ITU-T SG15/WP1 Access Network Transport, Energy Saving Checklist - An Overview

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ITU-T SG-15 Tutorials on Energy-Saving
Geneva
14 February 2008

What is an Energy Saving Checklist?

- **Tool for assessment of existing and new ITU-T Recommendations in the light of climate change (TSAG LS 30)**
- **TD-288 GEN provides guidance on energy saving in access networks for Rapporteurs and Editors**
  - **Intended to ensure that drafting leads to an economic and energy efficient solution**
- **Currently it is a set of questions relating to energy saving in networks**
  - **Greg Jones says it needs to be distilled down at the Question level to offer "tips and tricks" which will stimulate energy efficient thinking throughout the editing process**
  - **A new name may be needed for the "Checklist"**
  - **Will provide and the trigger to liaise with device groups such as IEC**

What are the benefits of energy saving?

- **Reduces the cost of energy**
  - **for operators or end-users.**
- **Reduces the carbon footprint**
  - **where electricity is sourced from fossil fuel**
- **Reduces the size and cost of backup battery/generator**
  - **to support lifeline services during power outage.**
- **Low power makes new technology solutions feasible**
  - **such as DSL or Ethernet back-powered Optical Network Units (ONUs).**

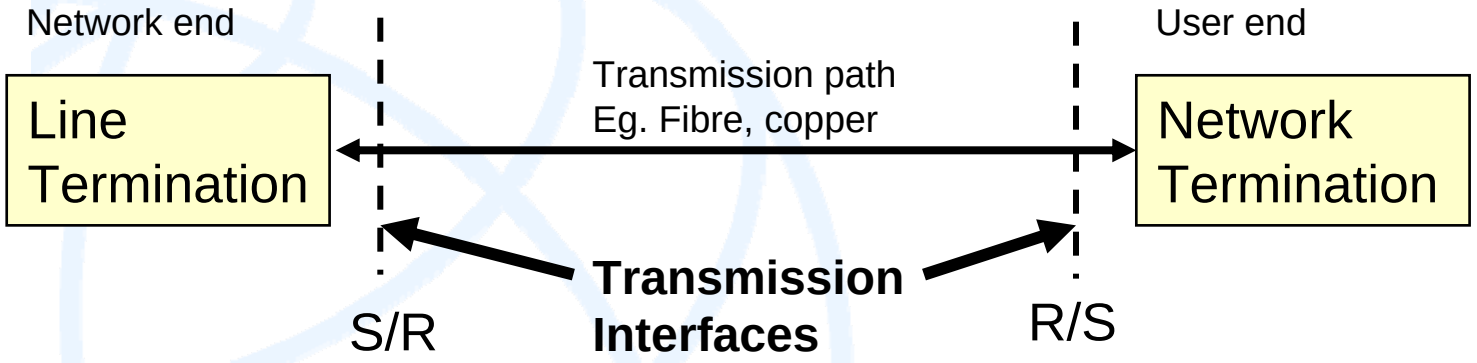
SG-15 Areas of Influence for Energy Saving - Some characteristics

- **Access Technologies:**
  - **Serve mass populations over the final drop**
  - **Potential for large energy savings in end devices**

- **Transport Technologies:**
  - **Carry aggregated traffic, sharing devices across whole populations (cf. train v car)**
    - Less potential for energy saving per customer
  - **SDH and packet allow frames and bytes to be extracted directly from a bit-stream:-saving energy**
    - PDH requires a ‘multiplex mountain’ to extract bytes and frames

