

A nighttime photograph of a city skyline, likely San Francisco, with numerous skyscrapers illuminated. A large, white, diagonal graphic element, resembling a stylized 'N' or a series of connected triangles, is overlaid on the left side of the image, extending from the top left towards the center.

Case study

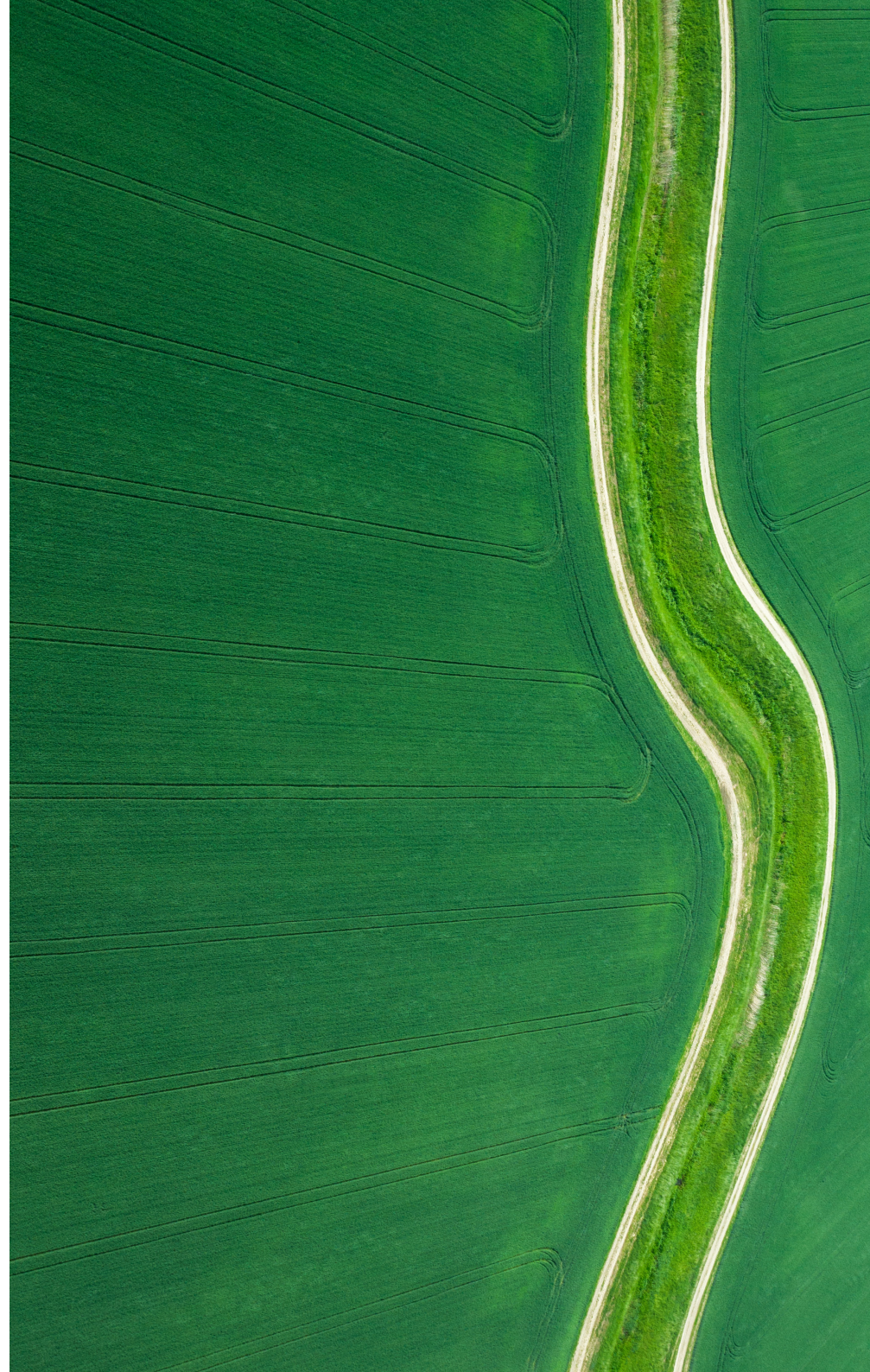
China Mobile Communication Corporation, Yunnan provinces

