



Japan
Smart Community Alliance

Community Energy Management System -CEMS-

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Characteristics of Japan



Urbanization



Industrialization



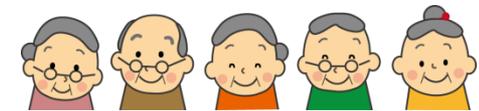
Depopulation of rural areas



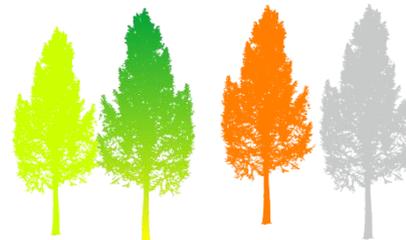
Fossil Fuel Imports



Electric appliances



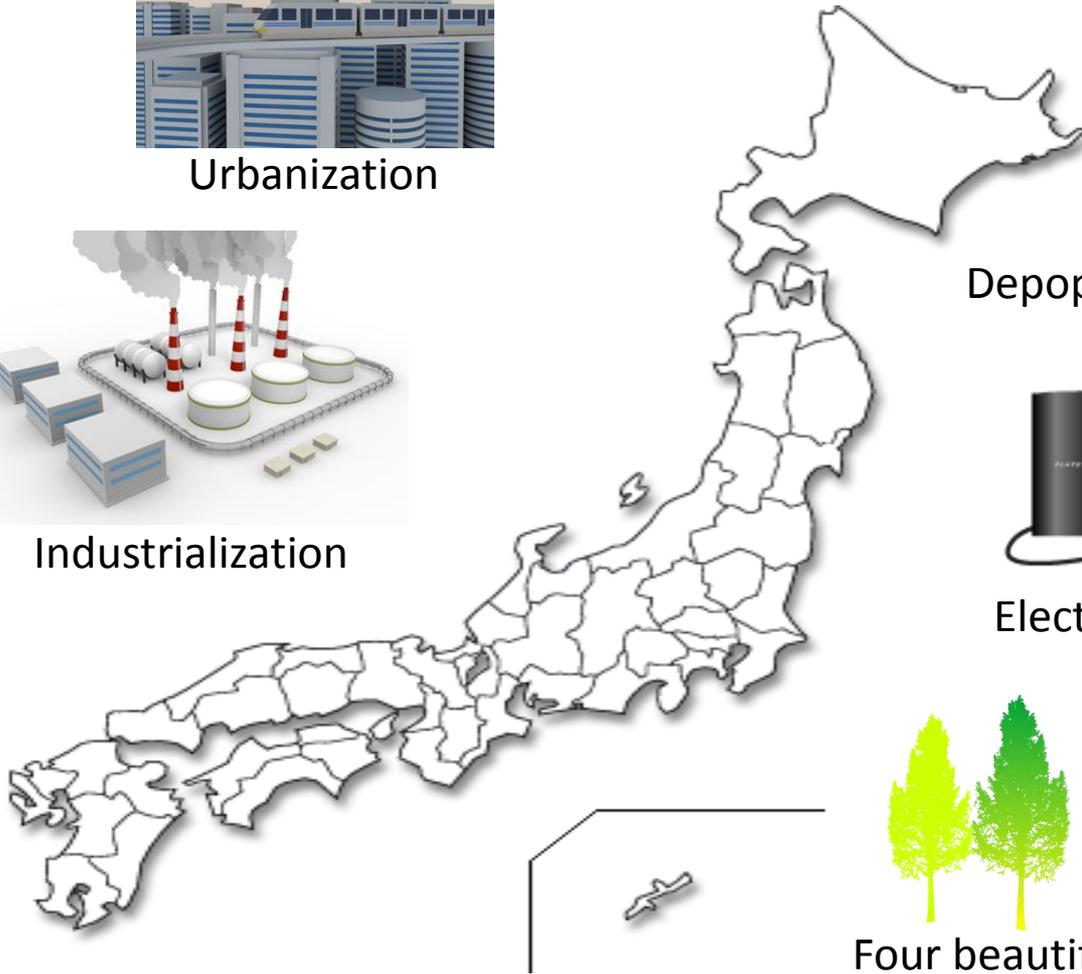
Aging society



Four beautiful seasons



Natural disasters



Expectations for CEMS in Japan

(1) Efficient energy supply:

Supply and demand can be controlled by encouraging customers to reduce the use of electricity by demand response, etc. during peak times, without having to burn more fuel in thermal power generator.



