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SERIES L: ENVIRONMENT AND ICTS, CLIMATE
CHANGE, E-WASTE, ENERGY EFFICIENCY;
CONSTRUCTION, INSTALLATION AND PROTECTION
OF CABLES AND OTHER ELEMENTS OF OUTSIDE
PLANT

Energy efficiency, smart energy and green data centres

Carbon data intensity for network energy performance monitoring

Recommendation ITU-T L.1333

ITU-T L-SERIES RECOMMENDATIONS

ENVIRONMENT AND ICTS, CLIMATE CHANGE, E-WASTE, ENERGY EFFICIENCY; CONSTRUCTION, INSTALLATION AND PROTECTION OF CABLES AND OTHER ELEMENTS OF OUTSIDE PLANT

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Recommendation ITU-T L.1333

Carbon data intensity for network energy performance monitoring

Summary

To meet the targets of the Paris Agreement, telecom operators, like other industries, need to set targets for emission reduction to arrive at a net zero situation as reported in Recommendation ITU-T L.1470.

For a situation in which network traffic will increase, this Recommendation defines a key performance indicator (KPI) useful to evaluate network emission and give an indication on how a network can reduce its emission due to energy usage.

Recommendation ITU-T L.1333 defines a KPI called network carbon intensity energy (NCIe); it also defines how to apply the Recommendation: which part of the network is covered and how to calculate the metric continuously in network evolution.

This Recommendation also defines the correlation between the carbon intensity indicator and energy efficiency metric.

The carbon KPI defined in this Recommendation refers to the energy efficiency metric defined in Recommendation ITU-T L.1331.

History

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* To access the Recommendation, type the URL <http://handle.itu.int/> in the address field of your web browser, followed by the Recommendation's unique ID. For example, <http://handle.itu.int/11.1002/1000/11830-en>.

FOREWORD

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The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

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Introduction

In recent years, a significant interest in GHG emission level from industry has been taken. The need to respect the Paris Agreement and carry out the activities linked to the United Nations Sustainable Development Goals are important aims and the possibility of setting of targets for countries and industries to reduce the amount of CO₂ that they emit also exists. As a consequence, it is clear and accepted that telecom operators, like other industries, need to set targets for emission reductions in line with the trajectories put forward in [b-ITU-T L.1470] to arrive at a net zero state as defined by [b-ITU-T L.1471].

To conform with [b-ITU-T L.1470], ICT companies need to reduce their absolute emissions in line with the science-based decarbonization trajectories it describes. Companies are permitted to use intensity metrics, which may be a more practical tool to monitor the development of networks. However, if intensity metrics are used, [b-ITU-T L.1470], [b-ITU-T L Suppl.37] and [b-ITU-T L Suppl.38] state that these metrics need to be checked at regular intervals to ensure that their development does not deviate from the absolute trajectory.

To align with these Recommendations, it is necessary to consider the GHG emissions from the network owner, which is composed by different contributions, in particular those termed scope 1, scope 2 and scope 3, but the preeminent part of the GHG emissions comes from network use. This is linked to the amount of energy used for the operation of mobile and fixed networks, so they need to reduce the energy consumption of their network and the contribution of network operation to the emission of GHGs.

The big challenge is that this reduction must be achieved in a moment in which global consumer data traffic from cellular and fixed broadband networks is expected to grow at a 29% compound annual growth rate (CAGR) between 2018 and 2024. This corresponds to 5.8 million petabytes (PB) of data in 2024 – the equivalent of every person on the planet uploading over 6700 photos per day – up from around 1.3 million PB in 2018. Within cellular networks, the total traffic is expected to grow by a factor of nearly five times over the same period [b-informa].

The amount of traffic will significantly increase, and it is necessary to define indicators to define the increased efficiency in terms of GHG of a network by linking the amount of GHG emitted to the services provided by the network.

Some operators use internal indicators to evaluate their network emission and give an indication of how they are reducing the contribution of the network to their total emissions [b-informa].

A wider set of intensity metrics will be published by ITU-T SG5 in the future.