Advanced Advocacy
Spring 2011: Policy Memo

Keeping the Lights On
Agriculture & NV Energy Team up for System Integrity

I. Proposal

By Nevada statute NV Energy, an electrical utility servicing 97% of Nevada[1], and the Nevada Public Utility Commission (PUCN), provide farmers with a program for reduced electrical rates in exchange for a contract that allows the utility to interrupt electric service to their irrigation pumps in emergency power situations or if the utility had to buy high priced power on the 'spot' market to cover peak demand requirements.[2] This program is known as Interruptible Irrigation program (IS-2).[3] I propose to amend the statute to eliminate the PUCN and NV Energy's authority to interrupt power for economic purposes (like buying on the spot market) while maintaining their ability to interrupt for emergency electric system integrity.

II. Background

A. Electricity and the Power Grid

Electricity is taken for granted until the lights go out, only then do we grasp how dependent our daily lives are on uninterrupted electricity. Based on simple physics, we generate electricity through hydroelectric, nuclear, or coal fired plants, or via renewable energy sources like solar facilities. These facilities create an electrical charge and based on the dynamics of flow, electricity is transported via an electric power distribution grid from the production source to our homes, schools and outlets.[4] These electrical distribution grids have been set up throughout the country and are managed by numerous electrical utilities. Electrical power is not a stored

resource. Power plants generate megawatts of power which is sent to millions of electrical customers who consume those megawatts of power. [5]

A key aspect of the system is that production and consumption have to be closely aligned otherwise the system gets out of balance. If the system is working close to capacity and interruption occurs the result can lead to power outages. For example, if something causes a power plant on the grid to suddenly go off-line, other power plants increase production to cover the power loss. Power plants can go off line for a number of reasons including generating equipment failures, human error, fires, lightening strikes or geomagnetic storms.[6] If all of the power plants on a particular grid are close to capacity, then they cannot handle the extra load from the first plant going off line. In order to protect the power generating plants, the facilities are designed not to overload but rather to also go offline.[7] This cascading problem of plants shutting down will leave millions without power. Operators in such a system can react by quickly bringing other generating plants online with the grid or shutting down particular customers in order to maintain system balance and integrity.

Utilities deal with power grid capacity issues in a number of ways. Utilities closely monitor supply and demand requirements. They have the option to increase capacity by building additional power generating facilities; however, this is an expensive proposition and an inefficient use of capital if the new power plants are only used to cover emergency demand spikes.[8] Utilities can also enter into peak demand contracts to buy power from other producers to cover emergency situations. In some markets such as California, additional power generating capacity is limited and the utility has had to engage in more active management of demand.[9] The California utility has opted in some peak demand time frames to do controlled outages. A

brownout occurs when the electrical flow is temporarily reduced; typically, theses events are barely noticeable with just a dimming of the lights.[10] A rolling blackout occurs when a utility shuts off power to a particular region, then turns it back on and shuts off power to another region. Typically these outages will last for approximately sixty to ninety minutes.[11] Both of these strategies have been used by California utilities to avoid more serious and uncontrolled power outages.

In Nevada, and in other jurisdictions, the utility has an additional option to manage peak demand of electricity, known as interruptible Service or Demand Response programs.[12] Typically, a utility will set up these programs focused either on emergency demand response or economic demand response. Emergency demand response is primarily needed to avoid outages. Economic demand response is used to help utilities manage daily peak loads. Nevada's PUCN has incorporated both objectives into one program. More commonly, utilities provide programs targeted to either emergency situation or to manage economic demand. As the nation's grid systems become more technologically advanced and we have a Smart Grid, demand management and smart metering will move beyond industrial and agricultural industries and into the residential demand segment.[13]

Basically, these programs provide 'interruptible' electric rates which are lower than other rates in exchange for the ability to demand a specific customer segment to occasionally reduce usage.[14] In Nevada the program is known as the IS-2 program; it gives the utility the option to cover an emergency event that affects electrical supply or an unplanned spike in demand by shutting down farmers enrolled in the program engaged in irrigating their fields. This represents approximately 1% of the NV Energy's electric demand during the summer months.[15] This

amount of interruptible demand is enough to provide the utility with time to re-align its flow and thereby avoid uncontrolled power outages. This available interruptible demand lessens the need for NV Energy to build excess generating capacity and thereby helps keep electrical rates lower for most of Nevada.

