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RECONFIGURING U.S. CLIMATE CHANGE MITIGATION POLICY: INSIGHTS FROM DENMARK'S PIONEERING DECARBONIZATION STRATEGIES

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Abstract
The mitigation of climate change necessitates states to make structural changes in the energy, transportation, industry, buildings, agriculture, land use, and consumption patterns. Despite the fact that the United States has a lot of technological, financial, and institutional resources to decarbonize, its climate-policy path has been marked by a high level of policy discontinuity between presidential regimes. The example of Denmark is useful as a comparative case since it has established a comparatively stable and integrated climate-governance system that integrates legally binding emissions targets, the implementation of renewable energy, district heating, the integration of energy systems, economic tools, sectoral agreements, and institutionalized scientific advice. The Climate Act of Denmark was a legally binding target of 70% reduction of greenhouse-gas emissions by 2030 relative to 1990 levels and institutionalized climate planning and monitoring procedures (Danish Parliament, 2021). As of 2022, wind power contributed about 54 percent of the electricity in Denmark, and wind, bioenergy and solar photovoltaic combined to contribute about 81 percent of the electricity production (International Energy Agency [IEA], 2023). The United States, in its turn, has been dependent on a more disjointed mix of federal laws, executive order, regulatory guidelines, state-based projects, and market incentives. The Inflation Reduction Act (IRA) of 2022 marked a significant change toward the integration of climate policy and industrial policy, clean-energy investment, tax incentives, and domestic manufacturing (Bistline et al., 2023). Nevertheless, the instability of federal climate policy to political and institutional changes has been proven by the changes in the policy later (Bistline et al., 2026).

1. Introduction
Climate change has ceased to be an environmental issue but has become a holistic governance issue that has impacted the economic development, energy security, the infrastructure of the people, the competitiveness of industries, international relations and the social welfare. According to the Intergovernmental Panel on Climate Change (IPCC), the global warming needs to be curtailed through swift and sustained decreases in the emission of greenhouse gases in electricity, transportation, buildings, industry, agriculture, and land-use systems (IPCC, 2022). The issue is therefore not just a matter of substituting fossil fuels with renewable

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technologies but a matter of changing the whole socio-technical systems. The political challenge of this change is in part due to the time lag between the costs and benefits of climate policy. Renewable energy, transmission system, public transportation, energy efficiency, industrial modernization, and low-carbon technologies can be characterized by high costs in the short term and numerous long-term benefits in the decades to come. Governments thus must build institutions that can ensure policy commitments that go beyond individual electoral terms (Meadowcroft, 2009; Dubash et al., 2022). The United States takes a very significant role in this regard. It is among the largest economies in the world and the past emitters of greenhouse gases and has wide technological, financial, scientific and industrial capacities. Meanwhile, there has been a significant change in American climate policy across administrations. Some administrations embraced bold climate policies in the country and others overturned or diluted major parts of these policies. This trend poses a basic issue of policy permanence: despite the adoption of significant climate laws, institutional structures to facilitate long-term decarburization may still be subject to political alteration.

The Inflation Reduction Act of 2022 was a significant change in the U.S. climate policy. The law introduced or increased renewable electricity, clean vehicles, energy efficiency, advanced energy manufacturing, carbon management, and other mitigation efforts tax incentives and programs (Inflation Reduction Act, 2022). Multi-model studies estimated that the IRA would help to reduce economy-wide emissions by about 43-48 percent below 2005 levels by 2035 with modeled implementation assumptions (Bistline et al., 2023). The act also associated climate mitigation with the local production, energy security, technology creation, and job creation. However, climate legislation cannot be considered effective based on the extent of financial resources invested in it. The institutional factors in which policies are carried out are also important. The IPCC concludes that the key to successful long-term mitigation lies in governance structures that can coordinate the institutions, align incentives, mobilize investment, and break policy barriers (Dubash et al., 2022). The U.S. experience thus begs the question of whether the climate policy should be restructured to focus on institutions that can decarburization more sustainable across political regimes.

