



Blocking the Sun

**Utilities and Fossil Fuel Interests That Are
Undermining American Solar Power**
2016 Edition



FRONTIER GROUP

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Executive Summary

Solar power is clean, affordable and popular with the American people. The amount of solar energy installed in the U.S. has quadrupled in the last four years, and the U.S. has enough solar energy installed to power one in 20 American homes.

America's solar progress is largely the result of bold, forward-thinking public policies that have created a strong solar industry while putting solar energy within the financial reach of millions more Americans.

Behind the scenes, however, electric utilities, fossil fuel interests and powerful industry front groups have begun chipping away at the key policies that have put solar energy on the map in the United States – often in the face of strong objections from a supportive public.

This report documents 17 fossil fuel backed groups and electric utilities running some of the most aggressive campaigns to slow the growth of solar energy in 12 states, including eight attempts to reduce net metering benefits, seven attempts to create demand charges for customers with solar power, and five efforts to roll back renewable energy standards. Citizens and policy-makers must be aware of the tools self-interested parties are using to undermine solar energy across America – and redouble their commitment to strong policies that move the nation toward a clean energy future.

A national network of utility interest groups and fossil fuel industry-funded think tanks is providing funding, model legislation and political cover for anti-solar campaigns across the country.

The **Edison Electric Institute (EEI)**, the trade group that represents U.S. investor-owned electric utilities, launched the current wave of anti-solar advocacy with a 2012 conference warning utilities of the challenges solar energy posed to their traditional profit centers. Since then, EEI has worked with the American Legislative Exchange Council (ALEC) on model legislation to repeal state renewable electricity standards and ran an anti-solar public relations campaign in Arizona.

The **American Legislative Exchange Council (ALEC)** provides utility and fossil fuel interests with access to state legislatures, and its anti-net metering policy resolution has inspired legislation in states like Washington and Utah.

The **Koch brothers** have provided funding to the national fight against solar by funneling tens of millions of dollars through a network of opaque nonprofits. A Koch brothers front organization, 60 Plus, also recently spent more than \$1 million to support a deceptive, ostensibly pro-solar group in Florida that is working to create new barriers to solar energy ownership.

The Koch-funded campaign organization **Americans for Prosperity (AFP)** has carried out anti-solar energy organizing efforts. In Florida and Georgia, AFP has run misinformation campaigns against net metering and other solar policies.

The **Consumer Energy Alliance (CEA)** is a Houston-based front group for the fossil fuel industry, representing fossil fuel companies like ExxonMobil, Chevron and Shell Oil. In Wisconsin in 2014, CEA submitted 2,500 dubious signatures in support of a utility rate case to increase costs for solar customers.

At the state level, electric utilities have used the support provided by national anti-solar interests, as well as their own ample resources, to attack key solar energy policies.

In Florida, **Florida Power and Light (FPL), Gulf Power Electric, Tampa Electric Company and Duke Energy**, the largest utility in the U.S., spent millions of dollars backing a front group, Consumers for Smart Solar, which was the primary backer of a deceptive ballot initiative that had it passed would have further restricted rooftop solar growth in the state.

American Electric Power (AEP) has backed anti-solar campaigns in states including Ohio and West Virginia. In West Virginia, AEP successfully lobbied for a bill to limit the net metering cap to 3 percent of utility peak demand.

In Utah and Nevada, subsidiaries of Warren Buffet's **Berkshire Hathaway Energy** have run campaigns to halt the growth of solar power. In Nevada, subsidiary **NV Energy** successfully campaigned for a utility commission ruling that has effectively halted the growth of rooftop solar in NV Energy's service territory.

In California, the publicly-owned utility **Imperial Irrigation District** abruptly ended its net metering program, stunting future solar energy growth and temporarily stranding many of its customers that were in the midst of rooftop solar installations.

Commonwealth Edison, Illinois' largest utility, has introduced legislation that would create statewide demand charges on its residential customers, a move with the potential to reduce the economic viability of rooftop solar for all of the state's residents.

Four major Arizona utilities – the **Salt River Project, Arizona Public Service**, and sister companies **Tucson Electric Power** and **Unisource** – have undertaken extensive campaigns to impose new charges on their solar customers. The Salt River Project implemented a demand charge that has all but killed distributed solar energy growth in its territory. Arizona Public Service,

the biggest utility in Arizona, has funneled money through nonprofit groups in order to fund anti-net metering advertisements and has been accused of improperly cultivating influence with the state commission that regulates utilities. And Unisource and Tucson Electric Power (TEP) have filed requests with state regulators to eliminate net metering and create a solar-specific mandatory demand charge.

In mid-2016, there were at least 84 ongoing policy actions in U.S. states that could impact the growth of solar energy, including through limitations to net metering or new charges to make rooftop solar power less economically viable.

State decision-makers should resist utility and fossil fuel industry influence, and reject policies like:

- Elimination of, or restrictions or unfair caps on net metering;
- Discriminatory surcharges or tariffs for solar customers;
- Unnecessary regulatory burdens on solar energy; and
- Rollbacks of renewable electricity standards.

In addition, state leaders can do more to encourage solar energy's growth. They should embrace ambitious goals for solar energy and adopt policies that will help meet them, including:

- Considering the benefits of distributed solar energy to the grid, to ratepayers and to society in any ratemaking or policy decisions about solar energy;
- Implementing strong net metering and interconnection standards, which enable many customers to meet their own electricity needs with solar power;
- Encouraging community shared solar projects and virtual net metering, which can expand solar access to more customers;

- Enacting or expanding solar or distributed renewable carve-outs and renewable electricity standards;
- Allowing companies other than utilities to sell or lease solar to residents and businesses;
- Making smart investments to move toward a more intelligent electric grid that will enable distributed sources of energy such as solar power to play a larger role; and
- Utilizing solar energy wherever possible on government buildings and properties.

Policymakers should also uphold our commitment to reduce carbon pollution under the Clean Power Plan, and ensure that solar power plays a major role in in any strategy to reduce global warming pollution.

Introduction

Solar energy is booming across the United States. In 2016, residential rooftop solar installations in the U.S. hit the 1 million mark, a number expected to double in the next two years.¹ The amount of solar energy installed in the U.S. has quadrupled in the last four years, and the U.S. has enough solar energy installed to power one in 20 American homes.² And as installation prices have fallen – 73 percent since 2006 – the pace of rooftop solar installations has only accelerated.³

In 2015, solar generation averted approximately 27 million metric tons of carbon dioxide pollution, equivalent to taking nearly 6 million passenger vehicles off the road.⁴ Meanwhile, solar energy is creating jobs, many of which cannot be outsourced. By the end of 2015, there were more than 208,000 solar industry workers in the United States, a 20 percent increase from the year before.⁵ It's not a surprise, then, that the vast majority of Americans support solar energy: a 2016 Pew Research Center survey showed that 89 percent of Americans favor increasing the use of solar power.⁶

But many electric utilities and the fossil fuel industry disagree. They perceive solar power – especially solar power generated locally by ordinary residents and businesses, as opposed to in centralized, utility-owned power plants – not as an opportunity to

clean our air but as a threat to established ways of doing business. As a result, many of these companies – among the most powerful in the world – have thrown their power and resources behind a growing campaign of attacks on solar energy and key public policies that make it accessible and affordable to Americans.

In the third quarter of 2016, U.S. states considered at least 84 policy actions with the potential to impact the economic viability of distributed solar energy, including through the reduction of net metering compensation and the creation of demand charges for residential electric customers.⁷

Unsurprisingly, many of these battles are being waged in the shadows – in regulatory agencies largely removed from public view, where the public's support for solar energy and solar power's contribution to a cleaner environment have little impact on decision-making.

This report attempts to pull back the veil on the major utilities, fossil fuel companies, front groups and special interest think tanks that are fighting solar power in America. By shining a light on the companies and entities attacking solar energy – and the tactics they use – citizens and decision-makers will be better equipped to respond when the nationwide assault on solar energy arrives at their doorsteps.

Strong Public Policies Have Fueled the Rise of Solar Energy

The rise of American solar energy, which has grown more than four-fold in terms of capacity since 2010, is no accident. In addition to dramatic price drops – residential solar installations fell in price by 43 percent from 2010 to 2015 – forward-looking policies have cut red tape and made solar power more affordable for consumers.⁸

A number of policies have been particularly important to the growth of solar:

- *Net metering policies* guarantee owners of solar power systems a fair return for the excess electricity they supply to the grid by crediting them with the value of such electricity, typically at the retail rate. Net metering essentially allows the customer's power meter to "spin backwards" at times when solar power production exceeds on-site needs.
- *Renewable electricity standards* (RESs, also known as renewable portfolio standards) set minimum renewable energy requirements for utilities. RESs with a specific minimum requirement for solar or distributed renewable energy have played a big role in fostering a stable solar energy market.
- *Third-party ownership policies* allow companies other than utilities to use financing tools like power purchase agreements or solar leasing that can relieve consumers' up-front costs for install-

ing rooftop solar. Power purchase agreements, for example, let a company install a solar energy system on a consumer's rooftop at no upfront cost, and then sell power generated by the panels back to the customer at a fixed cost. At the end of the contract, the customer may purchase the panels from the developer.

- *Federal and state tax credits* have made solar a more affordable option for consumers and businesses. In 2015, of the 10 U.S. states with the most solar capacity per capita, six offered tax credits for solar installations, and four offered rebates or grants. And in December 2015, federal lawmakers renewed the 30 percent solar Investment Tax Credit (ITC) through the end of 2019, resulting in a predicted additional \$38 billion in solar energy investment through 2021.⁹

The presence of strong solar policies has been consistently linked with the emergence of strong solar energy markets. Of the 10 states with the most solar capacity per person, nine had strong net metering policies through 2015; nine have strong interconnection policies; nine have policies that allow creative financing options like power purchase agreements; and all have renewable electricity standards.¹⁰ A 2014 study by the U.S. Department of Energy's National Renewable Energy Laboratory confirmed that strong solar policies are important indicators of state solar capacity.¹¹

Many Utilities and the Fossil Fuel Industry Are Fighting to Stop the Growth of Solar Energy

Solar energy is a boon to the environment, popular with the American people, and supports the creation of jobs and economic activity in our communities. But to many utilities, along with the fossil fuel industry, the rapid growth of solar energy is something to fear, not celebrate.

To companies that sell coal, oil and natural gas, solar energy represents an obvious long-term threat to the viability of their businesses. To electric utilities, solar energy – especially the solar energy systems installed by individuals and businesses – represents a different type of threat, one with much more immediate consequences. Some electric utilities claim that, as more individuals and businesses “go solar,” the cost of providing access to the grid will be divided among fewer paying customers. And as the price of energy storage technology declines, more customers will have the ability and the incentive to abandon the grid altogether, triggering a “utility death spiral.”

Recent research from Lawrence Berkeley Lab suggests that concerns about the so-called death spiral are probably overblown.¹² And some utilities have responded to the challenge posed by solar energy by working constructively with regulators and other decision-makers to develop new business models that maintain consumers’ access to an affordable, reliable electric grid. Others have invested resources in

utility-owned solar power plants – while simultaneously fighting to limit consumers’ ability to generate their own solar power. Still others have attempted to slow the growth of solar energy by fighting to eliminate policies that support the transition to a clean energy economy. Those fights – against distributed, local solar power and all forms of clean energy – are happening with increasing frequency across the United States. In the third quarter of 2016, U.S. states considered at least 84 policy actions with the potential to impact the economic viability of distributed solar energy, including through the reduction of net metering compensation and the creation of demand charges for residential electric customers.¹³

The campaigns to slow the rise of solar energy have often been conducted as if money were little object. The oil and gas industry and electric utilities are the fourth and fifth biggest spenders on federal lobbying in the United States, respectively.¹⁴ Yet many of these battles have been waged with hidden campaign spending, or in regulatory agencies that tend to receive limited public scrutiny.

Who are the interests behind these attacks on solar energy? And how have they waged their campaigns? The following section provides a list of key players and a glimpse at the fossil fuel industry’s anti-solar playbook.

