**ACEC ENERGY STRATEGY**

**Strategy**

ACEC supports **sustainable, innovative,** and **resilient** energy development.[[1]](#footnote-1)

**Principles**

**Energy** is a vital resource for sustaining human welfare.  Human welfare depends on economic development with infrastructure and industrialization to provide essential goods and services such as food, water, clothing, and shelter, as well as transportation, communication and health care. None of these goods and services are adequately, reliably, or sustainably available without affordable energy.[[2]](#footnote-2)

**Energy supply** is diverse from resources including fossil, nuclear, and renewables (hydro, geothermal, solar, wind, biological, and carbonaceous wastes).These resources are dispersed unevenly across the country and around the world.[[3]](#footnote-3) This geographic diversity requires multiple means of conversion and transportation by wire, pipe, rail, ship and barge. Electricity generation, transmission, distribution, and storage markets are undergoing rapid change driven in large part by technological innovation and rising demand for resilience and environmental performance. Geographic regions, in the event of extreme weather, rely on each other to supply energy without disruption.

**Energy demand** is equally diverse including transportation, industrial process heat and chemical feedstocks, fertilizers for agriculture, residential and commercial heating and cooling, among others.Existing and expected changes in electricity demand reflect shifts in consumption (e.g., electric vehicles, increasing electrification) and behind-the-meter generation and storage.

**Technology** to meet energy supply and demand has and continues to develop in a partnership of public and private markets to provide long-term economic growth. This growth is the basis for progressive achievement of less-carbon intensive consumption, as well as affordable and improved energy services.

**Sustainability** has advanced by economic development founded on technological **innovation** to lower carbon intensity, as well as improve energy efficiency and system reliability and **resilience**.[[4]](#footnote-4) An energy strategy should support the overall goal of sustainability through policies to advance energy innovation and improvements in energy system resilience.

**Climate** risk is the real concern that global energy systems underlying economic growth create carbon concentrations in the atmosphere which may reach levels with severe consequences to human welfare and the environment.[[5]](#footnote-5)

**Risk-management** is the best practice to address uncertainties such as climate risk or other natural and manmade physical and cyber risks.[[6]](#footnote-6) At the highest level, risk-management, considers the balance of investments to address various uncertainties from electromagnetic pulse to cyber security to climate mitigation (deployment of technologies to reduce, or eliminate GHG emissions) and adaptation (managing resources to cope with rising sea-levels, changing patterns of temperature and precipitation, and land-use).[[7]](#footnote-7)

**Innovation to Meet Climate Mitigation Challenge**

In the absence of global objectives backed by national commitments under policies such as a carbon price,[[8]](#footnote-8) cost-effective policy actions to advance technology and **innovation** are the next best mitigative energy strategy**.**  Policies to foster innovation include research, development, and demonstration; and commercial deployment of energy and associated environmental technologies (RDD&D).  This has proven successful in the past and should be accelerated in the future. These policies include grants, loan guarantees, and tax credits.

**Resilience to Meet Adaptation Challenge**

Combined with innovations to achieve mitigation, cost-effective adaptation is an essential component of the foundation of sustainable energy development.[[9]](#footnote-9) Among the most effective means of adaptation is investment in energy **resilience.** Such investments are grounded in risk-based assessments and management at the regional or local level.National energy policy must be sensitive to long-standing regional diversity such as availability of energy resources; coastal, riverine, and other geographies; population densities; land-use; underlying economic characteristics; and extreme weather challenges.[[10]](#footnote-10)

**Energy Policy Supported by the ACEC Energy Strategy**

Based on the principles and strategy stated above, both innovation and resilience policies are advocated under the ACEC energy strategy. Some policies clearly support innovation such as policies that enhance deployment of Green or Clean Energy.[[11]](#footnote-11) Some policies primarily support resilience investments such as hardening facilities from natural and manmade physical and cyber threats. Some policies support both innovation and resilience. Such policies include advanced nuclear technology development such as small modular reactors, or market rules to allow and encourage investments in distributed energy resources, and micro-grids.[[12]](#footnote-12)

Among U.S. Senate bills supported by the ACEC principles and strategy:

