Arizona Corporation Commission Policy Statement Regarding the Role of Forest Bioenergy in Arizona

INTRODUCTION

In May 2017, Commissioner Dunn opened Docket No. E-00000Q-17-0138 to explore the role of forest bioenergy in Arizona as a means to use the woody biomass generated from public lands to create energy for the grid. In Decision No. 76295, the Arizona Corporation Commission ("ACC" or "Commission") reiterated the Commission's interest in forest bioenergy, citing it as a carbon-neutral, renewable energy resource that is becoming increasingly important in Arizona by generating power, encouraging responsible forest management, and reducing the risk posed by wildfires. Referencing recent federal directives aimed at the U.S. Department of Energy ("DOE"), the U.S. Department of Agriculture ("USDA"), and the Environmental Protection Agency ("EPA") to develop policies that recognize the benefits of this resource and encourage its use, the Decision concluded that Arizona should follow the lead of these directives and explore forest bioenergy's benefits as an energy resource. As a result, the Commission has given a directive to examine having 90 MW of biomass energy developed through forest residues, with 60 MW contributed by its regulated electric utilities and the remainder being contributed by Arizona's non-regulated electric utilities.

This Policy Statement is applicable to electric utilities regulated by the Commission. It is not applicable to Salt River Project ("SRP"), municipal utilities providing electric service, and electrical districts. Regulated electric utilities and non-regulated electric utilities and other interested parties are strongly encouraged to work together in furtherance of these policy goals and efforts to use bioenergy in Arizona as a renewable resource to achieve the benefits recognized herein.

Biogas and biomass are eligible renewable energy resources as defined by the Arizona Administrative Code (R14-2-1802). Biogas and biomass should be subject to a specific annual energy requirement in a manner similar to distributed generation (DG), which has a defined carve-out. In this Policy Statement, a carve-out of 60 MW of biomass energy developed through forest waste is appropriate for regulated entities to pursue. Regulated utilities are encouraged to work with nonregulated utilities and others to also identify other alternative biomass projects with other uses that may have little or no impact on ratepayers and can be accomplished in a similar timeframe. If regulated, nonregulated entities, and others can identify such alternative uses and can establish the viability of those uses and that they will have little or no impact on ratepayers and can be accomplished in a similar timeframe, the regulated utility may request a waiver of the rules for all or a portion of the 60 MW carve-out.

PURPOSE

Humans have used bioenergy—the energy from plants and plant-derived material—since they began to burn wood to cook food and keep warm. Plants are a renewable resource and are in a supply sufficient to significantly offset the use of fossil fuels for energy generation. Even today, in many parts of the developing world, bioenergy is the only fuel source for domestic use. The challenge in the developed world is making this energy source viable for large-scale production of energy.

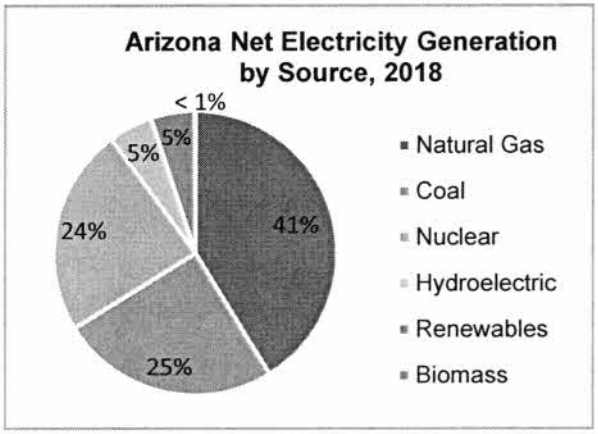

Figure 1. Source: EIA.

Currently, biofuels account for less than 1 percent of Arizona's energy production and the forest biopower contribution to that amount is essentially the output of the Snowflake White Mountain Biomass Power Plant that has a 27 MW capacity and purchase power agreements ("PPAs") with Arizona Public Service ("APS") and SRP, the state's two largest electric utilities. Increasing the amount of forest bioenergy generated in the State may help diversify the grid and provide many positive externalities to the public.