Denmark is a valuable comparative example. Denmark has come up with one of the most institutionalized national climatic frameworks in the world. Its Climate Act set a goal of 70% of the greenhouse-gas emissions by 2030 as compared to 1990 and a legal goal of climate neutrality by 2050 (Danish Parliament, 2021). The Act also introduced the Danish Climate Council and government reporting processes, which have become an institutionalized process of climate evaluation and policymaking (Danish Parliament, 2021). The energy transition in Denmark is also marked by the large-scale use of renewable energy and integration of the energy systems. Wind contributed to about 54 percent of the Danish electricity production in 2022, and wind, bioenergy, and solar photovoltaic contributed to about 81 percent of the electricity mix (IEA, 2023). Denmark also has built up a large district-heating network, combined electricity and heating networks, and sought the elimination of fossil-fuel heating using district heating and heat pumps (IEA, 2023).

2. Research Methodology

The research is a qualitative comparative case-study research. Denmark is chosen as the main comparative case since it is a comparatively developed case of institutionalized policy of decarburization of the country, and the United States is analyzed as the main case of policy reconfiguration. The paper is based on three types of evidence: academic literature (peer-reviewed sources), governmental and legislative sources, and sources of international institutions. The theoretical framework is developed with the help of academic literature and is used to assess the explanations of energy transitions, the durability of policies, technological change, and policy transfer. The legislative provisions, policy targets and

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government programs are established through official sources. Comparative evidence on energy and climate is given by international organizations, especially, IEA, OECD and IPCC.

Seven dimensions are used to structure the comparative analysis:

1. Legislation and institutional governance of climate;
2. Renewable-energy deployment;
3. Energy-system integration;
4. Economic instruments;
5. Sectoral decarbonisation;
6. Industrial policy and innovation;
7. Coalition-building, political and social.

The paper applies the concept of policy transfer as an analysis, and not prescriptive notion. Policy-transfer scholarship focuses on the fact that information about policies in one jurisdiction can be used in policymaking in other jurisdictions, but transfer is only possible when there is institutional, political, economic and cultural compatibility (Dolowitz and Marsh, 2000; Rose, 1993). The paper, therefore, differentiates between transferable principles and policy instruments which are context-specific.

3. Theoretical Framework

3.1 Historical Institutionalism

The historical institutionalism presents a proper point of departure to comprehend climate policy since the policy decisions bring about institutional and infrastructural paths that shape the future policy decisions. Past choices regarding electricity grids, heating systems, transportation systems, industrial systems, and energy markets may generate path dependencies that may support or limit decarburization. Pierson (2000) contends that the political institutions often produce increasing returns since the existing institutions are able to provide incentives to their survival. This is specifically applicable in energy systems since infrastructure is long-lasting and capital intensive. When an economy is reliant on infrastructure based on fossil fuels, it may be expensive and politically challenging to substitute the infrastructure. Unruh (2000) refers to this as carbon lock-in whereby technological systems, institutions and economic interests are strengthened to continue relying on carbon-intensive technologies. Seto et al. (2016) also define technological, institutional and behavioral aspects of carbon lock-in. The Danish experience shows that path dependency may go the other way as well. District heating, wind power, grid integration, and energy efficiency investments have established institutional and technological capacities to further decarbonize (IEA, 2017, 2023).

3.2 Sociotechnical Transitions Theory

The conceptualization of energy transformation proposed by the sociotechnical transitions theory is based on the interactions between technology, institutions, markets, infrastructure, users, cultural practices, and political actors (Geels, 2002, 2005; Markard et al., 2012). In this light, substituting fossil fuels is not a technological process. The technologies of renewable energy will have to be integrated in the electricity markets, infrastructure, regulatory institutions, industrial supply chains, consumer practices, and political systems. This model can be used to understand why the decarburization of Denmark cannot be shrunk to the level of wind-energy capacity. The evolution of wind power went hand in hand with the reform of the electricity market, interconnection, district heating, energy planning, industrial development, and political deals (IEA, 2017, 2023). In the case of the United States, it means that the implementation of renewable-energy sources should be supported by the expansion of transmission, storage, industrial chains of supply, permitting reform, coordination of electricity markets, workforce development, and regional planning.

