An Economic Case for Batteries for Energy Storage

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Introduction:

The country Australia is said to possess different types of resources of renewable energy that remain unexploited even to this day. The department of energy in Australia has pointed out that generation as well as utilization of age-old power system would mean incurring of increased cos (Heymans et al., 2014) t. On the other hand, demand for energy is on a constant rise across the globe. Thus, the storage industry would have a significant role to play to satisfy the overall demand of energy. The energy storage system possesses the potential to break the nexus amidst that of the electricity demand as well as its production (Esseghir and Haouaoui Khouni, 2014). It is argued that the Australian storage industry must promote its potential as well as activities to achieve the increasing demand of energy sustainably. The report emphasizes upon discussing all economic aspects of batteries for storing energy. Besides, this discussion would provide an overview of the Australian energy industry by depicting the present demand to store energy in the nation as well as the economic aspects to meet the overall demand for batteries for storing greater energy.

Australian Energy Storage Sector in context to other nations

In Australia it has been observed that power supply may be grouped into four different categories like that of generation, retail, transmission, and dissemination. Several other countries supply their power in three different routes such as production, transmission, and circulation. Nevertheless, maximum number of countries across the world focuses upon providing power supply by means of coal or any other related materials. In Australia, there has been successful expansion of resources of power supply throughout the nation with the utilization of renewable resources (Debnath, Ahmad and Habibi, 2014). These resources include solar power, wind power, and hydro power. It is identified that almost every nation generates power by blazing fossils such as gas, oil, coal, and others. Similarly, Australia is one such nation that utilizes burning fossils conventionally for supplying energy within large scale power stations.

According to the Australian administrative authority, some of the key resources of renewable energy like that of solar, wind, and hydro power have been spotted so far. Thus, shifting of these resources of power over long distances would require the government to contribute increased

capital in the transmission of the system to deliver electricity to the demand center. In order to minimize the limitation, the Australian legislature has emphasized upon the implementation of small scale network in the distribution purpose for supplying energy to different locations such as industries, local residences, etc. It is observed that electricity energy cannot be stored within the network (Hossein, Yazdan and Ehsan, 2012). As a result, the nation uses batteries to store energy. Also, the government of Australia suggests usage of pipes to store gas or even water energy resources within the network.

Within the nation, it has been identified that total consumption of electricity by means of storage of energy by using chemical batteries are much into practice. For generating large scale energy and also circulation, it is considered that batteries are anyway more effective and also productive for generating and storing energy while consumed (Aguayo and Gallagher, 2005). It has also been identified that manufacturing chemical batteries for storing energy during consumption of electricity is far better an option than any other mechanism to store energy. The associated direct cost with that of the manufacture of batteries based on the framework of chemical energy storage has been estimated to be quite low. Besides, it is also observed that batteries result in little loss of electricity during changing it in the form of storage. The world's largest energy storage resource has been developed by the group involved in energy investment by means of developing solar energy system (INABA, 2010). To develop the project of battery storage in Australia, more than around two million dollars have been invested. On the other side, some other nations like the United States and few from Europe have been considerably less as compared to that of Australia.

Energy Storage Project in Australia: Current & Future Situations

The greatest battery tank of the world is that of the Australian Energy Storage. Within the country, the constructor of energy storage has always encouraged storing of energy or more than around 400MWH. It has confirmed that it has been generating more than 100 Mega Watt in presence of the chemical lithium battery innovation (Jupesta, n.d.). Reportedly, in the venture of battery storage, Australia invests increased capital as compared to other nations across the globe. As per the report of energy storage, it may be found that an Australian company ASX owns the whole business power. On the other hand, another company named Rio-Tinto supports by

serving the remote bauxite operation in Queensland (00/00817 A multifunctional energy-storage system with high-power lead—acid batteries, 2000). This has promoted the total production of energy of around 6.7 mega Watt (Lastoskie and Dai, 2014).

According to the Director and CEO of Mpower, considerable potential of overall market growth has been evidenced with respect to energy storage as well as savings in support of chemical battery. All households in Australia can now easily bypass the retailers of electricity. Thus, in the near future the Australians would emphasize on buying electricity from open market with the help of advanced technology that are based on the chemical battery (McKenna et al., 2013). It is identified that Australians have pointed out a firm based in Canberra that has incorporated battery storage within six solar homes in Canberra and also undertook innovative technology further. The organization Renewable Energy Agency in Australia has already invested almost 445,000 dollars for this particular project for assisting all activities in context to battery energy storage. Currently, different organizations within Australia have been taking up numerous projects (Mehrara, 2007). The company Reposit Power is one of the firms that deal with all kinds of projects related to energy storage in the country of Australia. It has also claimed to be the first energy storage program in the world that has been the leading firm for storage of energy.

