

# **ACEMicrogrid®** Micro-Grid Program



# OUTLINE

An introduction of traditional Electric Power System and Micro-grid

The Advantages of Micro-grid

The Government's policy and attitude towards the Micro-grid

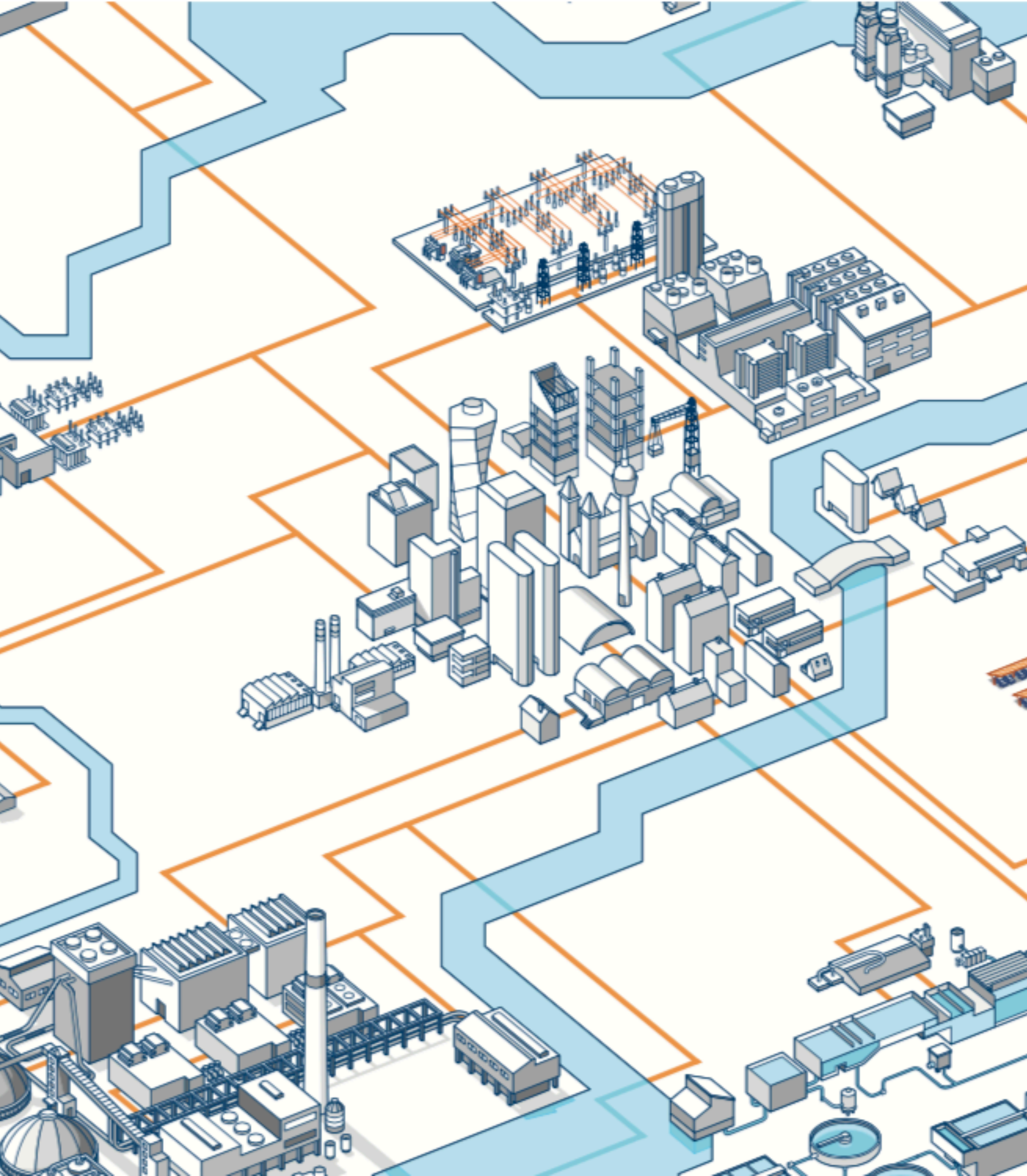
The prospects of Micro-grid

The business scopes of Micro-grid

An introduction of ACE company







# The Components

The components of electricity include power generation companies, electric grid, aggregator and users. Power generator sell electricity to aggregator, and aggregator will then supply electricity to customers in the form of retail sales.