Solar Power Is Popular across the Political Spectrum

Solar energy's immense popularity isn't limited to any one segment of the population. According to a recent Pew Research Center poll, 89 percent of Americans – including 83 percent of conservative Republicans – favor expanding solar power in the U.S.¹⁵

Among the most passionate champions of solar energy in some states are conservatives affiliated with the Tea Party movement, who see rooftop solar energy as a means to greater autonomy for individuals. According to Debbie Dooley, the cofounder of the Atlanta Tea Party, as quoted in the *New Yorker*: "I thought that the regulated monopoly in Georgia had far too much power... The average person cannot build a power plant, but they can install solar panels on their rooftop, and they should be able to sell that energy to friends and neighbors if they wish."¹⁶

In states like Florida and Georgia, members of the Tea Party have butted heads with industry-backed groups like Americans for Prosperity and ALEC. In Florida, one conservative citizens' group accused Americans for Prosperity of launching a "campaign of deception" against net metering.¹⁷ And despite the attempts of industry public relations campaigns to polarize the solar energy debate on traditional conservative-liberal lines,¹⁸ solar power is only increasing in popularity with the American public.¹⁹

Blocking the Sun: Utilities and Fossil Fuel Groups Undermining Solar Energy

Solar power is clean, affordable and popular with the American people. It is also being undermined by efforts to slow its growth. The fol-

lowing electric utilities and fossil fuel-backed groups are running some of the country's most aggressive campaigns against solar power.

Laying the Groundwork: The National Support Network for Anti-Solar Campaigns

A national network of utility interest groups and fossil fuel industry-funded think tanks is providing funding, model legislation and political cover for anti-solar campaigns across the country.



Setting the Policy: **Edison Electric Institute**

Edison Electric Institute (EEI) is the trade group that represents U.S. investor-owned electric companies. EEI put in motion what has become the utility industry's national campaign to slow the growth of rooftop solar, and has since played a prominent role funding

and actively participating in both national and state-level campaigns against solar energy.

In 2012, EEI effectively kicked off the utility war on rooftop solar when it brought together top utility executives to describe the threat posed to the utility business model by distributed generation, the most popular form of which is rooftop solar.²⁰ At the meeting, EEI warned that distributed generation would bring the "prospect of declining retail sales and earnings" and the "potential obsolescence of existing business and regulatory models."²¹ EEI then put forth an "action plan" of outreach to convince state legislators, governors, regulators, consumer advocates, and customers that net metering policies must change.²² One year later, EEI laid out its opposition in more detail, particularly to net metering. In that report, titled "Disruptive Challenges," EEI warned that net meter-

ing could inflict “significant potential adverse impact to utility investors.”²³

After creating the utility case against solar power, EEI helped put in motion the utility industry’s state-level legislative attacks. In 2013, EEI worked with the American Legislative Exchange Council (ALEC), which, as of 2014, received funding from EEI to craft and distribute to state legislatures sample bill language (written with help from the Heartland Institute) to attack net metering and create solar surcharges.²⁴

EEI also engages directly with lawmakers to make the case against rooftop solar. In 2014, an EEI executive held a briefing for the Congressional Black Caucus on net metering.²⁵ And leading up to a 2016 Federal Trade Commission (FTC) panel on solar energy and consumer protections, New York Congresswoman Yvette Clarke submitted a letter to the FTC critiquing rooftop solar as a financial risk for consumers. Metadata contained in the digital version of the letter revealed EEI’s director of governmental relations, Eric Grey, created the document, and that it was last edited by a lobbyist for Gray Global Advisors, a group which represents EEI.²⁶

EEI has also funded anti-solar public relations campaigns. From 2008 to 2013, EEI paid \$74 million to public relations and consultant firms to assist with publicity campaigns, some of which was spent to influence solar policy.²⁷ And in Arizona, EEI funded television and radio ads attacking rooftop solar.²⁸ After the Arizona utility Arizona Public Service admitted that it funneled ratepayer money through nonprofits in order to fund ads of its own, EEI was asked whether or not it had used similar dark money tactics but refused to answer.²⁹



Providing the Funding and Running Ground Campaigns: **The Koch Brothers and Americans for Prosperity**

Using the vast wealth accumulated from their fossil fuel businesses, the Koch brothers – Charles and David Koch – are notorious for heavy spending to influence American politics. In the two years leading up to the 2016 election, for example, the Koch brothers were projected to have spent \$250 million on campaign contributions.³⁰

In recent years, the Koch brothers have turned their attention to attacks on solar, applying their funding and political resources through a variety of avenues. The Koch brothers typically fund their anti-solar activity through a difficult-to-trace web of nonprofit organizations, including the nonprofit organization 60 Plus. The group, named for its stated purpose as a seniors’ advocacy group, received more than \$40 million from five different Koch-connected nonprofit groups between 2008 and 2013.³¹ The Koch brothers are able to apply political pressure through Americans for Prosperity and its network of citizen members. Through these and other means, the Koch brothers have taken part in fights against solar all over the country, including in Florida, Arizona, Ohio, South Carolina, and Washington state.³²

The Koch brothers have been particularly active in Florida, the Sunshine State, where they have fought solar energy side-by-side with state utilities. In 2014 and 2015, Americans for Prosperity organized coalition partners, held press conferences to attack net metering, spread misinformation about a proposal to enact a state renewable electricity standard, and activated its members against a ballot initiative that would allow

third-party power sales, an effort by AFP that Conservatives for Energy Freedom called “a campaign of deception.”³³ And in 2016, the Koch-funded group 60 Plus donated at least \$1 million to the utility-backed Amendment 1 ballot initiative, which could have potentially prohibited net metering and created new barriers to rooftop solar ownership.³⁴ Amendment 1 was defeated by voters in November 2016.³⁵

In Kansas in 2014, an Americans for Prosperity advertisement called for the repeal of the state’s renewable electricity standard.³⁶ The ad included a clear attempt to polarize the debate over solar energy on traditional conservative-liberal lines, ending with the line, “Like Obamacare, it’s another government mandate we can’t afford.”³⁷

In Georgia in 2013, as the state utility board readied for a vote requiring Georgia Power to obtain 525 MW of solar PV capacity, Americans for Prosperity tried to stop the move by activating its members and utilizing its social media to promote erroneous claims about the cost of the effort and its impact on the economy.³⁸ Ultimately, a coalition of conservative lawmakers and environmental groups convinced the Georgia Public Service Commission to resist AFP and to pass the requirement.³⁹

The Koch brothers also fund and support university research used to slow adoption of solar energy, including through their relationship with Professor Randy Simmons of Utah State University (USU). The Koch brothers have many connections with Simmons. Simmons runs an education program called the “Koch Scholars,” which depends on a Koch foundation grant.⁴⁰ Simmons is a senior fellow at the Koch-funded Property and Environment Research Center.⁴¹ Between 2008 and 2013, Simmons served as the Charles G. Koch Professor of Political Economy at USU.⁴² Simmons has been involved with a variety of anti-solar research projects. One study produced under Simmons blamed renewable energy for effects of the economic downturn of the Great Recession.⁴³ Simmons wrote another study attacking Ohio’s

renewable electricity standard, which included provisions that would expand solar energy, and which was subsequently frozen by Ohio lawmakers; that study was disseminated by the Heartland Institute.⁴⁴ Simmons also cofounded Strata Policy, a think tank that received \$1.1 million from the Charles Koch Foundation in 2014; in 2015, Strata Policy staff presented misleading economic data to Ohio lawmakers in support of freezing Ohio’s renewable electricity standard.⁴⁵



Drafting Anti-Solar Legislation: Heartland Institute

As a think tank with financial backing from the fossil fuel industry, the Heartland Institute plays an important role in battling solar energy, drafting anti-solar legislation and publishing misinformation about solar energy’s economic impact.

The Heartland Institute has a long history of colorful and sometimes tasteless advocacy at odds with solar energy and the environment. In 2012, the Institute ran a billboard campaign that featured a picture of the “Unabomber” Ted Kaczynski and the words, “I still believe in global warming. Do you?” The Heartland Institute also published a report finding a “net benefit” to carbon pollution and global warming.⁴⁶

While its funding sources are diverse, between 1998 and 2006, the Heartland Institute received \$736,500 from ExxonMobil, and in 2011 it received \$25,000 from the Koch brothers.⁴⁷ A leaked strategy document stated that Heartland’s fundraising strategy was to pursue contributions “especially from corporations whose interests are threatened by climate policies.”⁴⁸

The Heartland Institute has played an important role in the national anti-solar campaign, including crafting legislative documents used around the country.

- The Heartland Institute helped draft the language for ALEC's "Electricity Freedom Act," the template bill designed to repeal renewable electricity standards that require utilities to get a percentage of their electricity from renewable sources like wind and solar energy.⁴⁹
- The Heartland Institute conducts research and creates policy documents for use in anti-solar power campaigns. The institute's "Policy Tip Sheet" on North Carolina's renewable electricity standard including messaging points for opponents of the standard.⁵⁰
- The Heartland Institute spreads misleading information about solar energy. For example, at a Kansas conference co-hosted with Americans for Prosperity in 2013, Heartland staff claimed that the state renewable electricity standard had caused electricity prices to rise by nearly 20 percent, despite a report by the Kansas Corporation Commission that the RES had affected electricity rates by less than 2 percent.⁵¹



Selling Legislative Influence: American Legislative Exchange Council

The American Legislative Exchange Council, or ALEC, gives the fossil fuel and utility industry direct access to lawmakers. By distributing model legislation to its more than 2,000 state legislator members, who then introduce the bills, ALEC has enabled its industry funders to push the introduction of anti-solar legislation in statehouses across the country.⁵² ALEC's work to attack solar is wide-reaching, and includes efforts to kill net metering and to repeal renewable electricity standards.

ALEC's funding sources have included the Koch brothers, Edison Electric Institute, ExxonMobil, Chevron, Peabody Energy, American Electric Power and Duke Energy.⁵³ While it describes itself as a helpful policy aid for state legislators, ALEC has been described by the *New York Times* as a "stealth business lobbyist," and runs legislative campaigns across the country to prevent or repeal pro-solar policies. In the past, it has boasted that its high success rate at passing legislation makes ALEC a "good investment."⁵⁴

ALEC has seen the introduction of its model "Electricity Freedom Act," legislation to repeal RES standards, in at least 19 states.⁵⁵ However, because of the popularity of RES legislation, these attempts fail the vast majority of the time.⁵⁶ In North Carolina, for example, ALEC saw its Electricity Freedom Act defeated by a bipartisan group of legislators.⁵⁷ ALEC also pushed for solar power surcharges in Oklahoma, Kansas and Washington state.⁵⁸ And ALEC's "Updating Net Metering" resolution has inspired legislation to hamper net metering in Washington state and Utah.⁵⁹

ALEC legislative members were also involved in the Ohio clean energy freeze, which stalled the ramp-up of Ohio's renewable energy standard while also rolling back energy efficiency provisions and creating a committee to decide whether to dismantle even more of the law.⁶¹ Ohio state senator Bill Seitz sits on ALEC's national board, and during debate over the original freeze legislation compared his opponents'

policy positions to Joseph Stalin's "five-year plan."⁶² Seitz's advocacy on behalf of ALEC's position came despite ample evidence of the Clean Energy Law's benefits for Ohio's economy, including a 1.5 percent reduction in electric bills and a 2 percent carbon dioxide emission reduction in just the first four years of the law.⁶³ Two ALEC members were on the state's six-person committee to decide the future of the state's frozen Clean Energy Law, and in September of 2015, recommended to extend the freeze "indefinitely."⁶⁴

ALEC's influence extends beyond state legislatures to state utility commissions. When the Arizona Corporation Commission voted to let Arizona Public Service (APS) increase costs for its solar customers, four of the five ACC commissioners were or had been ALEC members.⁶⁵ In 2013, APS spokesman Jim McDonald said APS paid not only a \$7,000 membership fee to ALEC, but an additional \$3,000 for a seat on ALEC's Energy, Environment and Agriculture Task Force, the division of ALEC responsible for drafting model energy bills, including those against rooftop solar.⁶⁶