3.3 Policy Mix Theory

Climate change seldom comes about as a consequence of a single policy tool. Combination of taxation, regulation, subsidies, standards, public investment, research and development, infrastructure policy, and

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information instruments are normally used by governments. Sustainability transitions, Kivimaa and Kern (2016) believe, need policy mixes that enable new technologies, but at the same time, destabilize or limit carbon-intensive systems. Rogge and Reichardt (2016) also highlight that policy mixes have a variety of interacting instruments, the consistency, coherence, and credibility of which affect the results of transitions. This point of view applies especially to the case of Denmark and the United States. Denmark has employed renewable-energy support, energy-taxation, efficiency, infrastructure-planning, carbon-pricing, and sectoral-agreements. The IRA is also a policy combination and not a climate tool (Bistline et al., 2023). It means that the U.S. climate-policy reform must be aimed at not only finding the best single tool but building a policy portfolio.

3.4 Policy Transfer and Lesson-Drawing

The conceptual linkage between the United States and Denmark is through policy-transfer theory. According to Dolowitz and Marsh (2000), policy transfer is a process whereby information about policies, institutions, administrative arrangements and ideas in one political environment is used to develop policies in another political environment. Rose (1993) differentiates between copying, emulation, hybridization and inspiration. This is a critical difference especially in this case. The two countries, Denmark and the United States have a lot of differences in terms of political institutions, geography, population, energy markets, and administrative structures. Hence, it is adaptive lesson-drawing and not direct transplantation of institutions that should be used as an analytical method.

4. Denmark's DE carbonization Strategy

The oil crises of the 1970s had a great impact on the modern energy policy of Denmark. The vulnerability to energy stimulated the policy makers to diversify energy sources, improve energy efficiency, create district heating and renewable energy. The next policy course was a mixture of energy security and environmental goals. The previous reviews of the IEA have pointed out the long-term strategy of Denmark on renewable energy, energy efficiency and reduction of fossil fuel as significant factors in its energy-policy formulation (IEA, 2002, 2012). The significance of this historical experience is that the Danish climate policy did not come out of the blue in reaction to the modern climate politics. It was built up over decades of institutional and infrastructural experimentation. This is one of the main ideas of historical institutionalism: the capacity of policies is built up.

5. Denmark's Climate Act and Institutional Durability

he Danish Climate Act is the key to the climate-governance system in the country. The 2020 Climate Act has set a legally binding target of 70% greenhouse-gas emissions reduction in 2030 relative to 1990 levels and climate neutrality by 2050 (Danish Parliament, 2021). The Act also sets institutional obligations of the Climate Council and government, such as climate-status evaluations, yearly climate plans, reporting to parliament, and mechanisms according to which the government has to react to climate-policy evaluations (Danish Parliament, 2021). The importance of this institutional architecture is more than the number target. A political symbolic numerical target may be one that lacks an implementation mechanism. The system of Denmark puts in place a cycle of institutions by instituting periodic reporting and evaluation processes:

Target → Assessment → Government Program → Parliamentary Review → Corrective Policy → New Assessment

The role of the Danish Climate Council is particularly significant since it offers expert evaluation of government policy by independent experts. Such an arrangement enhances the relationship between scientific analysis and the public policy. The IPCC also highlights that long-term mitigation is more efficiently sought in the areas where the institutions can align policies, evaluate the progress, and align policy instruments with long-term goals (Dubash et al., 2022).

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Implication for the United States

The United States can emulate this principle by having a statutory national climate framework with:

1. Long-term emissions targets;
2. Five-year carbon budgets;
3. Federal climate assessments every year;
4. Independent scientific review;
5. Congressional reporting;
6. Compulsory explanations of policies that are not in line with set targets.