Among them, power companies(aggregator) purchase power resources from power generation companies at lower prices, selling them to users at higher prices, and earn most of their profits.

However, the traditional Electric Power System model is prone to produce a series of power incidents including power outages, insufficient power supply, and spot markets(extremely high electric retail price).



# What is Micro-grid

A Micro-grid is a local energy grid with control capability, which means it can disconnect from the traditional grid and operate autonomously. The grid connects homes, businesses and other buildings to central power sources, which allow users to use electronics.

A Micro-grid generally operates while connected to the grid, but importantly, it can break off and operate on its own using local energy generation in times of crisis like storms or power outages, or for other reasons.

A Micro-grid can be powered by distributed generators, batteries, and/or renewable resources like solar panels. Depending on how it's fuelled and how its requirements are managed, a micro-grid might run indefinitely.

A Micro-grid connects to the grid at a point of common coupling that maintains voltage at the same level as the main grid unless there is some sort of problem on the grid or other reason to disconnect. A switch can separate the Micro-grid from the main grid automatically or manually, and it then functions as an island.

In general, Micro-grids have made it possible for power generator to provide power to users directly. The Micro-grid has greatly weakened the role of electric grids and intermediaries, thereby providing investors with more lucrative returns.



Generator



ELECTRONS

ELECTRONS

Energy User



*We might think of the network company as the original "Aggregator"*  
*... then ask – **what alternative methods** of aggregating & then providing dispersed delivery of centralized electricity production?*



# The Advantages

---

Ability: during a utility grid disturbance, to separate and isolate itself from the utility seamlessly with little or no disruption to the loads within the Micro-grid

Minimisation of overall costs by eliminating intermediate links

Improvement of energy system reliability





# The Advantages

---

Stability of grid system is achieved to great extent

The power quality at consumer premises can be improved

Significant environmental benefits made possible by the use of low or zero emission generators (solar farm)