Deceptive Front Group: Consumer Energy Alliance

As utilities and the fossil fuel industry expand their efforts to slow solar power's growth, they are turning to new and more deceptive tactics. A prime example can be found in the Consumer Energy Alliance (CEA), a front group for utilities and the fossil fuel industry

that calls itself the "voice of the energy consumer."⁶⁷ CEA's members include ExxonMobil, Chevron and Shell Oil.⁶⁸

In Wisconsin in 2014, as the state's Public Service Commission (PSC) considered a proposal by the utility We Energies to change its rate structure in a way that would reduce the incentive for installing rooftop solar, it received a 2,500-name petition from CEA, ostensibly signed by We Energies customers, in support of the new fees.⁶⁹ A *Capital Times* reporter was suspicious that so many people would side with their utility's argument for a rate hike.⁷⁰ When he tracked down signers of the petition, he found that CEA had either tricked them into signing its petition or simply made up their support.⁷¹ Following his investigation, the PSC threw out the petition.⁷² (Although the petition was submitted in We Energies' rate case, the utility denied any involvement.)⁷³

CEA's policy aims are often hidden behind a seemingly pro-solar public image. For example, in October 2016, CEA hosted a petition on its homepage asking for signatures to "call on policy makers to create policies that are pro-solar, pro-grid and pro-consumer."⁷⁴ CEA recently displayed this tactic in Florida while working alongside the similarly-named and similarly-deceptive utility front group Consumers for Smart Solar. That group was a leading backer of Amendment 1, which would have created economic barriers to rooftop solar ownership, although it ultimately failed to pass.⁷⁵ CEA's Florida regional director, Kevin Doyle, wrote an op-ed in the *Orlando Sentinel* under the headline "Amendment 1 Would Boost Solar Energy and Benefit All."⁷⁶ His op-ed hailed "the Sunshine's State advance in solar energy technology" in its support of a ballot initiative that has seen universal opposition from the solar industry.

Battling Solar in the States: Electric Utilities

While national trade groups, funders, and think tanks provide the backbone of the national fight against local solar energy, electric utilities are leading the fight in state legislative offices and regulatory agencies.



Duke Energy, Florida Power and Light Company, Gulf Power Company and Tampa Electric Company: Waging a Deceptive Fight against Solar in the Sunshine State

Florida, the Sunshine State, has not lived up to its name. Despite being one of the sunniest states on the East Coast, when it comes to solar capacity Florida lags behind small northern states including New Jersey and Massachusetts.⁷⁷

Today, Florida is one of just nine states that does not allow third-party power purchase agreements, a popular financing option for home solar panel installations, and is also in the minority of states that has not passed a renewable electricity standard.⁷⁸ As a result, Florida's solar capacity lags well behind states with similar solar potential.⁷⁹ While Florida ranks third in the nation for rooftop solar potential, it is only 16th in actual solar energy production.⁸⁰

In recent years, attacks on solar power have been led by Florida's largest utilities – Duke Energy, Florida

Power and Light Company (FPL), Tampa Electric Company and Gulf Power Company – powerful companies with a long record of exerting political influence. A 2014 report by Integrity Florida tracked more than \$30 million in campaign and lobbying expenditures by the four utilities, and noted extensive revolving door practices by FPL, which hired at least 18 former Public Service Commission regulators.⁸¹ In 2014, Florida utilities spent millions of dollars supporting the re-election of Governor Rick Scott, whose opponent Charlie Crist had supported bringing more renewable energy to the state, including through the creation of a requirement that Florida generate 20 percent of its electricity from renewable energy by 2020.⁸²

In 2016, Florida's utilities came together in support of the anti-solar Amendment 1 ballot initiative, which had it passed would have put barriers to rooftop solar into the state constitution.⁸³ Amendment 1 was placed on the ballot by Consumers for Smart Solar, a group that received \$21 million of its \$26 million in campaign funds from Duke Energy, Florida Power and Light Company, Tampa Electric Company and Gulf Power Company.⁸⁴ The Amendment 1 campaign also received funds from the Koch-funded organization 60 Plus.⁸⁵

Similarly to the national fossil fuel front group Consumer Energy Alliance, Consumers for Smart Solar purports to be a pro-solar consumer group. The group's logo proclaims "Yes on 1, for the sun," while its website claims that the amendment "promotes solar in the Sunshine State, protects Florida's consumers from scams and rip-offs and guarantees the right to place solar panels on your home."⁸⁶ The *Miami Herald* reported accounts that some petition gatherers for the campaign to put Amendment 1 on the ballot intentionally misled petition signers into thinking they were signing a petition for a competing, legitimately

pro-solar energy ballot initiative (which ultimately failed to qualify for the ballot).⁸⁷ One signer reported to the *Herald* that the Amendment 1 petition was described as a “revised, updated version” of the legitimate pro-solar petition.⁸⁸

Florida Supreme Court Justice Barbara Pariente, who voted against allowing the bill on the ballot, said of Amendment 1: “Masquerading as a pro-solar energy initiative, this proposed constitutional amendment, supported by some of Florida’s major investor-owned electric utility companies, actually seeks to constitutionalize the status quo.”⁸⁹

Less than a month before the November election, the policy director of the James Madison Institute (JMI) in Tallahassee, a think tank supported by Gulf Power Company, was caught on audio recording admitting the deceptive strategy behind Amendment 1.⁹⁰ After noting that polls show solar energy to be extremely popular with the public, Sal Nuzzo, JMI’s policy director, described Amendment 1 as “political *jiu jitsu*,” and praised the political savviness of using “the language of promoting solar, and kind of, kind of put in these protections for consumers that choose not to install rooftop.”⁹¹

In November 2016 Amendment 1 was rejected by Florida voters, falling nine percentage points short of the 60 percent approval required for adoption into the state constitution.⁹²



American Electric Power

American Electric Power (AEP), one of the biggest utilities in the country, is also one of the most aggressive backers of anti-solar legislation.

A huge utility, with more than 5 million customers in 11 states, AEP has used its money and influence to

back anti-solar campaigns in states including Ohio and West Virginia.⁹³ In Ohio, AEP mounted a campaign of legal and regulatory challenges to limit the value of net metering for its customers. In 2014, the Public Utilities Commission of Ohio (PUCO) ruled that electric customers are entitled to the retail rate of electricity that they feed back into the grid from rooftop solar and other distributed generations, which could raise net metering compensation by about 15 percent.⁹⁴ In response, AEP appealed the decision to the Ohio Supreme Court (the case is under review as of October 2016).⁹⁵ AEP also joined FirstEnergy and other state utilities in successfully pushing for the freeze of Ohio’s renewable electricity standard, which has already resulted in a significant decrease in state solar investment.⁹⁶

In West Virginia, AEP lobbied for a bill that caps net metering at 3 percent of utility peak demand, while requiring the Public Service Commission to study net metering policies and potentially pass more onerous restrictions in the future.⁹⁷ The bill was signed into law in March.⁹⁸ AEP has made nearly \$400,000 in contributions to legislators and political groups in West Virginia since 2008.⁹⁹

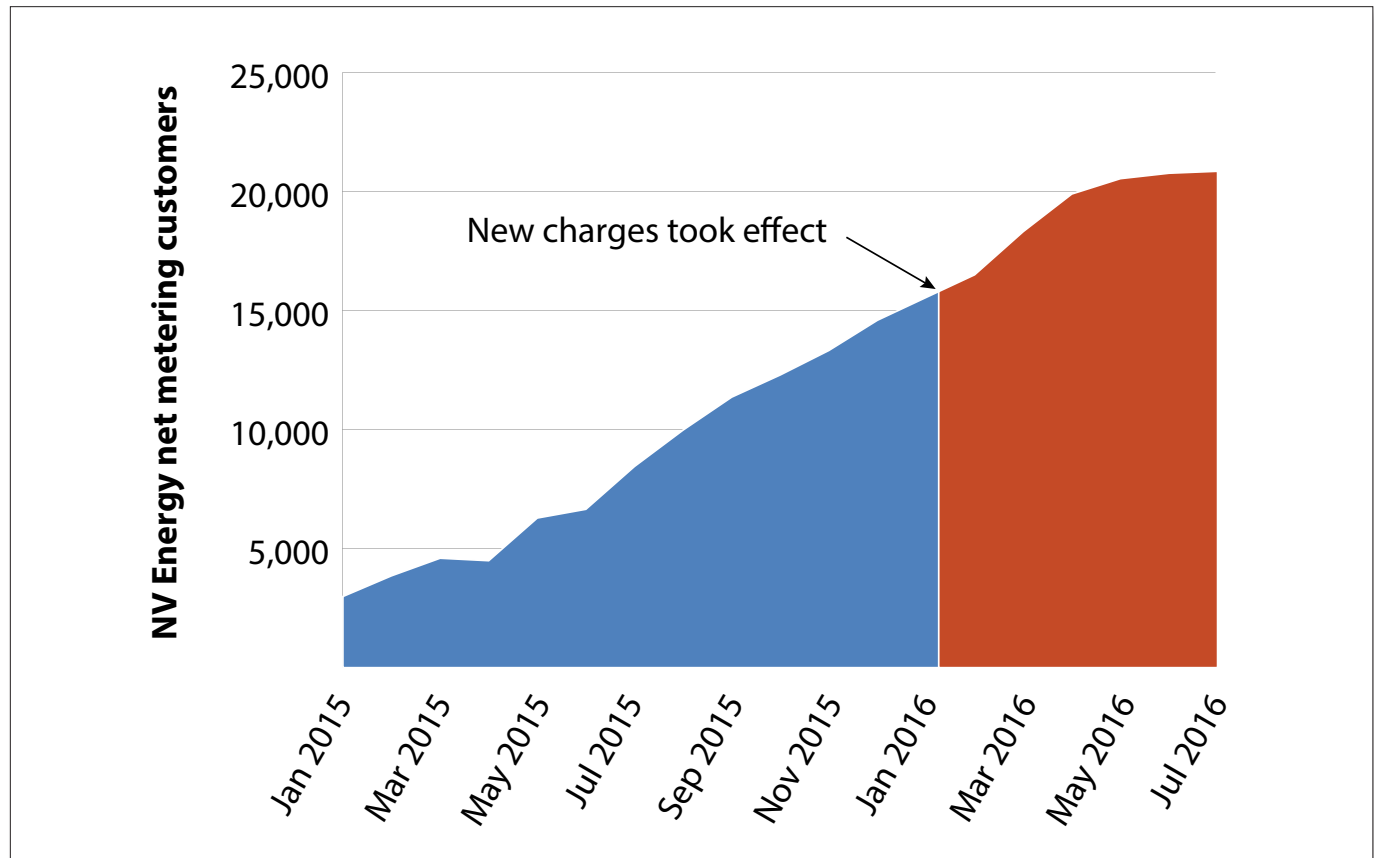


Berkshire Hathaway Energy

Berkshire Hathaway Energy (BHE), Warren Buffet’s energy holding company, has waged fights against distributed solar through its subsidiaries NV Energy in Nevada and Rocky Mountain Power in Utah, seeking to win new solar surcharges and restrictions on net metering.¹⁰⁰

BHE is a major player in the electric utility industry. It controls three major U.S. utilities, serving about 4.6 million customers.¹⁰¹ While the company leaves solar fights up to its subsidiaries, BHE’s internal position is that distributed generation customers should be charged higher rates than other customers.¹⁰²

Fig 1. NV Energy rooftop solar growth has stagnated since the implementation of new solar charges and reduced net metering credits. (Growth through approximately May 2016 reflects a backlog of projects submitted under previous net metering rules.)



BHE's most successful attack on solar came through its subsidiary NV Energy, Nevada's largest utility: an anti-solar campaign that resulted in the Nevada Public Utilities Commission devastating the state's rooftop solar industry by slashing net metering rates and instituting new charges for NV Energy solar customers.