This kind of a structure would not eliminate political conflict. Instead, it would make the governments more transparent on whether they are achieving set national goals.

6. Renewable Energy and Wind Power

One of the most apparent elements of the decarburization strategy of Denmark is its renewable-energy system. The proportion of wind in Denmark was 54 percent of the total electricity produced in 2022, the largest among IEA member states. With the addition of bioenergy and solar photovoltaic generation, about 81% of the electricity generation was through these sources (IEA, 2023). These statistics show how much the variable renewable energy has been incorporated into the electricity system in Denmark. The significance of the wind strategy of Denmark is not limited to installed capacity, though.

The institutional arrangements that the country came up with were in favor of:

1. renewable-energy deployment;
2. electricity-grid integration;
3. cross-border interconnection;
4. energy-market coordination;
5. local participation;
6. industrial development;
7. Research and technological innovation.

The IEA highlights that Denmark has good interconnections with the adjacent electricity systems as a significant aspect in integrating renewable generation (IEA, 2023). This shows that the implementation of renewable-energy cannot be isolated of grid infrastructure.

U.S. Implication

The US has significantly greater sources of renewable-energy than Denmark but has significant transmission and permitting issues. The Danish lesson is, therefore, not to put more wind turbines in place.

The principle which is transferable is:

> **Renewable generation must be developed together with the infrastructure and institutions necessary to integrate it.**

7. District Heating and Energy-System Integration

Another significant Danish innovation is the district heating. Denmark has built up large-scale district-heating networks that tie together the production of heat with the production of electricity, waste heat, renewable energy, and larger and larger heat pumps. District heating is one of the key aspects of energy transformation in Denmark, as pointed out by the IEA, and the sector has mostly abandoned coal (IEA, 2023). A study of the energy system in Denmark has discovered that the growth of district-heating can help to enable the earlier phase-out of natural-gas and combine industrial excess heat, electrification, and other sources of low-carbon energy. On the same note, Lund et al. (2016) reveal the possibility of large-scale heat pumps to enhance the relationship between district heating and variable renewable electricity. This is a valuable lesson since decarburization is usually regarded as an electricity issue. However buildings use large amounts of energy in the form of heat. The Danish strategy, on the other hand, considers electricity and heating as systems that are interrelated.

Implications for the United States

The urban design in the U.S. is very different than that of Denmark, so it would not be a good idea to nationally replicate the Danish district heating.

However, district heating might be taken into consideration strategically in:

1. dense metropolitan areas;

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ISSN (Online): 3006-2071 | ISSN (Print): 3006-2063
Volume 4 • Issue 5 • September 2026

2. university campuses;
3. military installations;
4. hospitals;
5. industrial clusters;
6. government complexes;
7. northeastern cities;
8. Locations where there are high amounts of recoverable industrial waste heat.

The principle to be transferred is thus energy-system integration, not the Danish district heating everywhere.

8. Energy Efficiency and Fossil-Fuel Phase-out

Energy efficiency and substitution of fossil fuel has also been sought in Denmark. According to the IEA, Denmark had policies limiting the use of fossil fuels in heating of new buildings, and has sought to replace fossil heating systems with district heating and heat pumps (IEA, 2023). The Danish government has resorted to energy-efficiency and deployment of renewable as well. This mix is important since raising the amount of renewable-energy supply does not always lead to energy insecurity elimination or a decrease in the total system costs. Energy efficiency decreases demand, electrification and renewable implementation alters the supply mix. The United States can follow a similar systems approach by incorporating standards of building efficiency, heat pumps, planning of electricity-grids, and deployment of renewables instead of considering them as independent policy domains.