Isolated from any grid disturbance or outage



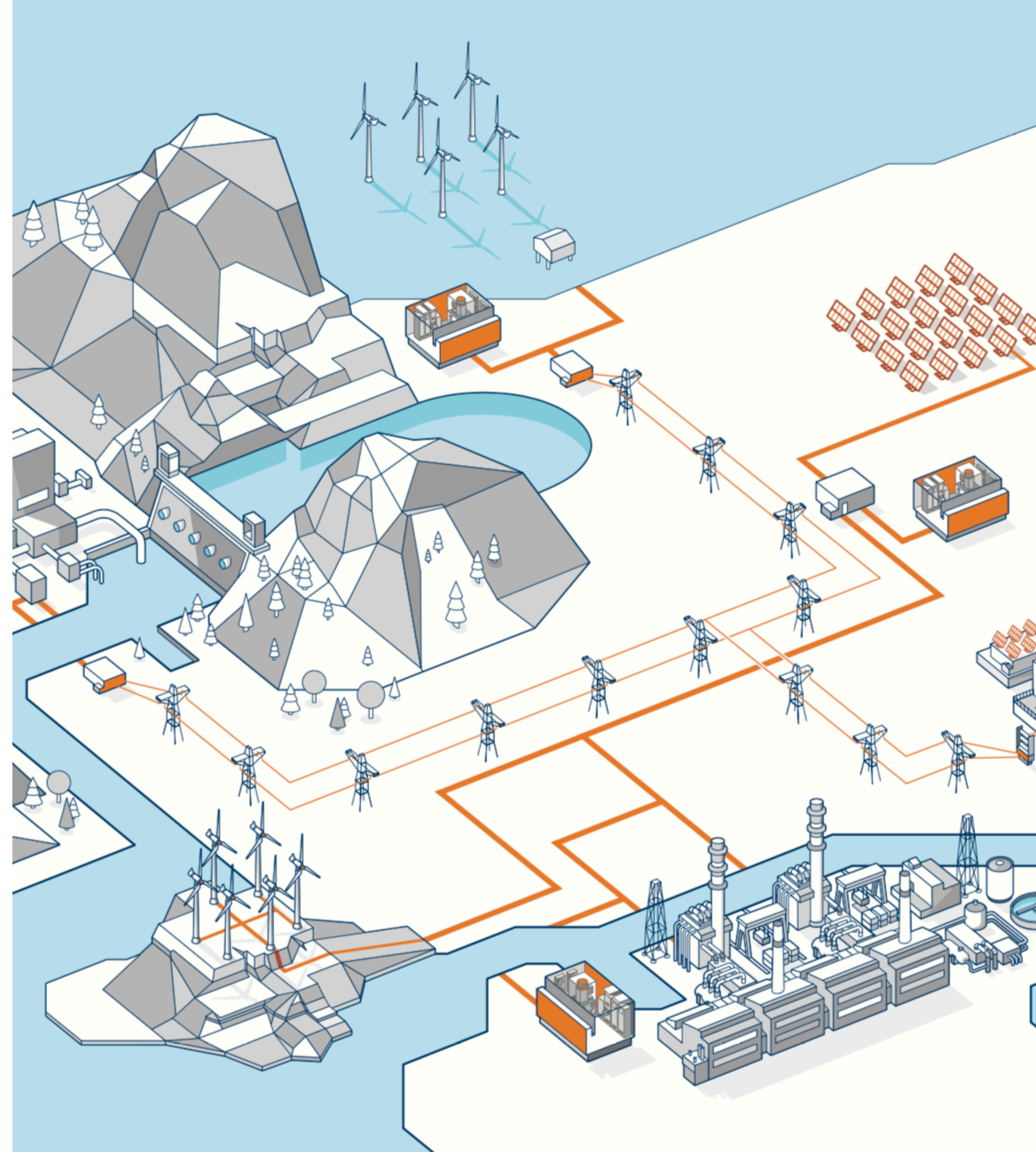


# Micro-grid in Australia

Australian Government has delivered a series of programs that have supported industry, community and individuals to manage energy use and costs. Micro-grid and smart grid is one of the programs were administered by the Department of Industry, Innovation and Science (DIIS)

The Victorian Government will contribute up to \$10 million in grant funding over four years to develop and implement state wide demonstration projects, using micro-grid models

The Western Australian Government and Western Power plan to develop an electricity micro-grid to improve reliability between the Geraldton and Kalbarri communities. Western Power will contribute \$300,000 towards a feasibility study to develop a micro-grid, to support the 140km network between the regions





# The Prospects of Micro-grid

---

The traditional power grid provides reliable power — most of the time. But when natural disasters or security breaches threaten the grid, the ensuing blackouts can be catastrophic and costly. That's why organisations and utilities are working together to build resilient, flexible power systems called Micro-grids. Operating either as part of the traditional grid or independently (or both), Micro-grids are revolutionising the way we manage our energy resources.

Organisations and communities with an absolute need for dependable energy are looking to the Micro-grid as an efficient, powerful, and ingenious solution. These reliable, emergency-ready systems can lead to fewer blackouts, greater cost savings, and less dependence on fossil fuels.

The community scale models could be cost-effective before 2020 for the mass-market, and battery costs seem to be moving faster than assumed. In fact, according to recent analysis by Navigant Research, revenue from the (currently) niche market of energy storage for micro-grids is worth \$US662 million in 2014, and will be \$US4 billion by 2024.