The Nevada PUC's decision came following a sustained campaign by NV Energy, which was undertaken as Nevada was becoming one of the most successful solar states in the country. In 2013, Nevada had the fastest growth of solar jobs and the largest number of solar jobs per capita in the country.¹⁰³ And by the end of 2015, Nevada had more cumulative solar capacity per person than any state in the country.¹⁰⁴

In 2015, NV Energy began a push for new fees for solar customers and proposed putting solar customers into a new, more expensive rate class.¹⁰⁵ NV Energy also worked to keep in place Nevada's net metering cap, as solar companies in the state claimed that NV Energy misled them about the speed in which the cap would be reached.¹⁰⁶ In May 2015, hundreds of people gathered outside NV Energy headquarters to protest the utility's role in fighting solar power.¹⁰⁷

Finally, in December 2015, the Nevada Public Utilities Commission (PUCN) voted to triple the fixed charges those with rooftop solar will have to pay over the next 12 years, while also slashing the net metering benefits received by solar customers.¹⁰⁸

The decision was supported by the political action committee Citizens for Solar Energy Fairness, a group funded by NV Energy.¹¹⁰ That group aired ads characterizing net metering as a “subsidy with no limits.”¹¹¹

NV Energy’s new charges and reduced compensation for solar customers have crippled growth of solar energy. During 2015, NV Energy added an average of more than 1,000 new net metering customers every month.¹¹² In July 2016, the latest month for which data is available, NV Energy had only 82 new net metering customers.¹¹³

In Utah, BHE subsidiary Rocky Mountain Power (RMP) has tried to impose new costs on its solar customers, which would slow the growth of Utah’s small but growing solar industry, which currently employs 1,500 people across the state.¹¹⁴ In 2014, RMP lobbied for state legislation designed to make it easier to impose fees on solar customers.¹¹⁵ State senator Curt Bramble, a national board member of ALEC and recipient of numerous RMP campaign contributions, introduced the legislation to require the Utah Public Service Commission to impose a fee on net metering customers if it found that those customers imposed costs on state utilities.¹¹⁶ Through his time in the Utah Senate, Sen. Bramble received at least \$3,900 in campaign contributions from Rocky Mountain Power and PacifiCorp. (Rocky Mountain Power is a division of PacifiCorp, which is itself a subsidiary of BHE.)¹¹⁷ Following protests from solar advocates, that legislation was ultimately amended to require a full cost-benefit analysis before fees could be imposed.¹¹⁸

In 2014, RMP asked the Utah Public Service Commission for permission to charge solar customers \$4.65 per month.¹¹⁹ A variety of groups came together to protest the surcharge, including Utah Citizens Advocating Renewable Energy and the Mormon Environmental Stewardship Alliance.¹²⁰ According to Mark Walton of Creative Energies, a Utah solar PV company, as quoted in *The Salt Lake Tribune*, the solar

surcharge “could be the horse out of the barn. Once enacted it could go up.”¹²¹ This was RMP’s second regulatory push for a solar surcharge after the Utah Public Services Commission rejected its original proposal and included a brief filed with the PSC arguing that environmental benefits should not be taken into consideration when it comes to allowing a solar surcharge.¹²² The charge request was ultimately denied.¹²³



Imperial Irrigation District

California is America’s solar powerhouse, home to nearly half of the country’s total installed solar energy.¹²⁴ In 2016, the California Public Utilities Commission (CPUC) helped ensure that California’s solar growth would continue, despite the efforts of California’s largest investor-owned utilities, when it voted to maintain retail net metering for its private utility companies through 2019, affecting the majority of the state’s residents.¹²⁵

However, the CPUC’s decision did not apply to everyone. California’s publicly-owned utilities are not regulated by the CPUC – rather, their net metering policy is bound by state 2010 net metering legislation.¹²⁶ That legislation allows publicly-owned utilities to cap their net metered solar energy systems at 5 percent of utility peak demand.¹²⁷

Shortly after the CPUC’s decision was released, the Imperial Irrigation District (IID), a publicly-owned utility that serves over 6,000 square miles of California including parts of San Diego and Riverside counties, abruptly announced it would be ending its net metering payments for all new solar customers.¹²⁸ Because California allows publicly-owned utilities to devise their own formulas for calculating peak demand,

IID determined it had reached its net metering cap earlier than it would have had it used a standardized methodology that the state requires investor-owned utilities to use.¹²⁹

IID's decision not only stunted future solar energy growth in its territory, it also stranded an estimated 1,200 homes and businesses who had already signed contracts with solar installers, were in the midst of installing projects, or had already installed solar panels but not yet connected to the grid.¹³⁰ Because there was no alternative tariff adopted at the time that IID ended its net metering program, these 1,200 customers were not able to use their solar panels to generate their own electricity, much less receive compensation for the electricity they sent back to the electric grid.¹³¹ Among the solar customers left stranded were several multi-family affordable housing projects and dozens of low-income families.¹³²

Finally, after six months of negotiations, with help from state legislators, IID signed an agreement that would grant interconnections and net metering benefits to most of its stranded customers, including those who had submitted an interconnection application before IID made its decision. IID will still, however, not pay full retail net metering credit to new solar customers going forward, and will likely result in slowed solar growth in its territory.¹³³ Meanwhile, other publicly-owned utilities in California, including Anza Electric Cooperative and Turlock Irrigation District, have also recently ended their net metering programs.¹³⁴



An Exelon Company

Commonwealth Edison

In Illinois, solar energy is just starting to take off. Although Illinois only ranks 26th nationally for cumulative solar energy installed, in 2015 Illinois' solar capacity grew by 75 percent.¹³⁵ Recently, however, Commonwealth Edison (ComEd) – Illinois' biggest utility, which serves 70 percent of the state's popula-

tion – began working to change the way residential customers are charged for electricity in a way that would slow the state's burgeoning solar growth.

A subsidiary of Exelon, one of the nation's largest utilities, ComEd set its focus on implementing a statewide demand charge for residential customers. Demand charges change the economic calculus of going solar, as they are based not on electricity use, but on peak electricity demand for a short (typically 15 to 60 minute) period over the course of a month. As a result, the savings resulting from low grid electricity use over the course of a month can be offset by short periods of heavy electricity use, for example at night or on a cloudy day.¹³⁶ Illinois Attorney General Lisa Madigan has noted that "by subjecting consumers to demand rates, ComEd's proposal could unfairly allow consumers to be charged more for using less."¹³⁷

ComEd's most recent proposal (House Floor Amendment No. 2 to 2016 Senate Bill 2814) would reduce the value of net metering while instituting a statewide demand charge based on an average of customer peak demand over the course of a month.

ComEd is not alone among utilities in pushing for a demand charge – in Arizona, for example, the Salt River Project has imposed a demand charge on its solar customers, which has resulted in stagnant solar growth. Yet ComEd's original demand charge proposal was novel in that it was through the state legislature, and would have resulted in mandatory residential demand charges throughout the state.

The latest proposal follows original legislation proposed in 2015. Since the original bill's failure in 2015, ComEd and parent company Exelon have donated heavily to state politicians. So far, Exelon has donated over \$240,000 to Illinois lawmakers' campaigns in 2016, while ComEd has donated over \$320,000. Meanwhile, Exelon and ComEd have combined to contribute more than \$50,000 over the past ten years to state Senator Donne Trotter.¹³⁸ Senator Trotter was the chief sponsor

of demand charge legislation proposed earlier in 2016, and is also a member of the Illinois General Assembly Committee for Energy and Public Utilities, which the statewide demand charge legislation will have to pass through before becoming law.¹³⁹

ComEd is also promoting its demand charge legislation through a group it founded in 2016, the Illinois Smart Solar Alliance (ISSA).¹⁴⁰ Like the national fossil fuel front group Consumer Energy Alliance, and the Florida utility group Consumers for Smart Solar, ISSA misleadingly brands itself as a pro-solar consumer group, calling on the public to “help Illinois grow its clean energy future.”¹⁴¹



Arizona Public Service, Salt River Project, Tucson Electric Power and Unisource: Battling Rooftop Solar in one of America's Top Solar States

Arizona is one of the top states in the country in terms of total solar capacity, solar capacity per capita, and number of solar jobs.¹⁴² Yet today, as large utilities have undertaken efforts to slow the growth of rooftop solar in their service territories, Arizona has begun to slip from its perch as a national solar leader.

Arizona Public Service

Arizona Public Service (APS), the biggest utility in the sunniest state in the country, has waged an extensive battle against distributed solar energy in Arizona.

APS has worked to impose high costs on its solar customers, most directly through rate proposals to

the Arizona Corporation Commission (ACC), which regulates Arizona utilities. Some of its efforts have been behind closed doors: APS has been accused of funding dark money political campaigns to elect members of the ACC, and of having improperly close relationships with current and former ACC commissioners.¹⁴³

One allegation focused on APS's relationship with former ACC chairman Gary Pierce, who repeatedly sided with APS in its fight to impose a surcharge on solar customers.¹⁴⁴ In February 2015, an ACC whistleblower accused Pierce of having unauthorized meetings with top APS executives.¹⁴⁵ Pierce's relationship with APS was further questioned by former ACC Commissioner Sandra Kennedy amid reports that APS funneled money through independent-expenditure groups to fund the Secretary of State campaign of Justin Pierce, Gary Pierce's son.¹⁴⁶

In addition, the Arizona Attorney General's office launched an investigation into the relationship between APS and ACC commissioner Bob Stump.¹⁴⁷ In the weeks prior to a 2015 ACC election, Stump was found to have exchanged text messages with an APS executive and with the head of an Arizona dark money group rumored to receive APS funding.¹⁴⁸

APS's efforts to hide its support for ACC candidates may have also included funneling money through the fundraising arm of Arizona State University. According to IRS records uncovered by the *Arizona Republic* newspaper, APS gave \$181,100 to the ASU Foundation in 2013, while the ASU Foundation in turn gave \$100,000 to the group Save Our Future Now, which then spent heavily on the ACC election.¹⁴⁹ Also in 2013, APS funded anti-net metering TV and radio advertising campaigns through the Koch brothers-backed nonprofit organizations 60 Plus and Prosper.¹⁵⁰

In November 2013, the ACC gave APS the right to charge customers 70 cents per kilowatt of installed solar capacity (much less than APS had initially re-

quested).¹⁵¹ That charge was the first of its kind in the nation, and resulted in an average charge for solar customers of about \$5 per month.¹⁵² In 2015, APS pulled a request with the ACC to raise its monthly solar charge to \$3 per kilowatt, which would have cost the average new solar customer about \$21 per month.¹⁵³