* **S. 2657, the American Energy Innovation Act (AEIA), including S. 903 the Nuclear Energy Leadership Act (NELA), among others.**
	+ Bill summary found [here](https://www.energy.senate.gov/public/index.cfm?a=files.serve&File_id=4BC53A6A-C275-44DE-9BB5-D973702F8F93). CRS summary found [here](https://acec.ddsync.com:510/shares/file/4ca05c9566c16b/) .
	+ Section by section found [here](https://www.energy.senate.gov/public/index.cfm?a=files.serve&File_id=CC266AB2-6E09-4BEE-88E2-BCFC5C87EBF6).
	+ ACEC support letters found [here](https://acec.ddsync.com:510/shares/file/06ea19d2976cbe/) , [here](https://www.uschamber.com/letters-congress/coalition-letter-s-2657-the-american-energy-innovation-act), and [here](https://acec.ddsync.com:510/shares/file/ade5ba50ec01fc/) and [here](https://acec.ddsync.com:510/shares/file/b7038ef9639b4c/) .

Among U.S. House bills supported by the ACEC principles and strategy are several passed by the House Science Space and Technology Committee:

* **H.R. 6097, the Nuclear Energy Research and Development Act**, to expand nuclear RD&D, and commercialization efforts at DOE.
* **H.R. 6084, the Water Power Research and Development Act,** to reauthorize DOE programs to advance hydropower, pumped storage, and marine energy technologies.
* **H.R. 4481, the Securing Energy Critical Elements and American Jobs Act of 2019,** to reinvigorate R&D on better use of energy critical elements and to find substitutes and to recycle these materials.
* **H.R. 4733, the Low Dose Radiation Research Act of 2019,** to establish a basic research program at DOE to enhance scientific understanding, risk assessment, and risk management of low-dose radiation.
* **H.R. 2986, the Better Energy Storage Technology Act or “BEST Act,”** to facilitate the RD&D of next-generation grid-scale energy storage systems.
* **H.R. 4230, the Clean Industrial Technology Act of 2019**, to promote innovation and enhance the competitiveness of domestic industries through the development of emissions reduction technologies for non-power industrial sectors.
* **H.R. 5374, the Advanced Geothermal Research and Development Act of 2019**, to support innovation and the R&D of advanced geothermal energy resources.
* **H.R. 5428, the Grid Modernization Research and Development Act of 2019**, to expand RD&D activities for enhanced security, reliability and resilience of electric grid operations and management.

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**ACEC Energy Strategy**

**Supporting Information**

**Facts**

Energy Primer A Handbook of Energy Market Basics April 2020

<https://acec.ddsync.com:510/shares/file/92c2b90462e229/>

Electricity - EEI

https://www.eei.org/resourcesandmedia/Pages/IndustryData.aspx

<https://www.eei.org/issuesandpolicy/generation/fueldiversity/Documents/A%20Diverse%20Energy%20Mix%20Helps%20Keep%20Electricity%20Reliable%20and%20Affordable.pdf>

Electricity Transmission – WIRES GROUP

<https://wiresgroup.com/wp-content/uploads/2020/01/ScottMadden_WIRES_Informing-the-Transmission-Discussion_2020_0113_FINAL.pdf>

Gas - INGAA

<https://www.ingaa.org/File.aspx?id=36501>

Quadrennial Energy Review - DOE

<https://www.ieee-pes.org/qer>

Employment – EFI/NASEO

<https://www.usenergyjobs.org/>

**Policy Transitions**

Cities 100% Clean Campaign

<https://www.sierraclub.org/ready-for-100/commitments>

Electrification Campaigns

<https://www.epri.com/#/pages/sa/efficient-electrification?lang=en-US>

<https://www.rff.org/publications/explainers/electrification-101/?utm_source=Resources+for+the+Future&utm_campaign=dc977955bc-EMAIL_CAMPAIGN_2019_12_05_09_38_COPY_01&utm_medium=email&utm_term=0_e896179bd7-dc977955bc-100242925>

