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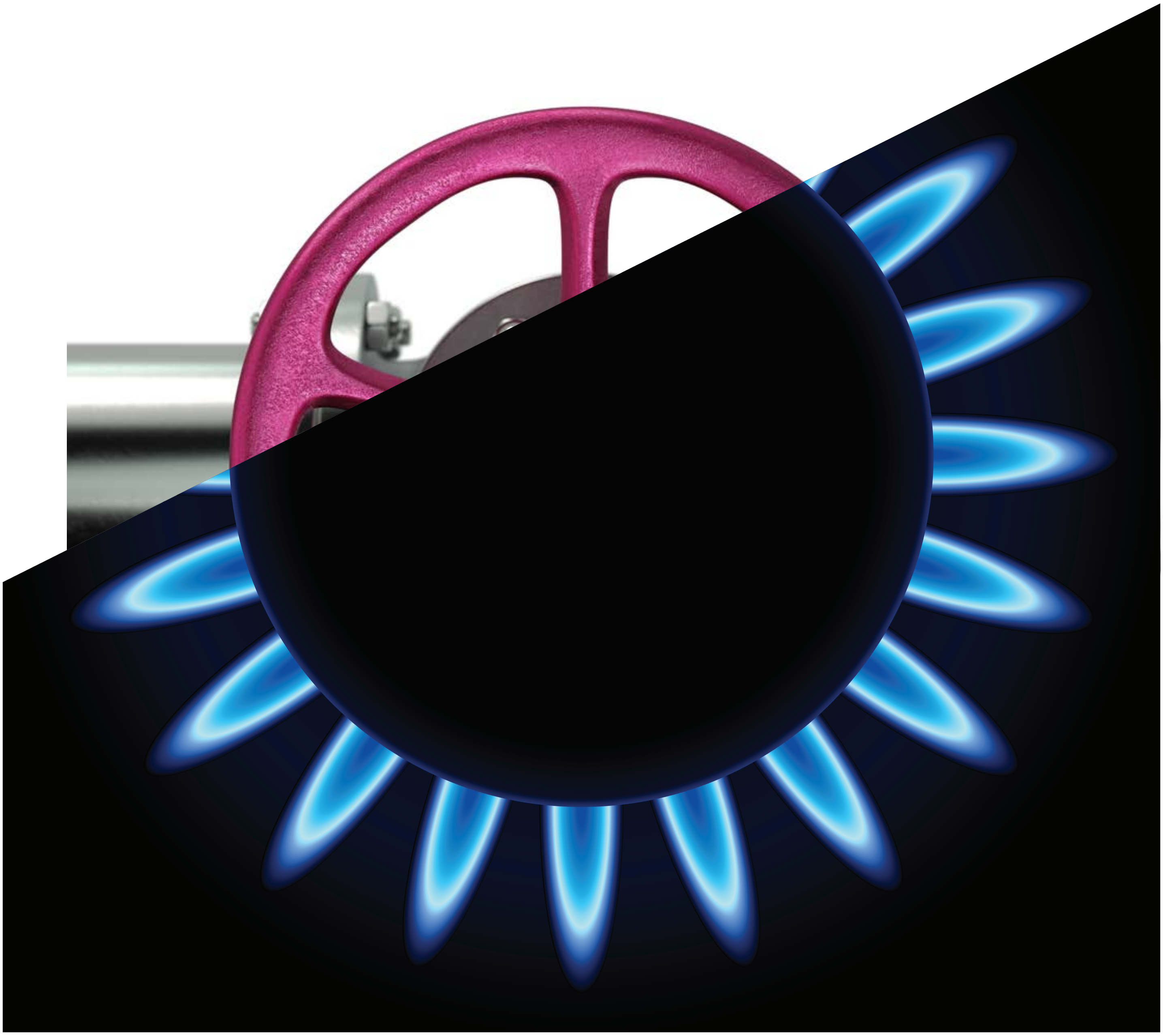

TRUMP VS. CLINTON
ON ENERGY, THE STAKES ARE HIGH FOR RENEWABLES, COAL

SPECIAL REPORT

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As with nearly every issue raised during this combative presidential campaign, the natural tension between environmental protection and the generation of electric power has revealed widely disparate positions by Donald Trump and Hillary Clinton.