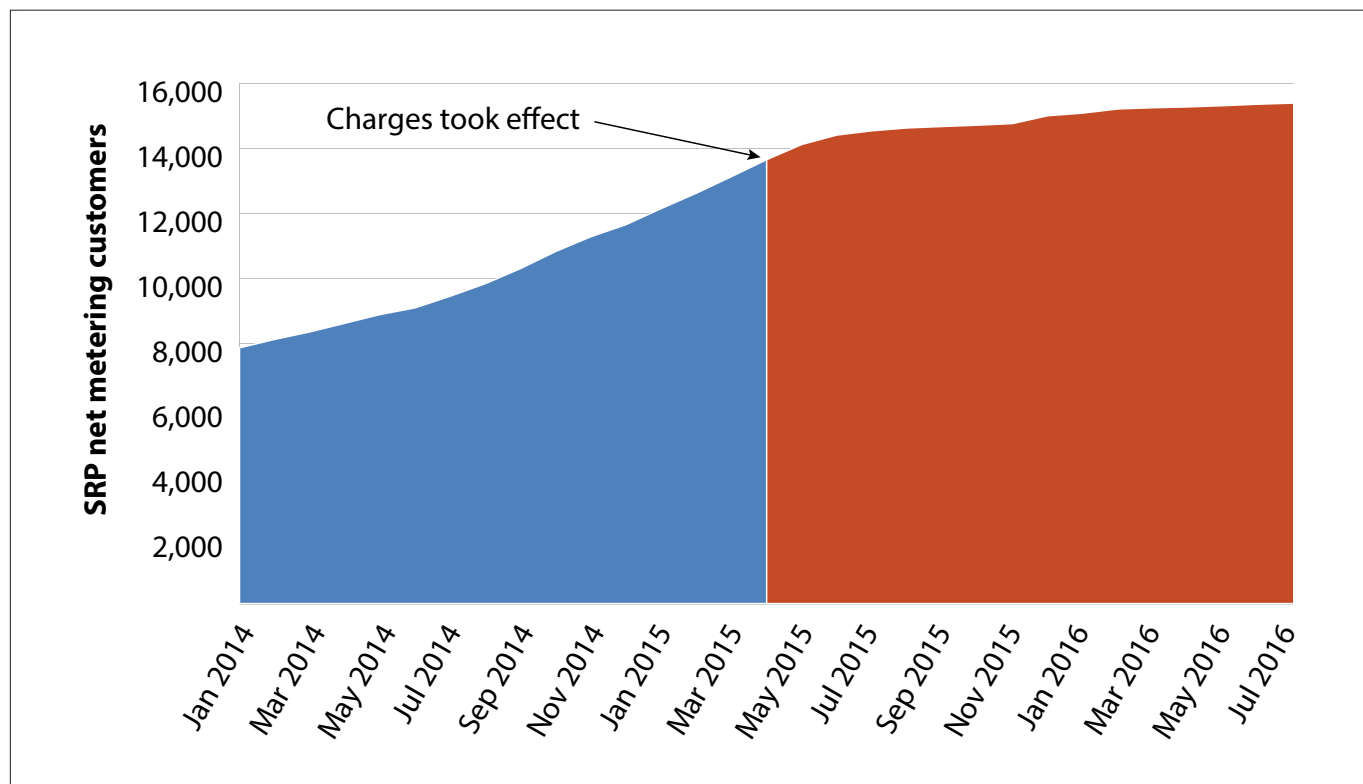
In APS' new rate case, filed with the ACC in June 2016, the utility has proposed both instituting a demand charge for most of its customers, while dramatically reducing net metering compensation for its solar customers. Under the new proposal, net metering credits for consumer-generated solar would drop by more than three quarters, from \$0.128 per kWh, the current retail rate, to \$0.0299 per kWh, an avoided cost rate.¹⁵⁴ "It's a proposal guaranteed to stop APS's customers from going solar," said an attorney for the Energy Freedom Coalition of America, Court Rich.¹⁵⁵

As the ACC considers APS's rate case, along with a multitude of cases that could impact the affordability of solar energy, APS has worked to influence the outcome of the November 2016 ACC commissioner elections.¹⁵⁶ In October 2016, APS's parent company Pinnacle West formed the AZ Coalition for Reliable Energy, a group which aims to spend at least \$1 million supporting the reelection campaigns of three current ACC commissioners.¹⁵⁷

Salt River Project

The Salt River Project, which serves the Phoenix metropolitan area, devastated the growth of distributed solar power in its territory by imposing a discriminatory rate hike in 2015 that costs the average new residential solar customer \$29 per month.¹⁵⁸ The fee amounts to a more than 30 percent rate hike over what the solar customers would have paid without a demand charge.¹⁵⁹

Fig 2. Salt River Project rooftop solar growth has stagnated since the implementation of new charges for solar customers



Unlike Arizona Public Service (Arizona's biggest utility, which also supports surcharges) SRP is a public utility, and the rate was passed by SRP's publicly elected board. The votes in SRP elections are acreage-based, meaning that SRP customers are not all equally represented by board members.¹⁶⁰ The vote to create the new solar rate came after a series of packed hearings, at which SRP customers voiced their opposition.¹⁶¹

SRP's solar charge was based in part on an internal SRP analysis that was criticized for failing to account for solar energy's full value to the grid system.¹⁶² That analysis' estimate of solar energy's value to the grid was far below what similar studies conducted elsewhere have found.¹⁶³

The new charge has crippled SRP's rooftop solar growth. In the year before SRP's new charge took effect, SRP added an average of nearly 400 new net metering customers per month. In July 2016, the latest month for which data is available, SRP added only 34 new net metering customers.

SRP board elections in recent years have seen interference from Arizona Public Service, another Arizona utility that has instituted demand charges. In elections in which candidates typically spend no more than \$500 over the course of entire campaigns, in 2014 an Arizona Public Service political action committee made a contribution of \$5,000 to an unsuccessful candidate.¹⁶⁴ APS and SRP work closely together on projects ranging from power plant development to energy contracts, and following SRP's solar charge, APS proposed a similarly high charge of its own.¹⁶⁵

Unisource and Tucson Electric

Following the successful implementation of demand charges by Arizona Public Service and Salt River Project, two other major Arizona utilities – the sister companies Unisource and Tucson Electric Power (TEP) – have attempted to institute anti-rooftop solar policies.

Unisource and TEP are both owned by parent company Fortis, which is Canada's largest investor owned utility holding company.¹⁶⁶ TEP serves more than 400,000 electric customers in the Tucson metropolitan area, while Unisource serves approximately 90,000 electric customers in western and southern Arizona.¹⁶⁷ Fortis is rapidly expanding in the United States, and in October 2016 acquired ITC Holdings, the largest independent electric transmission company in the United States, for \$11.3 billion.¹⁶⁸

In November 2015, TEP filed a rate case with the ACC that included elements such as eliminating net metering payments to rooftop solar users, creating a solar-specific mandatory demand rate and raising the grid connection fee for private solar infrastructure.¹⁶⁹ In May 2016, the ACC delayed a decision on some portions of TEP's proposal, stating they were more appropriate for the utility's general rate case, for which hearings began in August.¹⁷⁰

Unisource filed similar motions with the ACC to introduce demand charges in a three-tiered payment structure for all residential users.¹⁷¹ Their effort to introduce demand charges was bolstered by APS, which hired an analyst to provide testimony that demand charges benefit the grid.¹⁷² In May 2016, before its case was to be decided by the ACC, Unisource adjusted its filing to have demand charges apply only for new solar customers.¹⁷³

In August, the ACC delayed a decision on Unisource's proposed rate changes, as well as TEP's request to expand its utility-owned rooftop solar program, until a more complete investigation of rooftop solar's significance in the state could be done.¹⁷⁴ In late 2015, in response to allegations that two ACC commissioners had received significant donations during the 2014 campaign from APS, the ACC opened a docket to explore both the costs and benefits associated with rooftop solar before deciding on net metering and solar mandatory demand charge policies, including those pursued by TEP and Unisource.¹⁷⁵ The docket is expected to remain open into 2017.¹⁷⁶

Conclusion

Solar power has been almost universally embraced by the American public and is delivering benefits to the environment and economy. Thus far, widespread popular support for solar energy, combined with a growing understanding of solar energy's obvious benefits, has limited the success of fossil fuel interests' anti-solar lobbying campaigns.

Fossil fuel industry and utility opposition to solar energy has, however, made an impact on the course of solar energy. In parts of Arizona, residential solar energy is being installed at a slower pace; and in Florida, the Sunshine State, rooftop solar has barely gotten a foothold. Well-funded attacks on key solar policies are forcing the fledgling rooftop solar industry to spend resources fighting to survive rather than unleashing the next wave of clean energy innovation and deployment.

Recommendations:

State decision-makers should resist utility and fossil fuel industry attempts to reduce the economic viability of distributed solar energy, and reject policies like:

- Elimination of, or restrictions or unfair caps on net metering;
- Discriminatory surcharges or tariffs for solar customers;
- Unnecessary regulatory burdens on solar energy; and
- Rollbacks of renewable electricity standards.

In addition, state leaders can do more to encourage solar energy's growth. They should embrace ambi-

tious goals for solar energy and adopt policies that will help meet them, including:

- Considering the benefits to the grid, ratepayers, society and the environment of distributed solar power in any ratemaking or policy decisions about solar;
- Implementing strong net metering and interconnection standards, which enable many customers to meet their own electricity needs with solar power;
- Encouraging community shared solar projects and virtual net metering, which can expand solar access to more customers;
- Enacting or expanding solar or distributed renewable carve-outs and renewable electricity standards;
- Allowing companies other than utilities to sell or lease solar energy to residents and businesses;
- Making smart investments to move toward a more intelligent electric grid that will enable distributed sources of energy such as solar power to play a larger role; and
- Utilizing solar energy wherever possible on government buildings and properties.

Policymakers should also uphold our commitment to reduce carbon pollution under the Clean Power Plan, and ensure that solar power plays a major role in any strategy to reduce global warming pollution.

Notes

1 GTM Research and SEIA, *U.S. Solar Market Insight Report- 2016 Q3*, 12 September 2016.

2 The U.S. has 31.6 gigawatts of solar capacity as of the end of Q2 2016, enough to power 6.2 million American homes: SEIA, *U.S. Solar Market Insight*, archived at web.archive.org/web/20161020195402/http://www.seia.org/research-resources/us-solar-market-insight.

3 Shayle Kann et al., GTM Research and SEIA, *U.S. Solar Market Insight Report - 2014 Year in Review*, 10 March 2015.

4 Based on generation data from the EIA Electricity Data Browser. Carbon dioxide pollution averted estimated using EPA Greenhouse Gas Equivalencies Calculator, available at epa.gov/energy/greenhouse-gas-equivalencies-calculator.

5 The Solar Foundation, *National Solar Jobs Census 2015*, available at <http://www.thesolarfoundation.org/national/>, January 2016.

6 Brian Kennedy, Pew Research Center, *Americans Strongly Favor Expanding Solar Power to Help Address Costs and Environmental Concerns*, available at <http://www.pewresearch.org/fact-tank/2016/10/05/americans-strongly-favor-expanding-solar-power-to-help-address-costs-and-environmental-concerns/>, 5 October 2016.

7 Policy actions were included if they had to do with residential fixed cost increases, net metering, or residential solar charges: Benjamin Inskeep et al., NC Clean Energy Technology Study and Meister Consultants Group, *The 50 States of Solar – Q3 2016* (executive summary), available at nccleantech.ncsu.edu/wp-content/uploads/Q32016_FinalExecSummary.pdf, Q3 2016.

8 Residential price drop: Galen Barbose and Naim Darghouth, *Tracking the Sun IX: The Installed Price of Residential and Non-Residential Photovoltaic Systems in the United States*, August 2016.

9 Gideon Weissman, Rob Sargent and Bret Fanshaw, Frontier Group and Environment America, *Lighting the Way* 4, July 2016.

10 Ibid.

11 D. Steward and E. Doris, National Renewable Energy Laboratory, *The Effect of State Policy Suites on the Development of Solar Markets*, November 2014.

12 Naïm R. Darghouth et al., Lawrence Berkeley National Laboratory, *Net Metering and Market Feedback Loops: Exploring the Impact of Retail Rate Design on Distributed PV Deployment*, July 2015.

13 Policy actions were included if they had to do with residential fixed cost increases, net metering, or residential solar charges: Benjamin Inskeep et al., NC Clean Energy Technology Study and Meister Consultants Group, *The 50 States of Solar – Q3 2016* (executive summary), available https://nccleantech.ncsu.edu/wp-content/uploads/Q32016_FinalExecSummary.pdf, Q3 2016.

14 OpenSecrets, *Top Industries for 2016*, accessed at <https://www.opensecrets.org/lobby/top.php?showYear=2016&indexType=i>, 19 October 2016.

15 Cary Funk and Brian Kennedy, “Public Opinion on Renewables and Other Energy Sources,” *Pew Research Center*, available at <http://www.pewinternet.org/2016/10/04/public-opinion-on-renewables-and-other-energy-sources>, 4 October 2016.

16 Caroly Kormann, "Greening the Tea Party," *The New Yorker*, 17 February 2015.

17 Ivan Penn, "Conservative Solar Proponents Decry Attack on Ballot Initiative as 'Campaign of Deception'," *Tampa Bay Times*, available at www.tampabay.com/news/business/energy/conservative-solar-proponents-decry-attack-on-ballot-initiative-as/2220465, 7 March 2015.

18 One example: Americans for Prosperity – Kansas, *Repeal RPS in Kansas*, available at www.youtube.com/watch?v=RoN4v-TvQIY, 28 January 2014.