Congress Green New v. Real Deals 2018/2019

<https://en.wikipedia.org/wiki/Green_New_Deal>

<https://www.politico.com/story/2019/03/22/gaetz-green-real-deal-1290463>

Business: Green Real Deal 07.31.2019 Moniz to US Chamber

<https://energyfuturesinitiative.org/news/2019/8/1/press-release-moniz-reveals-framework-for-a-green-real-deal-nbsp>

Reliability, Security, Resilience 2nd QER January 2017

<https://www.energy.gov/sites/prod/files/2017/01/f34/Chapter%20IV%20Ensuring%20Electricity%20System%20Reliability%2C%20Security%2C%20and%20Resilience.pdf>

# FEMA Prep Talk Released:

[https://www.fema.gov/news-release/2020/02/04/preptalk-released-left-dark-power-outages-interconnected-world;](https://www.fema.gov/news-release/2020/02/04/preptalk-released-left-dark-power-outages-interconnected-world;%20%20) <https://www.youtube.com/watch?v=ccXmY0yN7gs&feature=youtu.be>

**ACEC/WEE Committee**

National Energy Policy Outline

1. Has sustained a communications of “all of the above” for more than 5 years
2. Makes no reference to “all of the above”
3. Cites concepts:
* Regional diversity
* Resilience
* Sustainability
* Reliability
* Innovation

WEE driven recent ACEC Actions under Outline and “all of the above” strategy:

1. FERC cyber security dominated member business interest (NERC standards development, letter to FERC)
2. DOE Loan Program Office: (appropriations letter for FY 2020)
* Gas development Marcellus Storage Hub (covered in 2018 WEE Summer)
* Nuclear developments, UAMP (covered in 2019 Winter and Summer WEE meetings)
1. Oil and Gas Pipeline and Electricity Transmission (regulatory)
* Sec. 401 comments filed with coalition
1. WEE motion and ACEC U.S. Senate letter (Summer/Fall 2019): nuclear and storage, and CCS (legislation)
2. 2019 Summer meeting awareness on Green Real Deal (Moniz) with expectation to support as strategy
3. 2019 Fall Conference Session: resilience – microgrids, storage

**ACEC Present Strategy: implement National Energy Policy Outline with communications:**

1. Resilience (applies to water policy as well)
2. Sustainable, Reliable
3. “All of the above”
4. Efficient, Affordable, Safe, Innovative
5. Take positions/actions to remove regulatory barriers to Real Deal implementation e.g., Sec. 401, NEPA regulations

**ACEC New Strategy: consistent with the NEP Outline; adopt an Energy Strategy with communications:**

1. Effectively endorse **Real Deal** (bipartisan legislation)
2. Communicate **Sustainability** with an **Energy Strategy** grounded in:
3. **Innovation** – support energy and environmental bills to achieve affordable GHG emissions reductions (climate mitigation); and
4. **Resilience** – support bills to foster risk management (reliable, secure services designed for efficient recovery from disruption) to meet various risks (climate adaptation): sea-level rise, floods, drought, wildfire, wind, physical and cyber security, and EMP.

**References:**

 **Adaptation** <https://nca2018.globalchange.gov/downloads/NCA4_Ch28_Adaptation_Full.pdf>

 **Clean Energy -** 2nd QER January 2017, DOE, Summary for Policy Makers <https://www.energy.gov/policy/downloads/quadrennial-energy-review-second-installment>

See also, 4th National Climate Assessment, 2018 Chapter 29, Reducing Risks Through Emissions Mitigation,<https://nca2018.globalchange.gov/downloads/NCA4_Ch29_Mitigation_Full.pdf>

 **Innovation -** clean power – The Power of Change, NAS, 2016<https://www.nap.edu/download/21712>

**Resilience -** The National Academy of Sciences (National Research Council, 2012) defines resilience as “the ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events.” <https://www.osti.gov/biblio/1346540>

[https://www.osti.gov/pages/servlets/purl/1346540](https://urldefense.proofpoint.com/v2/url?u=https-3A__www.osti.gov_pages_servlets_purl_1346540&d=DwMGaQ&c=H8S5wzIwo-7G_Ou9dg8E0MfTp0Xd5uFLOwdyvjB0JwY&r=R5fKU3UqGs4qhyxT-WdYUdpuGUbNwnutMkgDLm4CnaI&m=lDFRhv-JkIjZHq4omR8nTCanF1KS1i-pfVuo4BQh3eo&s=DTMjOYbb2bdh8ded52ac_1BcssC6Gzuv3388PmFRcWc&e=)

