Japan Sendai Microgrid Case

Where is the Sendai microgrid located?

Join ResearchGate to contact this researcher and connect with your scientific community. This case study describes the Sendai Microgrid,located on the campus of Tohoku Fukushi University in Sendai City in the Tohoku district in Japan,and focusses on its operation in the aftermath of the Tohoku Earthquake.

What happened to Sendai microgrid?

On March 11,2011,the devastating Great East Japan Earthquake hit the Tohoku district,inflicting catastrophic damage on the district's energy supply system for a number of days. Despite the extreme devastation,the Sendai Microgrid resumed supplying power and heat to customers after a short interruption,proving its effectiveness.

How effective was the Sendai microgrid after the earthquake?

Despite the extreme devastation,the Sendai Microgrid resumed supplying power and heat to customers after a short interruption,proving its effectiveness. This case study is an analysis of the operations of the Sendai Microgrid in the aftermath of the earthquake and will provide useful lessons for all microgrid operators and users around the world.

Why did Tohoku EPC stop supplying power to the Sendai microgrid?

When the earthquakeoccurred,Tohoku EPC stopped supplying power to the area surrounding the Sendai Microgrid,resulting in a three-day outage. Nevertheless,the Sendai Microgrid was able to supply power to loads within its service area continuously.

Why did the Sendai microgrid switch to island mode?

Beginning several tens of seconds after the occurrence of the earthquake at 14:46 on March 11,there were a series of major voltage fluctuationsin Tohoku EPC's commercial grid,then a gradual drop in voltage,leading to the outage. Accordingly,the Sendai Microgrid switched over to island mode.

Who is the Electric Power Company in Sendai?

The electric power company in the Sendai area is the Tohoku Electric Power Company(Tohoku EPC). An agreement with the Tohoku EPC permits the Sendai Microgrid to supply power to loads within the area shown in Figure 4 (including the hospital and nursing care facilities located on the campus of Tohoku Fukushi University).

Past Major Demos on Microgrid in Japan 3 Project / Location Year(s) Major Purpose ... (PV, WT, bio-gas) Kyotango 2003-2007 30-minutes balancing via commercial power line (virtual microgrid) Sendai 2004-2007 Different power quality service Shimizu Construction Company 2006-Power ... Emergency Case Building A (Medium Scale Office) Bulk Receiving ...

Photo credit (local microgrid in Sendai, Japan): NTT Facilities, Tokyo Commercial and industrial facilities can provide a positive business case for microgrid adoption, cutting energy costs while potentially providing a demand response opportunity for the local utility.

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Sendai Microgrid worked very well during the great east Japan earthquake. After the major event, the renewable energy and distributed power system were focused more and NTT-F have developed and demonstrated new microgrid systems. One of new distributed power systems includes the mutual

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Download scientific diagram | Picture of the Sendai Microgrid, located on the campus of Tohoku Fukushi University in Sendai City, Tohoku district, Japan [6]. from publication: Towards Service ...

Sendai microgrid project in Japan. In March 2011, the Great East Japan Earthquake (GEJE) and the accompanying tsunami caused devastating damage to the energy supply system of Northeast Japan. ... but also has incomparable advantages in terms of reliable power supply for critical loads in case of disaster. Moreover, the Sendai Microgrid also ...

Notable examples include the NREL demonstration project in the USA, 6 the Labein microgrid in Italy, 9 the Sendai microgrid in Japan, 12 and the Dongfushan Island microgrid in China. 15 Based on ...

Japan"s pivot to resilience: How two microgrids fared after the 2011 earthquake. C Marnay, H Aki, K Hirose, A Kwasinski, S Ogura, T Shinji ... The sendai microgrid operational experience in the aftermath of the tohoku earthquake: a case study. K Hirose, J Reilly, H Irie.

The Sendai case also indicated issues with the fuel cell technology since it replaced the molten carbonate fuel cell (MCFC) with the phosphoric acid fuel cell (PAFC) after the demonstration phase. ... This issue was experienced by the Sendai microgrid in Japan, but resolved by consulting with the local utility, Tohoku Electric Company ...

