



# Transmission deferral energy storage consumer energy

Is energy storage a transmission asset?

Storage as a transmission asset: Deploying storage systems strategically on the transmission network can help address multiple grid challenges and provide valuable services. Several states have initiated studies to evaluate the role of energy storage as a transmission asset.

How much does distribution upgrade deferral cost?

On distribution upgrade deferral, it was noted that distribution system costs are driven by non-coincident, local peak loads with deferral value estimated at \$14/kW-year (Schmitt & Sanford, 2018).

Should electric power companies deploy decentralized storage assets?

Storage as an equity asset: By deploying decentralized storage assets, electric power companies can help provide reliable, resilient, clean, and affordable electricity to low-income communities.

How has technology impacted energy storage deployment?

Technological breakthroughs and evolving market dynamics have triggered a remarkable surge in energy storage deployment across the electric grid in front of and behind-the-meter (BTM).

How can energy storage be used to reduce capacity charge?

Power purchase agreement: energy storage can be used to reduce capacity charge. Vertically integrated utilities: capacity value can be estimated based on the incremental cost of next best alternative investment (e.g., peaking combustion turbine) to meet the load.

What drives energy storage growth?

Energy storage growth is generally driven by economics, incentives, and versatility. The third driver--versatility--is reflected in energy storage's growing variety of roles across the electric grid (figure 1).

The work documented in this report was undertaken as part of an ongoing investigation of innovative and potentially attractive value propositions for electricity storage by the United States Department of Energy (DOE) and Sandia National Laboratories (SNL) Electricity Storage Systems (ESS) Program.

During 2017, Navigant predicts, some 331.7MW of energy storage will be deployed for T& D upgrade deferral as well as to optimise T& D assets. This annual figure balloons up to 14,324.8MW by 2026, making for a cumulative 46,499.7MW installed.

Energy storage at the distribution level is better suited to address potential interruptions of power delivery from the transmission system (e.g., fallen power lines or impacts to centralized ...



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Recently, non-wire alternatives for transmission deferral have come to the forefront of transmission planning conducted by utilities. This paper presents the application of battery ...

Transmission Investment Deferral: deferring transmission infrastructure upgrades and solving transmission congestion issues by installing energy storage systems instead of new lines. Angular stability : use of energy storage to charge and discharge high levels of energy in short periods when an accident occurs, overall improving angular ...

USE CASE EXAMPLE 4: TRANSMISSION AND DISTRIBUTION DEFERRAL Energy storage used to defer investment; impact of deferral measured in present value (PV) terms Net present value of deferring a \$1 million investment for one year estimated at \$90,000 or \$10,400 annually over economic life of battery  $PV = FV / (1+i)^n$  PV = Present value

Grid operators around the world continue to recognize the benefits of energy storage technologies, and one of the most intriguing applications is the ability to defer investments in conventional transmission and distribution (T& D) infrastructure. Energy storage systems (ESSs) providing T& D upgrade deferral can be a disruptive force in the industry as they allow for a

Despite these potential benefits, the traditional transmission planning process is still evolving new consensus methodologies to evaluate the specific benefits of non-wire alternatives such as energy storage that can function as both a transmission asset and a market resource, and allocate a portion of its costs through transmission rates (i.e ...

Battery Storage for Generation and Transmission Deferral Panel - Jan. 11, 2022 Deploying Energy Storage as Transmission Assets Bob McKee, Strategic Projects Director. 2 atllc Introducing ATC o Began operations in 2001 as the nation's first multi-state, transmission only utility

Energy storage systems (ESSs) providing T& D upgrade deferral can be a disruptive force in the industry as they allow for a more efficient deployment of capital to meet ...

While DSM portfolios from British Columbia and Quebec have identified transmission and distribution deferral benefits, it is unclear whether any viable NWA projects have been explored. 1. 12. 1 . Haley et. al. The 2019 Provincial Energy Efficiency Scorecard. ... Deferral (AB) Waterton Energy Storage (AB) n. In response to identified near-

We describe an electricity transmission network expansion and energy storage planning model (TESP) that determines the location and capacity of energy storage systems (ESS) in the network for the purposes of demand shifting and transmission upgrade deferral. This problem is significantly harder than the standard network expansion models that are typically ...