B. Agriculture in Nevada

In 2009, agriculture was just under a billion dollar industry in Nevada and contributed approximately $730 million to Nevada's exports.[16] There were approximately 3000 farms with the average farm being 1,916 acres.[17] Farming is a critical industry for the rural counties in Nevada and over 80% of the farms are located outside of the two urban counties while only 12% of the population lives in the rural counties. [18] Roughly half of Nevada's agricultural income is derived from Livestock (Cattle, Dairy products, Sheep, etc.) and half from crop production.[19]

The number one crop in Nevada is Alfalfa hay which accounts for 25% of all agricultural income. [20] Alfalfa is well suited for Nevada's rugged terrain, irrigable soils, and short growing season.[21] The average temperature north of Las Vegas in 2009 was 48 degrees with the lowest temperature being – 22 and the highest temperature reaching 102.[22] Much of the Central region is at higher elevation and has approximately 100 days of growing season. These conditions stress the alfalfa, and the result is a higher level of protein in the plant. The higher protein alfalfa is known as premium alfalfa and it commands a higher price per ton. Alfalfa is grown as a feed source for livestock and the higher protein levels makes it ideal for Dairy cows.[23] The majority of Nevada high protein alfalfa is shipped into California to support their dairy industry (246,000 tons in 2009)[24]. The biggest input to producing premium alfalfa is water and in Nevada the

largest cost component is the electricity needed to pump ground water to the surface and operate sprinklers. The majority of IS-2 participants grow alfalfa.

i) Water

Nevada is one of the most arid states in United States. Water resources come from either surface water sources or from ground water.[25] Nevada has an extensive system of underwater aquifers (underground reservoirs and rivers) and the majority of all irrigation of crops is drawn from ground water resources. It is estimates that there is a continuing supply of ground water equal to 1.7 million acres of water.[26] An acre of water equals 325,851 gallons or roughly the equivalent of 1 inch of water on a football field.[27] Nevada's annual supply of both ground and surface water is approximately equivalent to the same amount of water that flows out to the sea in 16 days from the Columbia River between Oregon and Washington.[28]

ii) Electricity

The drilling of wells to tap into ground water resources began in earnest in the sixties in Nevada.[29] Typically, the water is pumped over 200 feet to the surface by large pumps that pump water at a rate of 900 gallons per minute. The first generation pumps were mostly diesel powered. In the seventies, a concerted effort was made to electrify more of the rural areas of Nevada and the utility (Sierra Pacific, at that time) worked with farmers to modify their pumps for electrical power.

iii) Other Jurisdictions

Given the nature of the electrical distribution grid, interruptible service for large commercial and industrial customers existed early on. Typically these are voluntary contracts between industry and the utility and not codified into state law. Currently, there are no Uniform

state laws regarding demand response acts programs.[30] States do have extensive laws governing water useage and these are particular to the states needs[31]. In South Dakota, the state has been set up into irrigation districts each with elected board members and a complete chapter of Codified laws governing their duties and authority and while the primary utility has an interruptible irrigation program it remains outside of state legislation.[32] California was also originally set up with Irrigation Districts, however the recent trend in the state is to dissolve the Irrigation districts and re-form the governing units into Water districts with authority over the local governance of water and energy within the State's umbrella legislation.[33]

The History of IS-2

In the late seventies as more irrigators were coming on line in Nevada, electric rates also rose dramatically. The Nevada Farm Bureau created the Northern Nevada Irrigation Well Users Committee to review the issue.[34] Working with a consultant, the Committee's final recommendation was to develop a Interruptible service program to help lower electrical rates. This study was the basis of legislative bill AB580 which was presented and passed during the 1981 Nevada State Legislature session.[35] Senator Glaser from the Northern Nevada district presented the bill and testified that farmers in Nevada were at a competitive disadvantage with farmers in Idaho that had very little cost for water.[36] Evidence was presented showing that electrical rates for farmers had increased 300% from 1974 to 1980.[37] It was estimated that electrical costs would drop approximately 29% with the new service.[38] There was concern that other groups of customers would come forward to try and reduce their rates and Sam Hohmann, a Senior Research Analyst with the utility, reaffirmed that this was a load management proposal

which would reduce overall cost of service to consumers thus justifying the reduced rate to irrigators.[39] The bill was the result of cooperation between farmers and the utility company. [40]

NRS 704.225 was created as a result of the passage of AB580 in the 1981 Legislative Session. [41] IS-2 rate was created through the regulatory process of the PUCN. [42] In the development of the rate, the Commission focused solely on the issue of system integrity. [43]

In 1987, the legislature amended the statute and extended the period that the reduced rate was available to farmers (from April 1st to October 31st to March 1st to October 31st). [44] In the 2007 Session, the Legislature again addressed the issue. In 2005, the PUCN had proposed a rate increase for all customers and advised the Legislature that the increase would be nominal to irrigators.[45] The actual increase of the IS-2 rate between 1987 to 2007 was over 150%. The rate moved from 3 cents to 8.1 cent per kilowatt hour (kwh).[46] AB144 established a formula that the utility is to use in establishing the IS-2 rate for participating irrigators. The formula averages the lowest rate used by 17 different utilities. In 2007, the formula resulted in an IS-2 rate of 6.1307 cents per kwh.[47] During the hearing on AB144, there was discussion that because of the reduced IS-2 rate other consumers had to pay more to cover the loss of revenue. Kirby Lampley, Director of Regulatory Operations, Public Utilities Commission of Nevada confirmed that the increase to other customers averaged approximately 80 cents per month. [48] Legislators understanding that consumers would be charged for the loss revenue associated with IS-2 passed AB144 unanimously out of both houses. [49]