At normal times

(2) Energy saving:

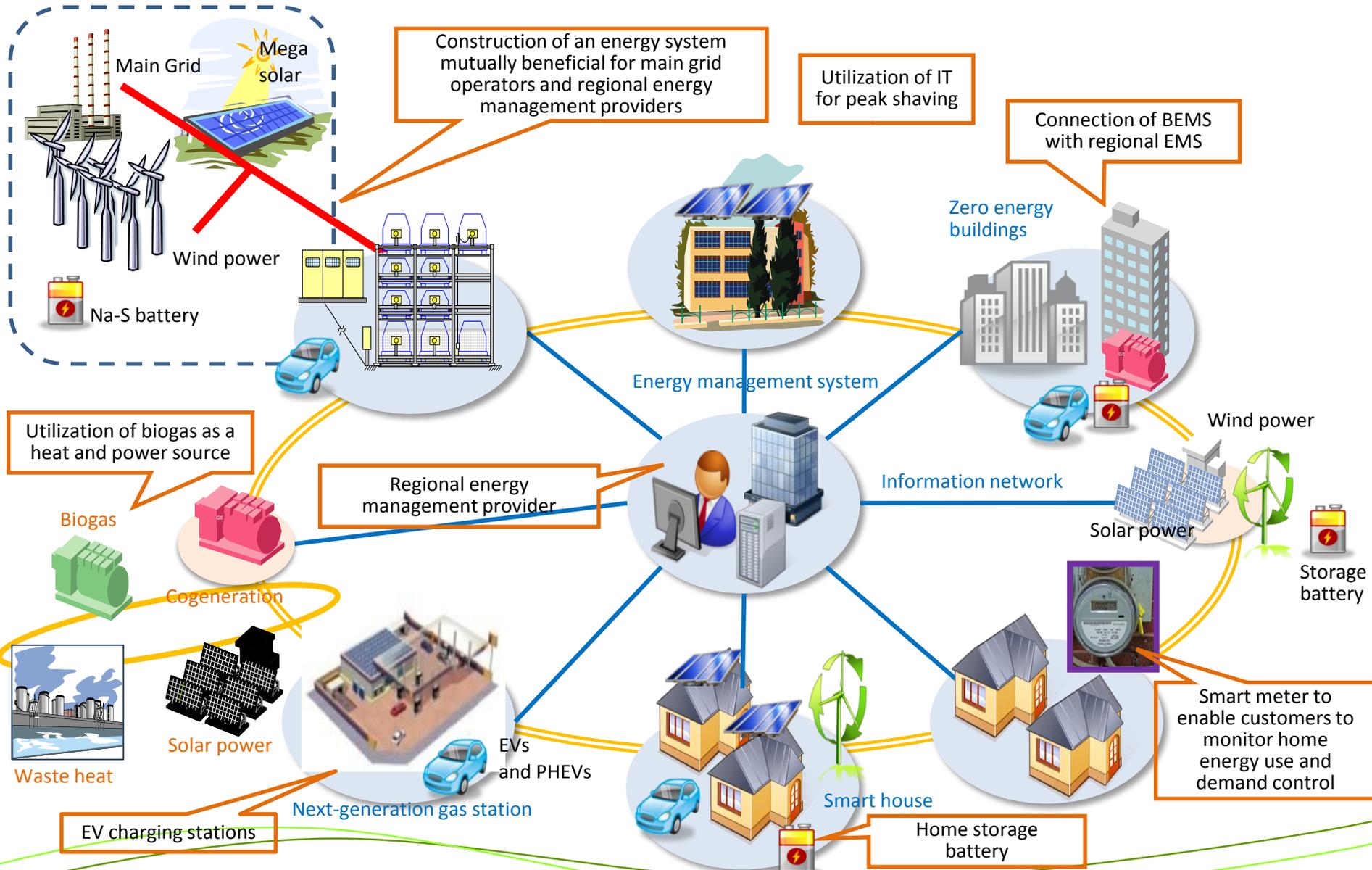
Optimize operation of energy producing, storing and saving equipment in accordance with supply and demand situation without undermining the comfort.