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The need for energy storage in the electrical grid has grown in recent years in response to a reduced reliance on fossil fuel baseload power, added intermittent renewable investment, and expanded adoption of distributed energy resources. ... Transmission deferral in this case effectively serves as a proxy for reliability, the benefit of which ...

ERCOT is seeing an increase in the amount of energy storage resources being developed for a variety of grid and customer applications in the ERCOT region. As of 2019, a 89 MW of utility ...

This paper presents a modeling framework that supports energy storage, with a particular focus on pumped storage hydropower, to be considered in the transmission planning processes as an alternative transmission solution (ATS). The model finds the most cost-effective energy storage transmission solution that can address pre-determined transmission needs ...

In this chapter, IEEE 24-bus test network is considered as test case. Figure 10.1 shows single line diagram of the network. Table 10.1 shows the bus data of test network, and Table 10.2 lists the line data. The data are taken from [] gure 10.2 shows the load growth over the planning horizon, and it is clear that 6-year planning horizon is adopted. The generation ...

Energy storage connected at the distribution level (i.e., "in front of" customer meters), can provide services both to the distribution system as well as to the transmission system. ... Distribution Network Upgrade Deferral. Historically, distribution utilities have focused on "wire-only" solutions, replacing existing equipment with ...

In electricity transmission networks, energy storage systems (ESS) provide a means of upgrade deferral by smoothing supply and matching demand. We develop a mixed integer programming (MIP) extension to the transmission network expansion planning (TEP) problem that considers the installation and operation of ESS as well as additional circuits. The ...

energy storage provided transmission deferral 10 days out of the year and resource adequacy another. 10 days out of the year while participating in energy and ancillary service markets for the ...

One of the "value of energy storage" questions that was being asked a lot two or three years ago was around the use of batteries and decentralised system architecture instead of traditional "poles and wires" grid networks. However, advancements in this area have been slow to materialise and Navigant Research's recent "Energy Storage for Transmission and ...



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RESEARCH OVERVIEW: The Storage Value Estimation Tool (StorageVET<sup>TM</sup>) or the Distributed Energy Resources Value Estimation Tool (DER-VET(TM)) was used with other grid simulation tools and analysis techniques to establish the optimal size, best use of, expected value of, or technical requirements for energy storage in a range of use cases ...

The Whitecourt Transmission Deferral Battery project involves installing a 20 MW/20 MWh Battery Energy Storage System (BESS) at the existing Whitecourt substation, minimizing or eliminating the need to build a new transmission line in the area. This project will demonstrate the competitive advantage of energy storage in enabling the growth of Alberta's low-carbon electricity ...

selected energy storage as a transmission asset Storage as Transmission: Waupaca, WI Under certain N-1 contingency scenarios (line outages), the Waupaca area would be cut off At \$12.2 million over 40 years, a 2.5 MW/5 MWh energy storage system, coupled with line sectionalizing, was selected over a \$13.1 million project to install an additional ...

The storage used for the two year deferral is "oversized" to address uncertainty with 1) power output of 4% of the existing T& D equipment's capacity, or 480 kW and 1) enough stored energy to discharge for 3.5 hours (requiring 1,680 kWh of stored energy, more than double the excess energy in the second year.

Create storage-centric transmission infrastructure to help reduce congestion and bolster resilience: The increasing transmission capacity shortage calls for more flexible alternatives. ...

Single-zone, 1 GW penetrations of each energy storage technology were modeled with a renewable energy penetration greater than 50% to identify the transmission zones where energy storage might ...

Transmission Deferral Energy Losses Energy Storage System Rate Impacts Lost Revenue Gen Set Cost Avoidance Outage Mitigation ...  
o Transmission Deferral for 3.65 years  
o ~ \$1M in lost revenue from Community Solar calculated into Utility costs.  
o Additional \$0.4M in outage mitigation

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1 Villarreal - China & Battery Energy Storage Systems Battery Energy Storage Systems from China: Being Realistic about Costs and Risks Juan F. Villarreal, MS Cybersecurity EXECUTIVE SUMMARY China has a dominant position in the battery supply chain, limiting the options of procuring Battery Energy Storage Systems (BESS) from US suppliers or ...

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