19 Caroly Kormann, "Greening the Tea Party," *The New Yorker*, 17 February 2015.

20 Joby Warrick, "Utilities Wage Campaign against Rooftop Solar," *Washington Post*, 7 March 2015.

21 Ibid.

22 Presentation slides from EEI board and chief executives meeting, 12 September 2014, available at DocumentCloud, <https://www.documentcloud.org/documents/1374670-2012-eei-board-and-chief-executives-meeting.html#document/p59/a191715>.

23 Peter Kind, Energy Infrastructure Advocates, prepared for EEI, *Disruptive Challenges: Financial Implications and Strategic Responses to a Changing Retail Electric Business*, available at <http://www.eei.org/ourissues/finance/documents/disruptivechallenges.pdf>, January 2013.

24 EEI's ALEC funding: Gabe Elsner, "Edison Electric Institute's Anti-Solar, PR Spending Revealed," *The Huffington Post*, available at www.huffingtonpost.com/gabe-elsner/edison-electric-institute_b_6519230.html, 22 January 2015; sample bill language: Gabe Elsner, Energy and Policy Institute, *The Campaign Against Net Metering: ALEC and Utility Interests' Next Attack on Clean Energy Surfaces in Arizona* (blog post), available at http://www.energyandpolicy.org/the_campaign_against_net_metering_alec_and_utility_interests_next_attack_on_clean_energy_surfaces_in_arizona, 18 November 2013; ALEC received EEI funding as of 2014: EEI IRS form 990 for 2014, available at documentcloud.org/documents/2638497-2014-EEI-990.html.

25 Evan Halper, "Minority Groups Back Energy Companies in Fight against Solar Power," *Los Angeles Times*, available at www.latimes.com/nation/la-na-solar-race-20150209-story.html, 9 February 2015.

26 Julia Pyper, "Deep Politics, Dark Money and Fraud Join the Solar Party," *GreenTech Media*, available at <http://web.archive.org/web/20161012195711/http://www.greentechmedia.com/articles/read/Deep-Politics-Dark-Money-And-Fraud-Join-the-Solar-Party>, 20 June 2016.

27 Gabe Elsner, "Edison Electric Institute's Anti-Solar, PR Spending Revealed," *The Huffington Post*, available at www.huffingtonpost.com/gabe-elsner/edison-electric-institute_b_6519230.html, 22 January 2015.

28 Roy Hales, "Are Arizona Ratepayers Paying +9 Million for Attack Ads?," *East County Magazine*, available at web.archive.org/web/20150529151747/http://greenlining.org/issues/energy/2013/arizona-ratepayers-paying-9-million-attack-ads/, 3 December 2013.

29 John Parnell, "US Utility Trade Body Told to Confess or Condemn in 'Dark Money' Row," *PV Tech*, available at www.pv-tech.org/news/us_utility_trade_body_told_to_confess_or_condemn_in_dark_money_row, 8 November 2013.

30 "Koch Brothers' Network Focusing on GOP Senate, not Trump," Associated Press, available at fortune.com/2016/10/16/koch-brothers-gop-senate/, 16 October 2016.

31 Michael Beckel, The Center for Public Integrity, *Koch-backed Seniors Group Low-Balling Election Spending?*, available at www.publicintegrity.org/2014/07/30/15163/koch-backed-seniors-group-low-balling-election-spending, 30 July 2014.

32 ALEC funding connection: Lisa Graves, "ALEC Exposed: The Koch Connection," *The Nation*, available at <http://www.thenation.com/article/161973/alec-exposed-koch-connection>, 12 July 2011; Koch state campaigns: Evan Halper, "Koch Brothers, Big Utilities Attack Solar, Green Energy Policies," *LA Times*, available at www.latimes.com/nation/la-na-solar-kochs-20140420-story.html, 19 April 2014.

33 "Campaign of deception": Kate Sheppard, "Conservative Groups Battle Over Solar In Florida," *Huffington Post*, available at huffingtonpost.com/2015/03/09/florida-solar-conservatives_n_6834792.html, 9 March 2015; anti-net metering press conference: AFP Florida, *Americans For Prosperity: Proposed Solar Policies Are Not Free Market (press release)*, archived at web.archive.org/web/20150616150856/http://americansforprosperity.org/florida/article/americans-for-prosperity-proposed-solar-policies-are-not-free-market/, 11 March 2015; AFP spread misleading claims about the cost impacts of renewable electricity standards: AFP Florida, *Charlie Crist Wants You To Have Higher Electricity Bills (press release)*, archived at web.archive.org/web/20150616151318/http://americansforprosperity.org/florida/article/charlie-crist-wants-you-to-have-higher-utility-bills/, 17 April 2014.

34 Tim Dickinson, "The Koch Brothers' Dirty War on Solar Power," *Rolling Stone*, available at: <https://web.archive.org/web/20161012210912/http://www.rollingstone.com/politics/news/the-koch-brothers-dirty-war-on-solar-power-20160211>, 11 February 2016; Ballotpedia, *Florida Solar Energy Subsidies and Personal Solar Use, Amendment 1*, available at [https://ballotpedia.org/Florida_Solar_Energy_Subsidies_and_Personal_Solar_Use,_Amendment_1_\(2016\)](https://ballotpedia.org/Florida_Solar_Energy_Subsidies_and_Personal_Solar_Use,_Amendment_1_(2016)), accessed 27 Oct 2016.

35 Jeffrey Schweers, "Solar Ballot Measure Falls Short," *The Tallahassee Democrat*, available at <http://www.tallahassee.com/story/news/2016/11/08/amendment-only-has-51-percent-60-percent-needed-pass/93474102/>, 9 November 2016.

36 Americans for Prosperity – Kansas, *Repeal RPS in Kansas*, available at www.youtube.com/watch?v=RoN4v-TvQIY, 28 January 2014.

37 Ibid.

38 Stephen Lacey, "Top 3 False Claims About Clean Energy Made by Americans for Prosperity," *Greentech Media*, available at www.greentechmedia.com/articles/read/the-3-most-inaccurate-clean-energy-claims-made-by-americans-for-prosperity, 1 August 2013.

39 Michael Kanellos, "Behind The Tea Party Push For Solar In Georgia," *Forbes*, available at www.forbes.com/sites/michaelkanellos/2013/07/16/behind-the-tea-party-push-for-solar-in-georgia/, 16 July 2013.

40 Erik Wemple, "Newsweek Adds Disclosure about Koch Ties of Professor who Wrote Anti-Wind Power Piece," *The Washington Post*, 21 April 2015.

41 Koch funding for PERC: Property and Environment Research Center, 2015 Annual Report, archived at web.archive.org/web/20161114161258/http://www.perc.org/system/files/attachments/PERC_2015AnnualReport_2020RoadMap_0.pdf; Simmons at PERC: Property and Environment Research Center, Randy Simmons staff page, archived at web.archive.org/web/20161114161354/http://www.perc.org/staff/randy-simmons.

42 See note 40.

43 Michael Goggin, AWEA, *Cookie-cutter Koch Study in North Carolina Still Suffers from Same Errors, Plus Some New Ones*, available at www.aweablog.org/cookie-cutter-koch-study-in-north-carolina-still-suffers-from-same-errors-plus-some-new-ones/, 23 March 2015.

44 Randy Simmons et al., Utah State University Institute of Political Economy, *Renewable Portfolio Standards: Ohio*, 29 April 2015; this report is available through the Heartland Institute website, archived at web.archive.org/web/20161114162512/https://www.heartland.org/publications-resources/publications/renewable-portfolio-standards-ohio.

45 Gabe Elsner, Cleveland Plain Dealer, "Ohio Lawmakers' Energy Mandates Study Critically Flawed (Opinion)," available at http://www.cleveland.com/opinion/index.ssf/2015/10/ohio_lawmakers_energy_mandates.html, 18 October, 2015.

46 Craig Idso et al., Nongovernmental International Panel on Climate Change (with the Heartland Institute), *Climate Change Reconsidered II: Biological Impacts*, available at <https://www.heartland.org/media-library/pdfs/CCR-IIb/Summary-for-Policymakers.pdf>, 2014.

47 Juliet Eilperin, "Climate Skeptic Group Works to Reverse Renewable Energy Mandates," *The Washington Post*, available at www.washingtonpost.com/national/health-science/climate-skeptic-group-works-to-reverse-renewable-energy-mandates/2012/11/24/124faaa0-3517-11e2-9cfa-e41bac906cc9_story.html, 24 November 2012.

48 The Heartland Institute, *Confidential Memo: 2012 Heartland Climate Strategy*, available at <http://www.desmogblog.com/sites/beta.desmogblog.com/files/2012%20Climate%20Strategy.pdf>, January 2012.

49 Juliet Eilperin, "Climate Skeptic Group Works to Reverse Renewable Energy Mandates," *The Washington Post*, available at www.washingtonpost.com/national/health-science/climate-skeptic-group-works-to-reverse-renewable-energy-mandates/2012/11/24/124faaa0-3517-11e2-9cfa-e41bac906cc9_story.html, 24 November 2012.

50 Heartland Institute, *Policy Tip Sheet: North Carolina Renewable Energy Mandate*, available at www.heartland.org/policy-documents/policy-tip-sheet-north-carolina-renewable-energy-mandate, 11 February 2013.

51 Gabe Elsner, "Utility-Backed Anti-Solar Bill On The Move in Kansas Statehouse," *Huffington Post*, available at www.huffingtonpost.com/gabe-elsner/utilitybacked-antisolar-bill-kansas_b_4854964.html, 27 April 2014.

52 More than 2,000 members: ALEC, *Membership*, accessed at <https://web.archive.org/web/20150514213738/http://www.alec.org/membership/> on 14 May 2015.

53 Matt Kasper, "How A Powerful Group Of Corporations Quietly Tried To Roll Back Clean Energy Standards, And Failed Miserably," *Climate Progress*, available at <http://thinkprogress.org/climate/2013/08/08/2399121/corporations-clean-energy-standards/>, 8 August 2013; also Connor Gibson, Greenpeace, *Coal And Oil Polluters Dominate Alec Conference*, available at greenpeaceblogs.org/2014/07/31/coal-oil-polluters-dominate-alec-conference/?_ga=1.176132134.501859317.143207512931 July 2014.

54 People for the American Way, *ALEC: The Voice of Corporate Special Interests In State Legislatures*, archived at <http://web.archive.org/web/20150617172016/http://www.pfaw.org/rww-in-focus/alec-the-voice-of-corporate-special-interests-state-legislatures>.

55 See note 53.

56 Ibid.

57 Brendan Fischer, PRWatch, *Big Defeat for ALEC's Effort to Repeal Renewable Energy Standards in North Carolina* (blog), available at www.prwatch.org/news/2013/04/12075/big-defeat-alecs-effort-repeal-renewable-energy-standards-north-carolina#sthash.9etX0SF6.dpuf, 24 April 2013.

58 The New York Times Editorial Board, "The Koch Attack on Solar Energy," *The New York Times*, 26 April 2014; Washington state: Lucy Woods, "Washington State Rejects Net Metering Fee and Solar Leasing 'Monopoly' Legislation," *PVTech*, available at www.pv-tech.org/news/washington_state_rejects_net_metering_fee_and_solar_leasing_monopoly_legisl, 17 March 2014.

59 Washington state: Lucy Woods, "Washington State Rejects Net Metering Fee and Solar Leasing 'Monopoly' Legislation," *PVTech*, available at pv-tech.org/news/washington_state_rejects_net_metering_fee_and_solar_leasing_monopoly_legisl, 17 March 2014; Curt Bramble, who introduced anti-net metering legislation in Utah, was on ALEC national board: ALEC, *ALEC Board of Directors*, archived at <http://web.archive.org/web/20120412014622/http://www.alec.org/about-alec/board-of-directors>; information on bill SB208: Brian Maffly, "Utah Bill to Impose Fees on Solar Power Users Advances," *The Salt Lake Tribune*, 24 February 2014.

60 American Legislative Exchange Council, *State Chairs*, archived at <https://web.archive.org/web/20161014162141/https://www.alec.org/about/state-chairs/>, accessed 13 October 2016.

