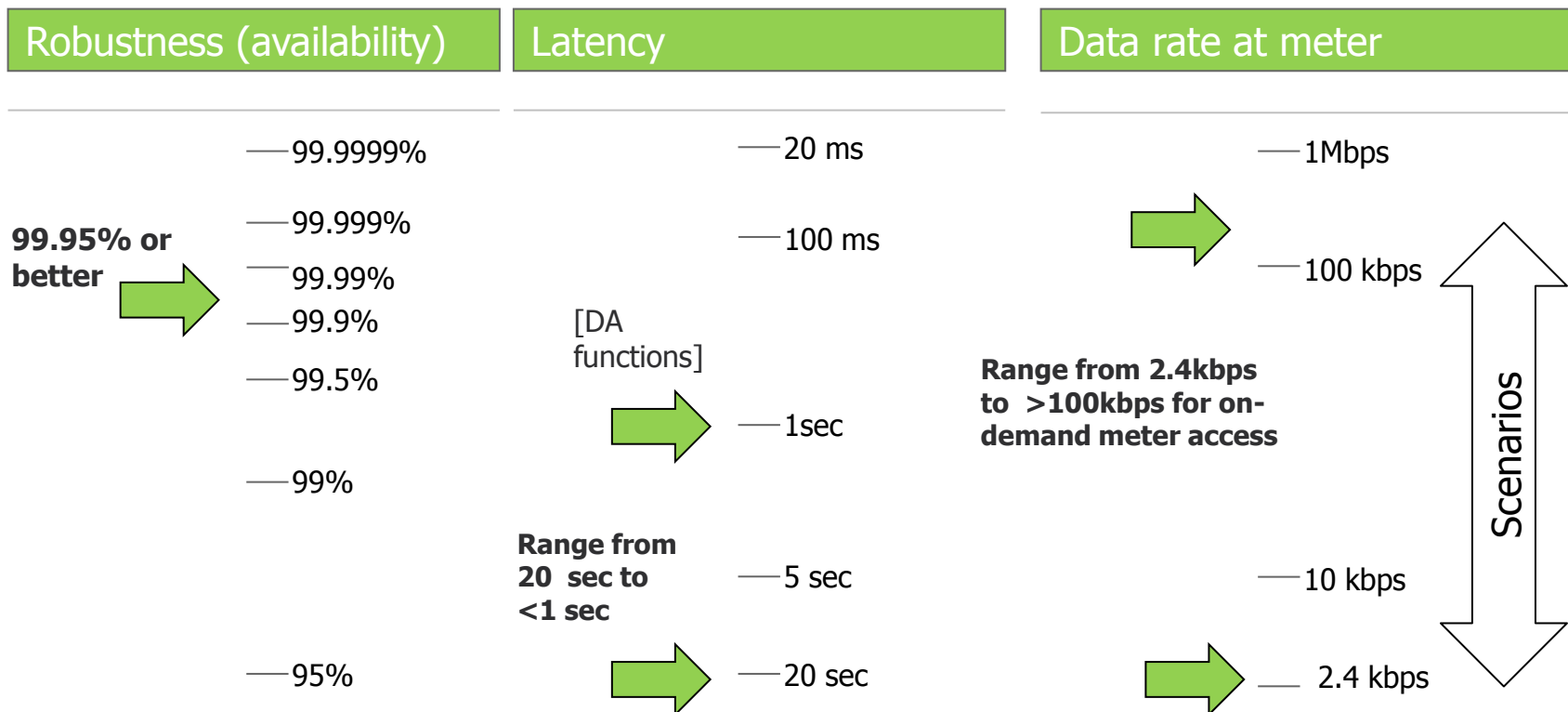
Mesh Radio: a leading option but spectrum dependent, possible EC driven approach

TV 'White Space' (TVWS): new opportunities from digital TV based on geo-database management of spectrum

Source: L+G and PA Consulting



What are the requirements on CT?



Latency: approximate time taken for a peer to peer 'ping' between DA nodes or from meter to concentrator.