9. Carbon Pricing and Sectoral Decarbonization

Climate policy has been broadened in Denmark to include electricity. In 2021, the IEA observed that about 45 percent of Danish emissions were offset by an effective carbon rate either by carbon or fuel taxation, which shows that there is coverage of carbon-pricing and its constraints (IEA, 2023). The nation has since shifted to more extensive sectoral carbon tax. This is noteworthy since the decarbonization of agriculture, industry, transportation and buildings cannot be achieved only by the policies of the electricity sector. Economic instruments have the ability to modify relative prices and give incentives to firms and households to cut down on emissions. But carbon pricing will not give transmission lines, invent new technologies, produce skilled labor or new infrastructure. As a result, carbon pricing is to be perceived as a part of a bigger policy package (Kivimaa and Kern, 2016; Rogge and Reichardt, 2016).

10. Denmark's Green Tripartite Agreement

The 2024 Green Tripartite Agreement in Denmark is a significant increase in climate policy to agriculture and land use. The agreement was negotiated between government and agricultural organizations, environmental organizations, labor representatives, industry and local-government interests (Danish Government, 2024). The agreement has a livestock greenhouse-gas tax that starts with DKK 300 per tonne of CO 2-equivalent in 2030 and rises to DKK 750 per tonne in 2035, after which the deduction mechanism (Danish Government, 2024) applies. The agreement also includes about DKK 30 billion of conversion of lowland agricultural soils that are rich in carbon and has intentions of around 250,000 hectares of new forest (Danish Government, 2024). The government estimated that the measures of the agreement would be able to cut down on the emissions by about 1.8 million tonnes of CO 2-equivalent in 2030 (Danish Government, 2024). This example shows two significant features of the Danish model. It does not imply that the Danish agreement does away with political strife. In fact, environmental groups have voiced disapproval with regard to the structure and vision of the agricultural tax (Green Transition Denmark, 2024). This has analytical significance as the policymaking that is based on consensus cannot be understood as the lack of disagreement. Instead, the Danish model illustrates a system of institutionalizing a disagreement negotiation.

11. Social Partnership and Political Coalition-Building

The climate policy needs to be sustained by political constituencies that have a long-term

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An International Peer-Reviewed Open Access Journal
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Volume 4 • Issue 5 • September 2026

nature. There are distributional implications of climate policies. New investment benefits some industries and adjustment costs are experienced by others. Employees will need to be retrained, consumers will have to deal with a fluctuating energy price, and areas that rely on the production of fossil fuels will need to be diversified. The political culture of consensus-based policymaking in Denmark has facilitated fairly wide-ranging energy and climate agreements (IEA, 2012, 2023). Danish Green Tripartite shows how the government can engage various stakeholders in systematic negotiations.

In the case of the United States, this principle might be implemented by national and regional climate-transition councils that would include:

1. federal and state governments;
2. labor unions;
3. industry;
4. environmental organizations;
5. agricultural groups;
6. utilities;
7. local governments;
8. universities;
9. affected communities.

The aim would not be to do away with disagreement but to put in place institutionalized mechanisms of negotiating transition costs.

12. The U.S. Climate Policy Trajectory

The U.S. climate policy has evolved as a result of federal laws, regulation, executive order, state efforts and market-based incentives. In 2021, the nationally determined contribution set by the Biden administration set a goal of 50-52 percent of the U.S. net greenhouse-gas emissions in 2030, compared to 2005 levels (U.S. Department of State, 2021). The Inflation Reduction Act was later to be a key element of domestic mitigation. The act was thus a shift towards comparatively disjointed climate incentives to a more inclusive blend of climate policy and industrial policy.

13. The Inflation Reduction Act and U.S. Climate Policy

Bistline et al. (2023) used nine independent energy and climate models to analyze the IRA. Their findings showed that the overall economy-wide emissions would be reduced by about 43-48 percent of the 2005 levels by 2035 with IRA implementation modeled. The research also estimated the significant increase in the use of clean-energy, especially in electricity generation, storage, and electrification (Bistline et al., 2023). These results indicate that massive federal financial support can greatly change the technological and investment paths. But the IRA also shows the shortcomings of over-reliance on financial incentives. The incentives needed in investment include: transmission capacity; permitting; manufacturing capacity; skilled workers; consistent regulatory environment; grid interconnection; implementation at the state level. Physical deployment is not necessarily the result of the existence of a subsidy. This aligns with the overall finding of the IPCC that climate mitigation must be governed and have institutional capacity instead of solitary policy tools (Dubash et al., 2022).

