



ICT使能绿色发展：欧洲电信 标准协会（ETSI）

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适用于： 第十一次GIO圆桌

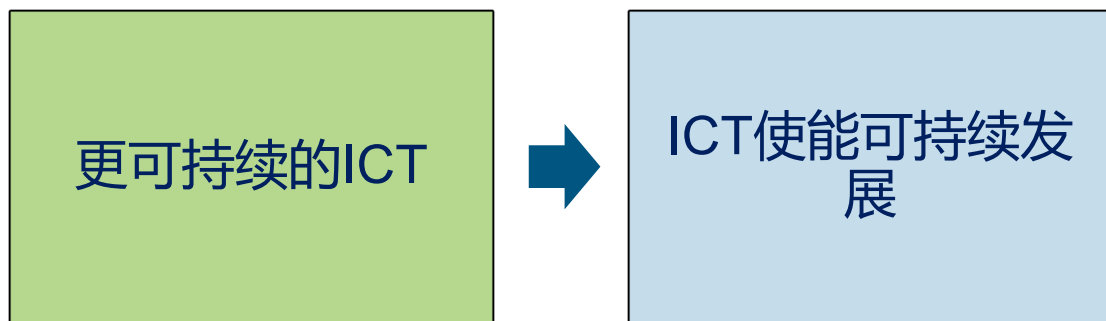
2023年2月28日



可持续发展



ICT使能可持续发展



电信部门的可持续发展是重中之重。

运营商、供应商和决策者宣布了雄心勃勃的能效和排放目标。

可持续的ICT涵盖能效、减排和废弃物/材料管理，这些在ICT产品生命周期的所有阶段（构建/部署/使用/处置）都至关重要。

数字技术的应用可以助力其他部门提升效率。ICT可以提高能效，减少污染，甚至使能新的服务。

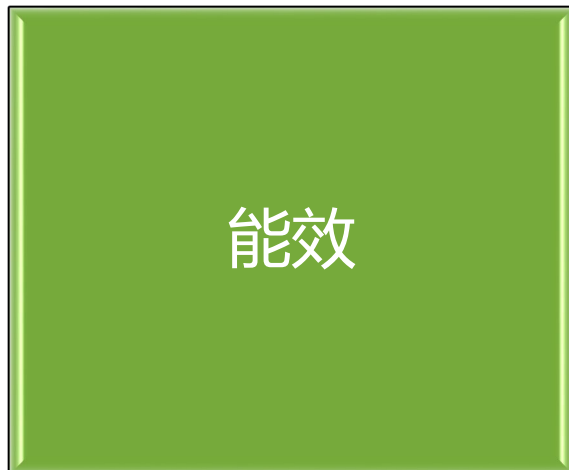
常见应用举例：（1）ICT使能远程办公（2）自动驾驶车辆（3）智慧电网和智慧城市等等