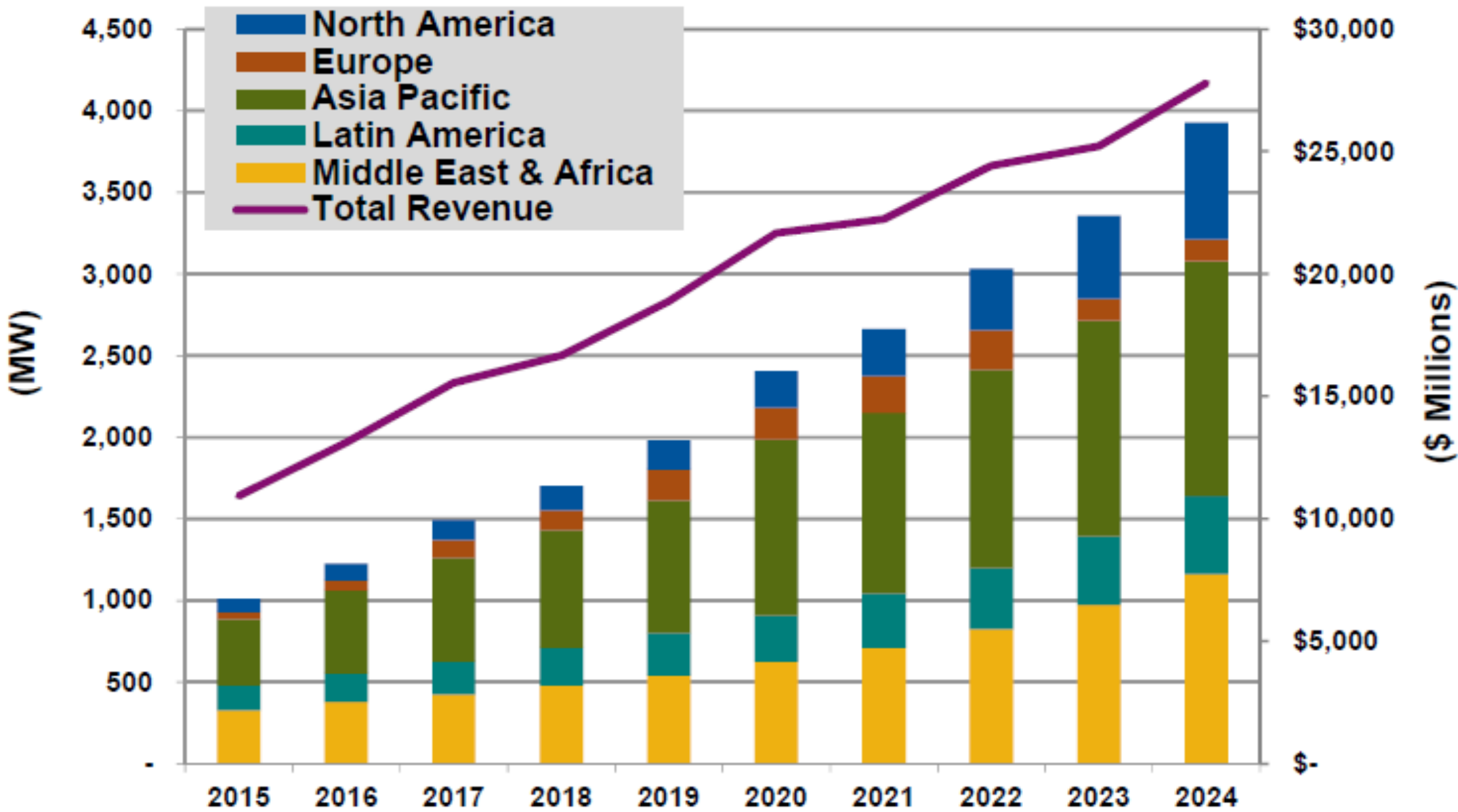


# The Prospects of Micro-grid

Meanwhile, the developing world increasingly views solar, and 'village-scale' micro-grids, as an obvious and cost-effective choice for its vast, distributed populations. By way of example, the trend is being led by new Indian Prime Minister Narendra Modi, who aims to increase solar's contribution to the Indian energy mix from 1 per cent to 5 per cent within seven years (likely to be extremely conservative, given the figures now coming out of both countries are large enough to create critical mass).

As for Australia, it looks as though it's likely to be politics which pushes the early adopters and, potentially, also the early majority, to take the next steps towards micro-grids at scale.

Chart 1.1 Annual Remote Market Capacity and Revenue by Region, World Markets: 2015-2024



(Source: Navigant Research)

