Governor's Committee on Energy Choice
Technical Working Group on Generation, Transmission and Delivery
DRAFT Findings & Recommendations

RECOMMENDATIONS:

A. The PUCN should continue to address Resource Adequacy and Planning Reserve requirements through the existing Integrated Resource Planning Process until an organized open competitive market is established by the Legislature.

B. NV Energy should identify must-run generation units and provide multiple options to eliminate the condition(s) giving rise to the must run status along with the estimated cost and time frame for implementation of each option provided. Construction costs should be recovered through ratepayers.

C. Transmission import and export capacity will need to be studied to see if additional expansion is necessary to join a wholesale market such as CAISO or SPP.

FINDINGS:

A. Issue – Resource Adequacy & Planning Reserves: Energy choice requires resource adequacy, including required reserves, to exist within the wholesale market region at the time Energy choice is implemented (i.e. there must be ample generation in the wholesale market area to meet expected loads in the market region served in order to foster competitive wholesale pricing of that generation). If Nevada elects to join an existing organized wholesale market such as the California Independent System Operator (CALISO) or the Southwest Power Pool (SPP), the wholesale market region is that of the organized wholesale market. If Nevada elects to create its own organized wholesale market, the wholesale market region is that of Nevada.

TWG Findings:

- Currently resource adequacy exists for the CALISO (see presentation by Stacey Crowley, April 26, 2017). Installed generation capacity is reported at 71,740 MW. Nevada native load peak of 7,961 MW occurred in 2016 (native load is only that of NV Energy affiliates and does not include balancing area loads of rural Nevada utilities, municipal utilities, and 704B customers) and would add approximately 11% (excluding reserves) to the CALISO resource requirement. The processes CALISO has in place to increase generation to meet Nevada native load require further investigation.
- Currently resource adequacy exists for the SPP (see presentation by Carl Monroe and Bruce Rew, August 8, 2017). Installed generation capacity is reported at 50,622 MW. Nevada native load peak of 7,961 MW occurred in 2016 (native load is only that of NV Energy affiliates and does not include balancing area loads of rural Nevada utilities) and would add approximately 16% to the SPP resource requirement. The processes SPP has in place to increase generation to meet Nevada native load require further investigation.

- Regional resource adequacy is verified by the Federal Energy Regulatory Commission (FERC) in its Winter 2017-18 Energy Market Assessment, Docket No. AD06-3, which states "Electricity capacity is adequate in all regions."
- By 2020 the shortage in resource adequacy is reported by NV Energy to be 1,178 MW, the equivalent of two large baseload/intermediate generating plants.
- Building out of new generation requires several years to plan, permit, finance and construct. Development of new baseload or intermediate generation resources within Nevada may not be possible within the available time frame. Buildout of new peaking or utility scale renewable resources may be possible in the time frame available.
- The decision on what organized wholesale market Nevada will participate in must be made several years in advance of the effective date of Energy Choice in order to provide time for the organized wholesale market to prepare for and adjust its resource mix for Nevada, or for Nevada to construct additional generation should Nevada elect to create its own organized wholesale market.
- Resource adequacy issues in Nevada will be further exacerbated by generation units or purchased power agreements that are not marketable for various reasons including contract terms, cost of generation or age of generating units. NV Energy currently has approximately 6,011 MW of owned generation and 2,930.5 MW in purchased power agreements (including pre-commercial agreements) (see presentation by Kevin Geraghty, June 21, 2017). The two primary electric energy trading hubs available for Nevada markets are COB and Mead. The trading hubs serve as a proxy as to current competitive wholesale markets in the region. Generation assets held by NV Energy with bus bar costs above these trading hub prices or purchased power agreements (PPAs) with pricing above these hubs may be difficult to liquidate and will further add to Nevada's resource adequacy issues in the short term. Current pricing at Mead follows in the below table. Of the 61 PPAs identified by NV Energy, all but the Kingston, Mill Creek, Newmont, TMWRF, Techren 2, Hoover, Stillwater PV, NPC_SPCC, and Techren 1 PPAs have pricing in excess of the Mead trading prices.