Also in character with the candidates and their campaign and debating styles, the Clinton camp has published and posted detailed policy positions, while Trump's plans are less defined, offering only campaign speeches and statements to indicate his energy policy positions.

The most notable difference in the likely path of the US electricity generation fleet if Clinton or Trump successfully implements their policies is the growth of renewables, particularly solar in the short term.

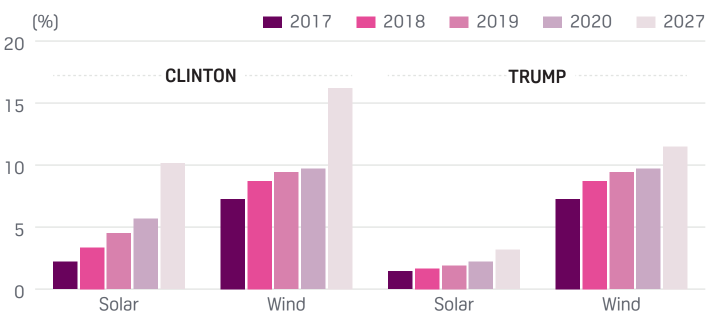
Clinton wants to aggressively build out renewable generation, having it account for 33% of US power by 2027. Her call for the installation of 500 million solar panels would drive about a 274% increase in solar capacity from 2017 through 2020, according to Platts Analytics' Bentek Energy estimates.

With her goal, estimated solar capacity in 2020 could be as high as 154 GW. In September, total installed solar capacity from both rooftop and utility-scale projects was at roughly 31.6 GW, according to data from the Solar Energy Industries Association, a US solar energy trade group. Even with wind capacity also growing by about 41% during that period, solar capacity would exceed that of wind by the end of her first term by about 9.3 GW.

Assuming flat load and similar capacity factors to current technology, generating 33% of US power by 2027 would require roughly 506 GW of combined wind and solar, representing over a four-fold increase from current levels.

Near-term renewables growth in a Trump presidency would be significant but comparatively modest assuming no action is taken to repeal the Business Energy Investment Tax Credit and Renewable Electricity Production Tax Credit, which are both on a glide path to lower incentive levels by the 2019-2020 time period.

ESTIMATED WIND AND SOLAR MARKET SHARE



Source: Platts Analytics' Bentek Energy

Under Trump, combined solar and wind capacity would grow by an estimated 46%, largely driven by the current pipeline of projects in development still coming to fruition. By 2020, Platts Analytics expects solar capacity to increase by nearly 20 GW, or 60%, from the beginning of 2017 to the end of 2020. As in the Clinton scenario, wind capacity is projected to grow by about 42 GW, or 41% over the same period.

With no federal mandates or incentives to drive renewables expansion, Trump's energy platform might appear bearish for renewables, however, the nation would likely still see growth for these resources due to the proliferation of state-level renewable portfolio standards as well as continued technology cost declines. Compared with Clinton's position, Trump's lack of federal incentives would likely result in significantly slower growth, although with state-level mandates and cost decline, renewable market share could still reach upwards of 21% by 2027, about 8 percentage points higher than 2016 levels.

LEVEL OF COAL GENERATION IN PLAY

Another important difference between Clinton and Trump's policy objectives is coal generation. Clinton would presumably stick by the Environmental Protection Agency's Clean Power Plan, or CPP, and possibly tighten emission standards down the road. That would increase the likelihood of coal retirements as renewables come online, leaving natural gas in an important balancing role.