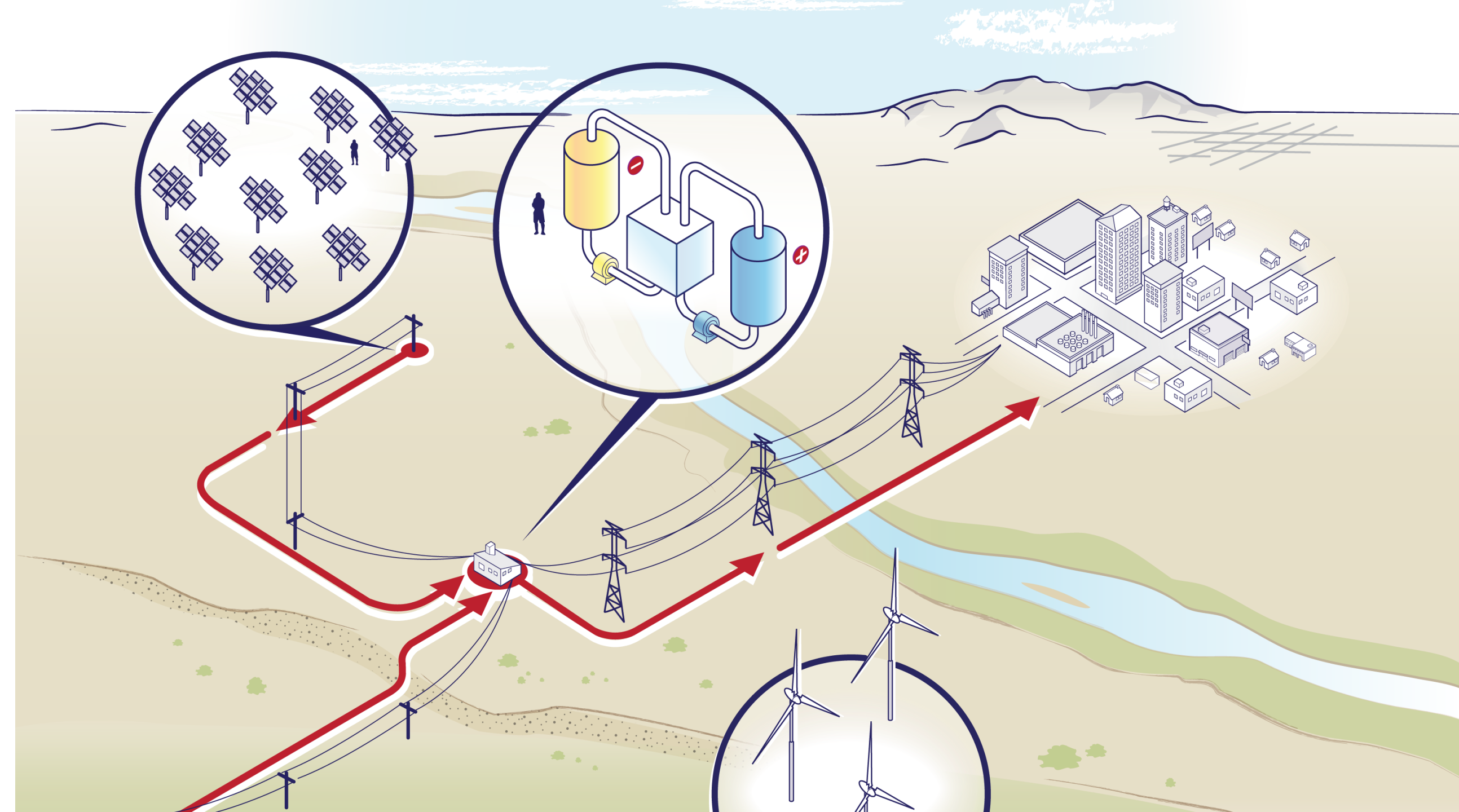


# Model 1: Regional Micro-grid

Appropriate: islands, mountains, remote areas where the grid cannot reach

Form: Build Photovoltaic power stations (or joint wind power stations), power storage stations and supplemented diesel generator sets in non-grid areas.

Charges: It requires minimum electricity usage, PPA, and charges a maintenance fee.