MEAD

Quote Date 10/13/2017

Forward Month	On Peak (6x16)	Wrap	7X24
Nov-17	$28.207	$23.281	$26.014
Dec-17	$29.105	$25.079	$27.244
Jan-18	$29.406	$26.852	$28.280
Feb-18	$28.939	$25.659	$27.533
Mar-18	$26.944	$23.139	$25.352
Apr-18	$25.268	$20.382	$23.096
May-18	$25.878	$21.455	$23.928
Jun-18	$35.404	$25.712	$31.312
Jul-18	$43.476	$25.919	$35.359
Aug-18	$42.315	$26.075	$35.505
Sep-18	$32.133	$23.894	$28.288

Oct-18	$28.801	$25.005	$27.209
Nov-18	$27.060	$23.228	$25.354

- Of the generation assets owned by NV Energy, its two coal resources - Navajo Generating Station (255 MW) and North Valmy Generating Station (261 MW) - are slated for retirement before or near the effective date of Energy Choice. These retirements will further add to the resource adequacy issues in the short term. Other units which were constructed prior to 1980 may be difficult to market such as Tracy Unit 3 (1974, 108 MW), Fort Churchill Units 1 and 2 (assuming must run conditions eliminated)(1968, 226 MW), and Clark Unit 4 (1973, 54 MW).
- In addition to other factors, resource adequacy is affected by planning reserves. Reserves are intended to assure sufficient generation resources are available to meet real-time operating requirements and to avoid the possibility that a load loss occurs no more frequently than one day in 10 years, commonly referred to as the "1-in-10 resource adequacy standard". Reserve margins directly affect reliability of the electric grid and cost of electric service.
- The concept of planning reserve margins is described by the North American Electric Reliability Corporation (NERC) as "…planning reserve margin is designed to measure the amount of generation capacity available to meet expected demand in planning horizon. Coupled with probabilistic analysis, calculated planning reserve margins have been an industry standard used by planners for decades as a relative indication of adequacy."
- Reserve margins have been historically established by individual regulated utilities using various methodologies to achieve the "1-in-10 resource adequacy standard". Differences exist among utilities in their calculation of planning reserve margin under the "1-in-10 resource adequacy standard". For example, some system operators calculate reserve margins using the nameplate capacity of intermittent generation such as wind and solar, while others use a derated capacity value.
- For the regulated utility in Nevada, reserve margins are established as a percentage of net customer requirements for NV Energy's native load and are 12 percent for NV Energy's customers in southern Nevada and 15 percent for NV Energy customers in northern Nevada. These reserve margins amount to 941 MW of generation in the year 2020, again the equivalent of two large baseload/intermediate generating plants.
- In a post Energy Choice environment, the regulated utility in Nevada will no longer be responsible for generation development but will continue to remain responsible for the development of transmission and distribution facilities to deliver electric energy to consumers within its designated service area. Reserve margins should be appropriate for Nevada specific circumstances.

B. **Issue – Reliability Must-Run Units:** Must-run generation units are those generation units that must run in order to provide for electric grid reliability under certain conditions. By definition a must-run generation unit has no competition, it is the only unit that can be operated to meet/eliminate the condition giving rise to the must run unit (i.e. transmission capacity overloads and transmission outages).

TWG Findings:

- NV Energy has identified four must-run generation units which if sold without addressing the must run condition, could result in anti-competitive behavior by the owners of such units. These units are:
    1. Fort Churchill Generating Station,
    2. North Valmy Generating Station,
    3. Clark Generating Station, and
    4. Clark Mountain Generating Station.
- Anti-competitive pricing by owners of must run generation units can be eliminated by pricing controls enacted by the organized wholesale market, or by elimination of the must run conditions through transmission system modification, load shedding or peak clipping that allow competition to occur.

C. Issue – Expanding Import/Export Transmission Capacity: Some of the advantages of joining an organized wholesale market include (a) participating in economies of scale relating to generation development, (b) taking advantage of load diversity amongst market participants, (c) minimizing overall quantities of reserves held in the market region, and (d) making the natural resources of various areas (solar, wind, geothermal) available to all participants of the organized wholesale market. To achieve these benefits will require sufficient transmission import and export capability from Nevada to the overall region served by the wholesale market.

