

SWVA Pumped Hydro Storage

October 11, 2018

Pump Hydro Storage Legislation

2017 Virginia General Assembly

Senate Bill 1418

Senator Chafin

House Bill 1760

Delegates Kilgore & Pillion

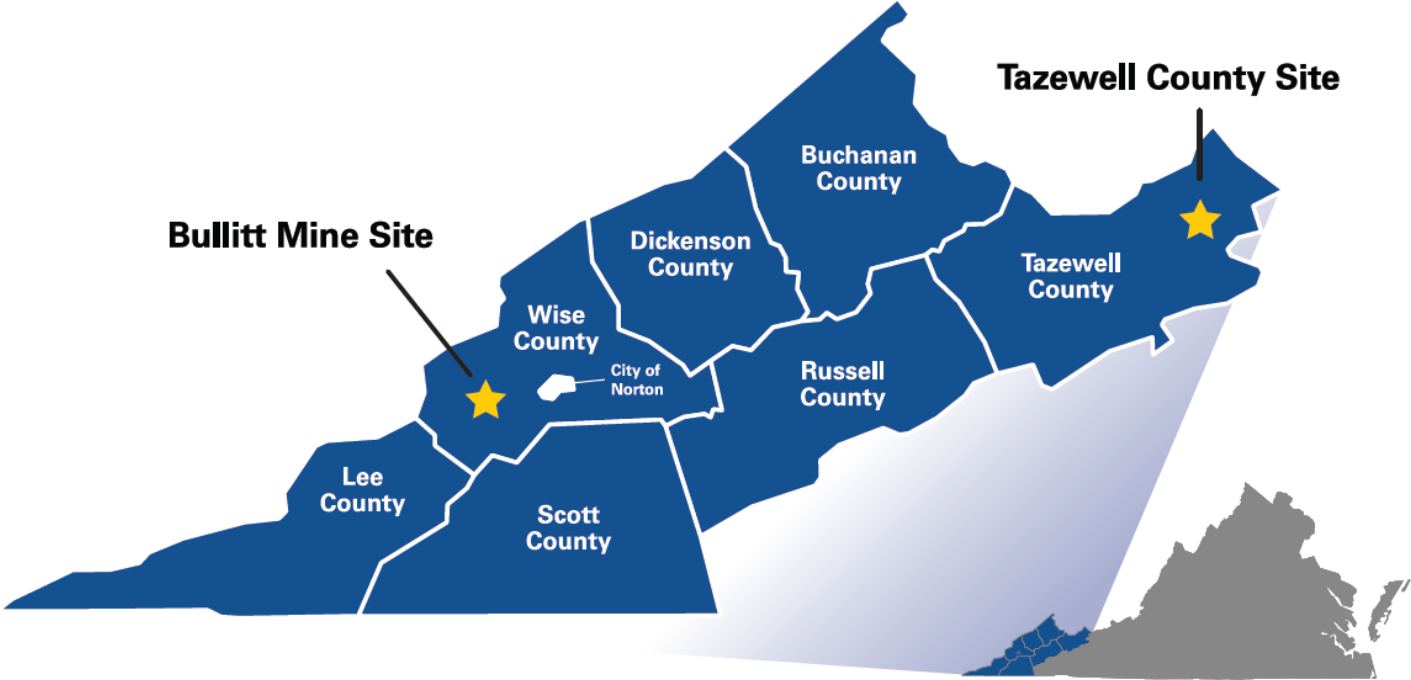
An act to amend and reenact §56-585.1 of the Code of Virginia relating to electric utility regulation; pumped hydroelectricity generation and storage facilities. Authorizes cost recovery for “one or more pumped hydroelectricity generation and storage facilities that utilize on-site or off-site renewable energy sources as all or a portion of their power source and such facilities and associated resources are located in the coalfield region of the Commonwealth as described in §56.2-6002, regardless of whether such facility is located within or without the utility’s service territory.”

Approved April 5, 2017

Effective Date July 1, 2017

This legislation deemed pumped hydroelectric storage in the coalfield region of Virginia is in the public interest.