The new formula was implemented in the 2008 growing season. That year, the PUCN initiated a series of meetings to determine whether and how they could curtail service to irrigators during peak times of the day and year. Their contention was that since this was

interruptible power, not providing it during peak demand times would end up saving money for all consumers. In 2009, the utility, with endorsement of the PUCN, implemented a pilot program to determine whether there was significant savings if service was curtailed from 2pm to 6pm in July and August. They provided irrigators the option to continue to utilize power during that time but at rate three times the utility's highest rate. For those participants that curtailed pumping during the time period, overall crop yields were reduced, in some cases, as much as 25%. For those who continued to pump and pay the higher rate, their electrical costs for the year were up significantly. The utility estimated that the system savings of the economic curtailment only amounted to 2 – 3% of the estimated $10.8 million dollar IS-2 subsidy.[50] This was significantly lower than anticipated.

Given the poor return for instituting a peak demand program, the utility, with approval from the PUCN, opted not to implement the peak period economic curtailment for the 2010 growing season.[51] Currently, this issue has been under review for the 2011 growing season. The PUCN started hearings related to the program in September and by November the utility and farmers had a stipulated agreement not to run the program for the 2011 growing season. The PUC Hearing officer, however, ignored the stipulated agreement and in his draft order recommended the program be run again in 2011.[52] On March 28, 2011, the PUCN held a hearing and the Commissioners voted not to accept the Hearing Officers' draft order but rather to accept the stipulated agreement between farmers and the utility.[53] The peak curtailment program will not be enforced in the 2011 growing season and interruptions to service for IS-2 customers will be based solely on maintaining system integrity.[54]

III. Policy Rationale of Proposed Bill

The proposed bill outlines the criteria for interrupting electrical service to irrigators. It limits the authority of the PUCN and the utility to initiate a curtailment program based on economic factors.

The legislature acted in 2007 and fully debated the tradeoff of creating a set formula for reduced IS-2 rates with the PUCN's contention that rates for other customers would rise. They discussed the value provided to the state via its agricultural sector and agreed that its importance to the rural counties and contribution to a diversified economy warranted the lower rate.[55] The fact that this rate was in exchange for the ability to 'interrupt service' during emergency situations was an acceptable trade-off and in the long run helped keep electric rates lower for all customers.[56]

The PUCN, however continued to pursue efforts to reduce the value of the IS-2 rate to agricultural irrigators and did not heed the policy directive sent to the Commission from the Legislators. Pursuant to NAC704.680 (Recover of Deficiency) and its regulatory authority, the PUCN attempted to create a program where some of the value provided by the legislature to farmers would be returned to its retail consumer base.[57] The pilot program showed that the peak curtailment program did not reap the cost savings expected and had a significant adverse impact to irrigators.[58] While the decision was made via the PUCN, utility and IS-2 customers not to operate the program in 2010 and now again in 2011, the current regulations require a yearly review process to make a determination whether the program will be enforced. [59] This review is costly and if the parties dispute the decision (as occurred this year), a decision whether to enforce or not can be delayed well into the IS-2 Irrigation season. The farmer cannot effectively plan their cost factors for the upcoming growing year with possible repercussions for farm financing.

In order to take out this yearly uncertainty, the proposed bill takes the issue of a peak curtailment program off the table and clarifies the Legislative intent that Irrigators should receive a reduced rate (via a set formula) in exchange for the ability to interrupt the Irrigator's electrical service when necessary for system integrity.

IV. Conclusion

The proposed bill clarifies the Legislators intent that Agricultural irrigators were to get the benefit of a reduce rate for electricity in exchange for interruptible service that could be used in an electrical emergency to maintain the system integrity. It repeals NAC 704.683, the PUCN's regulation requiring the utility to recover deficits between the IS-2 rate and consumer rate. The bill reinforces the policy rationale of promoting a healthy, competitive agricultural sector and thereby strengthens the state's economic diversity. The bill maintains the IS-2 program allowing the utility to utilize this customer segment as one of its tools to manage supply and demand and consistent electrical flow. The bill clarifies the parameters of an 'interruption' and streamlines the IS-2 program. This reduces Nevada's administrative expense for the program and allows farmers to more easily plan for their cost inputs. It takes uncertainty out of the program and it helps the farmer reduce its largest cost component while maintaining adequate electrical service. The program helps NV Energy '**keep the lights on**' in Nevada.