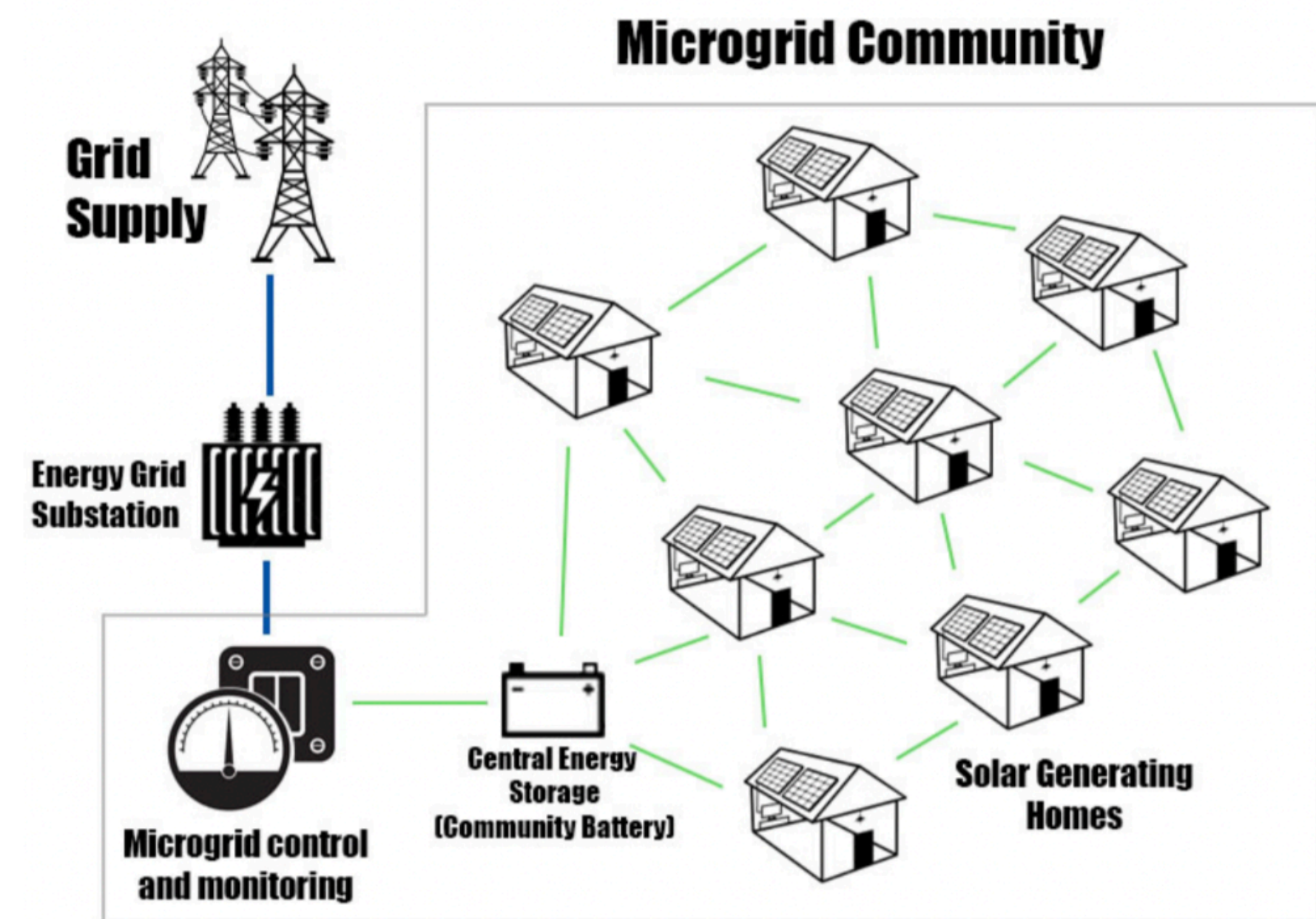


## Model 2: Embedded Micro-grid

Appropriate: New houses, new community, and towns with accessible grid connections

Form: The solar energy is made on the roof, and the energy storage box is built in the house. Each house serves as a complement between the user and the power station and is complemented by a unified network

Charges: Discounts on normal electricity prices and charges a fixed maintenance fees