Under the Clinton scenario, Platts Analytics estimates coal retirements from the 2020-2027 time period could come in around 58 GW. By comparison, the US Energy Information Administration's most recent Annual Energy Outlook released earlier this year estimated that the CPP would lead to an additional 55 GW of coal retirements.

In contrast, Trump's promise to repeal the CPP would likely keep coal and natural gas battling for generation share based on fuel economics, which would continue to ebb and flow through the years. Platts Analytics is tracking about 14.6 GW of currently announced coal retirements expected to take place sometime between now and the end of the next president's first term. Under the Trump scenario, after the first term, operational coal capacity would shrink by an additional 18 GW from 2021 to 2027, according to the estimates.

What follows is a detailed breakdown of each candidate's position.

Please enjoy this special collaboration between the content and analytics teams of S&P Global Platts and S&P Global Market Intelligence. By focusing our combined expertise on the energy policies of the presidential candidates, we're endeavoring to bring you broader perspective and insight into this very important topic.
Questions or comments? Please contact: Chris.Newkumet@spglobal.com or Bryan.Schutt@spglobal.com

TRUMP'S VIEW

Though details are scant, Trump has touted an America-first, all-of-the-above energy strategy with an eye on making energy independence and dominance a strategic economic and foreign policy goal. As a climate skeptic, Trump would try to roll back regulations on coal plants, unwind subsidies for renewable generation and seek to undo a recent international climate agreement.

Trump's energy plan means doing away with the government picking winners and losers, and instead letting markets work while "rebalancing the landscape," Representative Kevin Cramer, a top Trump energy advisor, said in an interview.

The North Dakota Republican said that in addition to repealing regulations Trump viewed as stifling the fossil-fuel sector, his team would put in place technology-neutral tax deductions to spur American production and better balance the distribution of federal dollars for energy projects.

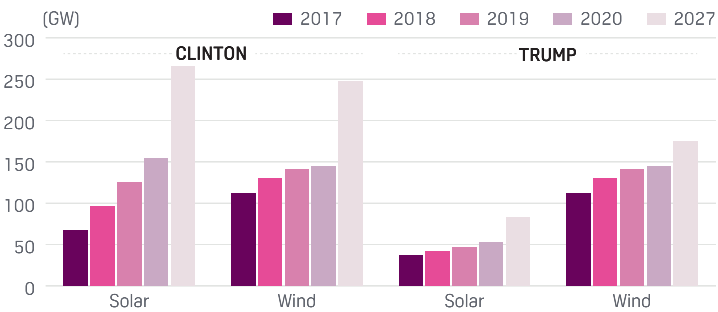
"I think Mr. Trump's more recent comments acknowledge that there's at least a political desire, a populist desire in this country for a carbon-reduced future," Cramer said. "Given that and accepting that, let's not preclude anything. Let's make sure that the innovators are able to make a profit and invest in the technologies that can make coal and natural gas less CO2-intensive."

Clear view of Trump plan lacking

But many still do not have a clear view of the direction Trump might take on energy policy. As US Energy Association Executive Director Barry Worthington put it, you could create a list with 10 people whom Hillary Clinton might appoint as energy secretary and probably see her nominee on that list, but you could create a 1,000-name list that might still not include Trump's eventual pick.

But with the Democratic Party seemingly moving away from President Obama's all-of-the-above position "to wanting to see an end to the fossil fuel industry and a complete embrace of the renewable fuels industry," Merrill Matthews, resident scholar with the Institute for Policy Innovation, a right-leaning think tank critical of restrictions on domestic energy exploration, saw areas where one might prefer a Trump administration.

ESTIMATED WIND AND SOLAR CAPACITY



Source: Platts Analytics' Bentek Energy

Matthews said the push for renewable fuels envisioned by Clinton "is a drain on the federal coffers." If she takes office, and her efforts to essentially phase out fossil fuels in the near future are not impeded by Republican lawmakers, "I think you wouldn't see economic growth, and you might very well go into recession because the energy industry has been such a net positive for the economy."