FOREST BIOENERGY MEETINGS

1. December 5, 2017

Extensive testimony, reports, and public comments related to forest bioenergy were shared during a Workshop at the Commission.

2. February 6, 2018

The Commission discussed the role of forest bioenergy in Arizona in the context of the Renewable Energy Standard and Tariff ("REST") rules and REST modernization docket during Open Meeting.

3. February 22, 2018

The Commission Staff continued to discuss the role of forest bioenergy in Arizona in the context of the REST rules and REST modernization docket.

4. November 9, 2018

A meeting between Commission Staff, the Residential Utility Consumer Office("RUCO"), and the regulated electric utilities was held at the Commission. Comments were provided by Tucson Electric Power ("TEP") and UNS Electric, APS, and the Electric Cooperatives.

5. November 19, 2018

A meeting between Commission Staff and all stakeholders was held at the Commission. During the meeting, concerns were expressed over the equitable cost sharing of using forest residues as an energy resource. Other possible solutions for forest residues were provided that could be included as part of the policy. The U.S. Forest Service ("USFS") provided stakeholders with an update of their Four Forest Restoration Initiative ("4FRI"). They will be issuing an RFP early 2019. USFS attested that most of Arizona's forests contain low value logs and lie in very remote areas lacking infrastructure, creating logistical issues. Representing the State's largest non-regulated utility, SRP stated that it is participating in forest restoration efforts with the Bureau of Reclamation.

6. *December 10, 2018*

A stakeholders meeting was convened at the Commission to discuss the draft of this Policy Statement and allow participants to provide feedback.

BENEFITS OF USING FOREST BIOMASS AS A FUEL SOURCE

1. Fuel diversification

Diversifying Arizona's electric generation fuel portfolio increases grid reliability, reduces the rate impact of price volatility within a single fuel source, and provides utilities with greater flexibility.

2. Carbon-neutral resource fuel

Growing plants capture an amount of carbon equivalent to that released to the atmosphere during biomass combustion, leading to zero net carbon emissions.

3. Healthier watersheds

Arizona's watersheds are fragile ecosystems and properly maintained forests will result in watersheds that are more resistant to climate change, as well as reducing the amount of freshwater lost through evapotranspiration.

4. Rural economic development

Arizona's forests lie in sparsely populated areas and high transportation costs will require a forest biopower facility to be located nearby, bringing additional employment opportunities and infrastructure to rural areas. Temporary jobs related to construction of a new forest bioenergy plant would number roughly 2,100, while the number of direct and indirect jobs related to the ongoing operation of the plant would number approximately 140.

5. Mitigating the risk of wildfires

Wildfires constitute a risk to the public health and safety of the people and property within the State of Arizona. This property includes the infrastructure of electric, gas, water, sewer, and telecommunication utilities that are regulated by the Commission to serve the residents of the State. This health and safety benefit extends to utilities beyond the Commission's jurisdiction and their customers, who also have a vested interest in addressing the risks posed by potential wildfires. As the Commission cannot mandate participation by utilities outside its jurisdiction, equitable cost-sharing remains an issue. Allocating federal and state funds currently earmarked for forest wildfire prevention to the harvesting and transporting of forest biomass would help distribute the cost more equitably.

6. Benefits to the environment when compared to open pile burning of biomass

One of the methods to deal with the accumulation of biomass from forest thinning is slash pile burning, which results in emissions in much greater quantities than biomass burned at a biopower facility. Methane, particulate matter 2.5, and carbon dioxide emissions are reduced dramatically (by 97.5%, or greater) as a result of the efficient combustion and controls at biomass energy facilities while nitrogen oxide emissions are moderately reduced (by 17%), mainly due to transportation and processing emissions being included in a facility's total emission calculation.

CONCERNS ARISING FROM THE USE OF FOREST BIOMASS AS A FUEL SOURCE

1. Cost

According to research from the USDA, "the value of woody biomass will rarely pay for the costs of harvesting, collecting, and transporting woody biomass to markets". Total costs can vary from $35 to more than $1,000 per acre depending on terrain, the diameter of the trees that need to be treated, and the density of the forest.