更可持续的ICT

提高能效，减少碳排放和废弃物



ICT可持续性剖析



目标: *优化ICT部门能效, 提升性能/速度/容量/联接。

*优化不等同于减少

范围: 电能以及生产和销毁ICT产品和服务涉及的能源。

技术: 无线网和核心网中的各种节能技术, 节能处理器和数据中心架构, AI能源管理等等。

挑战: 能源成本大幅上升, 迫使运营商急需降低能源需求 (OPEX)。此外, 需保持ICT部门的能耗与减少其他部门/行业的能耗之间微妙的平衡。

ICT可持续性剖析



减少二氧化碳/温室气体排放



目标: 将ICT部门产生的二氧化碳和其他温室气体尽可能减少到零（净零）。

范围: ICT产品/服务生命周期的各个阶段。呼吁减少ICT产品和服务在制造/使用/寿命结束时产生的二氧化碳。

技术: 使用替代/可持续能源（核/水电/风/太阳能），包括所有化石燃料替代技术。

挑战: 转型需要时间和大量投资。然而，由于宣布的目标是到2050年实现二氧化碳零排放，转型需求十分迫切，必须从现在开始。

ICT可持续发展剖析



减少废弃物/污染



目标: 减少ICT部门各个层面、产品/服务生命周期的各个阶段产生的废弃物。

范围: 废弃物存在于ICT生命周期的所有阶段（生产-使用-销毁），包括材料、热量、污染气体，也包括数据、代码、产品和服务。

技术: 软件而非硬件，设备的回收/翻新/再利用、设备生命周期延长、新材料、可生物降解物等。

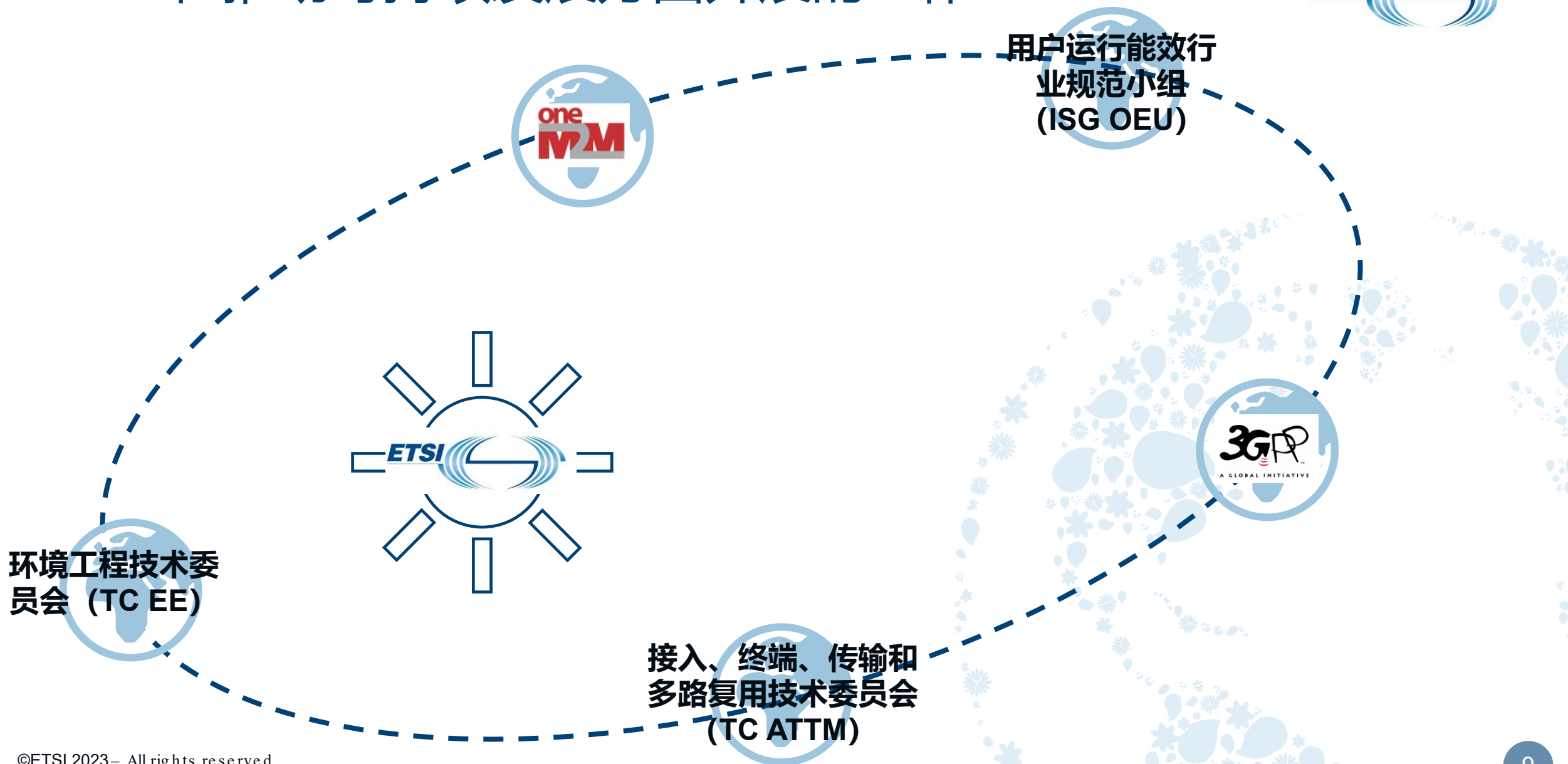
挑战: 需要重新思考如何构建ICT产品和服务，还需要大量投资和建造新设施（回收/废弃物管理）。这将影响所有业务流程，需要彻底改变思维模式。



