~~**Keynote Address to the Society of Women Engineers Awards Banquet**~~
~~**April 27, 2004**~~**Engineers Week 2006 Banquet**
Commissioner Kris Mayes
February 23, 2006

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INTRODUCTION

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Good evening. It is an honor to be with you tonight. I would like to thank Andrew Smigielski with Southwest Traffic Engineering,~~your National President, Vi Brown,~~ for extending the invitation to be with you tonight. I have to admit that recently my mother heard me introduced at an event and when someone afterward said that they thought I had an interesting career history she turned to them and said, "Not really, my daughter just can't keep a job."

Like all of us my Mom is very good at keeping my feet on the ground. Recently, I was interviewed on Channel 8's Horizon. I was talking about the record electricity demand that our utilities experienced this summer, including APS, and I asked my Mom afterward how she thought I did. She said to me, "well, Kristin, I didn't understand a thing you said, but your hair looked good."~~ I would also like to thank all of~~

~~the officers and members of the Society of Women Engineers, Phoenix section for your warm welcome.~~

~~It was only eight months ago that I joined you for Vi's installation as President for your society. In terms of business before the Corporation Commission, many of the issues we discussed in August remain at the forefront of our agenda.~~ Tonight, I would like to talk to you about some of the challenges and opportunities we face in the nation's second fastest growing state. ~~-~~First, a few numbers: In the next hour, 16 people will move to Arizona; every month 12,000 new people call our state home.

~~So let me just tease out this issue by referring to a~~A couple of recent headlines illustrate our dilemma. Last Sunday, the Arizona Republic ran a story on its front page about a proposed housing development in Mohave County, about 200 miles northwest of here on your way to Las Vegas. On the drawing boards for this parched high desert area are 32,000 new homes. But there are few roads, no water pipes, not enough electrical lines, and only half the water supplies in the

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area needed to support 32,000 homes. A few weeks before that headline ran, a story appeared in Tucson's main daily newspaper, describing a~~n~~ natural gas outage on the city's west side. It seems the growth in the area was so fast, and so unexpected, that Southwest Gas, the state's largest gas distribution company, was caught flatfooted, and thousands of homes had to have their pilot lights relit. And in an incident two and a half years ago that made national headlines, a Kinder Morgan high pressure gasoline pipeline the runs between Phoenix and Tucson ruptured, spewing 35,000 gallons of gasoline 40 feet into the air on onto 5 nearby homes. ~~two and a half years ago.~~ Had the pipeline ruptured 40 years ago closer to the time it was built, this incident might have gone virtually unnoticed~~might not have been noticed by many people~~. But 50 years into its lifetime, this pipeline, not unlike many others, now sits just feet away from dozens of new housing developments, which have encroached upon the pipeline as developers and new homebuyers are increasingly willing to put down stakes almost anywhere.

~~on the Commission.~~ Our state's population continues to grow exponentially and ~~,~~ with that comes the need for infrastructure to keep

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up with the demand. It was Kevin Costner who made the line "If you build it they will come" famous. Well, in Arizona they'd have to change the phrase to "You had better build it, because their coming." The stakes couldn't be higher. If we succeed, Arizona could become a beacon of economic prosperity; if we fail we will put millions of new denizens at risk of living in a region that is defined by its crumbling and inadequate infrastructure. And so I figured what better audience to talk about infrastructure than a group of engineers. I also figured I might be able to talk a few of you into staying in Arizona to help build it.

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~~At the Corporation Commission, we are working to address pipeline safety issues, electricity reliability issues, arsenic standards, infrastructure needs and environmental portfolio standards, to name a few. Before I captivate you with the details of those, and other projects, I would like to share with you how I got to be in my position on the Arizona Corporation Commission.~~

~~*They ask that you tell a personal story on how you ended up on the Commission. Specifically a few war stories – the McCain straight talk*~~