On the other hand, rolling back regulations on fossil fuels and opening up more federal lands to development would give the industry "a little more room to be able to operate in a market environment," Matthews said.

He also expected Clinton's promise to provide federal assistance to communities struggling with the downturn in coal production and consumption to be more burdensome on taxpayers. "Under a Trump administration, I suspect [coal's] decline slows down some, and you might have a chance for retirement and job changeover and other things that might require less federal help if the government were inclined to do that," he said.

Trump pledge on coal questioned

But John Coequyt, the Sierra Club's director of federal and international climate campaigns, didn't pull any punches in his criticism of Trump's promises.

"He talks about how he's going to boost industries that are real competitors to each other in ways that would lift them all up," Coequyt said in an interview. "Trump, as an individual, is not encumbered by the facts in the electric sector. So he's able to talk about outcomes that I would argue are mutually exclusive from one another."

Coequyt added: "The biggest lie in his talking points is this notion that he's going to bring back the coal industry while he simultaneously promotes natural gas, renewable energy and nuclear. He's talking about new energy for the most part and the more new resources we bring on, the harder it is for the coal industry."

From a market standpoint, Trump's support of increased oil and gas production could push down natural gas prices, which have been relatively low since the US shale boom.

Industry has acknowledged that cheap gas has been the main driver of the demise of the coal industry although environmental regulations have not helped the situation. Trump's remarks have not addressed this internal conflict between the rival fuels for power generation.

Even Cramer put caveats on how much Trump could actually do to put coal miners back to work, but said "at the very least he can stop the bleeding with some pretty basic policy changes."

Those policy changes, which he said would be easy to implement rather quickly, include shelving the CPP and the

Office of Surface Mining Reclamation and Enforcement's stream buffer zone rule as well as ending the current moratorium on new leases for coal mined from federal lands.

Cramer added that Trump has also supported breathing new life into clean coal technologies.

Cramer contended that research and development dollars at the US Department of Energy were shifted away from clean coal technologies and he would rebalance that funding which could lessen retirements and help coal's future. "I wouldn't preclude the possibility that some coal could come back," he said.

Coal, gas could both win

FBR Capital Markets Senior Policy Analyst Benjamin Salisbury said there was a "plausible scenario" under which coal and gas could both prosper.

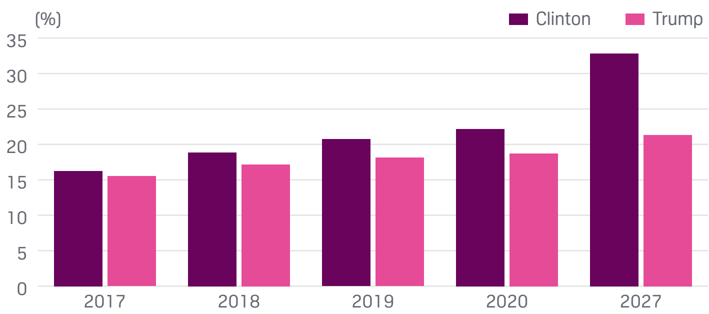
For instance, he said, the future could bring a serious boost in the usage of electric vehicles that would accelerate load costs, LNG exports would be at 20 Bcf/d and a robust petchem sector could be using about 1.5 Bcf/d of gas. Under such conditions, peak summer and winter demand could create higher price volatility for gas, which tends to lead to higher average prices, Salisbury said, pushing generators to use more coal for power generation.

So while gas demand would remain high, at higher prices, from uses outside of the power sector, coal could increase its market share in the generation mix, he explained.

Salisbury added that the future could also see an expansion of the power sector. While models generally forecast flat power demand growth, Salisbury noted that "predictions are almost never right," pointing to projections from 2005 that today's generation mix would be short and load would be on the rise.

Salisbury offered that Trump's position on coal appears to be better described as planning to alleviate "regulatory challenges that are designed to collectively disadvantage fossil fuels relative to zero-emissions sources," rather than saving coal. "The market will decide if gas does better or coal does better."

