

Digitalization in Off-Grid Systems

《离网系统中的数字化进程》

IEA PVPS has published a new report titled “Digitalization in Off-Grid Systems” providing a comprehensive analysis of how digital technologies can enhance the planning, performance, and sustainability of off-grid photovoltaic systems.

国际能源署 IEA PVPS Task18 发布最新报告《离网系统中的数字化进程》，全面分析了数字技术如何提升离网光伏系统的规划能力、运行效能与可持续性。

With growing global attention on providing clean, affordable energy access to remote and underserved communities, this report from IEA PVPS Task 18 examines how digital tools can be strategically deployed throughout the entire off-grid project value chain – from development and implementation to operation and capacity building.

随着全球日益关注如何为偏远及欠发达地区提供清洁经济的能源解决方案，该报告系统探讨了如何在整个离网项目价值链中——从开发部署到运营维护及能力建设——实现数字化工具的战略应用。

Key Takeaways

Digital technologies are essential to improving the planning, performance, and sustainability of off-grid PV systems. Tools such as GIS-based site assessment, IoT-enabled monitoring, and remote troubleshooting are already improving system design and long-term viability.

数字技术对于提升离网光伏系统的规划能力、运行效能及可持续性具有关键作用。基于地理信息系统（GIS）的场址评估、物联网（IoT）监控和远程故障排除等工具，正持续优化系统设计并增强长期运行稳定性。

A structured approach aligns digital tools with each phase of the off-grid project value chain, enhancing their effectiveness. The report outlines a four-phase framework — Development, Implementation, Operation & Maintenance, and Capacity Development – providing clear guidance on where and how digital tools can be applied.

该报告提出结构化实施路径，将数字化工具精准嵌入离网项目价值链各环节：开发、实施、

运维及能力建设四大阶段构成系统框架，明确规划了数字化工具的应用场景与实施方法。

Collaboration, open data platforms, and digital literacy are critical to scaling impact and ensuring long-term success. The report stresses the importance of knowledge sharing, open-source innovation, and human capacity building to fully harness digital potential.

协作机制、开放数据平台与数字素养是扩大影响规模、保障长期成效的核心要素。报告强调知识共享、开源创新及人力资本建设对释放数字化潜能的重要性。

The report also underlines the importance of local context, infrastructure, and skills development to ensure that digitalization delivers tangible benefits. As digital technologies continue to evolve, their integration into off-grid systems offers a critical opportunity to advance global energy access goals.

报告同时指出，必须充分考虑本土化场景、基础设施条件和技能发展需求，方能确保数字化转型产生切实效益。随着数字技术持续演进，其与离网系统的深度整合将为推进全球能源可及目标创造关键机遇。

关于 IEA

国际能源署（IEA）成立于 1974 年，是经济合作与发展组织（OECD）框架内的一个自治机构。技术合作计划（TCP）的创立是基于一种信念，即能源安全和可持续性的未来始于全球合作。该项目由政府、学术界和工业界的专家组成，致力于推进共同研究和特定能源技术的应用。

关于 IEA PVPS Task18

Task 18 专注于包括光伏在内的离网和边缘电力系统，优先解决各国和各市场共同面临的技术挑战和障碍，旨在免费传播解决方案、工具和指南，以改进离网和边缘电网系统的规划、融资、设计和运行。重点领域包括可靠性、安全性等，以确保可持续和不间断的能源供应。