The potential above-market cost of 90 MW of forest bioenergy (assuming continued production by the existing facility outside Snowflake) is estimated to be $67 million per year but could increase or decrease over time depending on the relationship between avoided costs and escalating bioenergy power prices. In comparison, from 2002 to 2017, wildfires in Arizona have cost taxpayers and ratepayers over $162 million[1] in direct and indirect costs. This figure does not include property loss, loss of tourism, lower real estate values, or other financial impacts not

[1] Tobin, Andy. 2018. Arizona's Energy Modernization Plan, available at https://www.azcc.gov/commissioners/atobin/letters/energyplan.asp.

directly recovered from taxpayers or ratepayers directly. A corresponding 15-year period of using forest biomass as an energy resource would result in greater than $1 billion in above-market costs.

2. Geographical limitations

Where bioenergy has found traction is adjacent to wood/paper mills to process their waste, especially where generation from biomass plants can satisfy renewable energy requirements on behalf of the operator or through PPAs. Outside these conditions, it is difficult for forest bioenergy to be economical enough to justify investment. The supply of mill/wood residue must be of sufficient size and within a reasonable distance to achieve the scale necessary to operate a generation asset. Woody biomass is subject to high transportation costs, making lower-priced alternative fuels more attractive.

Figure 2 shows the amount of forest biomass resources (measured in thousand dry tons per year) by county. The greater the concentration of the resource nearby, the more likely a plant will be sustainable. Figure 3 shows the geographic location of all bioenergy plants that process woody material. When comparing their location with the supply of woody residue from Figure 2, the relationship between the two is clear. The plants tend to appear only in the geographic areas that have the highest concentrations of forest residues.