ESTIMATED TOTAL RENEWABLE MARKET SHARE



Source: Platts Analytics' Bentek Energy

While most see Trump's plans for coal as having a measured impact — prolonging the sector's life but not necessarily returning the industry to its former glory — opinions vary more widely on the implications of a Trump presidency for renewable energy and climate efforts.

Stewart Glickman, director of energy equity research at CFRA, said he believed Trump's remarks about not being interested in picking winners and losers in the energy field were "code for he isn't interested in subsidizing alternative energy."

CFRA, an independent equity research firm, recently acquired S&P Global Market Intelligence's equity and fund research business. Like Platts, Global Market Intelligence is a subsidiary of S&P Global.

Trump is a climate change skeptic. "In that worldview, things like subsidizing wind or solar power are not seemingly interesting to him," Glickman said.

Such subsidies would likely get rolled back, he said, adding that it would not surprise him if a Trump administration tried to get rid of renewable tax credits ahead of their scheduled phase out.

Renewable energy widely supported

But renewable energy has support from both sides of the aisle as many conservative states have prospered from wind energy. Republican Senator Chuck Grassley of Iowa, who penned the original wind energy production tax credit in the 1990s, told media outlets that "if [Trump] wants to do away with it, he'll have to get a bill through Congress, and he'll do it over my dead body."

Support from Capitol Hill is likely to be an obstacle to Trump on many fronts, USEA's Worthington said. "He does not have a great relationship with the Hill right now — certainly, probably zero on the Democratic side, and probably less than half of the Republicans are likely to be strong supporters of his," Worthington said.

This could dampen Trump's ability to reverse Obama's climate agenda.

"We're on this path for greenhouse gas reductions, and we're doing it regardless of federal regulation," Worthington said, noting pressure from shareholders, community stakeholders and even prospective employees for energy companies to go green.

But a hypothetical President Trump still could push the power generation sector off that path.

In states that remain vertically integrated, for instance, utilities can only make investments that their state regulatory commission deems necessary. "If you have a federal mandate to reduce CO2 emissions, you could do things like carbon capture and storage and recover it in rates. If there's no federal or state mandate to reduce CO2 emissions, you're not going to be able to recover an investment in carbon capture and storage," Worthington said.

Similarly, in the restructured states with competitive power markets, if your competitor is not investing in emissions-reducing technologies, then neither are you as your cleaner but higher-priced generation units would risk not clearing the market, Worthington said.

But looking at the big picture, Worthington said Trump's lack of political support would make it "unimaginable that he would be able to … amend the Clean Air Act" in order to do away with EPA's authority to regulate carbon emissions.

"I would think that would be something in his heart of hearts that he would like to do. … I just don't think in a million years that he'd be able to pull that off," Worthington said.

Cramer sees strength in Republican Congress

But that's exactly what Cramer said Trump needs to pursue, and he thinks Trump can garner the political will to do it.

"I don't think he'll have any trouble getting support [in general] from the current Hill," Cramer said. "We are, as a Republican Congress, in sync with his vision on energy and job creation."

The biggest challenge a Republican Congress with a Republican president will need to take on is a full review of the Clean Air Act and Clean Water Act to make those laws more prescriptive, Cramer said.

Congress must look at what those broad authorities "intended to do and, more importantly, what they did not intend to do that's resulted in empowering the bureaucracy instead of the legislative policymaking branch of government," he said.

Many in the environmental sector are skeptical Trump would succeed in revising bedrock environmental laws.

"Does Trump really want to take on regulations on air pollution, for instance, that have been saving lives?" said Alan Krupnick, senior fellow and co-director of Resources for the Future's Center for Energy and Climate Economics.

"My read of public polls on air pollution is that the public cares a lot about reducing standard air pollution. Not only the coal industry, but a lot of industries have come under that regulatory gun for good reason," Krupnick said. "The benefits are shown to vastly outweigh the costs."

