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Comparison between China, the EU and the US's climate and energy governance: How policies are made and implemented at different levels

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Summary

This paper compares the different multi-level climate and energy governance in China, the European Union and the United States. While many comparisons across these three economies exist, they concentrate on comparing the climate and energy "policy instruments" and their results. This paper puts a focus on the importance of institutionalized multi-level governance processes, i.e., the "politics" - the actors and interaction processes inherent in a mode of governance, and the "polities" - the institutional setting. How are priorities and targets decided from both bottom-up and top-down processes? How do the central governments exert control over local authorities and ensure the implementation of their policies? How do the central governments enforce and evaluate the results of the policies? And finally, how do citizens play a role in the multi-level governance in these three blocs? Analysis of multi-level governance highlights the importance of target setting and cadre evaluation in China whereas legislation is the dominant process in the EU and the US.

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Abstract:

This paper compares the different multi-level climate and energy governance in China, the European Union and the United States. While many comparisons across these three economies exist, they concentrate on comparing the climate and energy "policy instruments" and their results. This paper puts a focus on the importance of institutionalized multi-level governance processes, i.e., the "politics" - the actors and interaction processes inherent in a mode of governance, and the "polities" - the institutional setting. How are priorities and targets decided from both bottom-up and top-down processes? How do the central governments exert control over local authorities and ensure the implementation of their policies? How do the central governments enforce and evaluate the results of the policies? And finally, how do citizens play a role in the multi-level governance in these three blocs? Analysis of multi-level governance highlights the importance of target setting and cadre evaluation in China whereas legislation is the dominant process in the EU and the US.

This paper is part of a series of working papers comparing the climate and energy policies of China, the EU, and the US to better understand the geopolitics surrounding global decarbonization.

Keywords: Multi-level Governance, Climate Policy, Energy Policy, Energy Transition, China, the European Union, the United States.

1. Introduction

Many countries are developing strategies both globally and domestically to tackle the climate change crisis. The three largest economies that are aiming at net-zero are China, the European Union (EU) and the United States (US).

Chinese President Xi Jinping announced that China would reach its carbon emissions peak before 2030 and achieve "carbon neutral" before 2060 on the 5th session of the UN General Assembly in September 2020. This is dubbed the "dual carbon goals (双碳目标)". In alignment with this announcement, China

has submitted its updated Nationally Determined Contribution (NDC). CO_2 intensity will be reduced by more than 65% from 2005 levels by 2030, and non-fossil fuel percentage in primary energy consumption will reach 25% by 2030 (*China's New NDC - E3G Responds*, 2021). Despite the ambitious headline goal, there is not yet a clear pathway mapped out to reach the dual carbon goals. In August 2021, Xie Zhenhua, China's special climate envoy, announced the "1+N" carbon policy. The "1" refers to the "guiding opinions" that sets out the overarching principles and "N" will include a "carbon peaking action plan" – a 10-point plan that will cover actions from all major emitting sectors (energy, industry, infrastructure, and transport) as well as other key policy areas for climate action (circular economy, technology, finance, economic policies, carbon trading, nature-based solutions).

In the US, President Biden signed an executive order to rejoin the U.S. into the Paris climate agreement on his first day in office. After rejoining, the Biden administration updated their National Determined Contribution (NDC) and pledged to achieve carbon neutrality by 2050 and cut its greenhouse gas emissions 50 per cent to 52 per cent below 2005 levels by 2030. In 2021, the Build Back Better Framework was introduced to set the United States on course to meet its climate targets. The 1.75 trillion bill included $555 billion of investments in clean energy and other climate change initiatives, seen as the new cornerstone of the federal climate policy.

In the EU, the European Green Deal serves as a comprehensive policy package to set EU-wide goals: cut greenhouse gas emissions by at least 55% by 2030 compared to 1990 levels to set Europe on a responsible path to becoming climate neutral by 2050. In July 2021, the European Commission unveiled a new climate action plan "fit for 55", which consists of 13 legislative proposals, including the Emissions Trading Directive (ETS), the Effort Sharing Regulation (ESR), the Regulation on Land-use, Land-use Change and Forestry (LULUCF), the Energy Efficiency Directive, the Renewable Energy Directive, and a Governance Regulation for the process of planning, reporting and review.

With China being the largest emitter (25.7% of the world total), followed by the US (12.8%) and the EU(27) (7.8%)[1], together they are responsible for around 46% of today's carbon emissions (ClimateWatch, 2018). At the same time, the three economies account for more than a quarter of the world's population and 60% of world GDP.

Effective multi-level governance is crucial to achieving headline goals and overarching policies set forth by the central or supra-national level administrative unit. Economies like China, the US and the EU have complicated internal administrative units. The internal administrative units, such as the 31 provinces[2] in China, 27 Member States in the EU and 50 states in the US, have significant variations in terms of population, economic size, culture, socio-economic status and geo-climatic conditions. While global-level cooperation and negotiation and national-level policies are crucial to climate actions, it is of equal

importance to look at the different layers of internal governance. How are priorities and targets decided from both bottom-up and top-down processes? How does the central government exert control over local authorities and ensure the implementation of their policies? How does the central government enforce and evaluate the results of their policies? And finally, how does public opinion play a role in the multi-level governance in these three blocs?