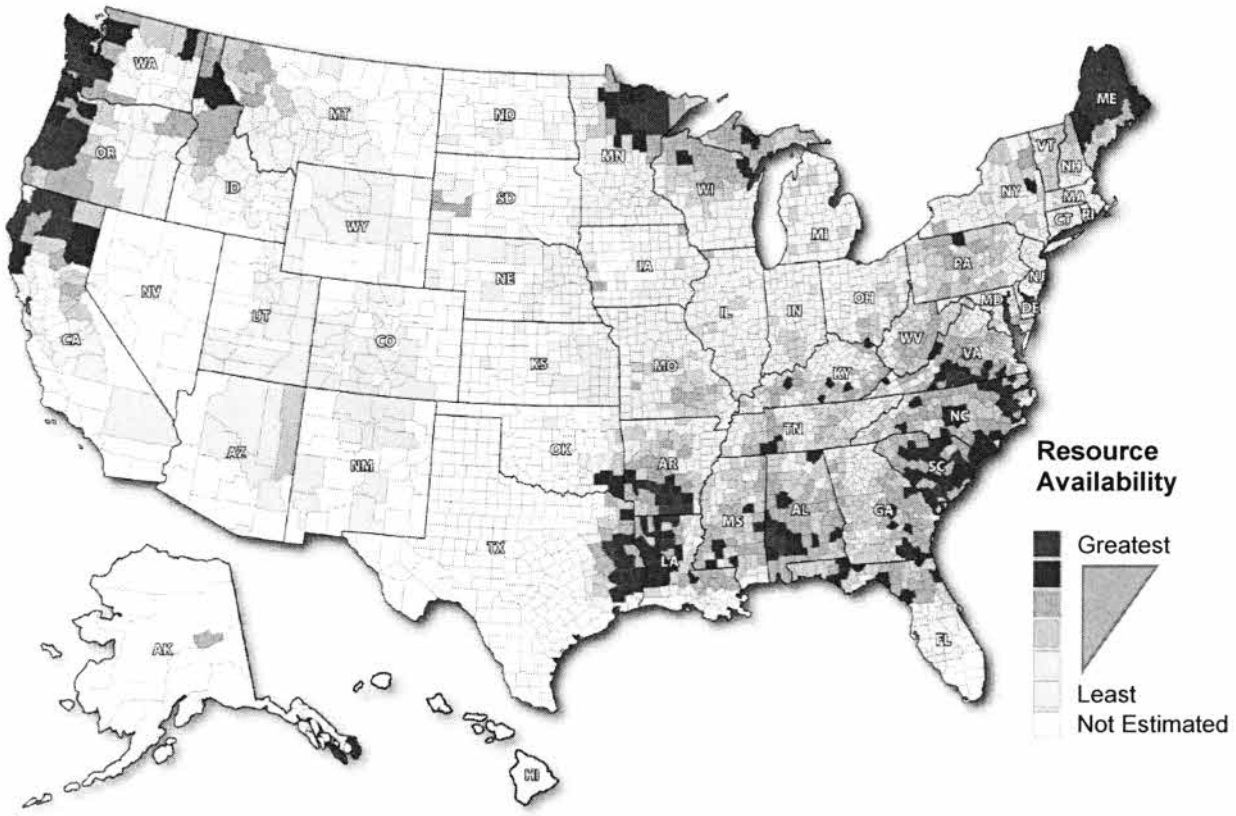

Figure 2. Forest residue resources by county. Source: NREL

Figure 3. Location of wood biopower plants.

3. Resource availability risk

An assured fuel supply is essential to secure PPAs and financing for the construction of new biopower facilities. While 4FRI efforts thinning the state's northern ponderosa pine forests has had difficulty finding a use for the biomass (waste wood residue separated from the more valuable logs) produced in the thinning process, they have also had difficulty finding large-scale mechanical tree thinning contractors who would provide a guaranteed supply of biomass at an acceptable cost. As a result, there is no guarantee that the forest industry can expand quickly enough and consistently over time to assure a 20-year constant fuel supply, not to mention the possibility of wildfires reducing the available fuel supply and air permitting risk of siting forest bioenergy facilities in environmentally-sensitive areas.

4. Economic viability of biopower plants

Arizona's only existing utility-scale woody biopower plant has struggled to be economically viable since its inception. As a result, the plant, which is only 10 years old, has already undergone two ownership changes. Initially, the plant was designed to process residues from an adjacent paper mill—at one point providing recycled paper fibers resulting in 25 percent of the plant's energy generation—until the paper mill went through its own economic hardships, finally ending in bankruptcy in 2015. Highlighting the economic risks of using Arizona's woody biomass as an energy source, respondents to a 2018 Biomass Request for Information ("RFI") from TEP required PPAs with a 20-year or greater duration at a fixed price.

5. Siting requirements

Construction of a new stand-alone woody bioenergy plant comes with potential siting requirements. These are summarized below:

a. Wood feedstock availability. Any new biopower facility would need to be located in proximity to 4FRI national forests to facilitate the use of wood thinned for forest fire management.
b. Local town proximity to meet staffing needs and provide a potential potable water supply. This may come with concerns from area residents due to environmental impacts, aesthetics, and other reasons. According to the American Lung Association's State of the Air 2018, many of Arizona's counties received poor grades for ozone and high particle pollution, and the burning of biomass releases emissions in amounts similar to the burning fossil fuels.
c. Highway accessibility for wood residue transport and delivery.
d. Proximity to existing APS 69kV transmission lines. This would allow for power delivery to the grid without the need for costly new transmission lines and would lower interconnection costs when compared to higher voltage transmission lines.
e. Separation from the existing biopower plant near Snowflake, Arizona.

6. Regulatory requirements

The construction of a new forest bioenergy plant will require numerous permits and/or approvals including those for siting, water supply, wastewater discharge, and air permits. A new facility may exceed Prevention of Significant Deterioration ("PSD") thresholds, necessitating a PSD permit, which requires extensive studies and stringent emission limits. Furthermore, many potential locations for the facility would likely be within close proximity to Federal Class 1 areas, which are recognized by the EPA as requiring maximum protection. As a result, additional study may be required to demonstrate that the biopower plant would not lead to detrimental impacts in these areas.

7. Baseload impacts

According to APS's 2017 Integrated Resource Plan, non-curtailable rooftop solar energy has pressured baseload resources and diminished the need for other assets to provide portfolio diversity. Baseload resources are having to make room for must-take renewable energy and fast-ramping flexible generation necessitated by duck curve shapes that continue to deepen. Adding forest bioenergy generation to existing baseload resources would further exacerbate this phenomenon, as it is relatively inflexible and could add curtailment pressure on other baseload resources. This may cause increased costs to customers by prompting a need to sell power into the wholesale markets at negative prices, however, the small share of baseload resources contributed by forest bioenergy will limit the size of this impact.

