intertrust®

EBOOK

Telcos turn to VPPs to unlock revenue

How virtual power plants are changing the energy management game

Building trust for a connected world.

Contents

Increasing energy demands for telcos 3

Optimizing energy economics with VPP 4

Generating new revenue with VPPs 7

Advanced energy flexibility for telcos with Intertrust Energy 9

Conclusion 10

Increasing energy demands for telcos

Telcos face escalating energy challenges as global energy consumption and cost continues to rise, driven by demand for connectivity and net-zero emissions.

The industry relies heavily on a consistent and reliable energy supply to power its vast infrastructure, including data centers, base stations, and network equipment. According to GSMA, telcos are amongst the most energy-intensive industries globally, consuming an estimated 2% to 3% of global energy.[1]

Research indicates that energy cost represents a substantial portion of telecos's operating expenditures (OPEX), ranging from 15% to 40% on average.[2] Large operators have seen their increasing energy cost outpace sales growth by more than 50 percent.[3] This upward trend is expected to continue, driven by rising global electricity prices, the extensive rollout of 5G networks, and increasing traffic and higher data volumes across their footprint.

In response, telcos must prioritize their strategy towards energy efficiency. Incorporating renewable energy sources is essential not only for cost management but also for achieving long-term sustainability and reduced carbon goals. Effective energy management is critical for the financial stability, profitability, and operational efficiency of the telecom industry.

Energy consumption and cost challenges in the telecommunications sector

3%
Share of global energy consumed by telcos

35%
Average portion of telco OPEX spent on energy

50%
Growth of energy costs relative to sales

3x
Energy required by 5G to match 4G coverage[6]

Optimizing energy economics with VPPs

Virtual power plants (VPPs) are revolutionizing energy flexibility management for telcos, providing a cutting-edge solution to optimize energy use and reduce costs.

A VPP is a network of distributed energy resources (DERs) such as solar panels, EV chargers, batteries, and smart devices that are aggregated and controlled through a centralized software platform.

This integration allows for flexible energy usage and cost optimization against the peak load demands of the grid. Here are few ways VPPs are transforming telco's energy management:

1

Energy cost management with existing assets

Telcos can leverage existing on-site assets, such as backup generators and energy storage systems, to manage energy consumption more efficiently. By strategically using these assets to lower dependence on grid power during high-cost periods, telcos can significantly reduce operational expenses.

For example, during peak electricity pricing times, a VPP platform can switch to on-site generation or stored energy, minimizing costly grid power usage. A VPP not only cuts energy costs but also decreases carbon emissions by better enabling the use of cleaner energy sources.

2

Renewable energy integration

Telcos can deploy renewable energy sources and storage solutions on-site, incorporating them into the VPP to generate local, clean energy.

The VPP solution prioritizes the use of these renewable resources and supplements with grid power as needed to meet demand. This reduces the carbon footprint, lowers electricity bills, and opens potential revenue opportunities from selling excess green energy.

3

Demand response

Telcos aggregate their energy assets and engage in demand response programs facilitated by the VPP program offered by the energy retailer and utility provider.

By utilizing artificial intelligence (AI) and advanced forecasting algorithms, VPPs dynamically adjust their energy consumption in response to signals from grid operators and/or energy markets. For instance, VPPs can automatically:

- **Curtail or shift non-essential energy loads:** Temporarily reduce or delay energy use of cooling systems or non-critical equipment within telco facilities.
- **Power down base stations:** Use data analytics to predict traffic patterns and safely reduce power in low-traffic areas during off-peak hours without compromising performance.
- **Optimize energy storage usage:** Efficiently manage the charging and discharging cycles of on-site battery storage systems to balance energy supply and demand, ensuring availability during peak periods and maximizing cost savings. This strategy enables Telcos to optimize resource use, reduce energy costs, and alleviate grid strain during peak times.