~~*express is always a good one to share.*~~ **CORPORATION COMMISSION**

First, a little background about the Corporation Commission. Constitutionally based; created in 1912 to protect consumers from the power of the monopolies of the day – railroads and big oil companies. Widely considered to be the most powerful utility commission in America, the Corporation Commission is the only Commission that is both popularly elected and lodged in the Constitution as the state's fourth branch of government. Today, the ACC ~~It~~ is composed of 5 Commissioners, all elected statewide. We regulate electric and natural gas utilities, pipeline safety, corporate filings and civil securities ~~Today we regulate Arizona's utilities~~. In the case of utilities we feel it's very important to hold these corporations ~~utilities~~ accountable because unlike other business entities, these are among the few true monopolies left in our economy. They operate outside the normal sphere of ~~they don't~~ ~~have~~ competition ~~– you don't have a choice. We regulate electricity, natural gas, pipeline safety, corporate filings and civil securities.~~

ENERGY ISSUES

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At the Corporation Commission, ~~we are dealing with many important issues to help meet Arizona's ever increasing need for safe, reliable energy service. As~~ we are discovering~~learning~~ every day, that it is simply not enough to have an adequate supply of the resources that keep our businesses and productivity going. We have to make sure those supplies reach those who need it in a safe and reliable fashion. Just as the population is growing, it is also spreading, to the far reaches of the state.

~~In the Valley specifically, and state as a whole, there's a lot more people who need power, fuel and telecommunications today then there were yesterday. Almost 12,000 new residents are calling our beautiful state home each month.~~ Recent census estimates place Arizona's~~our statewide~~ population at 10.7 million people by 2030. By that time, our state will be the 10th largest in the nation, surpassing states like New Jersey and Michigan. We will need reliable energy supplies, to help sustain the ~~tremendous economic~~ growth that we will see in the decades ahead.

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And as we look to the future, it can be instructive to think about how Arizona became positioned for all this growth. It all started in fact with the political visionaries ~~Arizona wouldn't be where it is today without visionary leadership of the past leaders,~~ who ~~-~~dreamed up~~established~~ monumental projects, like the Central Arizona Project and the engineers who made it happened. The tremendous growth in this state over the past 40 years was made possible by this major act, spearheaded by Arizona legends, Carl Hayden, Barry Goldwater, Paul Fannin and John Rhodes, to name a few. These leaders developed one of the largest public works projects in history, which brings Colorado River water to central Arizona. ~~This project~~The Central Arizona Project supplies the water that turned an otherwise inhospitable desert into this thriving, shining metropolis that we have today.

The growth that was made possible by our visionary forefathers, has given rise to the engineering challenges of tomorrow; how to build our critical infrastructure to meet the exponential growth that lies ahead.

~~Currently, regulated electric providers in the state develop 10-year plans to forecast future demand and supply. These forecasts enable our~~

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utilities to plan and develop the necessary resources and infrastructure to meet the growing demands of the state. I have confidence in our electric utilities that they will continue to meet the increasing thirst for energy that our state places on them. However, one area that I believe we can, and should do more planning for, is our natural gas infrastructure. The Corporation Commission does not regulate the interstate pipelines that cross our state, that job is left to the Federal Government.

The sobering reality is that Arizona is dependent upon a single pipeline for natural gas and a single fuel pipeline. An even more sobering thought is that this pipeline is the same 50-year old like the one that burst in Tucson two and a half years ago. We need to address this issue with due haste. We do not have the luxury of waiting for the next line to rupture; rather, we need to take proactive steps now, to ensure we have a safe, reliable flow of gas into our growing state. This will not be cheap, or easy, but it is necessary. Undoubtedly, we will need to turn to the engineering community for solutions to help us solve this problem.

However, before the Commission and the state can begin the process of adding additional infrastructure, our first task is to ensure that

the systems currently in place are safe, secure and reliable. Recent incidents in the state, such as the pipeline rupture in Tucson in 2003, and a major substation fire last summerin 2004 that placed more then 2 million people at risk of rolling blackouts, are a perfect example of our state's great challenge. I will address the substation issue later, but first I would like to discuss ongoing pipeline safety efforts at the Commission.

Almost two years ago that the issue of pipeline safety broke onto the Arizona scene when the Kinder Morgan pipeline burst in Tucson, sending more than 30,000 gallons of liquid gas through the soil, shooting 50 feet into the air and eventually onto several nearby homes.

One of the first and most instructive things we learned in the aftermath of that burst was that most of the 671 miles of Kinder Morgan pipeline in Arizona is at least 50 years old. It simply needs to be replaced, and in some cases expanded to meet our growing appetite for gasoline.