Elgie Holstein, Environmental Defense Fund's senior director for strategic planning, said while Trump's goal appears to be "to dismantle or attempt to dismantle as many environmental protections as possible," the environmental laws that have been in place for decades will remain in place. And not enforcing those statutes would make the federal government and agencies in charge of those areas vulnerable to lawsuits, Holstein said.

Removing existing regulations is seen as a similarly difficult task for Trump to achieve. "Regulations are developed carefully and over a long period of time, and they're based on records of science and fact as well as on public comment," Holstein said. "So a new president can't come in and simply repeal them or abolish them."

Trump would have to initiate reviews of those regulations and "develop a record that showed that the original basis for the decision-making was somehow flawed scientifically or that it was unreasonable — that there was some fundamental flaw in the agency's decision-making as represented in the record," Holstein said.

Enforcement seen as key

CFRA's Glickman noted, however, that a Trump administration could find a way to loosely enforce environmental rules that he does not agree with.

Many emissions reduction goals and other climate commitments are tied to long-term efforts without measurable outcomes until 2030 or beyond. "You're only getting eight years' worth of a Trump presidency so he can sort of just move the goal sticks back, and say, 'This is a long-term process and it's going to take time to achieve these goals,' and really just not do a whole heck of a lot to try to get there," Glickman said.

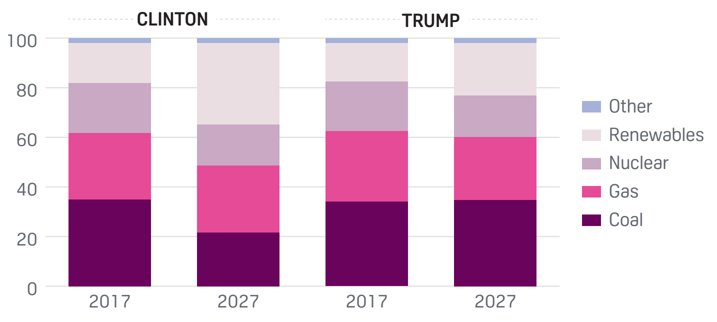
Trump has already said he intends to "cancel" the international climate deal struck in December during the United Nations climate conference in Paris.

The Paris agreement will go into effect with or without the continued support of the US. But inaction by a Trump administration to meet Obama's pledge to cut US greenhouse gas emissions between 26% and 28% below 2005 levels by 2025 could have repercussions.

Worthington cautioned that "a lot of our allies who don't understand US politics would look at it as a sign of the US not keeping its word, so there would be some automatic distancing with other international requirements."

Also, other countries would likely follow suit but with less geopolitical backlash. "If they see the US announcing that they're walking away, they can just say to themselves, 'We just won't do anything.' … They can say to the international community that 'We tried, it just didn't work out,'" Worthington said.

ESTIMATED GENERATION MARKET SHARE (%)



Source: Platts Analytics' Bentek Energy

He added: “The European countries feel so strongly about this that I could almost see some countries making economic decisions that hurt us, almost like a boycott of sorts of different US products.”

Cramer viewed these criticisms as a selling point for Trump over Clinton. “The idea that we would somehow as a nation bear the responsibility of making other countries feel better about themselves or better about us by becoming more like them defies the whole premise of the American experiment,” Cramer said.

“We have a current administration … that acquiesces America’s interests to global interests because they don’t believe that we’re exceptional,” Cramer added. “Therein lies, in my view, the starkest contrast between Hilary Clinton and Donald Trump — globalism vs. an America-first attitude and culture.”

CLINTON’S VIEW

For her part, Clinton has pledged that, if elected, she will pursue policies requiring 33% of US electric generation to be fueled by renewables by 2027. But what will it take to actually achieve that goal?

Renewable groups say a consistent national policy to cut carbon emissions and further tax and investment support for wind and solar energy will be needed. Others say Clinton’s plan will require additional infrastructure spending and the establishment of a more flexible grid. Its feasibility also may be largely dependent on whether the CPP survives court challenges.