How China Mobile is using Nokia AI for energy-efficient 5G

Nokia AVA for Energy Efficiency

NOKIA

China Mobile is in the midst of an ambitious 5G rollout, expanding its mobile network and growing its customer base — and driving up energy consumption as a result. The company needed an intelligent, automated way to manage energy use across its vast network. With Nokia AVA for Energy Efficiency, they now have fine-grained, automated control over power consumption of both active and passive equipment for optimized usage, lower costs and improved environmental sustainability of their operations.



Business benefits



Immediate 7% reduction in energy use with 20% expected over the longer term



Cost and consumption savings from automated power-downs of active and passive elements



74% reduction in energy use for air conditioning



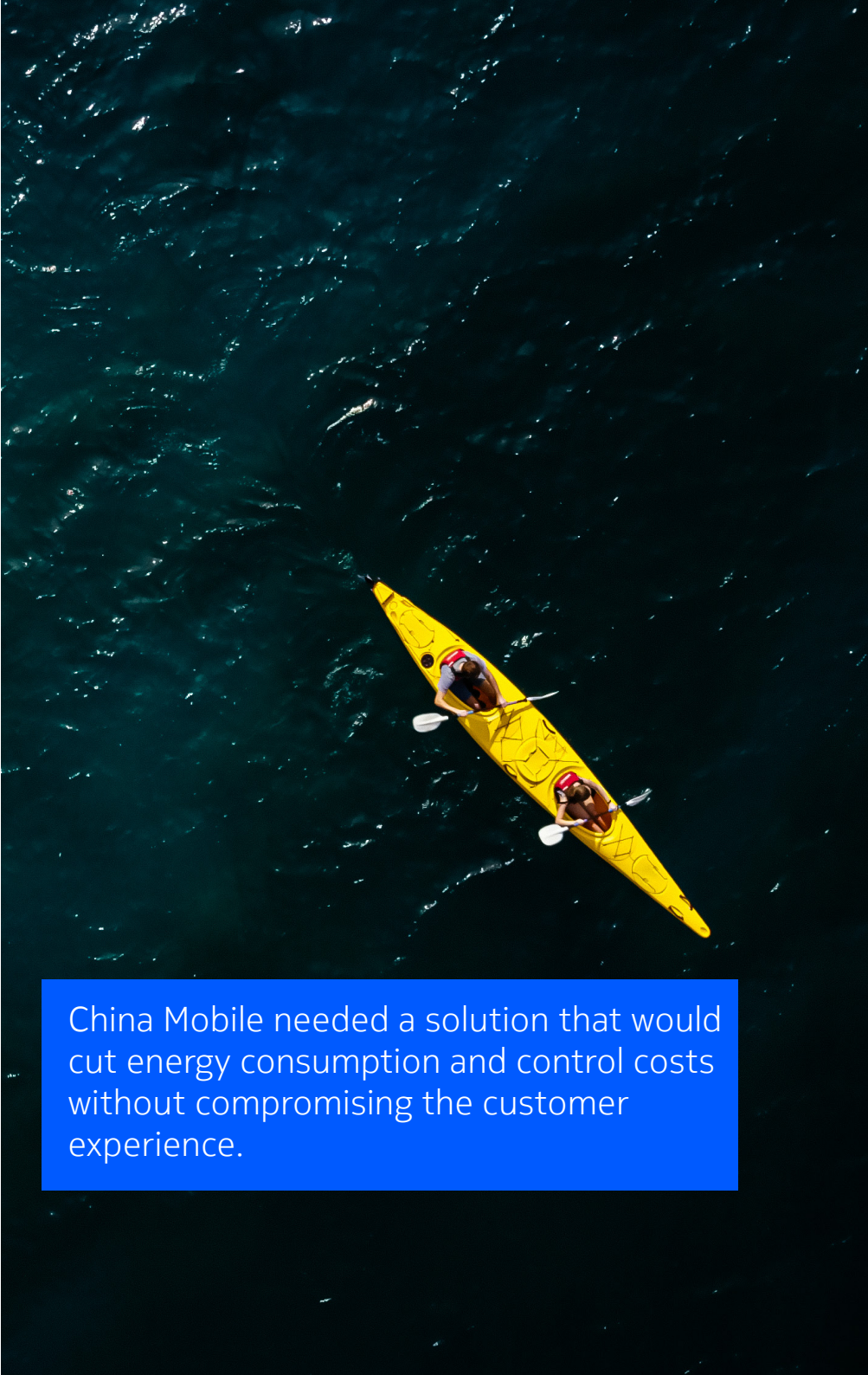
Challenge

China Mobile is mainland China's leading telecommunications service provider, with the world's largest network and biggest communications service provider (CSP) customer base.

As part of its large-scale 5G strategy, the company is building out new sites, integrating new technologies such as massive MIMO and adding new layers to the network. The enormous scale-up and growth in network activity drove an 8% jump in China Mobile's energy consumption in 2020.

The company realized it needed a comprehensive energy efficiency plan to reduce emissions and lower costs — but was adamant those mitigations could not affect the customer experience or compromise network performance.

To address its complex network and site scenario, the only feasible option was AI-based cognitive energy management that could deliver results in a multi-vendor network environment. That pointed China Mobile toward Nokia and its AVA for Energy Efficiency solution to meet their targets and help build their network sustainably.

An aerial photograph showing two people in a bright yellow kayak on a dark, choppy body of water. The kayak is oriented diagonally from the bottom right towards the top left. The water is a deep teal color with white foam from the kayak's wake. The people are wearing life jackets and paddling. The overall scene conveys a sense of navigating through a challenging environment.

China Mobile needed a solution that would cut energy consumption and control costs without compromising the customer experience.

Solution

Radio access alone consumes ca. 80% of network energy. Yet only 15% of that the power is used for 'forwarding' bits, which means that 85% of the energy "pumped" into the network "disappears" and is not used productively for serving users, primarily for two reasons:

1. Energy waste happens because of idle and underused - yet power consuming - resources.