See also:

* 2nd QER January 2017, DOE, Chapter IV Ensuring Electricity System Reliability, Security, and Resilience <https://www.energy.gov/policy/downloads/quadrennial-energy-review-second-installment>
* 4th National Climate Assessment, 2018, Chapter 4, Energy Supply, Deliver, and Demand <https://nca2018.globalchange.gov/downloads/NCA4_Ch04_Energy_Full.pdf>

**Reliability -** 2nd QER January 2017, DOE, Chapter IV Ensuring Electricity System Reliability, Security, and Resilience <https://www.energy.gov/policy/downloads/quadrennial-energy-review-second-installment>

 **Sustainability**

 <https://www.energy.gov/eere/bioenergy/sustainability>

 <https://www.energy.gov/ne/articles/3-reasons-why-nuclear-clean-and-sustainable>

<https://world-nuclear.org/information-library/energy-and-the-environment/nuclear-energy-and-sustainable-development.aspx>

 <https://www.ge.com/reports/post/105405414988/energy-sustainability-through-a-global-lens/>

**Definitions:**

|  |  |
| --- | --- |
| **Energy Resilience:** | “the ability to prepare for and adapt to changing conditions and withstand and recover rapidly from disruptions. Resilience includes the ability to withstand and recover from deliberate attacks, accidents, or naturally occurring threats or incidents.” *-Presidential Policy Directive* [*(PPD)-21*](https://fas.org/irp/offdocs/ppd/ppd-21.pdf) *: Critical Infrastructure Security and Resilience. See also the DoD definition for* [*energy and water resilience*](https://www.army.mil/article/212756/the_us_armys_pivot_to_energy_and_water_resilience) . |
| **Sustainability:** | According to the UN, [*sustainability*](https://academicimpact.un.org/content/sustainability) is defined as “meeting the needs of the present without compromising the ability of future generations to meet their own needs.” True sustainability is when everyone, everywhere can meet their basic needs forever.  |
| **Green Power or Energy:** | A subset of renewable energy and represents those renewable energy resources and technologies that provide the highest environmental benefit. The U.S. voluntary market defines green power as electricity produced from solar, wind, geothermal, biogas, eligible biomass, and low-impact small hydroelectric sources. [*EPA.gov*](https://www.epa.gov/greenpower/what-green-power) |
| **Clean Power or Energy:** | Energy derived from renewable, zero-emissions sources (“renewables”), as well as energy saved through energy efficiency (“EE”) measures. This energy may also include “[nuclear](https://www.energy.gov/energy-economy);” [Clean or Green](https://pulitzercenter.org/reporting/what-clean-or-green-energy-definitions-differ-across-regions) definitions differ across regions.  |
| **Net Zero Emissions:** | This expresses the calculation that remaining human-caused GHG emissions are balanced out by removing GHGs from the atmosphere (a process known as carbon removal). [*World Resources Institute*](https://www.wri.org/blog/2019/09/what-does-net-zero-emissions-mean-6-common-questions-answered) |
| **Greenhouse Gases:** | GHGs are any of various gaseous compounds (such as carbon dioxide or methane) that absorb infrared radiation, trap heat in the atmosphere, and contribute to the greenhouse effect. [*U.S. Energy Information Administration*](https://www.eia.gov/energyexplained/energy-and-the-environment/greenhouse-gases.php) |
| **Renewable:** | Renewable energy is energy from sources that are naturally replenishing but flow-limited; renewable resources are virtually inexhaustible in duration but limited in the amount of energy that is available per unit of time. [*U.S. Energy Information Administration*](https://www.eia.gov/energyexplained/renewable-sources/) |
| **Non-GHG Emissions Energy Sources (Hydro/Nuclear):** | These sources include hydroelectricity, biomass, wind, and solar. Most of these non-fossil sources, such as nuclear, hydroelectric, wind, and solar, are non-emitting. [*EPA.gov*](https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions) |
| **Small Modular Reactor:** | SMRs are envisioned to vary in size from a couple megawatts up to hundreds of megawatts, can be used for power generation, process heat, desalination, or other industrial uses. SMRs can employ light water as a coolant or other non-light water coolants such as a gas, liquid metal, or molten salt. [*Advanced Small Modular Reactors*](https://www.energy.gov/ne/nuclear-reactor-technologies/small-modular-nuclear-reactors) |
| **Distributed Energy Resources:** | DER is any resource on the distribution system that produces electricity and is not otherwise included in the formal NERC definition of the Bulk Electric System (BES). [*NERC*](https://www.nerc.com/comm/Other/essntlrlbltysrvcstskfrcDL/Distributed_Energy_Resources_Report.pdf) Variations on this definition may include, energy efficiency and demand or demand side management. [*AEE*](https://blog.aee.net/distributed-energy-resources-101-required-reading-for-a-modern-grid) |
| **Microgrid:** | A microgrid is a group of interconnected loads and distributed energy resources within clearly defined electrical boundaries that acts as a single controllable entity with respect to the grid. A microgrid can connect and disconnect from the grid to enable it to operate in both grid-connected and island-mode. [*U.S. Department of Energy Microgrid Exchange Group*](https://building-microgrid.lbl.gov/microgrid-definitions) |
| **Risk Management:** | Risk is an event that, if it occurs, adversely affects the ability of a project to achieve its outcome objectives. Risk management is the process of identifying risk, assessing risk, and taking steps to reduce risk to an acceptable level. [MITRE Systems Engineering Guide](https://www.mitre.org/publications/systems-engineering-guide/acquisition-systems-engineering/risk-management)  |

