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Green public ICT procurement

ITU-T L-series Recommendations – Supplement 20

ITU-T

Supplement 20 to ITU-T L-series Recommendations

Green public ICT procurement

Summary

Supplement 20 to the ITU-T L-series Recommendations provides technical guidance to public authorities on how to improve their procurement practices to purchase green information and communication technology (ICT) goods and services.

This Supplement collects and presents relevant standards, ecolabels and certifications from different organizations to help public authorities achieve green ICT public procurement practices.

The guidance presented here can also be used by private organizations interested in improving their green ICT procurement practice.

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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.

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Introduction

Communities all over the world are facing the consequences of climate change, depletion of natural resources, loss of biodiversity, environmental degradation and increasing poverty [b-UNDP]. In order to address these issues, all levels of society (public and private) are realizing that change is required to develop a more sustainable society and planet.

Governments can have an impact in addressing these issues through the implementation of sustainable procurement policies and practices that take into account the impact on the environment and society of the products and service they purchase. Sustainable procurement practices consider more than just the cost of acquiring a product. Sustainable procurement practices should be useful and understandable, equitable for all suppliers and viable from both an economic and environmental point of view. The price calculation should include all the costs related to the product throughout its life and eventual disposal, recycling and/or reuse.

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Supplement 20 to ITU-T L-series Recommendations

Green public ICT procurement

1 Scope

This Supplement provides technical guidance to public authorities on how to improve their procurement practices when purchasing ICT goods and services.

To this end, this Supplement collects and presents relevant standards, ecolabels and certifications from different organizations to help public authorities achieve green ICT public procurement practices.

This guidance can be also used by private organizations interested in improving their ICT procurement practice.

2 References

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| [ITU-T L.1005] | Recommendation ITU-T L.1005 (2014), <i>Test suites for assessment of the universal charger solution</i> . |
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- [ITU-T L.1410] Recommendation ITU-T L.1410 (2014), *Methodology for environmental life cycle assessments of information and communication technology goods, networks and services*.
- [ITU-T L.1420] Recommendation ITU-T L.1420 (2012), *Methodology for energy consumption and greenhouse gas emissions impact assessment of information and communication technologies in organizations*.

3 Definitions

3.1 Terms defined elsewhere

This Supplement uses the following terms defined elsewhere:

3.1.1 environmental procurement [b-UN]: Environmental procurement is procuring with the goal of reducing the impact on the environment. Also often referred to as "green procurement". Can be defined as building environmental considerations into the procurement policy and the day-to-day procurement decision-making and operations. Can include both procurement of products and services that reduce the use of all materials, energy, water, noise, protected natural resources such as rain forests, etc.

3.1.2 environmental life cycle assessment [ITU-T L.1410]: An environmental life cycle assessment (LCA) is a systematic analytical method by which the potential environmental effects related to ICT goods, networks, and services can be estimated. LCAs have a cradle-to-grave scope where all the life cycle stages (raw material acquisition, production, use, and end-of-life treatment) are included. Moreover, transport and energy supplies are included at each stage of the life cycle assessment.

3.1.3 green public procurement [b-EUa]: A process whereby public authorities seek to procure goods, services and works with a reduced environmental impact throughout their life cycle when compared to goods, services and works with the same primary function that would otherwise be procured.

3.1.4 life cycle [b-ISO 14040]: Consecutive and interlinked stages of a product system, from raw material acquisition or generation from natural resources to final disposal.

3.1.5 life cycle assessment [b-ISO 14040]: compilation and evaluation of the inputs, outputs and the potential environmental impacts of a product system throughout its life cycle.

3.1.6 procurement [b-UN]: Technically, obtaining goods or services by various means such as loan, transfer and hire, as well as straightforward purchase.

3.1.7 sustainable public procurement [b-UK DEFRA]: A process whereby organizations meet their needs for goods, services, works and utilities in a way that achieves value for money on a whole life basis in terms of generating benefits not only to the organization, but also to society and the economy, whilst minimizing damage to the environment.

3.1.8 supply chain [b-ITUb]: The group of planning, manufacturing and producing operations required to bring a product/service to the market is known as the supply chain, and it covers activities that range from sourcing of raw materials to the delivery of a completed product.

3.2 Terms defined in this Supplement

This Supplement defines the following term:

3.2.1 green ICT: Green ICT is about designing, manufacturing, using, procuring and disposing of ICT equipment and services efficiently with the goal of achieving reductions in energy consumption, resource consumption and end-of-life impact to the environment.