Minutes of the Senate Committee on Commerce, Labor and Energy, 10 April 2015, available at <https://www.leg.state.nv.us/Session/78th2015/Minutes/Senate/CL/Final/841.pdf>, accessed on 14 October 2016.

61 The New York Times Editorial Board, "The Koch Attack on Solar Energy," *The New York Times*, 26 April 2014.

62 State Sen. Bill Seitz on ALEC national board: ALEC, *National Board*, archived at <http://web.archive.org/web/20150603144423/http://www.alec.org/about-alec/board-of-directors/>; State Sen. Bill Seitz "Stalin" remarks: Julie Carr Smyth, "Foes of Ohio Clean Energy Bill Criticize Senator," *Akron Beacon Journal*, available at <http://web.archive.org/web/20150603144229/http://www.ohio.com/news/foes-of-ohio-clean-energy-bill-criticize-senator-1.482609>, 22 April 2014.

63 The Center for Resilience at Ohio State University, *Economic Analysis of Ohio's' Renewable and Energy Efficiency Standards*, available at web.archive.org/web/20150609135151/http://www.ohiomfg.com/wp-content/uploads/2013-10-04_lb_energy_deeps_sept25_2013_model_results.pdf, 25 September 2013.

64 Anastasia Pantsios, "How ALEC Stacks Deck against Renewables in Ohio," *EcoWatch*, available at <http://web.archive.org/web/20150603144125/http://ecowatch.com/2014/10/08/alec-renewable-energy-ohio/>, 8 October 2014.

The General Assembly of the State of Ohio, "The Energy Mandates Study Committee Co-Chairs' Report", available at <http://emsc.legislature.ohio.gov/Assets/Reports/emsc-final-report.pdf>, 30 September 2015.

65 Kiley Kroh, "In Heated Arizona Solar Battle, Top Regulators Tied to ALEC," *ThinkProgress*, available at <http://web.archive.org/web/20150602223308/http://thinkprogress.org/climate/2013/11/01/2873071/arizona-solar-battle/>, 1 November 2013.

66 Luige del Puerto, "Months After Publicly Leaving ALEC in 2012, APS Quietly Rejoined", *Arizona Capitol Times*, available at <http://azcapitoltimes.com/news/2013/11/07/arizona-public-service-aps-quietly-rejoined-alec-american-legislative-exchange-council-months-after-publicly-leaving-in-2012/>, 7 November 2013.

67 Consumer Energy Alliance, *About Consumer Energy Alliance*, archived at <http://web.archive.org/web/20150608134720/http://consumerenergyalliance.org/about-consumer-energy-alliance/>.

68 Consumer Energy Alliance, *Members*, archived at <http://web.archive.org/web/20150605214611/http://consumerenergyalliance.org/about-consumer-energy-alliance/members/>.

69 Mike Ivey, "Did Houston Energy Group Dupe MGE Customers to Back Rate Changes?," *The Capital Times*, available at host.madison.com/news/local/writers/mike_ivey/did-houston-energy-group-dupe-mge-customers-to-back-rate/article_2eea8630-589c-11e4-b320-4f43315671a6.html, 21 October 2014.

70 Ibid.

71 Ibid.

72 Mike Ivey, "PSC Tosses out Petition Supporting MGE Rate Hike," *The Capital Times*, available at host.madison.com/news/local/writers/mike_ivey/psc-tosses-out-petition-supporting-mge-rate-hike/article_04e6e576-605e-11e4-a6e7-1353b30bf982.html#ixzz3bwfFGTGS, 2 June 2015.

73 Ibid.

74 Consumer Energy Alliance, *Voice Your Support for Solar Energy*, archived at <https://web.archive.org/web/20161013171606/http://consumerenergyalliance.org/2016/09/voice-support-solar-energy/>, 15 September 2016.

75 David Pomerantz, "Consumer Energy Alliance, Group behind Fraudulent Petitions and Letters Signed by Dead People, Releases Anti-Solar Report", available at <http://www.energyandpolicy.org/consumer-energy-alliance-group-behind-fraudulent-petitions-letters-signed-dead-people-releases-anti-solar-report/>, 12 October 2016.

76 Kevin Doyle, "Amendment 1 Would Boost Solar Energy and Benefit All: My Word," *Orlando Sentinel* (op-ed), 12 June 2016.

77 Philip Warburg, "Florida Clean Power: The Missing Link", *Miami Herald*, archived at <https://web.archive.org/web/20161017210612/http://www.miamiherald.com/opinion/op-ed/article44791227.html>, 15 November 2015.

78 NC Clean Energy Technology Center, *DSIRE 3rd Party Solar PV Power Purchase Agreement (PPA)*, available at <http://ncsolarcen-prod.s3.amazonaws.com/wp-content/uploads/2014/11/3rd-Party-PPA.pdf>, July 2016; renewable electricity standard: NRDC, *Renewable Energy for America – Florida*, accessed at www.nrdc.org/energy/renewables/florida.asp on 22 May 2015.

79 Special interest impact: Eric Barton, Florida Center for Investigative Reporting, *In Sunshine State, Big Energy Blocks Solar Power* (blog), available at <http://fcir.org/2015/04/03/in-sunshine-state-big-energy-blocks-solar-power/>, 3 April 2015; solar lagging: SEIA, *Florida Solar*, accessed at <http://web.archive.org/web/20150521140517/http://www.seia.org/state-solar-policy/florida> on 21 May 2015..

80 Tim Dickinson, "The Koch Brothers' Dirty War on Solar Power", *Rolling Stone*, available at: <https://web.archive.org/web/20161012210912/http://www.rollingstone.com/politics/news/the-koch-brothers-dirty-war-on-solar-power-20160211>, 11 February 2016.

81 Ben Wilcox and Dan Krassner, Integrity Florida, *Power Play: Political Influence of Florida's Top Energy Corporations*, 31 March 2014.

82 Herman Trabish, "Florida Utilities Pour Millions into Tight Governor's Race," *Utility Dive*, 3 September 2014.

83 Ballotpedia, *Florida Solar Energy Subsidies and Personal Solar Use, Amendment 1*, available at [https://ballotpedia.org/Florida_Solar_Energy_Subsidies_and_Personal_Solar_Use,_Amendment_1_\(2016\)](https://ballotpedia.org/Florida_Solar_Energy_Subsidies_and_Personal_Solar_Use,_Amendment_1_(2016)), accessed 14 October 2016.

84 Ibid.

85 Ibid.

86 Consumers for Smart Solar, "What Amendment 1 Does", archived at <https://web.archive.org/web/20161017203122/https://smartsolarfl.org/the-solar-amendment/>, accessed 17 October 2016.

87 Mary Ellen Klas, "Rival Solar Petitions Spawn Confusion, Race for Signatures," *The Miami Herald*, 30 October 2015.

88 Ibid.

89 Sun Sentinel Editorial Board, "Vote 'NO' on Shady, Not Smart, Solar Amendment", *Sun Sentinel*, archived at <https://web.archive.org/web/20161014184531/http://www.sun-sentinel.com/opinion/endorsements/fl-endorse-no-on-amendment-1-solar-20160930-story.html>, 30 September 2016.

90 Gulf Power Company support for JMI: Energy and Policy Institute, *Press Release: Utility-funded PAC caught attempting more "political jiu-jitsu"* (press release), available at energyandpolicy.org/press-release-utility-funded-pac-caught-attempting-political-jiu-jitsu/, 21 October 2016.

91 Mary Ellen Klas, "Insider Reveals Deceptive Strategy behind Florida's Solar Amendment," *The Miami Herald*, 18 October 2016.

92 Jeffrey Schweers, "Solar Ballot Measure Falls Short," *The Tallahassee Democrat*, available at <http://www.tallahassee.com/story/news/2016/11/08/amendment-only-has-51-percent-60-percent-needed-pass/93474102/>, 9 November 2016.

93 AEP number of customers: American Electric Power, *About Us*, accessed at <https://www.aep.com/about/> on 22 May 2015.

94 Kathiann Kowalski, "Ohio Utilities Take Net Metering Fight to State Supreme Court," *Midwest Energy News*, 4 August 2014; Kathiann Kowalski "Net Metering Going Under the Microscope in Ohio", *Midwest Energy news*, 18 May 2015.

95 The Supreme Court of Ohio, *Case 2014-1290*, available at <https://supremecourt.ohio.gov/clerk/ecms/#/caseinfo/2014/1290>, accessed 18 October 2016.

96 AEP lobbied for freeze: Steven Mufson and Tom Hamburger, "Ohio Governor Signs Bill Freezing Renewable-Energy Standards," *The Washington Post*, 13 June 2014.

97 Herman Trabish, "West Virginia Bill to Study, Cap Net Metering Signed into Law," *Utility Dive*, 17 March 2015.

98 Ibid.

99 According to data from: National Institute on Money in State Politics, Follow the Money, accessed at www.followthemoney.org/show-me?s=WV&y=2015,2014,2013,2012,2011,2010,2009,2008&d-eid=130#{{1|gro=f-eid on 4 June 2015.

100 Stephen Lacey, "Warren Buffett's Energy Company Says Net Metering Should Be 'Eliminated'," Greentech Media, available at www.greentechmedia.com/articles/read/berkshire-hathaway-skeptical-about-distributed-energy, 22 August 2014.

101 Berkshire Hathaway Energy, *2015 Corporate Brochure*, available at www.berkshirehathawayenergyco.com/assets/pdf/corporate_brochure.pdf, 2015.

102 Brent Gale, Berkshire Hathaway Energy, *slide from Law Seminars International Energy in the S.W. Santa Fe, New Mexico*, 22 July 2014.

103 The Solar Foundation, *Nevada Solar Industry Jobs Grow 146%: Now Ranks 1st in the Country in Solar Jobs Per Capita* (Press release), available at www.thesolarfoundation.org/press-release-nv-census-2014/, 12 February 2015.

104 See note 9.

105 Sean Whaley, "Rooftop-Solar Official: NV Energy Proposal Spells Death of Industry," *Las Vegas Review-Journal*, 3 August 2015.

106 Kyle Roerink, "Solar Companies Say NV Energy Misled Them on Cap Limit," *Las Vegas Sun*, 8 July 2015.

107 Kyle Roerink, "Compromise between NV Energy, Solar in Works as Lawmakers Vet Bill," *Las Vegas Sun*, 20 May 2015.

108 "Net Metering," NV Energy, available at <https://www.nvenergy.com/renewablesenvironment/renewable-generations/NetMetering.cfm#forecast>, accessed on 9 November 2016.

109 Follow the Money, *NV Energy Giving to Candidates*, archived at <https://web.archive.org/web/20161018215814/http://www.followthemoney.org/entity-details?eid=9687651>, accessed on 18 October 2016.

110 Politifact, *Solar Energy Fairness's File*, available at <http://www.politifact.com/personalities/solar-energy-fairness/>, accessed on 18 October 2016.

111 Citizens for Solar Energy Fairness, "Choice", advertisement, available at <https://www.youtube.com/watch?v=hbMEAkj8PXk>, 13 April 2016.

112 Energy Information Administration, Form EIA-826 net metering data, downloaded at www.eia.gov/electricity/data/eia826/ on 20 October 2016.

113 Ibid.

114 SEIA, *Utah Solar*, archived at <http://web.archive.org/web/20150609144755/http://www.seia.org/state-solar-policy/utah-solar>.

115 RMP "went to the legislature with [the] bill" (SB 208) according to Sarah Wright, Executive Director of Utah Clean Energy: Kiley Kroh, "Push To Impose Extra Fees On Customers Who Install Solar Panels Sparks Outrage In Utah," *ClimateProgress*, 11 June 2014

116 Curt Bramble was on ALEC national board: ALEC, *ALEC Board of Directors*, archived at <http://web.archive.org/web/20120412014622/http://www.alec.org/about-alec/board-of-directors>; information on bill SB208: Brian Maffly, "Utah Bill to Impose Fees on Solar Power Users Advances," *The Salt Lake Tribune*, 24 February 2014.

117 Contribution data is from Follow The Money, search for *Electric Utilities PACIFICORP contributions to BRAMBLE, CURT*, accessed at <http://www.followthemoney.org/show-me?c-t-eid=6647149&d-cci=36&d-eid=8368#f1|gro=d-id> on 3 June 2015.