As you may have seen in the news recently, the City of Chandler is experiencing problems with a 6-inch jet fuel pipe owned and operated by

Kinder Morgan. In this case, the pipe is 55 years old and runs through the heart of Chandler, near the new 202 freeway. The City has asked Kinder Morgan to pay to (1) move and (2) replace the pipeline. This hasn't occurred yet, but we will continue to work with both the city and the company on this important issue to the Southeast valley.

The second thing we learned from the Tucson incident is that these pipelines simply aren't inspected enough. For the first time, last summer, the ACC was granted permission to perform unlimited inspections on the Kinder Morgan lines. Arizona is the only state that has been granted this unlimited authority for inspections, and it is a real victory for Arizona.

I will continue to work with the other Commissioners, other elected officials and Kinder Morgan to ensure we have a safe, reliable flow of gas into our state. We need to take proactive action so we don't experience another rupture in another Arizona city.

Electric reliability across the state is another priority of the Commission. When we last metIn July 2004, the West Wing substation fire was at the forefront of the local news. To refresh your memory of

this incident, last yearin July, 2004, the Valley was nearly brought to its knees when the APS West Wing substation burst into flames in the nearby city of Peoria. In an unprecedented accident, five transformers and thousands of gallons in mineral oil caught fire, rendering the entire substation virtually useless. West Wing is one of only four substations that act as a gateway for power into Phoenix. Rolling blackouts were avoided through the work of APS engineers and the conservation efforts of businesses and residents from across the Valley.

This incident demonstrates to us that a relatively simple series of events can leave our electrical grid vulnerable. Since we last metIn the aftermath of this incident, the Commission has convened workshops with both APS and SRP to address this issue and we have made significant progress on reducing the probability of another event like this occurring.

As you can see, we have a great deal of work to do to ensure the safety of our pipelines and electrical grid.

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Now I would like to turn to a topic you will be hearing more of in the weeks and months to come, renewable energy. Arizona was one of the

pioneering states in requiring its utilities to acquire a percentage of their power from renewable, or green, resources. This is through a program known as the Environmental Portfolio Standard, or EPS. The Commission is working on revised EPS standards. As it stands now, we require utilities to purchase 1.1% of their energy from renewable resources. Under a revised EPS, we would require the utilities to purchase up to 2515% of their energy from these resources. The Commission is poised to vote on this ambitious package next week.

A large percentage of these purchases come from solar power. As I'm sure most of you know, Arizona has more days of sunshine then any other state in the union, yet New Jersey, of all places, has surpassed us in the amount of solar that it requires its utilities to produce. It's high time for Arizona to become a nationwide leader in solar energy. We shouldn't be behind states like New Jersey in solar energy production. We need to take proactive steps to create a robust market for solar electricity in Arizona.

We will need assistance from engineers and technicians, like you, to help make this happen. Engineers will play a key role in

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~~designing and developing efficient solar technologies for use by utilities, businesses and residential units. I am confident that we are up to the challenge.~~

Complicating matters for fast growing states is the fact that energy costs just about everywhere are on the rise. Nationally, energy expenditures account for about $1 Trillion and 8.7% of GDP. This percentage is projected to continue to increase in coming years. And while its gasoline prices that most people see and feel most acutely, the real driver of our national energy crunch right now is natural gas, which for the first time in the history of this country is trading in tandem with the price of gasoline. As goes gasoline, so goes natural gas.

Natural Gas Prices

What had already been an upward trend in natural gas prices over the past year was exacerbated by Hurricane Katrina and later~~now~~ Hurricane Rita. Katrina shut down 83% of the gas production in the Gulf of Mexico. **In the last year, the price of natural gas increased over 130% - from roughly $4.50/mmbtu to over $10.70/mmbtu in the**

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Southwestern U.S. It has since settled down into the $7.00/mmbtu range.

In addition to the hurricanes, natural gas prices have been driven skyward by simple notions of supply and demand. In Arizona, we have increased the demand for natural gas by leaning too heavily on natural gas fired electricity. In the past 10 years, 90 percent of the new electric generation built in this state has been natural gas fired plants. This means that today, for the first time in history, we use more natural gas to fire our electricity than to heat individual homes.