14. U.S. Climate Policy and the Problem of Policy Durability

It is not the absence of policy tools that is the major flaw in U.S. climate policy. The possibility is that when there is a change in political control, there can be major changes in policy. This puts companies investing in the long run in doubt. The investment horizons of energy infrastructure can be several decades. Unless companies know whether tax incentives, regulations, or emissions standards or federal climate programs will persist, they might put off investment or require greater returns to cover policy uncertainty. Aklin and Urpelainen (2013) show how the political competition and path dependence may affect the creation of sustainable-energy policies. According to their analysis, the political conditions influence the institutionalization of new energy technologies. A more recent example is given by Bistline et al.

JOURNAL FOR SOCIAL SCIENCE STUDIES
An International Peer-Reviewed Open Access Journal
ISSN (Online): 3006-2071 | ISSN (Print): 3006-2063
Volume 4 • Issue 5 • September 2026

(2026). Their comparison of the IRA and the later U.S. law concludes that any changes to IRA tax credits can change the predicted emissions and clean-energy investment patterns, and that the response to changes in federal policy can have a significant impact on the results of the modeled decarbonization.

The lesson for policy design is straightforward:

Climate policy should be designed to remain credible even when political control changes.

15. Comparing the Danish and U.S. Models

Dimension	Denmark	United States
Climate target	Legally embedded national target	Targets have depended more heavily on legislation and executive policy
Institutional monitoring	Danish Climate Council	Multiple agencies and institutions
Renewable electricity	Wind-centered and highly integrated	Diverse renewable portfolio with regional differences
Heating	Extensive district heating	Predominantly decentralized building heating
Federal structure	Unitary state	Federal system
Stakeholder agreements	Broad political and sectoral agreements	More fragmented stakeholder environment
Industrial policy	Closely connected to energy transition	Increasingly integrated through IRA
Carbon pricing	Multiple carbon and energy taxes	No comprehensive federal economy-wide carbon tax
Energy planning	Highly integrated	Fragmented across federal, state, and market institutions
Local implementation	Municipal and national coordination	Significant state and local variation
Policy durability	Relatively institutionalized	More vulnerable to administration-level changes
Agriculture	Increasingly integrated into climate policy	Federal agricultural policy remains more fragmented

The comparison is not to be taken as a mere conclusion that one of the countries has been able to resolve climate change and the other one has not. Denmark is not an exception and has to deal with such issues as transport emissions, agricultural emissions, biomass sustainability, and the challenge of achieving more and more ambitious targets (IEA, 2023). The difference of analysis is thus more of an institutional architecture.

16. Why the Danish Model Cannot Simply Be Replicated

The policy transfer literature cautions against the notion that effective policies can be cross-jurisdictional transplantation and work in another jurisdiction (Dolowitz and Marsh, 2000; Rose, 1993). The United States and Denmark are different in a number of essential aspects.

16.1 Scale

America is much bigger, both geographically and economically, than Denmark. What works in a small country in Europe cannot necessarily be applied to the whole of the United States.

16.2 Federalism

Denmark has a unitary form of political system, but the United States separates the regulatory

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An International Peer-Reviewed Open Access Journal
ISSN (Online): 3006-2071 | ISSN (Print): 3006-2063
Volume 4 • Issue 5 • September 2026

power between the federal, state, and local governments.

16.3 Energy Resources

The US has a large supply of oil, gas, coal, solar, wind, hydro and nuclear energy. Denmark is another profile of resources.

16.4 Urban Structure

The settlement patterns in Denmark allow district heating to be more easily established than in much of the United States.

16.5 Political Institutions

The American bicameral system of Congress, presidential system, federal courts, state governments and regulatory agencies make the policymaking environment much more fragmented. Therefore, institutional adaptation and not policy imitation should be the goal.