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[1] NV Energy website *available at* http://www.nvenergy.com/company/facts.cfm.
[2] NV Energy website *available at* http://www.nvenergy.com/company/rates/is2customer/images/faq.pdf .
[3] NRS 704.225 last amended 2007 *available at* http://www.leg.state.nv.us/Division/Legal/LawLibrary/NRS/NRS-704.html#NRS704Sec225.
[4] Marshall Brian, *How Power Grids Work*, available at http://science.howstuffworks.com/environmental/energy/power.htm (last visited April 2, 2011).
[5] *Id*.
[6] Marshall Brian and Julia Layton, *How Blackouts Work*, available at http://science.howstuffworks.com/environmental/energy/blackout.htm (last visited April 2, 2011).

[7] *Id*.
[8] *Id*.
[9] California Energy Commission , *Rotational or Rolling Blackouts, available at* www.consumerenerby center.org/tips/BLACKOUTS (last visited April 4, 2011).
[10] *Id*.
[11] *Id.*
[12] Lindsay Audin, *The History of Demand Response*, Facilities Net, July 2008 *available at* http://www.facilitiesnet.com/powercommunication/article/The-History-of-DemandResponse--9247 (last visited April 2, 2011).
[13] *Demand Response, available at* http://en.wikipedia.org/wiki/Demand_response (last visited April 1, 2011).
[14] *Id.*
[15] See 2007 Testimony
[16] Minnesota IMPLAN Group, Inc. IMPLAN Professional System (data and software), *Nevada 2009 Employment, Output, Labor Income and Exports by Economic Sector*, IMPLAN V3, Hudson, WI.
[17] *Number of Farms and Land in Farms and Ranches: 2000-2009*, USDA's National Agricultural Statistics Service, Nevada Field Office; cooperating with the Nevada Department of Agriculture and University of Nevada, at 6.
[18] *Id*., 4-6.
[19] *Id*., at 9.
[20] *Id*.
[21] *Id.*, at 18.
[22] *Id*., at 14.
[23] *Commodity fact sheet: Alfalfa*, California Alfalfa & Forage Association, 2004.
[24] Supra 17 at 22.
[25] Jason King, P.E. *Water Rights 101 Presentation* , State Engineer's office, Division of Water Resources, Department of Conservation & Natural Resources, State of Nevada, at Slide 41.
[26] *Id.* at Slide 48.
[27] *Id.* at Slide 8.
[28] Id. at Slide 49.
[29] *Id.* at Slide 45.
[30] *available at* http://www.nccusl.org/Legislation.aspx.
[31] For a state review of water withdrawl regulations see http://www.nccusl.org/Legislation.aspx
[32] SeeChapter 46A on SD irrigation districts *available at* http://legis.state.sd.us/statutes
[33] For an example of this trend see SB117 Chaptered on 9/30/08 *available at* http://www.leginfo.ca.gov/cgi-bin/waisgate?WAISdocID=92126225393+6+0+0&WAISaction=retrieve (last visited April 1, 2011).
[34] Minutes of the Nevada State Legislature, Assembly Committee on Commerce, dated 5/6/1981, at 3.
[35] *Id.*
[36] *Id.*
[37] *Id.*, Testimony of Leroy Horn, rancher from Lander County.
[38] *Id.*, Testimony of Assemblyman Rhoads.
[39] *Id.* Testimony of Sam Hohmann, in response to a question from Assemblyman Jeffrey.
[40] Minutes of the Nevada State Legislature, Senate Committee on Commerce and Labor, dated 5/20/1981, at 4.
[41] NRS 704.225
[42] Docket #2357, General Order Number 34.
[43] Testimony of Dave Noble, PUC Hearing officer,
[44] NRS 704.225
[45] Testimony from Assemblyman Pete Goicoechea, Minutes of the Meeting of the Assembly Committee on Commerce and Labor, 74th Session -3/9/2007.
[46] *Id.*, at 17.
[47] *Id.*
[48] *Id.*, at 29.
[49] Journal of the Assembly, 73rd Day, Pg.60 and Journal of the Senate, 119thDay, at 61 *available at* http://www.Leg.State.NV.US/Session/74th2007/Journal.

[50] PUC Commission Order Docket 09-09020, at 11-12.
[51] *Id*.
[52] Docket 10-10031 Draft Order filed 3-17-11 by David Noble, PUCN Hearing Officer.
[53]Docket 10-10031 Order Filed 3-31-11 Stipulations approved.
[54] Id.
[55] Supra 35
[56] Id.
[57] NAC 704.680 amended by PUCN by R070-07, 4-17-2008.
[58] Supra 45.
[59] Docket 10-10031.