ETSI推动可持续发展



ETSI在推动可持续发展方面开展的工作



环境工程技术委员会 (TC EE)



负责电信设备安装工程方面的工作

- 气候、热力和其他环境条件
- 设备机架和机柜的物理要求
- 电源和接地
- 循环经济 (包括生命周期分析和物料效率)
- 能效

支持欧盟委员会关于生态设计的政策、法规和立法

与欧洲标准委员会 (CEN)、欧洲电工标准化委员会 (CENELEC)、ITU-T第5研究组合作

2022年重点工作领域:

- ICT设备能效
- 生态设计标准化
- 电源接口要求



接入、终端、传输和多路复用技术委员会 (TC ATTM) ETSI

负责电信设备运行和物理层面的工作

- 高效的ICT服务
- 运营网络和设备的可持续性
- 能源管理效率
- 运营期间ICT废弃物管理

支持城市和社区的可持续和绿色ICT

- 网络和业务互操作性
- 废弃物减少和回收
- 能效KPI和衡量

合作机构包括：

CEN /CENELEC、ITU-T第5研究组和第15研究组、ISO/IEC 第1联合技术委员会/第11工作组、第25工作组和第39工作组



用户运行能效行业规范小组 (ISG OEU)



应对ICT运行对生态的影响，包括：

- 耗电量
- 温室气体排放

汇集欧洲各行业的ICT人才

重点关注：

- 定义用户需求
- 制定参考规范，界定ICT要素的可持续水平

参加CEN-CENELEC-ETSI智慧电网协调小组 (CG SG)



oneM2M可持续发展分委会 (SSC)



oneM2M是ETSI合作伙伴项目，负责制定全球物联网标准。
2021年4月，oneM2M成立了一个专门的可持续发展分委会。
该分委会对所有成员和非成员开放。
该组织发表了两份相关白皮书：

- oneM2M [最新发布的白皮书](#)基于此前发布的[白皮书](#)撰写，探讨了可持续发展和物联网的市场和战略背景。
- 通过这两份白皮书，物联网生态系统中的用户和供应商能够了解具有前景的使用场景以及物联网如何推动可持续发展。
- 这两份白皮书还提供了可持续设计原则和设计实践指导，供组织在进行采购决策时参考。



3GPP 能效与节能



Release 15发布后3GPP有关节能/能效的主题

参见通过5G功能以提高效率

5G自组织网络&大数据

5G MIMO增强

5G定位和定位增强

双连接增强

设备能力交换

5G扩张

5效率



名称	缩略语	版本	工作组	进度
能效即服务标准研究	FS_EnergyServ	Rel-19	S1	40%
智慧能源和基础设施	SEI	Rel-18		100%
5G智慧能源和基础设施研究	FS_5GSEI	Rel-18	S1	100%
智慧能源和基础设施第1阶段	SEI	Rel-18	S1	100%
能源公用事业网络和服务运营研究	FS_NSOEU	Rel-18	S5	55%
Rel-18 降低能耗和复杂度	-	Rel-18		100%
NR网络节能研究	FS_Netw_Energy_NR	Rel-18	R1	100%
NR网络节能	Netw_Energy_NR	Rel-18	R1	0%
核心部分: NR网络节能	Netw_Energy_NR-Core	Rel-18	R1	0%
性能部分: NR网络节能	Netw_Energy_NR-Perf	Rel-18	R4	0%
高能效、广覆盖增强型继电器	REFEC	Rel-17		100%
5G能效	EE_5G	Rel-16	S5	100%
无线接入网 (RAN) 功率、能源和环境 (PEE) 参数的控制和监控	PEE_CMON	Rel-15	S5	100%
3GPP标准能效研究	FS_ENEFF	Rel-15	SP	100%
有关OAM如何支撑移动接入网能效评估的研究	FS_OAM_EE	Rel-15	S5	100%
5G网络能效研究: 系统层级和功能层级	FS_EE_5G	Rel-15	S5	100%

ETSI推动可持续发展：更多内容



可持续发展：ETSI工作计划、ETSI Enjoy!杂志



Future Focused

Work Programme 2022-2023

ETSI
The Standards People

The transformative benefits that ICT can bring must be carefully balanced with their potential long-term impact on our planet. At ETSI, we are working to make ICT more efficient. We are also considering the impact on climate change of the ICT industry.