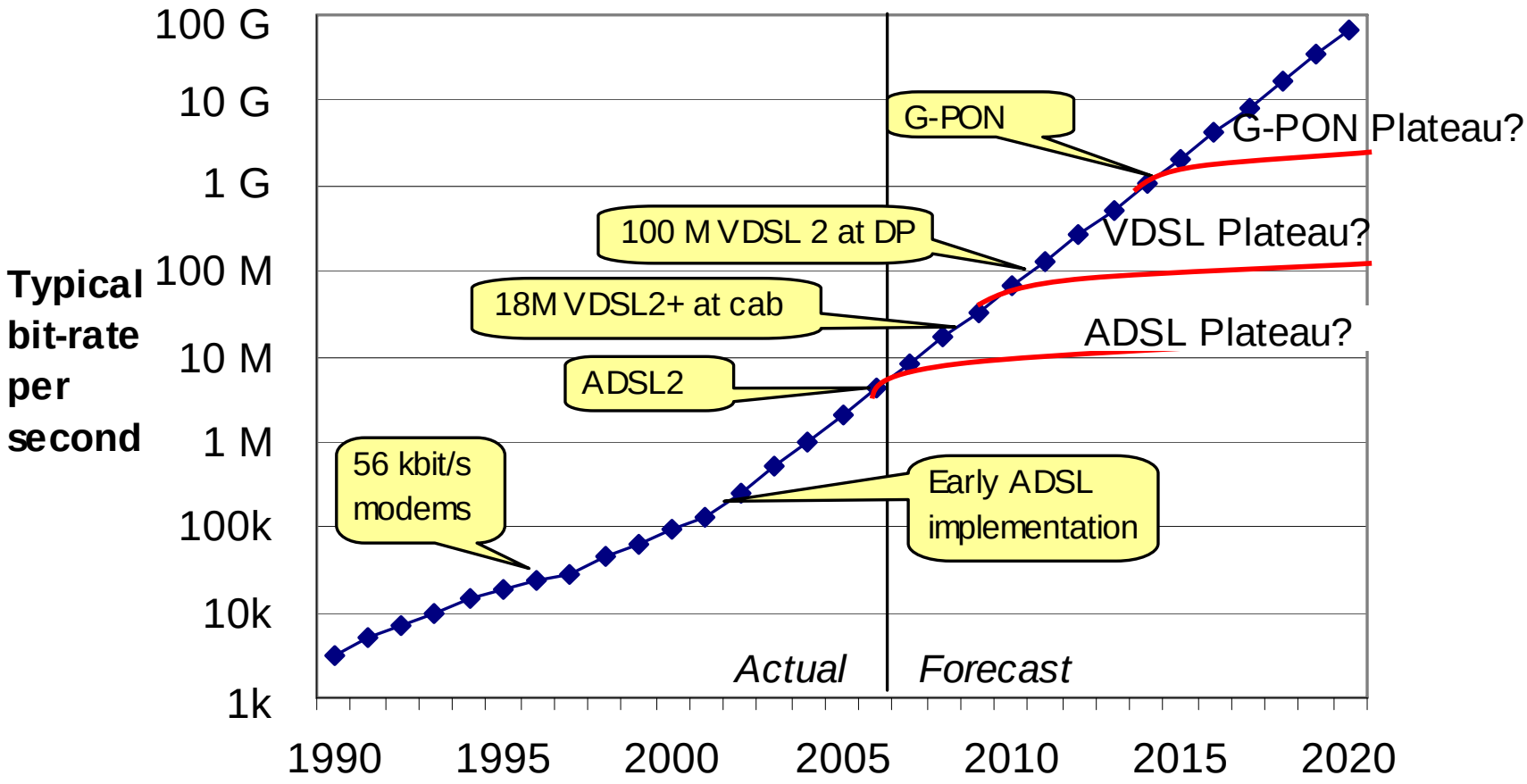
- **Cross-connect or path-switching:**
  - **Similar to transport but focus in SG-15 is on interfaces rather than switch technologies**