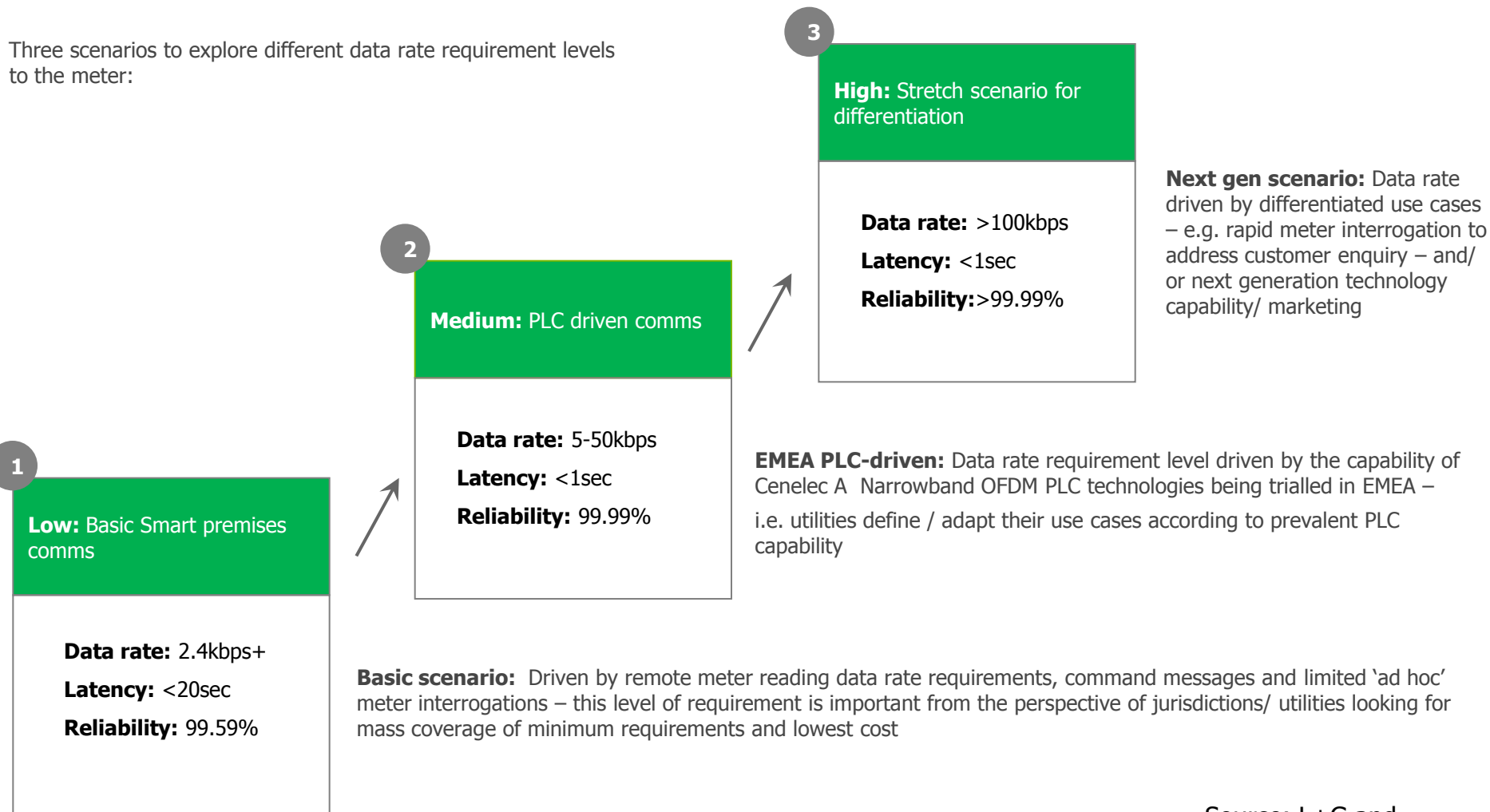
Data rate at the meter: peak data rate that can be attained at a selected meter on an on-demand basis

Source: L+G and PA Consulting

Possible Scenarios?