So how have those wholsesale prices translated for the average customer? Not well. The rise in natural gas prices have led to the need for dramatic rate increases by both natural gas companies and electric companies. This winter, we were asked by a company called Unisource, which serves in northern Arizona, to raise rates on customers by more than 40 percent; we raised them by 26 percent. One woman called me and told me she had been forced to shut off her gas, and was wearing sweaters to keep warm. And the state's largest electric provider,

Arizona Public Service, has over the past year asked for more than 25 percent in rate increases, prompting a deluge of complaints I might add to our offices.

What has to be done? Like most problems in life, I think we need a plan to solve this one.

AZ Energy Plan

President Bush has spoken about the need for a National Energy Policy, and I believe it is time for the Arizona Corporation Commission to take the lead in crafting a statewide energy plan that will help keep down the cost of energy and help us win our energy independence.

It has almost become a national consensus that as a country we've become too reliant upon foreign oil.

The federal government is taking steps to lessen our dependence on foreign oil, and I strongly believe that Arizona needs to take bold steps to help ensure our energy independence.

I believe we need to take important, bold steps to help ensure our energy independence.

I have three ideas to help Arizona on this path.

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First, we need to increase our natural gas and refinery infrastructure here in Arizona.

Second, we need to diversify our energy portfolio.

Third, we need to work to ensure that our utilities are providing reliable supplies of electricity and natural gas, and not allow AZ to fall into the trap that other states, namely CA have.

These steps will help both our economic and national security. By lessening our dependence on foreign oil, we decrease our reliance on countries with political uncertainty, specifically in the Middle East which helps our overall national security interests. By encouraging more domestic production, we help bolster local economies, and create good jobs for Americans helping boost our economic security.

Need for Infrastructure

We need new refineries throughout the United States. No new refinery has been built in the U.S. in **30 years.** There is currently a proposal to build a refinery outside of Yuma, utilizing crude oil supplies that would be piped up through Mexic and into Arizona. The gasoline would be refined, and then placed onto the Kinder Morgan pipeline,

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pumping new supplies of gas into both Arizona and Claifornia, ~~I have been supportive of this project, which will bring necessary sources of gasoline into Arizona,~~ as well as providing good jobs in the Yuma area. And what is even more remarkable than the fact that this project has achieved the necessary permits from Mexico and Arizona is the fact that the people of Yuma aren't objecting, in what has to be one of the few cases of reverse ~~nimbyism~~NIMBYism.

We also need natural gas storage to provide some price stability when prices are skyrocketing elsewhere. Arizona is one of the only states in the Country with no natural gas storage. Possible storage exists in salt caverns located throughout the state in particular south of Phoenix in Pinal County.

We need additional pipelines to bring gasoline into Arizona. I spoke about the lack of pipelines earlier – we only have 1 natural gas and 1 fuel pipeline – we need additional supplies.

We **must** continue to build power plants and site power lines. This isn't always easy and from time to time we have turned power plants down, such as near Toltec in southern Arizona and near the Big Sandy

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River in western Arizona, because of the environmental impacts attendant to these projects.

But when the need is there, Arizona, unlike California, which hasn't permitted a single new power plant in 20 years, has sited power generators and power lines. Since 1999, the ACC has sited 18 power plants and 21 transmission lines (115 kV and higher).

We need to get away from natural gas fired power plants and seriously evaluate the need for a new coal or nuclear plant in Arizona. APS is looking to get away from natural gas and build a coal plant. We should be looking at clean coal. Palo Verde is 20 years old and entering the second half of its life. It is suffering from numerous shutdowns and maintenance problems – 18 shutdowns in the last year. When Palo Verde was sited, it was sited for 5 nuclear pods – only 3 were built, consequently we have 2 open pods, but there are challenges of encroachment and getting enough effluent to the plant.

~~We also must protect and build on what we have, which includes improving upon and adding to existing physical infrastructure like power substations and the 500 kv power lines that bring kilowatts into the~~

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~~Phoenix and Tucson load pockets from the remote locations where those kilowatts are made.~~

Currently, regulated electric providers in the state develop 10-year plans to forecast future demand and supply. These forecasts enable our utilities to plan and develop the necessary resources and infrastructure to meet the growing demands of the state.