**American Council of Engineering Companies**

**Water, Energy & Environment Committee**

*National Energy Policy Outline 11.20.18*

As a society, we need to move people and goods; create and maintain comfortable/safe/sanitary indoor and outdoor environment; communicate, interact, and transact commerce local/regionally/globally; apply technologies; and educate, provide healthcare, entertain, and provide for a prosperous community. These activities of society require a variety of robust, affordable, innovative, diverse, sustainable and environmentally compatible energy sources including a variety of power technologies, fuels and renewables.

Energy sources require extraction, shipping, processing, generation, transmission, management, investment, consumption, and water disposal. Regardless of the source, this should be accomplished in the most practical environmentally conscious and reasonable ways possible. Accomplishing all these goals requires a national energy policy derived from Congress that redefines the nation’s energy strategy and provides guidance for all stakeholders, including consumers. This strategy must address:

1. Environmental Protection
	1. Balanced Approach
	2. Solutions have minimal life-cycle impacts on air, water and environment
2. Infrastructure – Secure, Resilient, Reliable
3. Economics
	1. Jobs
	2. Sensitivity to market forces (local, regional, global)
	3. Financial incentives and tax credits to achieve long-term objectives
	4. Risk management – invest sustainable, abundant and diverse sources
	5. Funding mechanism (MLPs, etc.)
	6. Assessment of life cycle costs and environmental impact
	7. Competitive energy pricing
4. Management
	1. System Approach – integrated/holistic
	2. Energy needs require local and regional solutions
	3. Create a National Energy Commission (with engineers) providing oversight to ensure federal agencies are in alignment with energy policies
5. Education
	1. Workforce development
	2. Public education/behavior modification
6. Technology
	1. Efficiencies (supportive of cost-effective energy for industry, manufacturers, and rate payers)
	2. System upgrades
	3. R&D/innovation
	4. Unbiased, flexible (allow for paradigm shifts)
7. Effective Regulations
	1. Provide certainty in the field
	2. Performance based (level playing field for all energy sources)
	3. Expedited environmental review and planning