As part of her 33%-by-2027 goal, Clinton wants to have half a billion solar panels installed by the end of her first term and to boost hydropower production from existing dams, which could grow that energy source’s share of US generation from about 7% now. Her hope is that enough renewable energy will be produced to power every home within 10 years of taking office.

To reach those goals, Clinton said she will “fight” to extend federal clean energy tax credits and make them “more cost effective” for taxpayers and energy producers. Congress authorized five-year extensions of the federal wind production tax credit and solar investment tax credit in late 2015, with the large-scale solar ITC to stay at 10% after 2021. The extensions could spur an additional 100 GW of wind and solar capacity, White House Senior Adviser Brian Deese said in an interview.

Clinton also pitched the creation of a national infrastructure bank that would leverage public and private funds for energy projects and a plan to make the infrastructure review and permitting process “more efficient and effective.”

With respect to federal climate standards, Clinton backs the Obama administration’s CPP and said she will “build on the momentum” from the rule. The regulation, which the US Supreme Court stayed in February pending legal appeals, set the first national carbon emissions limits for existing power plants.

Clinton’s campaign staff has been focused more on a tight race leading up to Election Day than on transition plans, sources say. But policy experts see a number of ways she could work with Congress to execute her energy plans on top of whatever executive-level action she takes.

The Democratic nominee has pitched an ambitious jobs plan that would partly focus on clean energy growth. Congress could help execute Clinton’s jobs plan, particularly if Democrats obtain majorities in both the Senate and House of Representatives, said Greg Dotson, vice president of energy policy at the Center for American Progress. Additional extensions to federal solar and wind tax credits are another area of possible collaboration.

Perhaps more significantly, if the CPP ultimately is overturned in court, Clinton could decide to work with lawmakers on an alternative climate policy rather than directing the EPA to develop another rule to regulate power sector carbon emissions under the Clean Air Act.

Clinton renewable goals ‘achievable’

The Democratic nominee’s renewable growth targets are ambitious and likely will require further investment in clean energy sources beyond what is expected to occur under the policies currently in place.

EIA’s latest long-term outlook expects renewable energy to make up about 23% of US power generation in 2027, compared with 14% in 2016. The estimate accounts for the extension of federal wind and solar tax credits at the end of 2015 and assumes the CPP survives court challenges.

EIA’s projections for 2027 fall short of the Democratic nominee’s goals, but renewable industry representatives say the agency’s growth estimates are conservative. Clinton’s targets “are very ambitious, but they are achievable given the right policy environment,” said Christopher Mansour, vice president of federal affairs at the Solar Energy Industries Association.

In the near term, Mansour said federal tax credits are the “most important” policy piece for boosting renewable deployment, even as costs for wind and solar keep falling. State renewable portfolio standards and local or state policies that fully reimburse rooftop solar power at the retail rate will also be crucial, according to Mansour.

But in the long term, “we’re going to need to have national policies that more fairly reflect the cost and impacts of electricity generation,” said Greg Wetstone, president and CEO of the American Council on Renewable Energy.

If the courts ultimately strike down the CPP, clean energy developers will lose a potent growth driver, even if state laws encourage more reliance on resources such as wind and solar.

“Obviously, once the Clean Power Plan moves forward, that will drive a lot of renewable energy growth,” said David Ward, a spokesman for the American Wind Energy Association. He added that wind resources could supply 57% of the energy needed to hit the CPP's emissions reduction targets. Prior to the rule's court stay, the EPA estimated that it would cut power sector carbon emissions by 32% from 2005 levels by 2030.

But even if the courts toss the CPP, sources expect Clinton to come back with an alternative way to cut emissions from existing power sources – one that some policy experts have speculated may be more stringent than its predecessor.

Further cost cuts necessary

If the CPP is scrapped and tax incentives for wind and solar are not extended beyond the early-2020s, reaching Clinton's renewable goal will hinge on cost declines for wind and solar power making those resources more competitive.