In an emergency

(3) Securing energy supply:

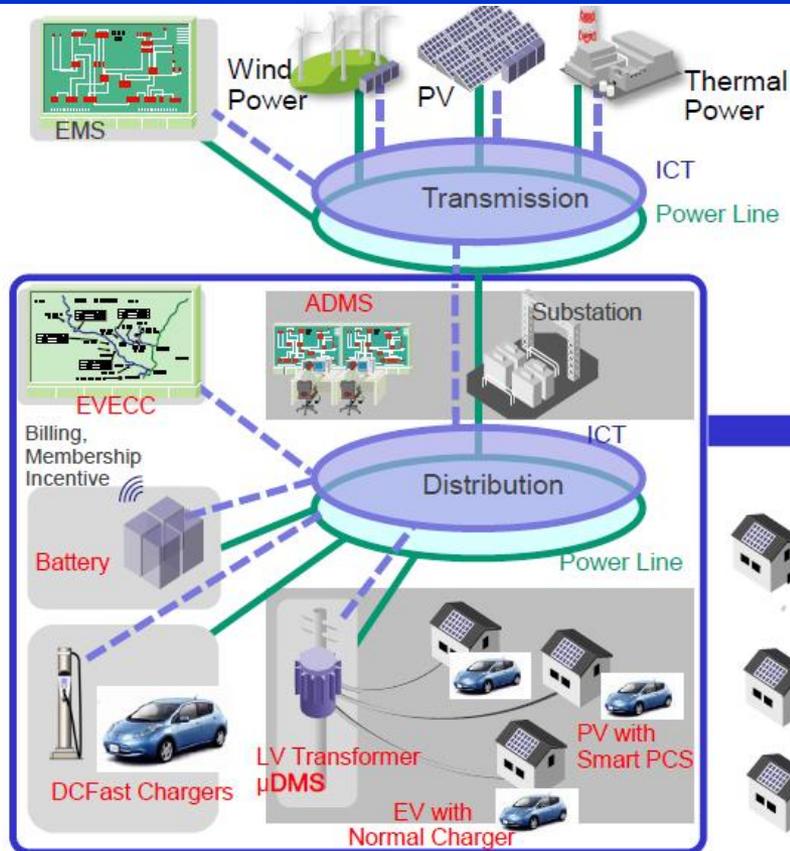
Secure energy supply in the community by distributed energy resources including renewable energy, cogeneration, etc.

Concept of CEMS

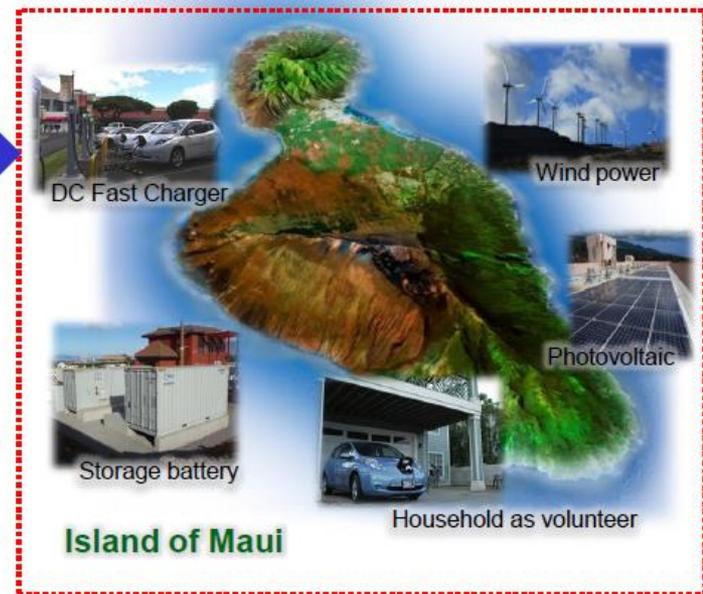


<Hawaii> Japan U.S. Island Grid Project

<Phase 1> EV batteries are utilized as stationed batteries for storing excess energy and controlling frequency fluctuation.



Demonstration will be implemented by 200 EVs and 30 residences in the whole island of Maui. (Final target is to establish EV-Virtual Power Plant.)



EVECC: EV Energy Control Center / ADMS: Advanced Distribution Management System / LV: Low Voltage / DOE: Department of Energy

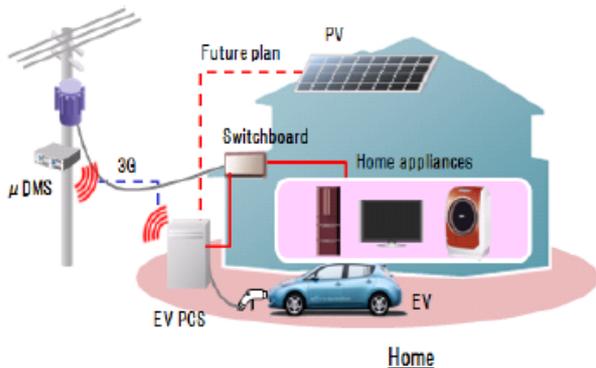
Source: Hitachi, Ltd.