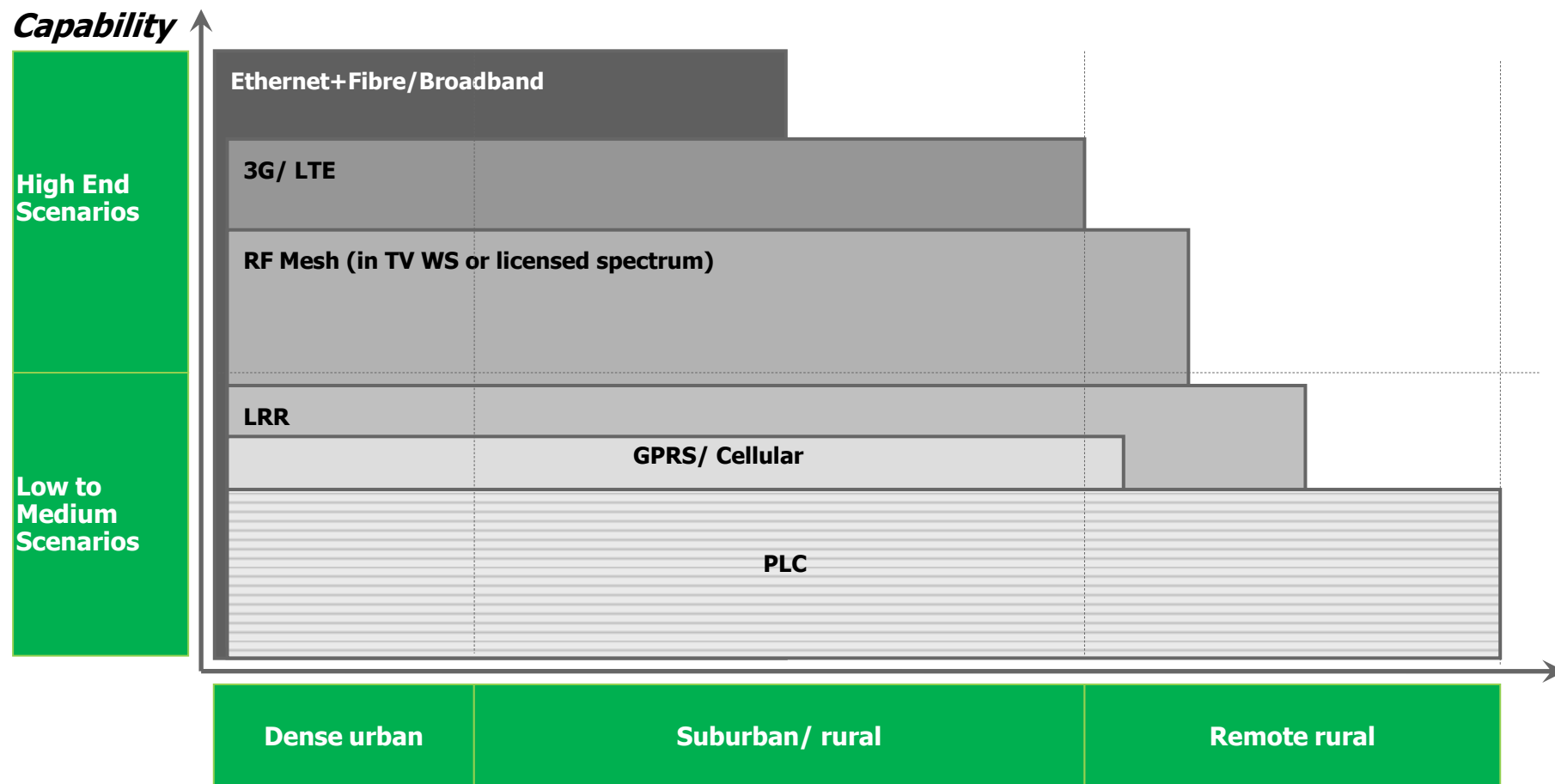
Scenarios incorporating three data rate requirements – Basic (2.4kbps), NB OFDM PLC limit driven (5-50kbps), Stretch (>100kbps)

Three scenarios to explore different data rate requirement levels to the meter:



Source: L+G and PA Consulting

CT Positioning



Coverage

Source: L+G and
PA Consulting

PLC in Smart Grid today

- ✓ NAN communication for Smart Metering (mainly Narrowband PLC for Meter to Data Concentrator)
- ✓ BPL for backhaul from Data Concentrator
- ✓ Low speed long range PLC (TS1/TS2) for rural and sub-urban deployments.
- ✓ HAN communication, today via gateways for SEP 1.x (later on IP bridging with SEP 2.0)
- ✓ ...

Where will PLC be going in the future?

- ✓ Standardization and interoperability
- ✓ Increasing speed and data throughput
- ✓ Support for IP(v6)
- ✓ Increasing adaptiveness and robustness
 - ✓ noisy environments
 - ✓ predictable characterised transformer crossing
- ✓ Improved grid analytics (incl. outage management)
- ✓ PLC for Electric Vehicles and HAN using SEP 2.0
- ✓ Competition to PLC may emerge from RF based solutions
- ✓ We may see hybrid PLC/RF approaches in the NAN?

**Everyone benefits if we
„Manage Energy Better“**

Landis
|Gyr+



Thank you