Enabling ICT production and deployment and Energy Efficiency

Our Environmental Engineering committee (EE) manages various engineering telecommunication equipment in different installation. These include climatic, thermal, environmental conditions, physical requirements, equipment racks and cabinets; power supply; grounding; Circular Economy (including analysis) and energy performance measurement methods for different parts of networks including data centres. The committee also embraces innovative energy storage for ICT equipment – for example to provide sustainable smart cities.

Much of our work supports European (EC) policies, regulation and legislation on aspects, where we liaise with CEN/CENELEC relevant standards. In relation to ETSI, TC EE also cooperates with CEN/CENELEC creating standards supporting M/573 requirements for servers and storage equipment.

This work is conducted in our Working environmental conditions (EE 01); power bonding and related topics (EE 02); environmental (EE EPPS); and environmental matters affecting mobile ICT devices (EE M-ICT).

ETSI工作计划：2022-2023年

<https://www.etsi.org/e-brochure/Work-Programme/2022-2023/mobile/index.html#p=31>

Enjoy!
THE ETSI MAG

Sustainability & ICT, ARE WE READY?

IN THE SPOTLIGHT
Sustainable & Efficient Smart Communities. p.13-14-15

TECH HIGHLIGHTS
The needs of Smart Cities. p.10-11

THE INTERVIEW
Claire Chauvin, Standardization Director, Orange. p.4-5

In the Spotlight
Sustainable Smart Communities

One way we can reduce our operational costs – is by improving. The ATTM committee is developing of sustainable smart cities and management, of their sites and

The issue of carbon footprint

Today we are confronted with worldwide environmental issues, mainly originating from global warming, but also by the depletion of non-renewable natural resources and the societal and environmental damage that their extraction causes.

We need to refocus the debate on the real causes of our ecological problems.

It is necessary to refocus the debate on the real causes of these ecological problems: our carbon emissions and exponentially increasing consumption of products and materials for ever shorter periods with little or no concern for recycling and reuse.

These causes have little to do with the consumption of electricity. In fact, CO₂ emissions linked to energy consumption depend largely on the energy mix of its production (gas, nuclear, oil, or green - wind, solar, hydroelectric, etc.). Where there is a low-carbon electricity mix, as in France (89 g eq. CO₂/kWh, according to the International Energy Agency), electricity savings have little impact on CO₂ emissions and therefore on global warming.

ETSI Enjoy!杂志：2021年1月，特别版

https://www.etsi.org/images/files/Magazine/ETSI_Enjoy_MAG_2021_N01_January.pdf

SUSTAINABILITY & ICT, ARE WE READY?

17.4% / 9.3 Mt TODAY'S RECYCLING RATE

4 Mt Raw Materials Recovered

35 Mt Virgin raw Materials

By prescribing interoperable solutions, based on public standards, we can make great strides towards sustainability.

By exploiting what already exists, by pooling the use of products for several functions, by prescribing interoperable, modular and modelled solutions, based exclusively on public standards and on common languages and APIs (Application Program Interface), we can make great strides towards sustainability.

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■ Dominique Roche, ETSI Chair TC-ATTM, Gilles Genin, ETSI DEU ISG, CEO InCoTel-bst.

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Think virtual and pool the uses of products when defining the networks and computing power required for the services.

Converge all communications systems into a common network infrastructure.

Favour multi-purpose products, the same unit can contain an occupancy sensor, air quality meter, thermometer, humidity sensor, a Lux meter, etc.

LED street lighting can also be a communications medium.

Prefer edge computing to cloud computing when data from digital systems is processed and used locally.

In order to provide relevant and pragmatic answers to the ecological problems posed by digital technology, the ETSI OEU ISG is working on a position paper that aims to lay down principles and guidelines for sustainable and ecologically responsible digital technology, in technical, economic, organizational and regulatory fields.