4.6 Sendai microgrid 4.7 Roppongi Hills (Tokyo) 4.8 Smart energy system for residential dwellings Section 5 Microgrids 5.1 General 5.2 Benefi ts of microgrids 5.2.1 To end users 5.2.2 To utilities/distribution companies 5.3 Microgrids for disaster relief 5.4 Microgrid associated technologies 5.5 Microgrids around the world

To name an existing precedent, Sendai Microgrid, one of the early pilot projects conducted by NEDO in Japan, survived the 2011 earthquake and managed to supply power to its customers (hospital, water treatment plan, nursing house and ... Sendai Microgrid during the 2011 disaster (photo courtesy of A. ... "Sendai

microgrid - introduction and ...

SENDAI Microgrid System 4 Servers Lightings Fans 1 mega-watt microgrid system in university campus PV panels AC grid power Gas Gen Fuel cells Natural gas (City gas) Batteries High quality power supply for mission critical loads Renewable energy (Solar) PV panels Fuel cells Power converters & batteries Gas Gen-sets Supported by NEDO FY 2005-08 ...

studies in this report, the Santa Rita Jail microgrid in California and the Sendai microgrid in Japan, both feature solar photovoltaic (PV) arrays, as seen in Figure 4 and Figure 3. Because common renewable microgrid resources are intermittent and/or variable, high renewable generation typically requires

March 11, 2011, a tsunami and large-scale earthquake struck the Tohoku area and caused severe damage to many cities and towns in Japan. The Sendai MG, depicted in Figure 3, is designed as an ideal ...

(NEDO Sendai Project) Version 3.2 . 4 Sep, 2012 . 1 Descriptions of Function 1.1 Function Name Multi Power Quality Microgrid (MPQM) 1.2 Function ID System Level Use Case SEN-1 . 1.3 Brief Description This use case describes a Microgrid that enables the supply of power to critical loads at multiple levels of power quality, a Multi

Sendai project - Japan Sendai microgrid test system shown in Fig. 16, consist of two 350 kW gas engine generators, one 250 kW MCFC, 50 kW PV, battery energy storage and various types of compensating devices.

refers to this as a "best practice" case. This ties together the microgrid section with the earlier planning sections. The studies include the Sendai microgrid in Japan, data centres, the Roppongi Hills (Tokyo) microgrid and an example from a Smart Energy home in Saitama, Japan. These examples from the Great

History of Microgrid R& D in Japan from 2000 to 2011 Introduction Japan was heavily involved in microgrid research beginning around 2000, as shown in Figure 1. The motives for microgrid development were mixed but of particular importance was that microgrids were seen as a vehicle for achieving high renewable penetration in electricity supply.

The Sendai Microgrid Operational Experience in the Aftermath of the Tohoku Earthquake: A Case Study . ?? ??, ?? ??(NTT????????) ... NEDO Microgrid Case Study - 3 - 3. ???????????????? . 2011?3?11?14?46?????????????130km

practice" case. This ties together the microgrid section with the earlier planning sections. The studies include the Sendai microgrid in Japan, data centres, the Roppongi Hills (Tokyo) microgrid and an example from a Smart Energy home in Saitama, Japan. These examples from the Great East Japan Earthquake, reveal a number of microgrids, from

The Roppongi Hills and the Sendai microgrids have already shown that microgrids can improve the resilience

of power systems when they disconnected from the main grid and functioned as secure power ...

The Sendai Microgrid Operational Experience in the Aftermath of the Tohoku Earthquake: A Case Study ?? ??, ?? ??(NTT????????) James T. Reilly (Reilly Associates)

3.2 Microgrids activity in Japan. ... A three-day outage occurred in the area surrounding the Sendai Microgrid while the microgrid could still operate to supply power to its service, which had proved advantage in stability and robustness of microgrid construction in severe cases. 3.3 Microgrids project in America.

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