SG-15 Areas of Influence for Energy Saving – Access Recommendations

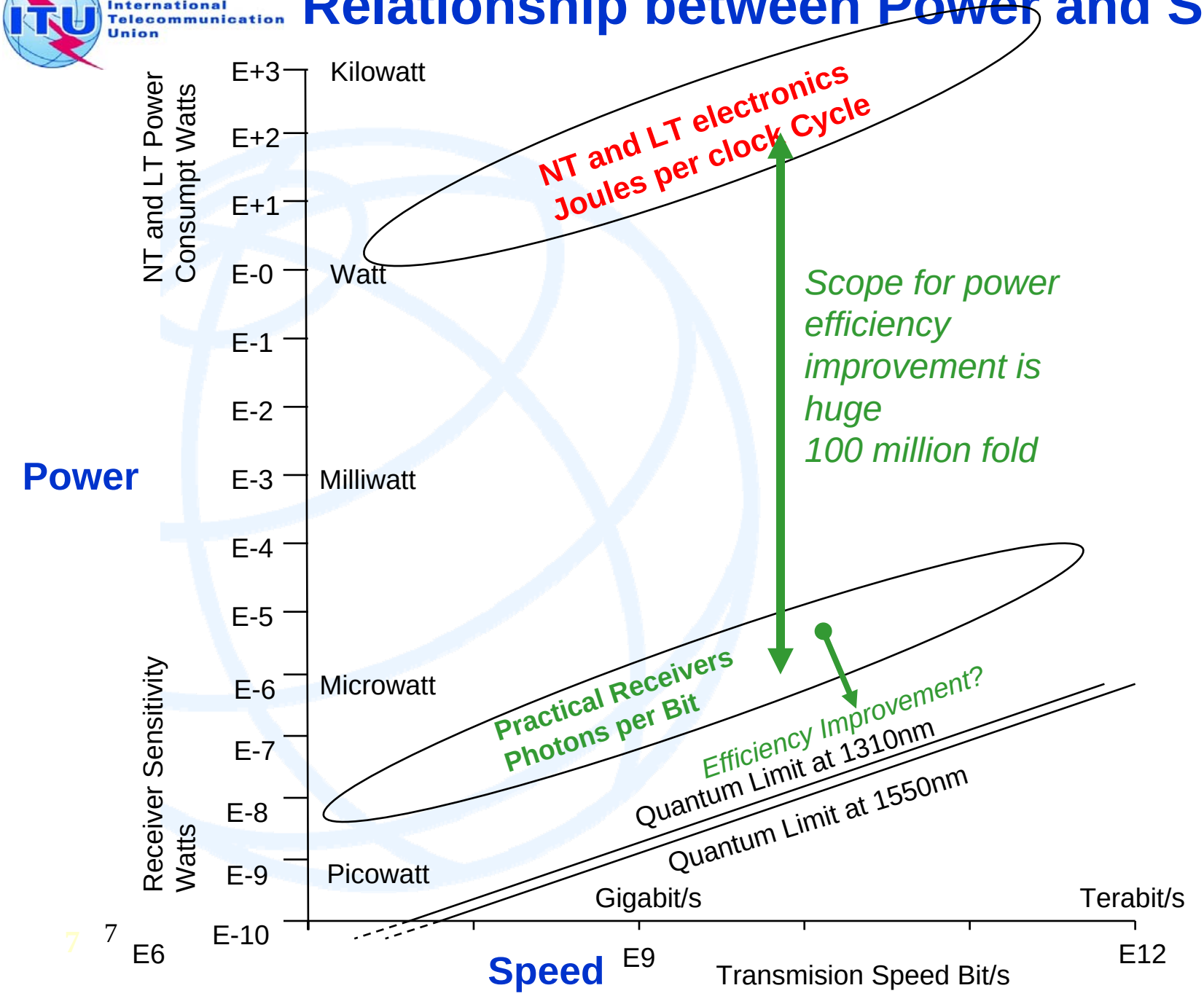


- **At Question level, the focus is on transmission interfaces**
  - **Describing "The Signals Passing Through"**
  - **But: "Black boxes" at the ends consume the energy**
  - **For energy saving, the focus needs to include end devices**
- **Devices are covered in other bodies. Liaison is therefore needed with**
  - **International standards bodies such as IEC**
    - International Electrotechnical Commission
  - **Regional Policymakers such as**
    - EUROPEAN COMMISSION DIRECTORATE-GENERAL JOINT RESEARCH CENTRE Institute for the Environment and Sustainability Renewable Energies Unit "Code of Conduct for Broadband Equipment"