4 Abbreviations and acronyms

This Supplement uses the following abbreviations and acronyms:

AC	Alternating Current
BFR	Brominated Flame Retardants
CA	Competent Authority (of Egypt)
CPU	Central Processing Unit
CRT	Cathode Ray Tube
DC	Direct Current
EPA	Environmental Protection Agency
EPEAT	Electronic Product Environmental Assessment Tool
EPP	Environmental Public Procurement
GDP	Gross Domestic Product
GEC	Green Electronics Council
GHG	Greenhouse Gas
GPP	Green Public Procurement
ICT	Information and Communication Technology
ICT GPP	Green Public ICT Procurement
IT	Information Technology
ITU	International Telecommunication Union
ITU-T	International Telecommunication Union – Standardization
LAN	Local Area Network
LCA	Life Cycle Assessment
LCC	Life Cycle Cost
LCI	Life Cycle Inventory
MFD	Multifunction devices
Mt	Metric Tonnes
OS	Operating System
PC	Personal Computer
PVC	Polyvinylchloride
R&D	Research and Development
SG5	Study Group 5
SPP	Sustainable Public Procurement
UK	United Kingdom
UNEP	United Nations Environmental Programme
UNFCCC	United Nations Framework Convention on Climate Change



5 Conventions

None

6 Buying responsible and sustainable

Information and communication technology (ICT) is at the centre of every modern organization; as such, public authorities need ICTs for the functioning of their daily operations. The widespread use of ICT has contributed significantly to increasing economic productivity and social development. However, it has also had negative impacts on the environment (e.g., increased energy use, overuse of natural resources, and creation of hazardous electronic waste) that should not be neglected.

Governments can have an impact in addressing these issues through the implementation of eco-friendly procurement practices, without undermining cost-efficiency. The good news is that procurement costs can be reduced by purchasing products that are less harmful to the environment.

6.1 Objective

This Supplement aims at providing technical guidance for public authorities to improve their procurement practices to purchase green ICT goods and services.

6.2 Target

This Supplement is aimed at procurement officers, managers and people involved in the procurement process of green ICT goods and services for public authorities.

6.3 Products

This Supplement covers the purchase of information technology (IT) office equipment, including:

- personal computer (PC) products;
- network equipment and servers;
- imaging equipment;
- light current systems.

6.4 Environmental impacts

Environmental impacts of office ICT equipment stem from their manufacturing, use and disposal. They are not radically different from the environmental impacts of many other manufacturing industries, but pose specific problems depending on the product considered and its specific lifecycle.

Given the diversity of the office ICT equipment considered, this Supplement lists the main environmental impacts relevant to all products.

Manufacturing

Manufacturing activities include: acquisition, assembly and transport of raw materials and components.

Supply chain in the ICT industry is extremely complex, as ICT products are generally made of several thousands of components made up of a large variety of materials and substances.

Components including circuit boards, connector cards, graphic cards, memory cards, central processing units (CPUs), cables, hard drives and batteries contain precious metals that are rare, hazardous and dangerous to extract, process and dispose.

The availability of these metals, such as aluminium, cobalt, copper, gold, nickel, palladium, platinum, silver tantalum, tungsten, tin and zinc, is limited on earth and they may be depleted.

The mining of these metals often has detrimental consequences to the environmental health of the extraction area. Large land portions are cleaned up to allow extraction activities, resulting in large-scale deforestation thereby leading to biodiversity reduction. The use of poisonous chemicals can leak into nearby water supplies, contaminate the soil or evaporate in the air with consequences for miners, local residents and wildlife. Dangerous waste and tailings can contaminate the area, when not properly managed and disposed of [b-ICMM].

In general, mining, manufacturing and transporting activities require energy for their operations. This causes pollution and energy consumption.

Energy consumption and carbon emissions

Electricity is the dominant form of energy used throughout the ICT lifecycle.

ICT equipment requires electricity to run, including power used directly as well as indirect power use such as for cooling in data centres or maintenance operations. In 2012, ICT usage consumed 4.7 percent of electricity worldwide, amounting for approximately 920 TWh (1 TWh is a terawatt-hour or 1012 watt-hours) [b-ACM].