Transmission planning in Nevada currently occurs in a vertically integrated utility environment in which one organization forecasts load requirements; and plans the generation and transmission to meet that requirement. Once approved by the regulatory body, the utility proceeds with development efforts. As pointed out by Pat Woods in his presentation on May 10, 2017; one of the critical components to ensure success of competitive wholesale markets (and by extension ultimately retail markets) is that the region covered by the market must have "robust" transmission infrastructure.

Currently, transmission development is funded by the regulated utility's investors who earn a rate of return on that investment once a project is approved by the Public Utilities Commission of Nevada. Transmission development in an Energy Choice environment may occur in a variety of formats including transmission companies, existing utilities, and state funded projects.

TWG Findings:

- The transmission system serving Nevada is electrically connected to all of its surrounding states. However, greatest connectivity from an import/export capacity perspective exists with California and Arizona (see presentation of Shahzad Lateef and Marc Reyes, November 7, 2017). This connectivity could support the deployment of the CALISO organized wholesale market into Nevada; however, development of a Nevada-only or deployment of an SPP organized wholesale market could also occur with the adoption of interchange policies between adjacent organized wholesale markets as common in organized wholesale markets serving Midwest, east and northeast regions of the country.
- Transmission import and export capabilities into Nevada are less than NV Energy's existing native load. Southern Nevada import limits are reported at 5,331 MW and northern Nevada import limits are reported at 1,000 MW.

- Increasing transmission import and export limitations is currently a multi-year process involving numerous stakeholders including interconnected transmission owners, regional transmission operators, the Western Electricity Coordinating Council, public utility regulatory bodies, local planning commissions, federal land management agencies, land owners, environmental groups, and citizen groups.
- Until import and export limitations are increased, Nevada based generation serving NV Energy native load is required.
- The current process used in Nevada to plan generation and transmission resources is the Integrated Resource Planning (IRP) process. This process is codified in NRS and NAC. Under the IRP process, NV Energy files with the Nevada Public Utilities Commission its IRP every three years and an energy supply plan annually. Much of this process may no longer be applicable to NV Energy in an Energy Choice environment.
- Using the IRP process, NV Energy historically has built the least-cost transmission option to meet local needs. In an Energy Choice environment transmission must be planned proactively as "highways" to benefit region covered by the organized wholesale market. This broader approach to transmission planning allows loads to be served and renewable generation options to be developed.
- In an Energy Choice environment responsibility for planning transmission to support local needs and to eliminate must run generation units may still fall to the utility.
- In an Energy Choice environment responsibility for planning transmission to support increases in Nevada import and export capabilities may need to be placed upon the regional transmission operator and the organized wholesale market.
- In an Energy Choice environment responsibility to plan transmission to support development of localized wind, solar and geothermal resources may need to be placed upon an existing or new state agency.
- In a vertically integrated utility model transmission study costs under the existing integrated resource planning process are borne by electric utility rate payers. Transmission study cost responsibility in an Energy Choice environment will need to be addressed.
- Texas instituted a program called the Competitive Renewable Energy Zones (CREZ) transmission development. Under CREZ, ERCOT identified areas of the state best suited for wind development. The Public Utility Commission of Texas then selected those areas as CREZ. ERCOT developed transmission plans to transfer future wind energy from CREZ to loads.
- A joint venture called Electric Transmission Texas (ETT) was formed to by several companies to construct approved transmission projects. Once a transmission project is constructed the ETT receives a return on its investment through transmission revenues collected by ERCOT.
- Use of the CREZ process resulted in the development of 18,500 MW of generation in Texas. Texas produces more wind power than any other state. Wind energy accounts for 12.63% of the energy generated in Texas.
- A variety of other methods to fund transmission projects are used by regional transmission organizations. One concept used by SPP for high voltage lines is identified as the "highway/byway" methodology. Under this concept cost responsibility is allocated based on voltage as follows:

Voltage	Region Pays	Local Zone Pays
300 kV and above	100%	0%
Above 100 kV and below 300 kV	33%	67%

100 kV and below	0%	100%