Relationship between bit-rate and speed of access over time:-

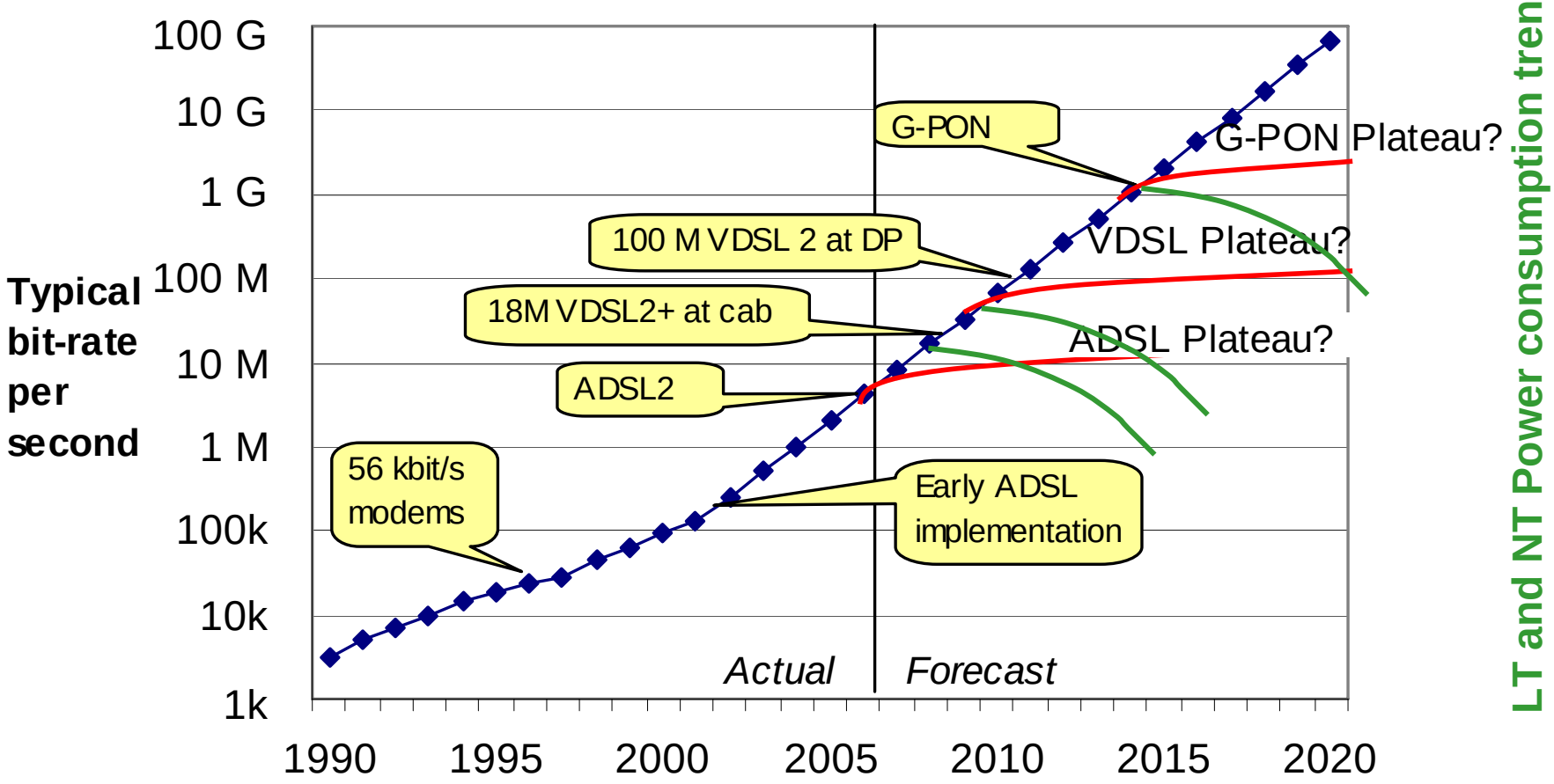


Relationship between Power and Speed



Relationship between bit-rate and power consumption over time:-

Can we increase speed while saving power?



Example Questions- 1. General

- **Does this ITU-T Recommendation foresee the development of devices or networks that will require the consumption of electric power?**
  - **YES / NO**
- **Will the implementation of this ITU-T Recommendation change the power requirements of existing devices or networks?**
  - **YES / NO**
- **If YES, please assign an approximate score to the significance of this Recommendation for climate change,**
  - **based on the following assumptions concerning power consumption and market potential (see next Figure)**

Categorisation of power consumption and market potential for ITU-T Recommendations

	Power consumption per device / network				
Market potential (users within 10 years)	Less than 0.1 watt	Up to 1 watt	Up to 10 watts	Up to 100 watts	More than 1 kw
Fewer than 1 mill.	**A**	**A**	**B**	**B**	**C**
Up to 10 million	**A**	**B**	**B**	**C**	**C**
Up to 100 million	**B**	**B**	**C**	**C**	**D**
Up to 1 billion	**B**	**C**	**C**	**D**	**D**
More than one 10^{10} billion	**C**	**C**	**D**	**D**	**E**

Example Questions- 2. Mitigation

- **Does the ITU-T Recommendation consider/enable lower power/energy consumption of the technology or network (e.g. NGN, ADSL2+), for instance by enabling multiple power modes? YES / NO**
- **If so, how well does the ITU-T Recommendation perform the action of reducing energy consumption?**
  - **For example, is power saving mandatory or optional?**

SG-15 Questions- The Challenge

- **All Questions are now requested to include climate change issues (e.g. energy saving, reducing greenhouse gases, etc).**
- **Each new Recommendation should identify**
  - **its impact on climate change**
  - **how it contributes towards measurable reduction in emission of greenhouse gases**

Summary

- **The checklist (TD-288-GEN) is at a first draft stage for WP1**
  - **A General Technical Document with useful metrics and tools**
  - **Is it workable yet for old and new Recommendations?**
    - See Annex 1 and Annex 2 Respectively
  - **What improvements can be made at the Question level?**
- **Can other WPs use it as a model?**

Thank You

For information, see www.itu.int/ITU-T/climatechange

and http://www.itu.int/ITU-T/studygroups/com15/index.asp