8. Sustainability

Despite being carbon neutral, when considering that growing plants capture an amount of carbon equivalent to that released to the atmosphere during biomass combustion, leading to zero net carbon emissions, the sustainability factor cannot be ignored. It takes years or even decades for tree tops and branches to capture the CO^2 released during forest biomass residue combustion. In contrast, during forest biomass combustion, the carbon stored in the wood is instantaneously released into the atmosphere. Furthermore, there is a difference of many years between the immediate emissions from burning forest residue and the slow evolution of carbon from natural decomposition if the forest residue is left to decompose on the forest surface. Thus, in a context of sustainability, the amount of forest biomass extraction for energy purposes should not exceed the natural level of production of the ecosystem.

Arizona Corporation Commission Policy Statement Regarding the Role of Forest Bioenergy in Arizona

POLICY STATEMENTS

1. Diversifying Arizona's electric generation fuel portfolio may increase grid reliability, reduce price volatility within a single fuel source, and provide utilities with greater flexibility.

2. Biogas and biomass are eligible renewable energy resources as defined by the Arizona Administrative Code (R14-2-1802). Biomass should be subject to a specific annual energy requirement in a manner similar to distributed generation (DG), which has a defined carve-out.

3. The carve-out should be equal or greater than 60 MW of biomass energy developed through renewables as defined by Arizona Administrative Code R14-2-1802. The affected utilities, as defined by the REST rules, would be required to acquire their appropriate share of the 60 MW total as determined by a one-time allocation by the Affected Utilities.

4. The Commission should encourage the development of alternative uses for forest biomass (e.g. biofuels, biochar, etc.) that have little or no impact on ratepayers. To obtain a waiver of the carve-out due to alternative use, regulated utilities must demonstrate the viability of such projects and that such alternatives will have little or no impact on ratepayers and will be accomplished in a similar timeframe.

5. The use of forest biomass fuel for electric generation, including co-firing or co-generation, will produce multiple positive externalities that benefit the residents of Arizona. These benefits include the following:

   A. *Healthier watersheds*. Arizona's watersheds are fragile ecosystems and properly maintained forests will result in watersheds that are more resistant to climate change, as well as reducing the amount of freshwater lost through evapotranspiration.

   B. *Rural economic development*. Arizona's forests lie in sparsely populated areas and high transportation costs will require a forest biopower facility to be located nearby, bringing additional employment opportunities and infrastructure to rural areas.

   C. *The reduction in the frequency and intensity of wildfires*. Wildfires constitute a risk to the public health and safety of the people and property within the State of Arizona. This property includes the infrastructure of electric, gas, water, sewer, and telecommunication utilities that are regulated by the Commission to serve the residents of the State.

6. The public health and safety benefits of forest bioenergy extend to utilities beyond the Commission's jurisdiction and their customers. Therefore, the costs of using forest biomass as a fuel source should be shared equitably by all residents of the State.

7. The federal government owns 95 percent of Arizona's forests. Understanding the need for partnerships, the Commission encourages participation by utilities outside its jurisdiction. Any RFPs for bioenergy should coincide with the issuance of a U.S. Forest Service RFP.

8. Stakeholders should approach the State Legislature or the Arizona delegation to the U.S. House of Representatives, the U.S. Senate, and the Governor's Office to seek additional funding to recover the difference between the competitive cost of energy and the actual cost of forest bioenergy.

9. The most effective means for electric cooperatives to comply with a biomass requirement may be through the purchase of renewable energy credits from a forest biomass facility or an existing plant that is co-firing biomass or biomass-derived fuel. To the extent other beneficiaries are unable to lower the cost of forest biomass to the true avoided costs, electric utilities would recover the difference (between the cost of biomass and the avoided cost) either through the REST surcharge or fuel adjustor.

10. To be sustainable, the amount of forest biomass extraction for energy purposes should not exceed the natural level of production of the ecosystem.