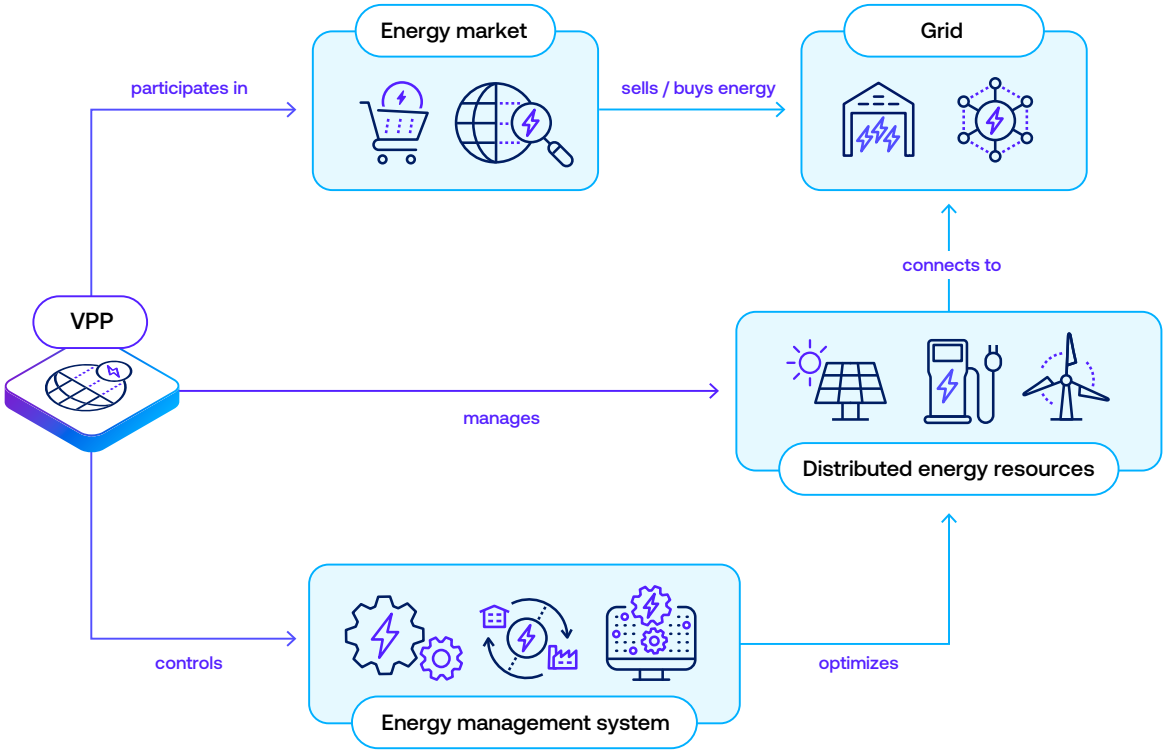
4

Participation in electricity markets

Additionally, telcos can trade energy and earn incentives for load reduction by participating in wholesale electricity markets, and providing ancillary grid services (frequency regulation, voltage control, reserve capacity) that are compensated by grid operators.

These activities not only contribute to grid stability but also generate new revenue streams, offsetting energy costs and enhancing the economic value of telecom energy management.

VPPs dynamically adjust energy use based on grid and energy market signals



A virtual power plant coordinates energy resources, responds to price signals, and optimizes energy with with grid demand.

Generating new revenue with VPPs

According to McKinsey, adopting VPPs and advanced energy management strategies can reduce energy costs by 15-30%, with minimal upfront investment.

Virtual power plants offer network operators significant financial benefits by unlocking new revenue streams. Besides optimizing energy usage, telcos can provide flexible grid services and sell surplus energy back to the grid, transforming their energy infrastructure into a profitable asset.

These strategies include both operational and organizational improvements, such as state-of-the-art energy management and sourcing methods, which collectively enhance the financial impact of VPPs. A robust trading platform and implementing necessary technological upgrades are essential steps to fully leverage these benefits, establishing VPPs as a highly effective and innovative solution for network operators.

30%

Potential reduction in energy costs through advanced energy management and sourcing

10%

Reduction in energy costs with VPP energy management

30–50%

Potential offset of electricity costs by combining energy optimization with grid services

VPP cost and energy savings add up to significant ROI

Reducing electricity cost

VPPs are an innovative approach to optimize energy consumption, reducing total OPEX. GSMA research shows that deploying a VPP at 75% of a telecom operator's sites can reduce network electricity costs by 5-10%.

Given that the energy costs for operating the world's mobile networks are projected to exceed $25 billion annually, the potential financial savings are substantial.[5]

Projected financial impact

Even with substantial OPEX savings, the lion's share of financial gain comes from revenue generation, which can account for up to 80% of the total financial uplift.

Combining revenue from grid services with cost savings, the overall offset on electricity costs can range from 50% to 80%.[5] These figures vary depending on local conditions such as climate and electricity market dynamics, underscoring the substantial revenue potential of VPPs.

Scalability across network assets

These projections primarily consider energy drawn from batteries at base-station locations, excluding other network assets like data centers or potential electric vehicle charging networks. As telcos expand VPP implementations to additional assets, the financial benefits will likely increase further.

In the long run, telcos can also look to provide their B2B and B2C customer base with new energy-related services. Leveraging VPPs enables telcos to significantly enhance their revenue while achieving cost savings, thereby reinforcing their competitive edge in a dynamic energy market.

Advanced energy flexibility for telcos with Intertrust Energy

Intertrust Energy provides cutting-edge energy flexibility solutions like VPPs, offering telcos the tools and technologies required to optimize their energy usage effectively.

Telcos are empowered to aggregate and manage their DERs efficiently, participate in demand response programs, and integrate renewable energy seamlessly into their operations. Energy reduction, grid stability, and additional revenue through energy trading and grid services are all easily possible through Intertrust's energy flexibility platform.

These strategies include both operational and organizational improvements, such as state-of-the-art energy management and sourcing methods, which collectively enhance the financial impact of VPPs. A robust trading platform and implementing necessary technological upgrades are essential steps to fully leverage these benefits, establishing VPPs as a highly effective and innovative solution for network operators.