Southwest Virginia Coal Field Region



Pump Hydro Storage

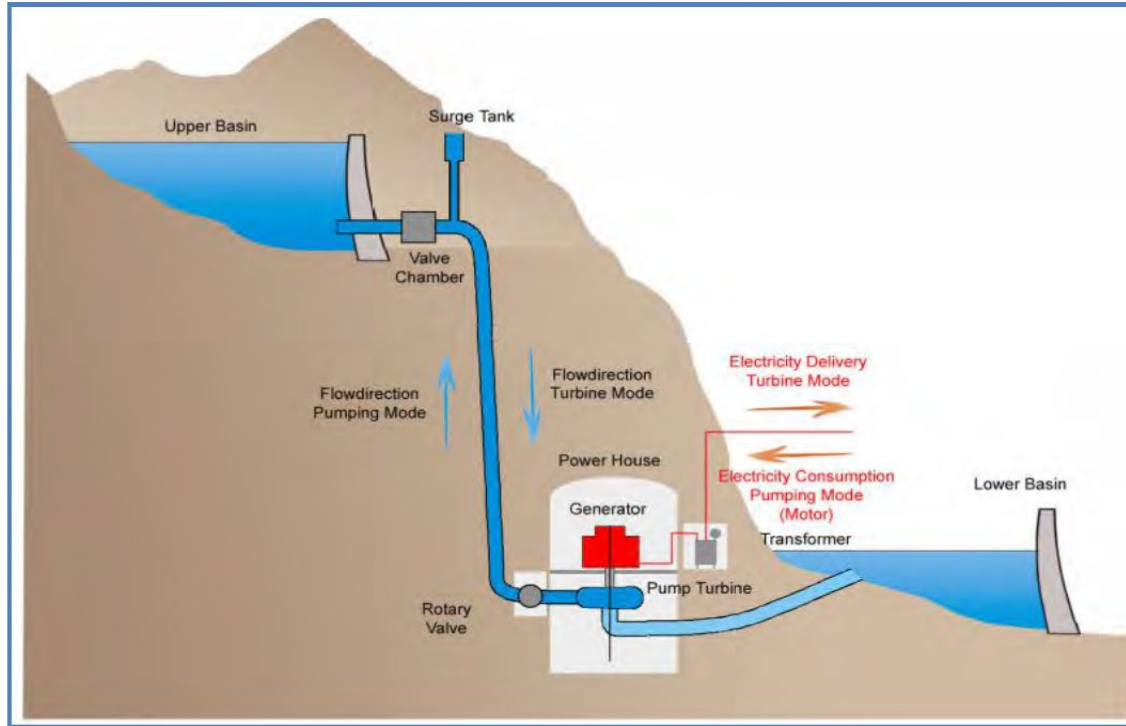
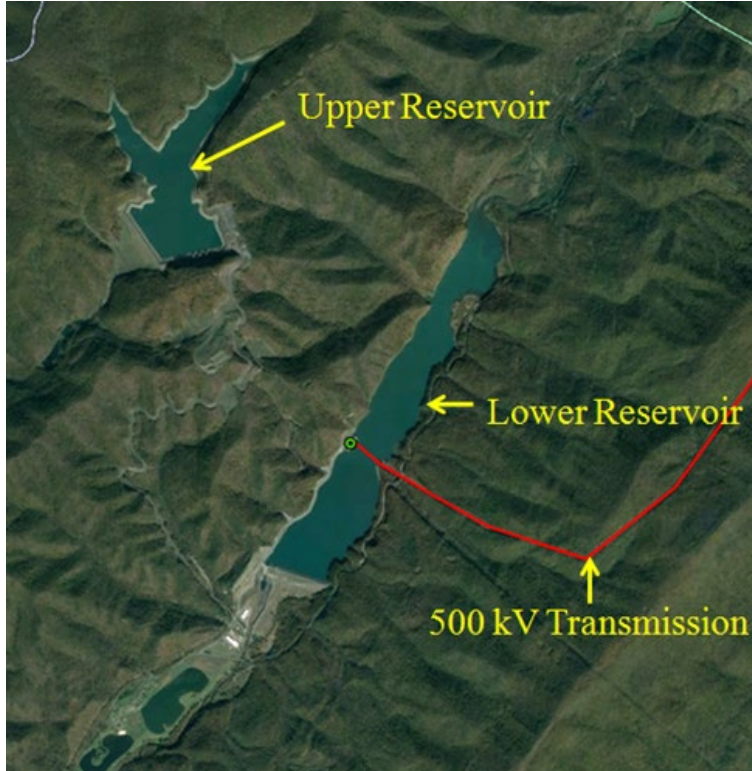


Figure 1: Typical Pumped Storage Plant Arrangement (Source: Alstom Power).

Pump Hydro Storage – Bath County



Station Facts

- Net generating capacity is 3,003 megawatts (6 units)
- License Issued - January, 1977 and commercial operation began December, 1985
- Owned jointly by Dominion (60%) and Allegheny Power System (40%)

Lower Reservoir Dam:

- 135 feet high and 2,400 feet long
- Contains 4 million cubic yards of earth and rock fill

Lower Reservoir:

- 555 surface acres
- Water level fluctuates 60 feet during operation

Upper Reservoir Dam:

- 460 feet high and 2,200 feet long
- Contains 18 million cubic yards of earth and rock fill

Upper Reservoir:

- 265 surface acres
- Water level fluctuates 105 feet during operation

Water Flow

- Pumping: 12.7 million gallons per minute
- Generating: 13.5 million gallons per minute