Without tax credits, "we would just have to rely on the market's ability to lower the costs of [solar photovoltaics] and wind further," said Jeffrey Logan, a senior energy analyst at the DOE's National Renewable Energy Laboratory (NREL).

The solar industry already is cutting costs more quickly than expected. In 2010, DOE set a goal of reducing the cost of utility-scale solar power to $1 per watt by 2020 — a level the agency said would make solar competitive with other sources of electricity. Logan said the industry is 70% to 80% of the way there, and GTM Research recently estimated that costs will fall even further to 99 cents per watt by 2020.

Moreover, a report released by the DOE in March 2015 said wind costs are "rapidly approaching cost-competitive levels" but, without tax incentives, would still be above 2013 national average rates for coal and gas power. However, that "Wind Vision" study anticipated that new wind power will fall below average costs for new and existing fossil fuel-fired plants within the next decade.

Other 'moving parts'

Generation costs are just one of the many "moving parts" in the path to greater renewable energy reliance, Logan said. Renewable energy advocates point to the massive infrastructure improvements, such as investment in new transmission lines, that a big jump in wind and solar will require.

There are also technological and operational hurdles to accommodating more renewables. The intermittent nature of wind and solar power presents a "real challenge" for the electric grid once renewable penetration exceeds about 20% to 30%, according to Logan. One possible solution to that challenge is electric vehicle batteries, which could help facilitate distributed generation from sources such as rooftop solar.

Logan expects electric vehicle usage to increase in the 2020-2025 timeframe. Batteries for those vehicles last about 10 years and could get a second life supporting integration of variable renewable energy onto the grid. Approximately a half million electric vehicles are on the road right now, and once that number doubles, Logan said, batteries from some of those cars could even back up utility-scale renewable energy facilities.

But the cheapest solutions to the problems caused by integrating more renewables could be operational. Each regional grid operator can handle a certain amount of renewable energy, but those with more coal or nuclear plants, compared to gas-fired generation, have a harder time responding to renewable intermittency.

Logan said the US needs to operate the grid differently and have bigger load balancing areas to spread out the variability, which is something NREL is working on at its energy systems integration facility.

Clinton's permitting reforms could be another key factor in expanding renewable capacity.

A substantial amount of new transmission will be needed to accommodate increased wind and solar generation, and while the Obama administration has tried to help in getting around state or local opposition to siting new transmission lines, those efforts have encountered legal challenges.

Fossil fuels, nuclear still crucial

Despite Clinton's focus on renewable growth, gas and nuclear energy would still play a crucial role in her energy plans and, more generally, in the US generating mix.

Clinton supports a prior US commitment to reduce oil- and gas-related methane emissions by 40% to 45% from 2005 levels by 2025 and wants to undo the "Halliburton loophole" that bars EPA regulation of part of the hydraulic fracturing process. But she has resisted calls from more left-leaning Democrats to seek a nationwide ban on fracking.

Gas has surpassed coal as the single biggest source of US electricity, and it could step in for certain intermittent renewable resources as needed. Some market sources have questioned whether Clinton could shift further to the left on gas regulation once she enters the White House, but she said during a recent presidential debate that she sees gas as a bridge to a cleaner energy future.

The Democratic nominee has also voiced support for nuclear. She proposed further public investment in advanced nuclear technologies and possible competitive grants for states, cities and rural communities that invest more in low-carbon energy sources such as nuclear.

More may be required, though. Former American Nuclear Society President Donald Hoffman, who is advising both the Clinton and Trump campaigns, recently urged that electricity markets be restructured and the CPP be revised to recognize nuclear energy's ability to provide zero-carbon baseload power.

EIA's latest long-term outlook shows nuclear power's share of US generation falling from about 20% now to 17.5% in 2040 in light of recently announced plant closures and a spate of planned retirements in the 2020s.

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