17. Move from Presidential Climate Policy Toward Statutory Climate Policy

The lesson of the importance of entrenching climate goals in law is one of the best lessons of Denmark. A system in which the U.S. relies on executive orders and administrative rules to a great extent can create a fast policy change, but can also be susceptible to a fast change. Political contestation would not be done away with by statutory targets. They could still be changed by legislatures. Nevertheless, institutionalization by law would raise the political and procedural expenses of undoing long-term climate goals. An example of how targets may be associated with regular reporting and review of policies can be found in the Danish Climate Act (Danish Parliament, 2021).

18. Green Industrial Policy

The case of wind energy in Denmark demonstrates the potential of environmental policy to generate industrial potential. The climate policy can also enable the United States to build domestic capacity in:

1. batteries;
2. solar technology;
3. wind equipment;
4. grid infrastructure;
5. heat pumps;
6. electrolyzers;
7. low-carbon steel;
8. clean chemicals;
9. carbon-management technologies.

The IRA already has major industrial-policy elements, such as incentives to clean-energy production and domestic supply chains (Inflation Reduction Act, 2022; Bistline et al., 2023). Reduction of emissions should not be the strategic objective then. Such a combination of policies can establish economic interests in constituencies to carry on with the energy transition.

19. Strengthening Transmission and Grid Infrastructure

The size of the electricity system is one of the most significant differences between the Danish and American contexts. To transport electricity between the regions of renewable resources and the large population and industrial centers, the United States needs significant expansion of its transmission. Non-transmission deployment of renewable can cause congestion, curtailment and delays. The Danish experience shows the significance of interconnection and integration of the systems to accommodate high shares of variable renewable electricity (IEA, 2017, 2023). To the United States, this implies that climate investment must focus more on: high-voltage transmission; interconnection of regions; modernization of the grid; storage; demand response; digital grid management.

20. Decarbonizing Buildings and Heating

One of the greatest opportunities in terms of Danish-inspired policy adaptation in the U.S. building sector is offered. Instead of trying to copy the Danish district heating system to the rest of the country, the U.S. policymakers can develop regional heat-transition programs. These may comprise: implementation of heat-pumps; insulation of buildings; efficiency levels; district heating where cost-effective; waste-heat recovery; thermal storage; electrifying buildings. The Danish experience shows that the heating policy can be incorporated into the planning of

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An International Peer-Reviewed Open Access Journal

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Volume 4 • Issue 5 • September 2026

the electricity system and not seen as an independent policy area.

21. Agriculture and Land Use

The Green Tripartite Agreement of Denmark offers a possible example of how to include agricultural emissions into the national climate planning. The agreement is a combination of taxation, land conversion, forestry, technological innovation, and stakeholder negotiation (Danish Government, 2024). An American approach might rather focus on: methane cuts; agricultural fertilizer efficiency; soil-carbon management; agroforestry; reforestation; wetland rehabilitation; manure management; agricultural biogas; low-emission livestock production. But the policy tools must be made on the pattern of the American agriculture and not directly imitated in Denmark.

22. Just Transition and Workforce Policy

Distributional consequences are brought about by decarbonization. Coal mining workers, oil and gas production and refining, conventional power generation workers and other workers in other carbon-intensive industries might need new jobs. The Danish experience indicates that the climate policy can be linked to the labor-market institutions, education, and skills development. The United States might set up regional transition programs that would include: retraining; apprenticeships; wage support; infrastructure investment; community-development funds; industrial diversification; assistance to the affected municipalities. These would not just be compensating the losers. By making decarbonization a part of economic opportunity, they could make climate policy more politically sustainable.

23. Climate Policy as Coalition-Building

The more successful climate policy is in establishing constituencies that have an interest in the policy being sustained, the more likely it is to become durable. This gives us a possible feedback mechanism:

Climate investment → new industries → employment → technological learning → regional economic benefits → political support → policy continuity.