By exploiting what already exists, by pooling the use of products for several functions, by prescribing interoperable, modular and modelled solutions, based exclusively on public standards and on common languages and APIs (Application Program Interface), we can make great strides towards sustainability.

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能效：ETSI网站



← Back

Energy efficiency and environmental aspects

Introduction | Our Role & Activities | Standards

INTRODUCTION

Technology has the potential to improve the way we live and work, but it can also carry risks to the environment. The ICT industry and its customers have a responsibility to minimize the adverse impact of ICT.

One way we can reduce the impact on climate change – and at the same time reduce operational costs – is by improving the energy efficiency of ICT products and services. Standards can help achieve this goal. ETSI works on these matters also answering to EC standardization requests continuing to develop the standards needed to support the EC's energy efficiency targets.

OUR ROLE & ACTIVITIES

Our current work on the [environmental aspects of ICT equipment](#) includes energy efficiency.

Environmental Engineering committee (TC EE)

TC EE develops standards for reducing the eco-environmental impact of Information and Communications Technologies (ICT) equipment. This includes:

- the Life Cycle Assessment (LCA) of ICT goods, networks and services
- methods to assess the energy efficiency of wireless access networks and equipment, core networks and wireline access equipment including Efficiency metrics/KPI definition for equipment and network
- network standby mode for household and office equipment
- Circular economy standard for ICT solutions
- Power feeding solutions based on higher DC voltage to reduce losses on the distribution cabling and innovative efficient storage solution

ETSI technical committee Environmental Engineering (EE) is responsible for defining the environmental and infrastructural aspects for all telecommunication equipment and its environment, including equipment installed in subscriber premises. Where ever possible this will be achieved by referencing existing international standards.

Environmental aspects considered include:

- climatic and biological conditions
- chemically and mechanically active substances
- mechanical conditions during storage, transportation and operation
- power supply issues including power distribution, earthing and bonding techniques
- thermal management for equipment and facilities
- noise emission of equipment.
- mechanical structure and physical design

Related Committees

- [ATM](#)
- [EE](#)
- [OEU](#)

Related Events

- [Les technologies numériques pour une ville intelligente et durable](#)
- [ETSI Research Conference: Maximizing the Impact of European 6G Research through Standardization](#)

环境工程技术委员会 (TC EE)

TC EE负责制定相关标准，以减少ICT设备对生态环境的影响，包括：

- ICT产品、网络和服务的生命周期评估 (LCA)
- 无线接入网和设备、核心网和有线接入设备的能效评估方法，包括设备和网络的效率指标/KPI定义
- 家用设备和办公设备的网络待机模式
- ICT解决方案循环经济标准
- 基于较高直流电压的供电方案（降低配电线路损耗），创新高效的储存方案

TC EE负责针对所有电信设备及其环境提供有关环境和基础设施的定义，包括安装在用户场所的设备，并尽可能参照现有国际标准。

考虑的环境因素包括：

- 气候条件和生物条件
- 化学活性物质和机械活性物质
- 贮存、运输和运行期间的机械条件
- 电源问题，包括配电、接地和连接技术
- 设备和设施的热管理
- 设备的噪声排放
- 机械结构和物理设计

TC EE正和ITU-T SG5共同制定统一的技术标准，覆盖能效、供电方案、循环经济和网络效率KPI以及ICT生态设计要求，旨在推动国际生态环境标准化。

接入、终端、传输和多路复用技术委员会 (TC ATM)

TC ATM聚焦运营网络和站点以及宽带传输的“绿色”需求，包括：

- 制定全球KPI，为ICT用户提供生态效率和能源管理监测工具
- 定义连接城市多项数字化服务的网络，制定宽带解决方案可持续性监控KPI
- 完善传输设备标准，从而支撑欧盟委员会能源相关产品生态设计指令的推行
- 支撑高效的ICT废弃物管理（维护期和寿命终止）