118 Kiley Kroh, "Push To Impose Extra Fees On Customers Who Install Solar Panels Sparks Outrage In Utah," *ClimateProgress*, 11 June 2014.

119 Brian Maffly, "Is a fee for solar energy users a 'sun tax' or fair play?," *The Salt Lake Tribune*, available at www.sltrib.com/sltrib/news/58211096-78/solar-power-energy-net.html.csp, 27 July 2014.

120 Brian Maffly, "Utah's Solar Power Homeowners Fight Proposed Utility Fee," *The Salt Lake Tribune*, 23 May 2014; religious support: Brian Maffly, "Faith, Business Groups Blast Proposed Fee on Solar-Equipped Homes," *The Salt Lake Tribune*, 25 July 2014.

121 Brian Maffly, "Faith, Business Groups Blast Proposed Fee on Solar-Equipped Homes," *The Salt Lake Tribune*, 25 July 2014.

122 UPSC rejection: Lucy Woods, "Utah Rejects Net Metering Charge," *PVTech*, available at http://www.pv-tech.org/news/utah_suspends_net_metering_dispute, 4 September 2014; argument against consideration of environmental benefits: Brian Maffly, "Proposed Surcharge on Utahns with Solar Panels is Back for Rocky Mountain Power Customers," *The Salt Lake Tribune*, 12 May 2015.

123 Benjamin Inskeep and Kathryn Wright, NC Clean Energy Technology Study and Meister Consultants Group, *The 50 States of Solar – Q1 2015*, available at nccleantech.ncsu.edu/wp-content/uploads/50-States-of-Solar-Is-sue2-Q2-2015-FINAL3.pdf, Spring 2015.

124 Owen Comstock, "California Has Nearly Half of the Nation's Solar Electricity Generating Capacity," U.S. Energy Information Administration, available at <http://www.eia.gov/todayinenergy/detail.php?id=24852>, 5 February 2016.

125 Herman K. Trabish, "California Utility IID Halts Net Metering Incentives after Hitting 5% Cap", *UtilityDive*, available at <http://www.utilitydive.com/news/california-utility-iid-halts-net-metering-incentives-after-hitting-5-cap/415014/>, 8 March 2016.

126 California Legislative Information, "Assembly Bill No. 510," available at http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=200920100AB510.

127 See note 125.

128 Ibid; IID, *Energy Service Maps*, available at <http://www.iid.com/district-services/economic-development/energy-service-area>, accessed on 20 October 2016.

129 Sammy Roth, "Imperial Irrigation District Slams Brakes on Solar," *The Desert Sun*, 11 May 2016.

130 CALSEIA, *Diverse Group of Organizations Get Behind AB 2163: Bill Would Help Stranded Solar Families in Coachella and Imperial Valleys* (press release), archived at web.archive.org/web/20161020213308/http://calseia.org/press-releases/2016/8/24/diverse-group-of-organizations-get-behind-ab-2163-bill-would-help-stranded-solar-families-in-imperial-irrigation-district.

131 Ibid.

132 Ibid.

133 Sammy Roth, "Rooftop Solar Industry, Imperial Irrigation District Strike Last-Minute Compromise on Net Metering," *The Desert Sun*, available at <http://www.desertsun.com/story/tech/science/energy/2016/08/31/rooftop-solar-industry-imperial-irrigation-district-strike-last-minute-compromise-net-metering/89660070/>, 31 August 2016.

134 Anza Electric, *Net Metering*, archived at web.archive.org/web/20161109215907/http://www.anzaelectric.org/content/net-metering-0; TID Water & Power, *Solar Net Metering*, archived at web.archive.org/web/20161109220004/http://tid.com/solar-net-metering.

135 SEIA, *Illinois Solar*, archived at <http://web.archive.org/web/20161020173058/http://www.seia.org/state-solar-policy/Illinois>.

136 See note 9.

137 Peter Maloney, "ComEd Jumps on the Demand Charge Train with New Illinois Proposal," *UtilityDive*, available at <http://www.utilitydive.com/news/comed-jumps-on-the-demand-charge-train-with-new-illinois-proposal/418735/>, 9 May 2016.

138 According to data from: National Institute on Money in State Politics, *Follow the Money* accessed at <http://www.followthemoney.org/entity-details?eid=3615> and <http://www.followthemoney.org/entity-details?eid=11258> on 14 October 2016.

139 Illinois General Assembly, *Bill Status of SB 1585*, available at <http://www.ilga.gov/legislation/BillStatus.asp?DocNum=1585&GAID=13&DocTypeID=SB&SessionID=88&GA=99>, accessed 27 October 2016.

140 Kari Lydersen, "Utility-backed Group Divides Illinois Solar Advocates," *Midwest Energy News*, 6 July 2016.

141 Illinois Smart Solar Alliance, *About Us*, archived at web.archive.org/web/20161114171726/http://illinois-smart-solaralliance.com/about-us.

142 Solar Energy Industries Association, *2014 Top 10 Solar States*, available at www.seia.org/research-resources/2014-top-10-solar-states, 2015.

143 Laurie Roberts, "AG's Office Widens Arizona Corporation Commission Investigation," *The Arizona Republic*, 23 July 2015.

144 Ryan Randazzo, "Utility Regulator's Meetings with APS Scrutinized," *The Arizona Republic*, 2 May 2015.

145 Ibid.

146 Ryan Randazzo, "FBI questions Former Utility Regulator, APS, Corporation Commission," *The Arizona Republic*, 10 June 2016.

147 Laurie Roberts, "AG's Office Widens Arizona Corporation Commission Investigation," *The Arizona Republic*, 23 July 2015.

148 Ibid.

149 Laurie Roberts, "APS to ASU Charity to Dark-Money Campaign?," *The Arizona Republic*, available at <http://www.azcentral.com/story/laurieroberts/2015/03/10/save-our-future-now-dark-money-campaign/24717217/>, 10 March 2015.

150 Herman Trabish, "Arizona Utility Funds Solar Smear Campaign, Saying It Is 'Obligated to Fight'," *Greentech Media*, available at <http://www.greentechmedia.com/articles/read/arizona-utility-admits-funding-anti-solar-ad-campaign>, 22 October 2013.

151 Matthew Philips, "Arizona's New Fee Puts a Dent in Rooftop Solar Economics," *Bloomberg Business*, available at www.bloomberg.com/bw/articles/2013-11-22/arizonas-new-fee-puts-a-dent-in-rooftop-solar-economics, 22 November 2013.

152 Ibid.

153 Arizona Corporation Commission, *Docket E-01345A-13-0248*, available at edocket.azcc.gov/Docket/RSSDocket?docketId=18039, accessed on 19 September 2015.

154 Herman Trabish, "APS Rate Case Sparks Concern Beyond Mandatory Demand Charge Proposal," *UtilityDive*, available at <http://www.utilitydive.com/news/aps-rate-case-demand-charge-proposal/420332/>, 7 June 2016.

155 Ibid.

156 Herman Trabish, "Why Arizona's Long-Awaited Value of Solar Schemes Please No One," *UtilityDive*, available at <http://www.utilitydive.com/news/why-arizonas-long-awaited-value-of-solar-schemes-please-no-one/428677/>, 24 October 2016.

157 Patrick O'Grady, "APS Parent to Jump into ACC Race with Plans for \$1 Million in Spending," *Phoenix Business Journal*, 24 October 2016.

158 Ryan Randazzo, "SRP Data Shows Some Solar Customers Save Money with Demand Rates," *Arizona Republic*, 28 March 2016.

159 Ibid.

160 Ryan Randazzo, "SRP Leaders Squabble over Elections," *The Arizona Republic*, available at archive.azcentral.com/business/articles/20110703srp-leaders-squabble-over-elections.html, 3 July 2011.

161 Ryan Randazzo, "SRP Board OKs Rate Hike, New Fees for Solar Customers," *The Arizona Republic*, 27 February 2015.

162 Herman Trabish, "Why SRP's Controversial Demand Charge Unlocks a Huge Opportunity for Solar-plus-storage," *Utility Dive*, available at utilitydive.com/news/why-srps-controversial-demand-charge-unlocks-a-huge-opportunity-for-solar-/372548/, 12 March 2015.

163 Rosalind Jackson, VoteSolar, *Shady Math Puts Rooftop Solar at Risk in Arizona* (blog post), available at votesolar.org/2013/04/30/shady-math-puts-rooftop-solar-at-risk-in-arizona/, 30 April 2013.

164 Ryan Randazzo, "Newcomers Fail to Upset Rivals on Salt River Project Board," *The Arizona Republic*, available at www.azcentral.com/story/money/business/2014/04/02/newcomers-fail-upseat-rivals-salt-river-project-board/7228091/, 2 April 2014.

165 APS involvement with SRP race: Ryan Randazzo, "Candidates Suspect APS Influencing Corp. Comm. Race," *The Arizona Republic*, available at azcentral.com/story/money/business/2014/06/19/candidates-suspect-aps-influencing-corp-comm-race/10886483/, 19 June 2014; APS proposal of new rate hike: Julia Pyper, "Inside the Minds of Regulators: How Different States Are Dealing With Distributed Energy," *GreenTech Media*, available at greentechmedia.com/articles/read/what-are-the-most-pressing-issues-facing-public-utility-commissioners, 29 May 2015.

166 Tucson Electric Power, *About Us*, archived at web.archive.org/web/20161020184737/https://www.tep.com/about/.

167 Unisource, *About Us*, archived at web.archive.org/web/20161020185054/https://www.uesaz.com/about/.

168 Fortis, *Fortis Inc. and GIC Private Limited Complete Acquisition Of ITC Holdings Corp. (press release)*, archived at <http://web.archive.org/web/20161020185515/https://www.fortisinc.com/news-and-media/news-releases/news-release?id=2103835>.

169 Gavin Bade, "ACC Approves TEP plans for Renewables, Storage, but Not Utility-Owned Solar," *UtilityDive*, available at <http://www.utilitydive.com/news/acc-approves-tep-plans-for-renewables-storage-but-not-utility-owned-solar/418568/>, 4 May 2016.

170 Ibid.

171 Peter Maloney, "UES Electric Drops Mandatory Demand Charge Proposal, Except for New Solar Customers", *UtilityDive*, available at <http://www.utilitydive.com/news/ues-electric-drops-mandatory-demand-charge-proposal-except-for-new-solar-c/419287/>, 17 May 2016.

172 Ryan Randazzo, "Rural Utility's Case Could Have Big Impact on Rooftop Solar Fees" *The Arizona Republic*, available at <http://www.azcentral.com/story/money/business/energy/2016/02/18/rural-utilities-case-could-have-big-impact-rooftop-solar-fees/80516092/>, 19 February 2016.

173 Peter Maloney, "UES Electric Drops Mandatory Demand Charge Proposal, Except for New Solar Customers", *UtilityDive*, available at <http://www.utilitydive.com/news/ues-electric-drops-mandatory-demand-charge-proposal-except-for-new-solar-c/419287/>, 17 May 2016.

174 Arizona Corporation Commission, Decision #75697 on Docket E-04204A-15-0142, available at <http://edocket.azcc.gov/Docket/DocketDetailSearch?docketId=18997#docket-detail-container3>, 18 August 2016;

Krysti Shallenberger, "Heating up again: Arizona Turns to Solar Valuation after Demand Charge Decision Delayed", *Utility Dive*, available at <http://www.utilitydive.com/news/heating-up-again-arizona-turns-to-solar-valuation-after-demand-charge-deci/424454/>, 15 August 2016.

175 Herman K. Trabish, "AZ Regulators Call for Formal Policy to Prevent Utility Donations in Commission Elections", *UtilityDive*, available at <http://www.utilitydive.com/news/az-regulators-call-for-formal-policy-to-prevent-utility-donations-in-commis/404894/>, 1 September 2015.

176 Arizona Corporation Commission, *Docket Details: E-00000J-14-0023*, available at <http://edocket.azcc.gov/Docket/DocketDetailSearch?docketId=18350>, accessed on 28 October 2016.