~~LAST SUMMER'S MISSED FORECAST~~ It is likely that as the valley and state continue to grow, each year we will set new records for electricity consumption. Indeed, this happened last year; however the problem we had was that we had record consumption in last June – well in advance of the usual peaks which typically occur in July and August. It turned out that in the middle of July, power use surpassed the June highs! Our record peak load occurred on July 18 with 11,068 MW, our forecasted peak was 10,860 MW. While forecasts are just that, forecasts, it is imperative that we have ample supplies of energy for our growing population. Next month, the Commission will meet with our state's utilities to discuss their plans for this summer – but I remain concerned about transmission constraints and generating capability.

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~~PARAGRAPH ON POWER LINES PLANNED AND WHERE THEY ARE NEEDED~~In order to feed the growing power needs of Arizona's businesses and residents, we also need transmission lines to bring the power from generating resources, which, for the most part, are located outside of the major metropolitan areas, to where the power is needed. We have some generation in load pockets, but for the most part the generation we rely upon in generated west of the valley - the Palo Verde Hub, or in Northeastern Arizona – 4 Corners. Currently, Phoenix and Yuma have the most need for additional transmission. Thanks to the addition of a new transformer last summer, Yuma has a cushion of 80 MWs, but Yuma still has what is called a Reliability Must Run situation, meaning that local load exceeds the transmission input capability. There is a proposal to bring a 500 kV line from Palo Verde to Yuma, which will greatly help with serving the growing demand in that area.

Last summer, the Commission approved a power line for the southeast valley which will bring power from Palo Verde to the booming communities of Coolidge, Casa Grande, Florence, Chandler, Queen Creek and Gilbert. In addition, the Commission approved a line running

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from Palo Verde to Surprise to help with the northwest valley. There is a growing need for an additional power line in North Phoenix, which the Commission will take up later this year.

Looking ahead, APS has proposed what is being called the "Transwest Express" to bring power, primarily electricity generated from clean coal technologies and wind farms, from Wyoming down to Arizona. Also looming on the horizon is the Palo Verde – Devers 2 power line, which is working its way through the regulatory process in California, but will be filed with the ACC later this spring. This project would be an additional 500 kV line from the Palo Verde Nuclear Generating Station into California. Competing against this project is the "East of River 9000+" project which would upgrade the existing transmission lines from Palo Verde into California, instead of the construction of a new line.

I'm sure you all have seen 500 kV power lines while driving, but to give you an idea of their size though: a typical 500 kV power line, like the ones the Commission approved for the southeast and northwest

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valley, would stand between 150-180 feet tall. The proposed Palo Verde-Devers 2 line would be an astonishing 241 feet tall!

In order to site a new transmission line, a utility must get approval from the Arizona Power Plant & Line Siting Committee before getting approval from the ACC. The power plant & line siting committee takes into account various factors, such as: existing plans for the development of a site; fish, wildlife and plant life; noise emission levels; existing scenic or historic areas; the estimated cost; and habitats for rare and endangered species. The Commission ultimately approves, denies or amends the line siting committee's recommendation for the power plant or transmission line.

~~However, before the Commission and the state can begin the process of adding additional infrastructure, our first task is to ensure that the systems currently in place are safe, secure and reliable. Recent incidents in the state, such as the pipeline rupture in Tucson in 2003, and a major substation fire in 2004 that placed more then 2 million people at~~

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~~risk of rolling blackouts, are a perfect example of our state's great challenge.~~

Electric reliability across the state is another priority of the Commission. In July 2004, the West Wing substation fire was at the forefront of the local news. To refresh your memory of this incident, in July, 2004, the Valley was nearly brought to its knees when the APS West Wing substation burst into flames in the nearby city of Peoria. In an unprecedented accident, five transformers and thousands of gallons in mineral oil caught fire, rendering the entire substation virtually useless. West Wing is one of only four substations that act as a gateway for power into Phoenix. Rolling blackouts were narrowly avoided through the work of APS engineers and the conservation efforts of businesses and residents from across the Valley.

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This incident demonstrates to us that a relatively simple series of events can leave our electrical grid vulnerable. The Westwing incident occurred because of bird droppings. Bird droppings led to a short in the 500 kV power line, which led to human error in shutting off current into the Westwing substation, which weakened a transformer at the

substation, which two weeks later led to the fire. In the aftermath of this incident, the Commission has convened workshops with both APS and SRP to address this issue and we have made significant progress on reducing the probability of another event like this occurring.