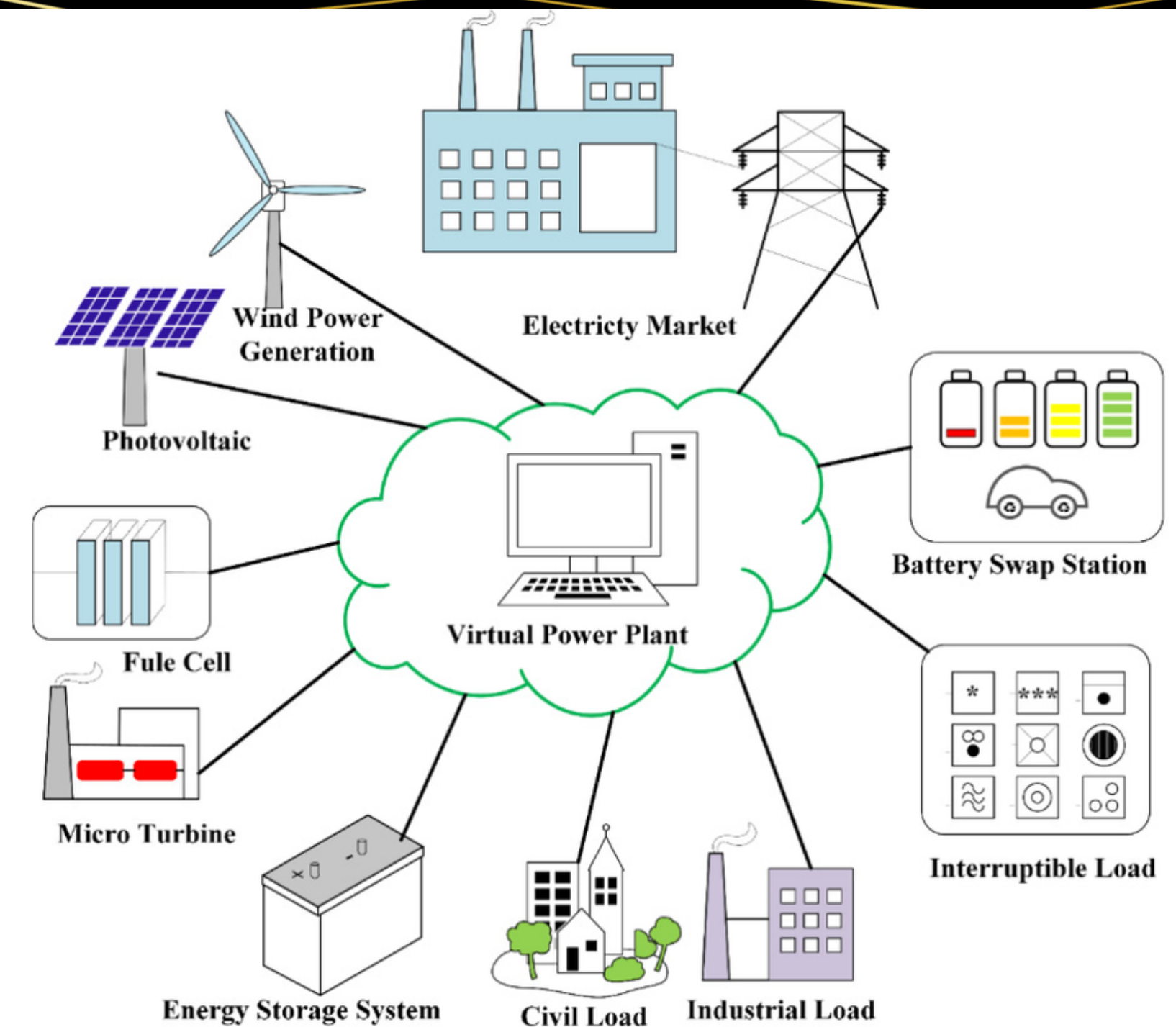
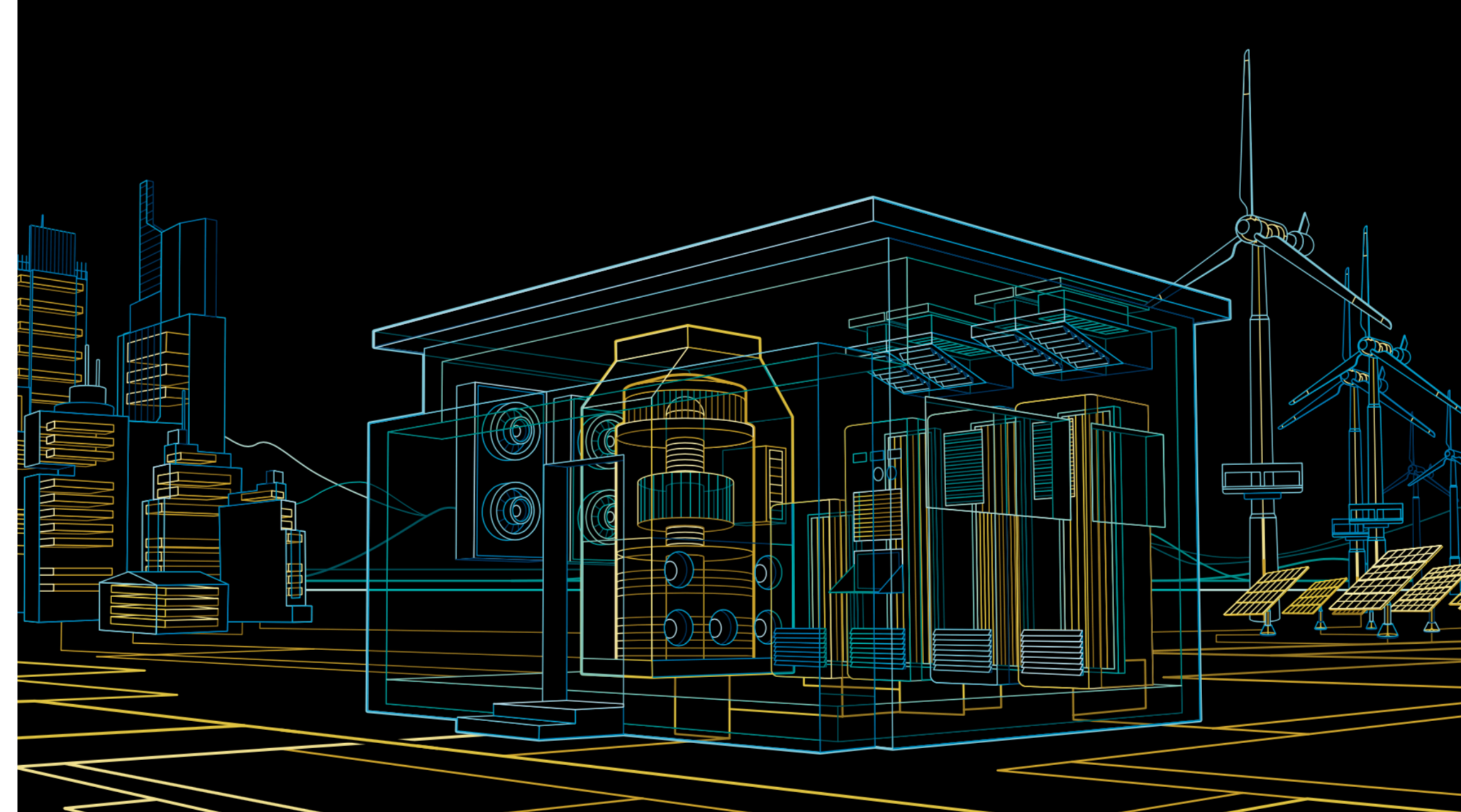