<Hawaii> Japan U.S. Island Grid Project

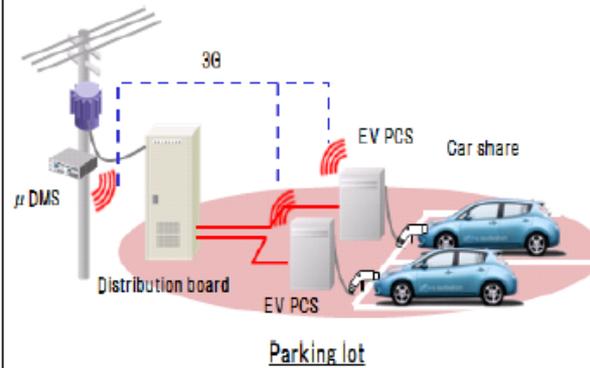
<Phase 2> By demonstrating in a high-penetration renewable energy area such as Maui:

- ✓ Evaluate using integrated and controlled EV battery discharge and managing distributed loads including V2X, as a “Virtual Power Plant (VPP)”
- ✓ Expand the target of EV volunteers to 500 EVs including the phase 1 volunteers

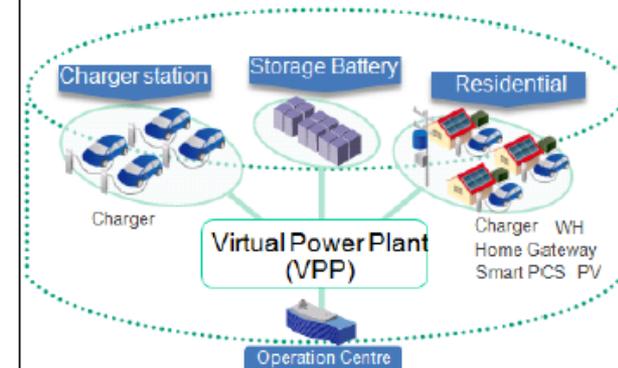
V2H (Vehicle to Home)



V2G (Vehicle to Grid)



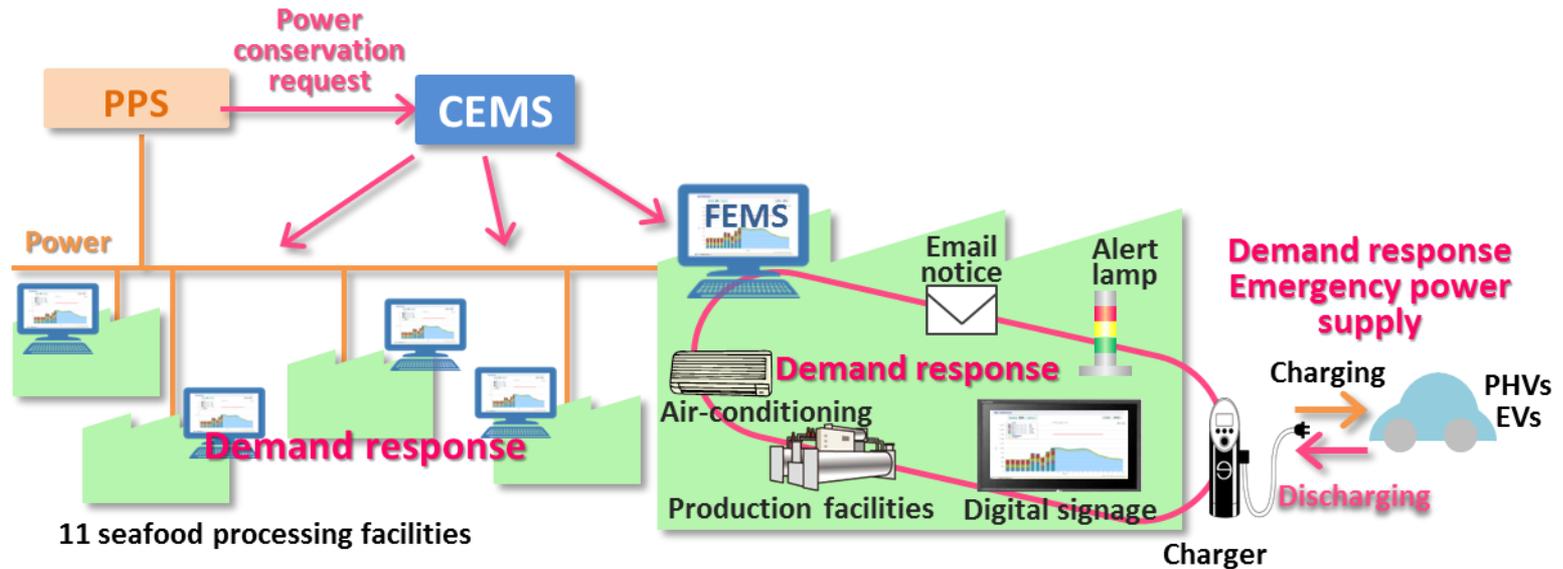
VPP (Virtual Power Plant)