Future Scenario:

The Agency of Renewable Energy of Australia has been assessing the development of the system of energy storage along with the help of simulation of the scenario with respect to designing and development of energy storage system during consuming energy in the country. The form of simulation reflects that development of energy storage system in support of the chemical battery enables reduction of energy usage and also consumption of fuel (Olken, 2005). The Australian government may develop low renewable energy infiltration by presenting the innovative engineering as well as technology. The Australian government has ventured into the energy storage that focuses on battery within 2011 and yet proceeded with their project of development u to 2030. Besides, suitable infrastructure to generate electricity in the country has been emphasizing upon the objectives of various energy saving projects that undertake the key steps to

support the future economy of Australia. The concept of greenhouse gas within Australia has positive impacts upon the electricity generation.

Life Cycle Management Process for Storage of Energy

Remote Electricity & Fringe System

For storing energy in support of battery, remote system may be used since the process of this system is completely dependent upon the potential electricity generation. However, generation of electricity in the local regions was supported by the diesel plant. The department for energy storage must shift its energy saving lifecycle to that of some renewable system of energy. To obtain larger electricity grid, the department for energy resource emphasizes upon application of connection procedure to the network of energy transmission (Silva, de Oliveira and Severino, 2010). The concept of fringe system within the array of long signal network as well as supports in maintaining the regulation of energy during critical areas. Besides, constraints of infrastructure results in the increment of cost for strengthening the links.

Network Support

The expense of electricity is quite high in the country of Australia. On account of population growth, the electricity demand is also on a rise. To maintain the equipment to consume electricity, the government of Australia has emphasized upon the participation of demand side. This would support technological promotion of energy consumption (Swierczynski et al., 2015).

Participation in the Market

In order to store electricity energy, this concept of market penetration is essential. The market for national market has generated support for starting the wholesale market of energy storage. It has been identified that the function of the National Electricity market has a deeper link with the energy sector for storing power in the world (Takagi et al., 2013).

Stability of Grid

To be applied in the management of life cycle for storing energy, the concept of deman and supply would alter in the AC electricity grid. The stability as well as the frequency of each of the grid must be observed. The control service frequency would generate additional services that would be permitted in specific market design.

Storage Systems at Residences

For applying the life cycle management to store energy, distributed renewable generations need to be taken up for household purposes within Australia. The system of residential energy storage will be quite helpful to avoid lengthy electricity bills (Zhou, 2013).

Challenges

Economical Challenges

Since the industry of unstructured electricity in Australia can be easily acquired by a single vendor of different kinds of benefits, it would not be possible for the government to capture the service that easily.

Technical Challenges

To control the interface is one of the key challenges that are encountered during implementation of life cycle management procedure. For utility battery, no specific standard is followed within the network resource by the vendors.

Cultural Challenges

To develop system of energy storage in the presence of chemical battery, almost every engineer would provide some kind of non-familiar technology to manage the AC system. this is often mistaken by that of future growth, possibilities and requirements.

Using of UNEP Life Cycle Management Process

- Determine policies
- Organize
- Survey
- Set objectives
- Storage of energy to address issues

Storage of Energy to address issues

Various kinds of energy storage system are available to permit in restoring energy, for instance, thermal energy storage, electrical energy storage, electrochemical energy, mechanical energy, and chemical energy storage. Also, according to the issues of the current situations of energy storage within Australia, the system of electrochemical energy storage would be preferable. This is the most effective method of restoring energy (Silva, de Oliveira and Severino, 2010). Some gadgets are also available such as fuel cell, battery, etc which helps in conversion of chemical energy to that of electricity. Battery possesses immense storage potential and also charge density. Besides, energy density within the battery is much superior as compared to that of other devices.

Battery has voltage effectiveness which is valuable as well as extent of yield of a battery is quite proficient as compared to that of other gadgets. Gadgets used for electrochemical energy storage like battery allows utilization of two types of batteries, for instance non rechargeable batteries as well as chargeable ones. All chargeable batteries possess excessive capacity and ability to re-energize. The rechargeable batteries have electro code which means the capacity to go prior to responses in both directions (Lastoskie and Dai, 2014). This promotes imparting free energy within the non spontaneous bearing which keeps away different varieties of supply energy as well as vitality during power consumption. By this manner, using electrochemical framework of vitality stockpiling, the nation Australia possesses the capacity to reduce issues of using energy with capital speculation to gain various resources other than fuel, coal, and so on. Another kind

of storage for electrochemical energy is that of fuel cell. This supports conversion of chemical energy to that of electricity.

Conclusion

Thus, this report has emphasized upon the analysis of current circumstances of industry of storage of energy within Australia. The present situations of the nation are favorable to adopt large scale of alternative mechanism for energy involving storage battery (McKenna et al., 2013). Commonly, the wholesale market of electricity must be applied since it would be operational within the western areas of the nation which has a population of more than around 2 million. Besides, utilization of natural resources like solar, wind and hydro power rather than oil, fuel, and gas would be helpful to develop scrap electrical generation capacity. The cost of greenhouse gas has been the key concerning issue for all policy makers of Australia.

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