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1. For definitions and references see below pp. 9-11. [↑](#footnote-ref-1)
2. Electricity is the most consequential development of the 20th century to provide for human welfare, according to the National Academy of Engineering. Electricity is generated from a variety of sources, and stored and delivered by a variety of means.   [↑](#footnote-ref-2)
3. For example, some regions are more dependent upon hydro while others are more dependent on fossil resources. In drought years when hydro resources are stressed, thermal resources may provide back-up power. [↑](#footnote-ref-3)
4. See References see below p. 9. [↑](#footnote-ref-4)
5. However, recent forecasts suggest worst-case scenarios based on unrestrained economic growth under fossil fuel dependencies are highly unlikely. [Nature 01.29.2020](https://www.nature.com/articles/d41586-020-00177-3)  Nevertheless uncertainty remains concerning the relationship of emissions and global temperatures in the long-term.   [↑](#footnote-ref-5)
6. See definitions below p. 11. [↑](#footnote-ref-6)
7. Resources allocation arbitrarily for mitigation to the exclusion of cost-effective adaptation to drought, wildfires, floods, sea-level rise, extreme temperatures, or hurricanes may be unsustainable. Ignoring or underinvesting in long-term adaptation could undermine economic development supportive of technological advancement to less-carbon intensity, greater reliability, and resilience.

In the 4th National Climate Assessment the chapter on energy identifies barriers to achieving energy resilience.   Chapter 4, p. 189:

‘The current pace, scale, and scope of efforts to improve energy system resilience are likely to be insufficient to fully meet the challenges presented by a changing climate and energy sector, as several key barriers exist. Among these impediments is a lack of reliable projections of climate change at a local level and the associated risks to energy assets, as well as a lack of a national, regional, or local cost-effective risk reduction strategy.This includes a consideration of where adaptation measures are pursued, thereby addressing the uncertainty concerning their effectiveness and the need for additional resilience investments.

Addressing these obstacles would benefit from improved awareness of energy asset vulnerability and performance, cost-effective resilience-enhancing energy technologies and operations plans, standardized methodologies and metrics for assessing the benefits of resilience measures, and expanded public–private partnerships to address vulnerabilities collaboratively. Ensuring that poor and marginalized populations, who often face a higher risk from climate change and energy system vulnerabilities, are part of the planning process can help lead to effective resilience actions and provide ancillary co-benefits to society. Energy infrastructure is long-lived and, as a result, today’s decisions about how to locate, expand, and modify the Nation’s energy system will influence system reliability, resilience, and economic security for decades. In addition, without substantial and sustained mitigation efforts to reduce global greenhouse gas emissions, the need for adaptation and resilience investments to address the impacts of climate change on the energy sector is expected to increase if the most severe consequences are to be avoided in the long term.’ [↑](#footnote-ref-7)
8. The unilateral actor exports production, jobs, innovation, and emissions; and imports goods, emissions, and trade deficits. The result is that sustainable production of goods and services and standards of living are compromised or lost by the unilateral actor. Arguably, the unilateral actor experiences climate adaptation costs minus the economic and technological means to mitigate flood, drought and other risks. The consequences of an unbalanced investment over-weighted in mitigation is not sustainable. Effective climate mitigation policies are grounded in national commitments to reach global GHG concentration objectives.   An energy strategy based on hard and fast unilateral mandates for emissions reductions undermines domestic economic support for necessary innovative technological development. Arguably, unilateral carbon controls or prices in globalized trade, drives “leakage” in which energy intensive industrial production, GHG emissions, and employment decline domestically, while industrial production shifts to foreign competitors where production, GHG emissions, and employment increase. [↑](#footnote-ref-8)
9. Sustainable energy development goes beyond mitigative policies for tomorrow and begins with adaptive polices to meet the priorities of today. [↑](#footnote-ref-9)
10. Cost-effective adaptation is data-driven, committed to future risk mitigation, and cuts across political boundaries. Climate adaptation for energy and related infrastructure is place-based and related to regional resources and supply chains, vs. a global or regional commitment to a carbon price.   Data-driven, risk-based assessments of projected flood, drought, wind, and temperature threats across riverine and coastal watersheds and other geographic regions are a reasonable basis for sustainable infrastructure investments.    [↑](#footnote-ref-10)
11. See definitions below p. 9. [↑](#footnote-ref-11)
12. See definitions below p. 10. [FERC Order No. 841](https://www.ferc.gov/media/news-releases/2019/2019-4/10-17-19-E-1.asp) is an example of such market rules. [↑](#footnote-ref-12)