11. Consistent with the provisions of the Consolidated Appropriations Act of 2018, the regulated utilities are encouraged to work with the DOE, the USDA, and the EPA on the directive in the Act to recognize the full benefits of the use of forest biomass for energy, conservation, and responsible forest management.

12. The Commission's policy supports the Consolidated Appropriations Act of 2018's provisions to establish clear and simple policies for the use of forest biomass as an energy solution, including policies that (A) reflect the carbon-neutrality of forest bioenergy and recognize biomass as a renewable energy source; (B) encourages private investment through-out the forest biomass supply chain, including in (i) working forests, (ii) harvesting operations, (iii) forest improvement operation, (iv) forest bioenergy production, (v) wood products manufacturing, or (vi) paper manufacturing; and (C) encourages forest management to improve forest health.

13. Wildland fires in Arizona are a public health and safety emergency. It is the policy of the Commission to mitigate any delay, uncertainty, and risk by striving to reach administrative decisions as expediently as possible.

ORDER

To provide guidance for electric utilities regulated by the Commission, this Policy Statement addresses the Role of Forest Bioenergy in Arizona and the use of biogas and biomass as a renewable energy resource.

Tom Forese
Chairman

Bob Burns
Commissioner

Andy Tobin
Commissioner

Boyd Dunn
Commissioner

DISSENT

Justin Olson
Commissioner

APPENDIX A

SUMMARY OF COMMENTS FILED

1. *Salt River Project*

SRP submitted an update on its current efforts in the Cragin Watershed Protection Project; the Coronado Generating Station's biomass co-firing that is anticipated to allow for blend of 7.5 percent biomass in one of the units; its Verde Watershed Forest Restoration investment of $400,000; and its lobbying efforts in Congress for legislative changes. SRP urged the Commission to issue a policy that expresses its support for the further development of biomass in Arizona but does not mandate the size or timing of such facilities.

2. *Arizona Public Service*

APS recommended that the Commission explore a suite of possible solutions for the use of forest biomass and not be limited to electric generation. APS provided an estimate of the above-market cost of using forest bioenergy and stated its support for legislation as a funding source.

3. *Tucson Electric Power ("TEP")*

TEP recommended that the required biomass capacity be based on the proportional amount of total retail sales as reported in the respective Subject Utilities' REST Compliance Report and this capacity amount should remain static during the compliance period. TEP also recommended that its costs should be recovered through the Purchased Power Fuel Adjustor Clause ("PPFAC") as opposed to the REST to more equitably allocate biomass costs to all customers.

4. *Trico Electric Cooperative ("Trico")*

Trico believes the most cost-effective means of complying with a biomass requirement would be for it to purchase Renewable Energy Credits ("REC") from a biomass facility to acquire its share of the proposed requirement and that an appropriate REC price and cost recovery mechanism would need to be determined through a proceeding.

5. *Novo Power*

Novo Power stated that the cost of biomass-generated electrons is no longer affordable in comparison to other intermittent renewable power sources, but it believes that electrons generated at a biomass facility are more valuable due to the positive externalities arising from the use of forest biomass as a fuel source. Novo Power is concerned about the reliance on the State Legislature as a funding source, noting that according to the Arizona State Constitution, a current legislative body cannot bind a future legislative body to an appropriation.

6. *Natural Resources Working Group/Eastern Arizona Counties Organization/4FRI Stakeholder Group*

These organizations submitted comments regarding the limits of burning biomass at landscape scale, which negates some of the benefits of restoration and puts USFS at risk of

violating EPA and Arizona Department of Environmental Quality ("ADEQ") air quality standards. The comments also referred to other uses for forest biomass. If a technology (cellulosic biofuels, biogas, biochar, etc.) existed to dispose of forest biomass at scale and in an economically-viable way, a facility would be already in operation.

Continued generation through the use of a new 20-year PPA agreement with the existing White Mountain facility and the addition of a new facility on the Mogollon Rim was recommended to meet a goal of 90 MW in forest bioenergy. Furthermore, these organizations recommended a mandate that regulated utilities purchase the proportion of 90 MW that corresponds to the proportion of the ratepayers they serve, contingent upon the purchase by non-regulated utilities of the proportion of the 90 MW that corresponds to the proportion they serve.