Significant cost reduction

By implementing advanced energy management and demand response strategies, telcos can achieve cost reductions of up to 30%. Reduce consumption and dependence on costly grid power during peak periods for substantial savings.

Enhanced decarbonization

Intertrust energy supports telcos in improving their decarbonization efforts by facilitating the use of cleaner, renewable energy sources. Shrink carbon footprints and align with global sustainability goals, for greener operations.

New revenue streams

Participate in wholesale energy markets and provide ancillary services, such as frequency regulation and voltage control. Generate significant new revenue streams, reducing costs up to 50-80%.

Comprehensive energy management

Gain real-time monitoring, forecasting, and automated dispatch of energy assets. Experience grid-constraint management and dynamic capacity connections, which collectively enhance operational efficiency.

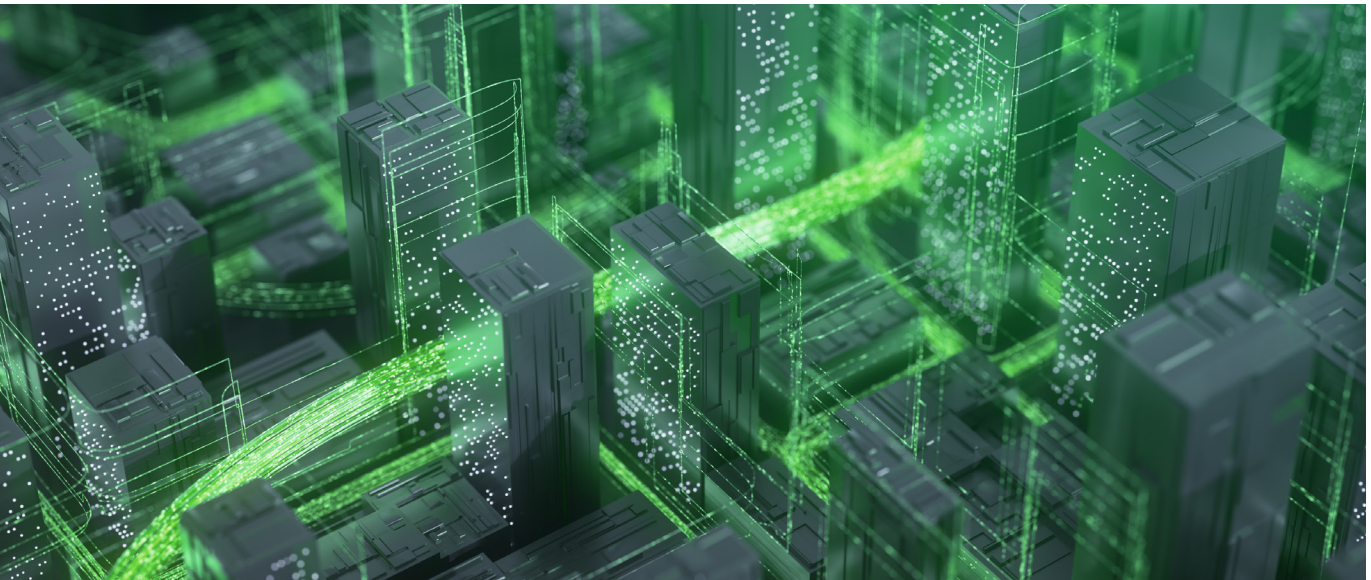
Conclusion

In an era of rising energy costs and increasing demands for connectivity, telcos are confronted with the dual challenge of managing their substantial energy consumption while striving for sustainability.

VPPs emerge as a transformative solution, offering telecom operators the ability to turn energy management from a cost center into a profit center.

Through sophisticated demand response, integration of renewable energy, and leveraging new revenue opportunities, VPPs provide a pathway for telcos to enhance energy efficiency, reduce operational costs, and create new financial streams.

As the energy and telecommunications sectors continue to converge, organizations that successfully implement VPP strategies will position themselves as leaders in energy digitalization, likely gaining a significant competitive advantage, while realizing substantial financial returns.



Sources

1 https://data.gsmaintelligence.com/api-web/v2/research-file-download?id=74384072&file=280223-Going-Green-Second-Edition.pdf

2 https://www.gsmaintelligence.com/product-news/going-green-energy-efficiency-in-telecoms/

3 https://www.mckinsey.com/industries/technology-media-and-telecommunications/our-insights/the-growing-imperative-of-energy-optimization-for-telco-networks

4 https://www.alixpartners.com/insights/102i641/telcos-powering-through-the-rising-energy-cost-challenge/#&utm_source=mondaq&utm_medium=syndication&utm_content=articleoriginal&utm_campaign=article

5 https://data.gsmaintelligence.com/research/research/research-2024/telcos-and-virtual-power-plants-green-energy-green-profit

6 https://www.abiresearch.com/press/hardware-optimization-promises-up-to-a-70-improvement-in-5g-power-consumption/

Learn more: intertrust.com
Contact us: energy@intertrust.com

intertrust®

Building trust for a connected world.