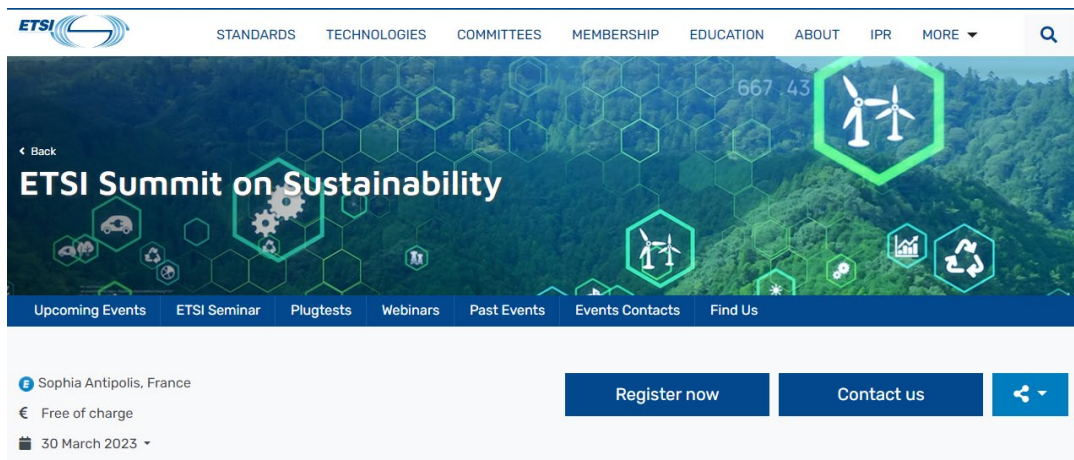
TC ATM目前关注的一项重点是能效，并正制定总体工作方案，以解决所有电信设备和系统的能耗问题。此外，TC ATM也在和CENELEC合作，共同推动欧洲的宽带部署。能源成本持续上升，而宽带的普及正推动网络架构引入新的设备。因此，能耗是影响宽带广泛部署的主要因素。

用户运行能效行业规范小组 (ISG OEU)

ISG OEU致力于最大限度降低ICT站点和网络的基础设施、公用事业、设备和软件的功耗及温室气体排放，涉及：

- 测量IT服务器、存储单元、宽带固定接入和移动接入的能耗，并在此基础上制定全球KPI
- ICT设备寿命终止管理
- 绿色智慧城市全球KPI建模定义

ETSI可持续发展峰会：2023年3月30日



活动信息：[ETSI - ETSI可持续发展峰会](#)

活动为期一天，将探讨：

ICT对于可持续发展有何作用？深入了解ICT如何助力本行业及其他行业节约能源、减少浪费。

主要有哪些使能技术？深入探讨支撑ETSI技术小组、3GPP和oneM2M绿色倡议的一些关键技术和标准化活动。

为进一步解决标准化的可持续性问题的，还需要弥合哪些差距，采取哪些行动？帮助ETSI及其合作伙伴识别新的发展领域和机会，并参与相关辩论。

此次**ETSI可持续发展峰会**的主题为“ICT的发展和标准将如何使能可持续发展并为社会带来积极影响”。峰会将于**2023年3月30日**举行，重点探讨ICT行业及相关标准化活动对于支撑绿色倡议发挥的关键作用。

概览

未来，电信行业机遇和挑战并存，能效等可持续发展话题已成为该行业的重点话题。

2023年ETSI峰会将重点探讨ICT在支撑绿色倡议方面发挥的关键作用，并将特别关注当下及未来的相关技术标准化工作。

诚邀您参与ETSI此次有关ICT行业及其他相关行业的独家峰会，共同探讨通信领域及其他可通过数字化实现减碳增效的领域的可持续发展，包括可持续发展的现状和未来的方向。

演讲、辩论和公开讨论将探讨当下推动能效提升、二氧化碳减排、循环经济发展、生态设计的技术，同时展望未来的需求。



总结



可持续发展是所有人面临的一个亟需解决的基本问题

ICT是可以直接、间接推动可持续发展的关键因素

标准是实现全球ICT市场充分竞争的必要条件

ETSI是ICT标准化的主要参与者

ETSI非常重视可持续发展，并从不同角度推动可持续发展

谢谢

您可以通过如下方式与我联系：

luis.romero@etsi.org