7. Arizona Wildlife Federation

The Arizona Wildlife Federation ("AWF") recommended that the Commission require a small percentage of the energy production of the state must be generated from biomass removal projects. This will provide investors with an assurance that these forest product removal companies and sawmills are a viable long-term investment in Arizona. Furthermore, AWF believes the most equitable method of recovering the cost of forest bioenergy would be to impose a forest biomass energy surcharge on regulated electric utility customer bills.

8. The Nature Conservancy

The Nature Conservancy recommended incentives spread across multiple industries due to the low value of the wood being thinned from Arizona's forests coupled with the long hauling distances required to deliver biomass from the forest to industry.

9. Arizona Council of Trout Unlimited/Gila and Grand Canyon Chapters of Trout Unlimited

The Arizona Council of Trout Unlimited stated that the 4FRI project has not been able to attract biomass energy suppliers to the state to assist in the maintenance of the forest and requested that the ACC require a small percentage of energy production in Arizona be generated from biomass removal projects. The most equitable method of recovering the cost of forest bioenergy would be to impose a forest biomass energy surcharge on regulated electric utility customer bills.

10. Osborn Maledon

Osborn Maledon submitted comments on behalf of clients who invest in biomass projects that convert wood into biofuels. It recommends that any policy that the Commission adopts should recognize the availability of alternative solutions that will not burden Arizona ratepayers with higher electric bills caused by uneconomical, long-term electric supply contracts.

11. Grand Canyon State Electric Cooperative Association ("GCSECA")

GCSECA recommended that the Commission encourage its regulated electric utilities to actively contact representatives of federal, state, and local governmental bodies (as well as private entities), asking them to identify and put into place incentives and funding to bring the cost of forest bioenergy to a level equal to its true avoided cost. To the extent other beneficiaries do not

bring the cost of forest biomass to its true avoided cost, electric utilities should collect costs above true avoided cost through the REST surcharge. Utilities that do not need or do not secure additional energy should be able to collect the entire cost of the biomass RECs through the REST surcharge.

12. Dr. Jim Strogen

Dr. Jim Strogen submitted his concerns regarding the vulnerable watershed surrounding the C.C. Cragin Reservoir, which the residents of Payson will soon depend on for their water supply. Dr. Strogen stated that an assurance that a certain percentage of future energy generation using forest biomass is vital to the biomass industry.

13. SW Ecology, LLC

SW Ecology was concerned about new diverse wood product investment and development being crowded out by a mandate committing all available biomass to meet the 90 MW of power generation. The biomass issue does not necessarily "drive" the success or failure of forest restoration outcomes.

14. Certus Financial

Certus Financial represents the owner of a 50 MW woody biomass power plant currently located in Texas, but available to be relocated to Arizona. The plant is currently being preserved at a considerable cost to the owner in order to keep it available for relocation. These costs cannot be incurred indefinitely.

15. United States Forest Service

A strategic 5-party partnership comprised of USDA Forest Service Southwestern Region, Arizona Department of Forestry and Fire Management, Salt River Project, U.S. Bureau of Reclamation, and Arizona Commerce Authority is working together to design the next large-scale RFP within the 4FRI area. The intent is to support existing industry and attract new sustainable industry that will construct infrastructure and significantly increase the pace and scale of restoration. The RFP is being prepared with a sense of urgency and is expected in early 2019. Contracts are anticipated to be awarded in the Fall of 2019.

16. Flagstaff Fire Department

The Flagstaff Fire Department submitted comments regarding the Flagstaff Watershed Protection Project. This $10 million effort, approved by Flagstaff voters in 2012 and underway today, is focused on treating city, state, and federal lands, much of it outside Flagstaff itself, to reduce the risk of catastrophic wildfire and severe post-fire flooding. It is the only bond-funded, citizen approved (74%) effort of its kind in the country.

17. Coconino County Board of Supervisors

Coconino County does not support asking the Arizona Legislature to address the biomass question and believes the ACC has the authority to address this issue. To be fair to all Arizona citizens, mandates on regulated utilities that purchase bioenergy could be contingent on non-regulated utilities purchasing a comparable amount of bioenergy for their ratepayer base.