Virtual Power Plant (VPP): Aggregating and optimizing available distributed energy resources such as EV, storage and home side energy capability to use optional energy sources

Source: Hitachi, Ltd.

Smart Energy Management for Industrial Park



Akaiwaminato District
Kesennuma Smart Community

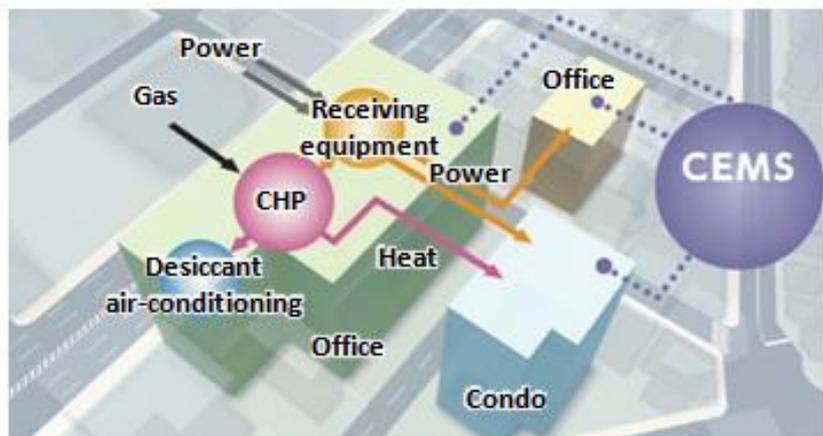
- Provided energy management and micro grid for an industrial park.
- District-wide controls of peak cut, peak shift, and demand response achieves reductions of cost and CO2 emission.
- Formulate area specific power generation mix and micro grid.

Source: SHIMIZU CORPORATION

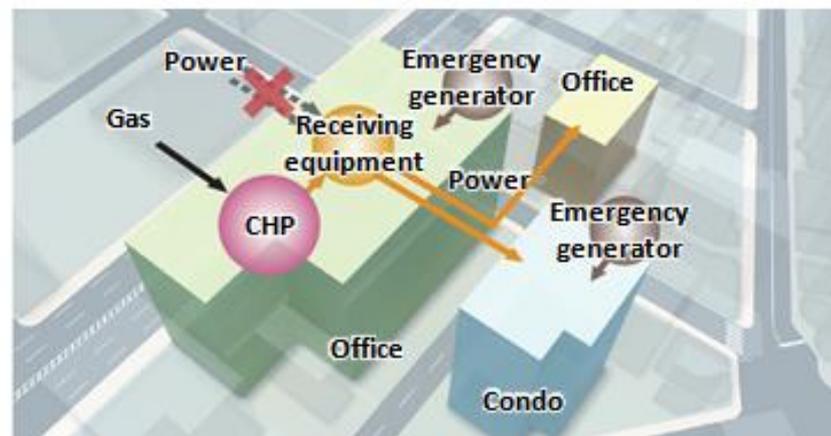
Smart Urban Regeneration

Smart district: Shibaura Smart District, Minato Ward, Tokyo

- Installed private lifeline under public road. 3 sites (2 offices and 1 residential) share and utilize power and heat.
- Business as usual: 25% power peak cut and 30% CO2 emission reduction by CEMS.
- Emergency: Deliver power to 3 buildings at half of the normal use level. Provided community's emergency supply storage, evacuation terrace, and a temporary shelter.



Business as usual : power conservation



Emergency: power supply



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