Depending on the electricity's power-generation method (e.g., geothermal, wind and hydro power, coal, natural gas, nuclear power), the quantity of carbon emissions generated by an ICT equipment can vary considerably.

Water consumption

Water is used to manufacture ICT products, as well as for data centres' cooling operations. Water is also indirectly used to generate electricity.

Noise pollution

Office ICT equipment can generate noise when functioning. Noise is generated by motors and spinning components, such as hard drive, CPU fan, case cooling fan and power supply fan [b-EU].

Noise pollution is often under-estimated, but has in fact consequences to wildlife and humans such as hearing problems, psychological health issues and distraction.

Hazardous materials

Electrical and electronic equipment contain various heavy metals and other hazardous chemicals which are harmful to health and the environment if not manufactured, used and disposed of carefully. These include [b-Greenpeace]:

- brominated flame retardants (BFR): A group of organobromine compounds which are used to prevent combustion and/or retard the spread of flames in a variety of plastics and other materials. BFRs are also found in printed circuit boards and plastic casings. They are environmentally persistent and highly bioaccumulative; they are also common contaminants in humans.
- lead: Used in electrical solder primarily on printed circuit boards, in cathode ray tubes (CRTs), as stabilisers in polyvinylchloride (PVC) formulations and in batteries. Lead is processed at high temperatures. It tends to accumulate when released into the environment. It is highly toxic to plants, wildlife and humans. Humans can be exposed by inhalation or ingestion.
- cadmium: Used in contacts, switches and batteries. Its disposal by incineration can cause releases into the environment. It is persistent in the environment and highly toxic to plants, wildlife and humans.

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- mercury: Used in lighting device that illuminate earth, switches, older mainframe computer and some batteries. It can be released into the environment during dismantling by incineration or landfilling, thereby polluting air and water. Humans can be exposed by inhalation. It is highly toxic. It can damage the nervous system and increase cardiovascular and heart disease.
- polyvinylchloride: A chlorinated plastic incorporated into some electrical and electronic products, including as insulation on wires and cables. Production of PVC and its disposal by incineration can generate chlorinated dioxins and furans, which are highly resistant to the environment and toxic at very low concentration.

End-of-life disposal, recycling and durability

When equipment no longer satisfies the initial user's needs, it is disposed of.

According to the United Nations University (UNU), the total amount of waste that electrical and electronic equipment generated (or e-waste) in 2014 was 41.8 million metric tonnes (Mt) and is forecasted to increase to 50 Mt of e-waste in 2018. [b-UNU-IAS].

Dumping of obsolete ICT equipment in landfill sites or by incineration require energy and can be dangerous for the environment and human health if not handled with due care. During the disposal phase, some hazardous chemicals and heavy metals can be released into the environment, poisoning air, soil and water sources if not properly handled. Workers can be exposed to toxic substances by inhalation if safety measures are not in place.

Though some components cannot be reused, much of what is used to make ICT equipment can be recycled. Recycling needs particular expertise, including setting up recycling facilities and handling dangerous materials. Electronics recycling can be challenging because discarded electronic products are complex devices made of multiple components, which need to be processed and separated into clean commodity streams in order to make new products. Recycling activities are energy intensive, thereby generating carbon emissions and air pollution.

Packaging

Packaging materials are generated at various stages of the ICT lifecycle to transport, protect and distribute products. Environmental issues related to packaging include resource consumption, primary energy consumption, use of chemicals and waste generation [b-EUb].

6.4.1 Environmental life-cycle assessment

Life cycle cost (LCC) is the name of the technique used to establish the real cost of ownership of a product or service, from purchase, through usage and maintenance costs, to disposal. It is based on the concept of best value for money [b-UNOPS].

This technique is well established as a decision-making tool during procurement. However, this technique does not reflect the financial impacts that are offered by environmental considerations over the product's entire life cycle.

As described above, office IT equipment consume energy and water for their operations and additional resources are used for their disposal. These costs are easily forgotten at the moment of purchase, but will have to be paid sooner or later. Purchasing a product with reduced energy consumption or other environmental impacts will have a smaller economic impact on the total cost of purchase and should be preferred for financial and environmentally sound considerations [b-UNOPS].

The reduction of environmental impacts leads usually to economic savings in a short to medium-term time period [b-UNOPS]. In order to evaluate the potential economic gains related to the environmental sustainable performance of a product or service, an assessment of the environmental impacts of that product or service through all lifecycle stages should be performed.