# Model 3: Virtual Micro-grid

Appropriate: apartment buildings, hotels, office buildings, and group users.

Form: Set up energy storage power station and system on the site of photovoltaic power station far away from the urban areas, integrate the network point at the user end, remote power supply, supplemented by the external grid

Charges: Discounts on normal electricity prices and an additional access fees may charges





# The Storage

---

Within Microgrids, energy storage systems provide much more than just a supportive source of power.

At utility level they serve other important functions, such as smoothing intermittent PV power flow, regulate frequency and voltage control.

At consumer level they can boost the supply at peak periods (peak shaving) and offer important backup in case of emergencies as described above.

A Microgrid can then engage its stored energy while waiting for the other source of energy to come back online, keeping the lights on.





# About **ACEMicrogrid**®

---

ACE is a company specialising in Microgrid power supply and professional integrated solutions, whose business scope covers design, development, construction and further maintenance.

Our ground-based photovoltaic power plants and rooftop projects have been able to provide a stable power supply for more than 30,000 households, and in 2019 the volume of size will be doubled. With our advantages and foundation, ACE company solves power supply problems for industry and commerce (manufacturing industry, hotel industry, business office area and agriculture), establishes Microgrid on the roof and ground of industrial and commercial buildings, and achieve the goal of reducing power supply cost and risk and improving power supply quality. We welcome companies that need to build their own Microgrid to cooperate with us.





# Business cooperation

---

2 ways to cooperate with ACE

1: ACE company invest the project as an investor, providing electricity to the user, user will then have a lower electric price

2: ACE company as the contractor, responsible for EPC and project maintenance, the project is invested by user