2. At radio sites about 50% of the energy is used up by auxiliary components such as fans, cooling systems, lighting, uninterruptible and other power supplies. These power-hungry passive components aren't touched by existing energy management solutions.

While most energy efficiency solutions manage only active elements, Nokia's AVA technology also controls passive elements, allowing them to be powered down remotely and automatically when not needed. This provides fully transparent, fully controllable dynamic energy management, maintaining optimal network performance and customer experience.



Solution

China Mobile is using Nokia AVA Energy Efficiency solution for:

- Predictive and dynamic management of passive and active components rather than applying fixed schedules for powering on and off — to gain much finer-grained control over energy consumption and not affect network performance or the quality of customer services
- AI-powered cooling — intelligent air conditioning and intelligent fresh air ventilation — to directly address the fact that air conditioning consumes nearly 50% of site energy
- Predictive closed loop actions for faster, automated responses to changing conditions — maintaining quality and energy optimization — instead of relying on manual interventions that cause delayed responses
- Automated remote antenna control to adjust coverage dynamically in accordance with shifting capacity requirements

Mobile networks consume 2% of the world's electricity, with RANs alone consuming 80% of mobile network energy.



Results

With Nokia AVA Energy Efficiency deployed within weeks, China Mobile was able to quickly and easily meet its energy management goals. The effort to reduce energy use isn't just about cutting costs: China Mobile recognizes the importance of industry-wide sustainability and corporate responsibility. Many CSPs have set the goal of carbon neutrality by 2050.

Using Nokia AVA, China mobile was able to:

- Reduce short-term energy use by 7%
- Set the stage for an expected future reduction of 20%
- Reduce air conditioning energy use by 74%
- Permanently balance energy savings and performance requirements, allowing KPIs to be pre-set, with savings calculated by the AI
- Maintain network performance

Critically, China Mobile was able to maintain its massive rollout of 5G while controlling costs and reducing energy in the short term, while setting the network up to meet its long term sustainability goals.



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Through networks that sense, think and act, we work with our customers and partners to create the digital services and applications of the future.

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