Pump Hydro Storage Study Locations



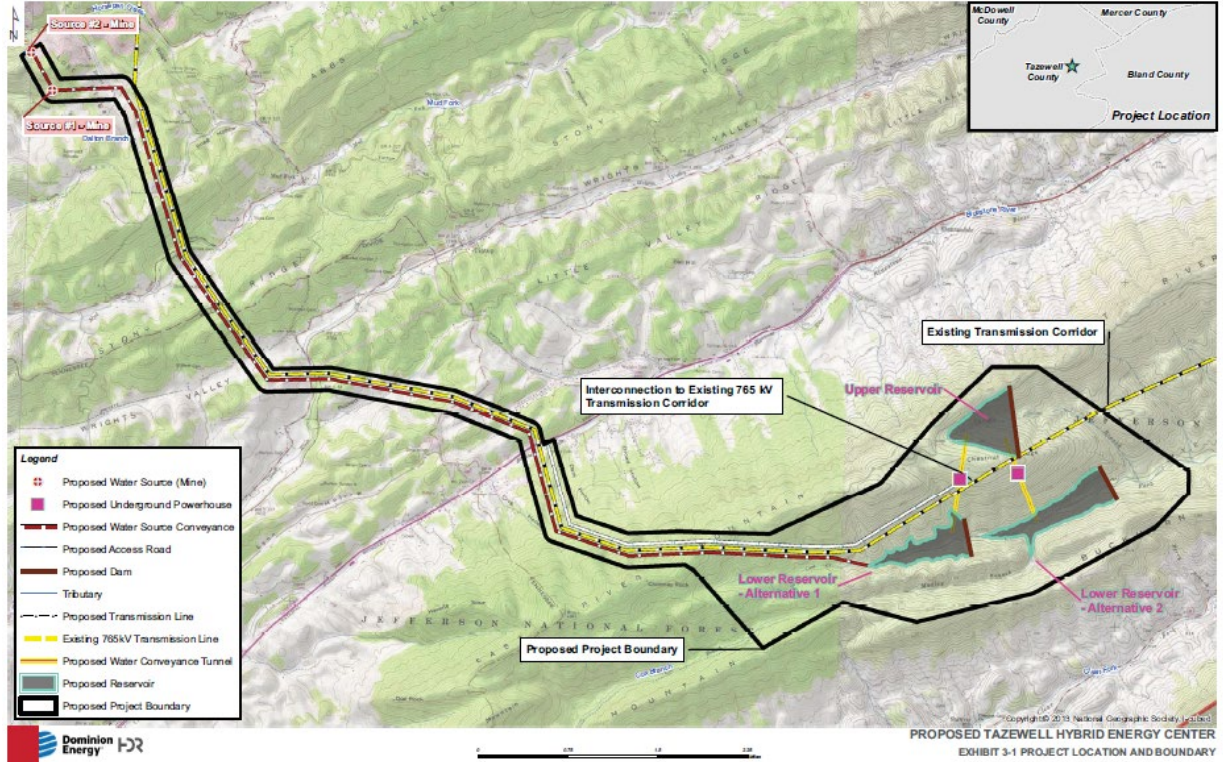
Wise County

Bullitt Mine



- Based on information from the Department of Mines, Minerals and Energy (DMME), the Bullitt Mine was identified as a top site for evaluation
- This concept would entail pumping water from the abandoned mine cavity up to an upper reservoir and then allowing it to flow back into the mine cavity; the abandoned mine would act as the lower reservoir
- Dominion has engaged with the DMME of Virginia Tech to evaluate the feasibility of this concept
- Virginia Tech is performing various studies, including hydrogeological, mine stability, subsidence, water quality, impact of water cycling, and validation of mine capacity.
- Study should be complete by late 2018

Tazewell County



Development Process

- FERC PPA filed September 6, 2017
- 4,100 acre site (2,600 acres owned by Dominion Energy)
- Conditions of Preliminary Permit
 - Valid for 3 years
 - Incorporates Department of Interior comments
 - Requires pre-filing consultation and study plan preparation in support of FERC PAD/NOI filing
 - Consult State, Federal, Local, and Tribes regarding project effects on related resources
 - Consult USFWS concerning bats, mussels, and other wildlife species
 - Consult US Army COE for permitting of fill and wetland impacts

Development Process – Next Steps



Site Selection Process:

- Complete site screening & risk ranking of all sites under consideration
- Select initial sites



Preliminary Permit Application:

- Dominion Energy has filed a Preliminary Permit Application with the Federal Energy Regulatory Commission (FERC)



Pre-Feasibility & Feasibility Studies:

- Begin an in-depth study of the initial sites
- Complete a variety of studies including: geological, environmental, layout, electrical transmission/interconnect, construction cost estimates, and more
- Select preferred site



Preliminary Application Document (PAD)

- Submit Preliminary Application Document (PAD) for preferred site to start FERC application process



On-going

Q4 - 2019

Economic Benefits – Revenue Sharing

A study conducted by Chmura Economic & Analytics found that the development and construction of a pumped hydroelectric storage project would have significant economic impacts in the Southwest region, from 2017 - 2027 including:

Additionally, once the potential station begins operations, the Southwest region will continue to receive annual benefits, including:



2,083
Jobs During
Development and
Construction



**\$320
Million**
Total Economic
Impact



**\$2.0
Billion**
Infrastructure
Investment



**Up to 50
Permanent
Station Jobs**



**\$37
Million**
Annual Economic
Impact



**\$12
Million**
Annual Local Tax
Revenue

NOTE: Values are approximate, based on economic modeling

Pumped Hydro Storage Revenue sharing – SB780 & HB1555

- Seven coal field counties & City of Norton