This process is aligned with the historical-institutionalist and sociotechnical-transition views (Aklin and Urpelainen, 2013; Geels, 2002; Markard et al., 2012). The recent federal incentives related to clean-energy manufacturing in the U.S. show the possible significance of this dynamic. Nonetheless, the industrial policy should be durable enough to allow companies to invest in the long run.

24. Carbon Pricing in a U.S. Policy Mix

The lack of a national price on carbon is one of the differences between the United States and a number of European climate-policy regimes. Theoretically, a federal carbon-pricing system can be coupled with: household rebates; industry transition assistance; clean-energy investment; state-level climate policies; border carbon; infrastructure investment. Nevertheless, carbon pricing cannot be considered as an alternative to regulation and government spending. The sustainability transitions literature indicates that policy mixes are more suitable since various tools deal with various market and institutional failures (Kivimaa and Kern, 2016; Rogge and Reichardt, 2016).

25. Discussion

The Denmark-United States comparison shows that ambition is not the only important aspect of climate policy effectiveness. The case of Denmark explains the value of continuity of institutions. The Climate Act establishes long-term goals, periodic evaluations, and accountability of the government. Its energy transition process has been built up by making long-term investments in renewable energy, district heating, energy efficiency, grid integration, and technological innovation (IEA, 2023). The US has also shown a great policy capacity. The IRA is a significant instance of a large-scale climate and industrial policy, and multi-model studies show that it can greatly decrease the estimated emissions compared to a baseline in the absence of the legislation (Bistline et al., 2023). The key divergence is on

JOURNAL FOR SOCIAL SCIENCE STUDIES
An International Peer-Reviewed Open Access Journal
ISSN (Online): 3006-2071 | ISSN (Print): 3006-2063
Volume 4 • Issue 5 • September 2026

institutional permanence. The U.S. system allows significant changes in the policy after the change in political leadership. The climate policy in Denmark is more continuous because of the climate governance architecture that entails the incorporation of objectives and reporting processes into the legislation. This does not imply that there is no political contest in Danish climate policy. Agriculture, transport, energy security, biomass sustainability, and the implementation of its ever-ambitious targets remain challenging in Denmark (IEA, 2023). Similarly, institutional durability does not imply that a country is bound to meet its climate targets. Instead, durability enhances the likelihood of policymakers being forced to address deviations in an open manner and come up with corrective actions. That is why the Danish experience is especially helpful in designing the U.S. policies.

26. Conclusion

The mitigation of climate change will necessitate governments to change the energy systems, infrastructure, industry, transportation, buildings, agriculture, and consumption patterns over time periods that are far beyond the electoral cycles of individual governments. The main problem of U.S. climate policy is not, however, merely the discovery of technologies that can be used to cut down on emissions. The US has already a significant technological and financial potential of decarbonization. The harder question is how such capacity can be instilled in institutions that can support policy implementation over the long term. A valuable comparative study is that of Denmark. It has a legally binding 70% emissions-reduction target in 2030 compared to 1990 and a long-term climate-neutrality goal in its Climate Act (Danish Parliament, 2021). It has a highly integrated renewable-energy system, with wind making up about 54% of electricity production in 2022 and wind, bioenergy, and solar making up about 81% (IEA, 2023). The electricity, heat, infrastructure and renewable energy can be combined as seen in its district-heating system. Its Green Tripartite Agreement is an example of trying to include agriculture and land use in climate policy by negotiated stakeholder governance (Danish Government, 2024). What is more significant, but not the most important, is that the United States should not copy these policies. The United States cannot just graft the institutional model of Denmark due to the fact that American federalism, geography, energy markets, political institutions and industrial structure are completely different. In the case of the United States, these principles may be the foundation of a new climate-governance framework of federal goals and state-level experimentation. The U.S. climate policy would be more institutionally sustainable by having a national climate act, independent climate council, regional energy plans, green industrial strategy, workforce-transition programs, infrastructure investment, and coordinated policy mix.

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Volume 4 • Issue 5 • September 2026

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