

Renewable Energy Zones in Queensland: A means to Integrate Transmission and Generation Infrastructure Development

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Abstract

A lack of suitable access to the transmission grid continues to be a fundamental barrier to the deployment of renewable energy projects on a large scale. Unlike conventional generators, renewable energy power plants must be located close to their primary energy source. Often these sites are remotely located which makes the cost of connecting to the grid prohibitive or expensive. The cost of establishing operations in areas remote from the main electricity grid often makes these projects unattractive to investors and developers, leading to the following challenges: proximity to existing transmission infrastructure is given a higher priority for new connections rather than selecting an optimal location; connections established away from existing infrastructure must bear the cost of transmission upgrades; prohibitive connection costs leading to projects being abandoned. There is a need for a connection model which incentivizes and supports these investments. A potential solution to these challenges is for several renewable energy connections to cluster within a predefined location. A Renewable Energy Park offers such a model. It is an area designated for the development of clusters of renewable energy generation projects, notionally serviced by a single transmission corridor, the cost of which is shared amongst proponents. In essence, it is an enabler of high quality renewable energy generation. Two potential models to facilitate a REP include: A model represents a single transmission line connection to the utility substation with multiple spur connections; and the second entails the creation of a dedicated connection hub to host several renewable energy developments. A six-step process is presented and discussed, to support the creation and development of a renewable energy park. Results obtained from a solar farm case-study in the central region of Queensland are presented and discussed. The study shows how a single connection could be extended to facilitate a larger scale renewable energy park.