As you can see, we have a great deal of work to do to ensure the safety of our electrical grid.

We Must Diversify our Energy Portfolio

You may have seen recently the pictures of President Bush, once a proud oilman, at a solar factory in Michigan. Bush, who has solar on his own home in Crawford Texas, was pushing his new initiative to ween America off of fossil fuels. He talked about the benefits of solar panels, and how they can be used to literally democratize the generation of power. Bush went to great lengths to emphasize that with solar panels, ~~E~~each homeowner becomes a power station unto himself. .

Bush is right~~, not only because the price of natural gas has skyrocketed, but because we have made ourselved dependent on terrorist~~

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~~sponsored regimes~~. We need a **balanced** energy portfolio that includes nuclear, more coal in rural Arizona, and **renewable energy.**

As I mentioned earlier, the ACC is going to increase the amount of energy we use from renewable sources such as the sun, the wind and biomass to 15 percent by 2025. **Why?** It used to be that renewable energy was more expensive than natural gas. This just isn't the case anymore, and the more we invest in renewable energy, the less expensive it will be.

A large percentage of these purchases come from solar power. As I'm sure most of you know, Arizona has more days of sunshine th~~e~~an any other state in the union, yet New Jersey, of all places, has surpassed us in the amount of solar that it requires its utilities to produce. It's high time for Arizona to become a nationwide leader in solar energy. We shouldn't be behind states like New Jersey in solar energy production. We need to take proactive steps to create a robust market for solar electricity in Arizona. And Arizonans, like most Americans, I think, want us to do this.

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Recent polls show that more Republicans in AZ support renewable energy than Democrats:

- 80 percent of Arizonans said they want to dramatically increase the amount of energy we use from renewable sources.

However, it isn't enough just to diversify our fuel mix. We also need to stress energy conservation, and increase energy efficiency programs. Last week, the ACC approved $21 million in energy efficiency programs for schools and businesses in the APS service territory.

We will need assistance from engineers and technicians, like you, to help make this happen. Engineers will play a key role in designing and developing efficient solar technologies for use by utilities, businesses and residential units. I am confident that we are up to the challenge.

We need to maintain utilities that are fair to consumers and invest in reliability

Earlier, I spoke about the Westwing incident in 2004, as our Valley and state continue to grow (energy demand in the Valley is increasing by

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approximately 500 MW each year), I believe that it is important that we establish reliability standards for our state's utilities.

AZ doesn't have any reliability standards – I would like to pursue establishing them in order to help protect us from incidents like the one that occurred at West Wing in July, 2004.

Now is the time to bolster our utilities, and keep them accountable to the people of this state.

We need to make sure that they are focusing on things like building out infrastructure and improving reliability, so that our businesses continue to thrive and our residents don't have to live through the power outages and rolling blackouts that California has had.

CONCLUSION

~~One area that we have not discussed tonight is water. In 2001 the EPA issued new guidelines for arsenic content in drinking water. They are lowering the acceptable arsenic content from 50 ppb to 10 ppb. While this is a good policy objective, many water utilities, especially in Arizona, are finding it difficult to come into compliance with the new mandate.~~

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~~There are some technologies that have been invented to help remove arsenic from water, but they are very expensive. I turn to you tonight to ask for your help in engineering technologies to help water companies deal with the new arsenic standard. Our state will be hardest hit by this and it is important to work with you to help develop affordable technologies to help Arizona communities comply with this rule.~~

I have presented you an ambitious agenda that is before the Commission. While the Commission works on many issues, I have tried to highlight the main issues facing Arizona as we deal with a burgeoning population. We will need to decisions and skills of our engineering community to help us with pipeline and electrical safety, in the design of economical renewable resource technology and to help us deal with our growing appetite for energy~~, and in the development of new technologies to help us deal with arsenic~~.

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You all play an important role in our community. In many ways, the success of Arizona will depend on the ability of people, like you, to provide the innovative solutions we need to meet our growth. Our

nation and our state was founded upon visionary leadership and bold goals, we need that same vision today to help engineer a state and a nation that is capable of meeting the needs of tomorrow.

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It has been a privilege to join you tonight. I thank you for the honor to speak to you, and thank you for your time.