While many comparisons regarding climate change actions across these three economies exist, they concentrate on comparing the policy instruments and the results. Our comparison, instead, puts a focus on the importance of institutionalized governance processes, i.e., the "politics" and the "polities". Using the framework from Gong et al (2020), polity refers to "the institutional setting, structural side of governance, or the rules of the game". Politics refer to "the actors and interaction processes inherent in a mode of governance". We compare the institutionalized governance processes based on the theory of multi-level governance, i.e. how policies are implemented from central to local, or supranational to the national structure. The key question we aim to answer is, how climate and energy policies are formulated and implemented effectively at different levels. By comparing the limits and potential of each country's governance, we can identify opportunities to maximize the effectiveness of each model in their terms, instead of forecasting or recommending the convergence of governance models in different economies.

The paper proceeds as follows. Section 2.1, 2.2 and 2.3 detail the polities and multi-level governance models in the three blocs. We then proceed to the comparison and summary of differences in the governance models in section 3. Section 4 provides a deep dive into the role of citizens and public opinions in multi-level governance. Section 5 concludes.

2. Multi-level governance
2.1. High-level and medium-level admin units

Table 1 summarises the two layers of administrative units considered in this paper (Noussan et al., 2021). For China and the US, the higher-level administrative unit is the central/federal government whereas the EU is the Union of countries. The medium-level administrative unit for China is provinces[3] for the EU are the countries and for the US, states. These administrative units are chosen to ensure the scale and thus the relevance of these two layers are comparable.

Table 1 – Main features of the three economies considered in this analysis.

		China	**European Union**	**United States**
high-level admin. unit	*type*	Country	Union of countries	Country
Total population[4]	*million (2019)*	1,398	448	328

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[3] We would like to remark that the term "provinces" in this paper refers to provincial-level administrative regions, including both provinces and autonomous regions. We have chosen to use "provinces" to simplify the wording.

[4] World Bank Data, Total population, https://data.worldbank.org/indicator/SP.POP.TOTL

Total GDP[5]	*billion USD (2019)*	14,280	15,626	21,433
Power generation[6]	*TWh (2019)*	7,519	2,912	4,391
medium-level admin. units	*type*	Provinces	Countries	States
number	-	31*	27**	50***
population (max)	*million (2019)*	115.2	83.2	39.5
population (mean)	*million (2019)*	45.1	16.6	6.6
population (median)	*million (2019)*	38.8	8.9	4.3
population (min)	*million (2019)*	3.5	0.5	0.6
GDP[7] (max)	*billion USD (2019)*	1,562	3,080	3,133
GDP (mean)	*billion USD (2019)*	461	579	429
GDP (median)	*billion USD (2019)*	357	199	250
GDP (min)	*billion USD (2019)*	25	12	34

* Excluding the 2 Special Administrative Regions (Hong Kong and Macau) and 1 disputed region (Taiwan). ** The European Union considered in this study is the EU-27, after the withdrawal of the United Kingdom (UK) on Jan 31st ,2020. *** Excluding District of Columbia.

2.2 China

2.2.1 Polities of climate and energy governance in China

The political system in China consists of vertical lines and horizontal lines. Vertically, each administrative division of the Government of China is supervised by their vertical superior. Horizontally, they receive strategic guidance from the Chinese Communist Party (CCP) at the same level, meaning that the party leads on everything. (Fig 1)

Within the government of China, the central government established the National Leading Group for Climate Change, Energy Conservation and Emissions Reduction (国家应对气候变化及节能减排工作领导小组) in 2007, led by the Premier Li Keqiang. The Leading Group serves as a cross-departmental coordination mechanism for any climate change and energy-related issues. For example, the Vice Minister of Foreign Affairs, Minister of Ecology and Environment, Minister of Natural Resources, Minister of

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[5] World Bank Data, Nominal GDP, https://data.worldbank.org/indicator/NY.GDP.MKTP.CD

[6] Source: ENERDATA (2021).

[7] Sources: https://data.stats.gov.cn/english/easyquery.htm?cn=E0103 (with 1 USD = 6.91 CNY), https://ec.europa.eu/eurostat/databrowser/view/tec00001/default/table?lang=en (with 1 Euro = 1.12 USD), https://apps.bea.gov/itable/iTable.cfm?ReqID=70&step=1&acrdn=1

Transport and Minister of Finance are all included in the leading group, to ensure a holistic view and consistency across climate and energy-related policies (State Council, 2019). As of June 2021, a new climate "leading group" is established to achieve the "dual carbon goals". The new leading group is led by vice-premier, Han Zheng, who is also a member of the Standing Committee of the Politburo of the Communist Party of China. Han Zheng is also the head of the Central Ecological and Environmental Inspection Team (CEEIT), a top-level institution to ensure the implementation of ecological and environmental regulations (You, 2021).

The two most important ministries that are directly responsible for climate and energy policies are the Ministry of Environment and Ecology (MEE) and the National Development and Reform Commission (NDRC). NDRC is in charge of organizing the formulation of the Five-year Plan, the most crucial document that outlines the country's economic and societal development priorities for every five years. At the same time, China's National Energy Agency (NEA) sits under the NDRC, giving NDRC the competence to formulate energy-related policies. On the other hand, the Department of Climate Change sits under MEE. The mandate of the Department of Climate Change includes internal climate mitigation and adaptation strategy formulation, international climate negotiation and compliance with the UNFCCC, as well as market mechanism development such as the carbon emission rights trading markets. At the provincial, municipal and local levels, the administrative divisions replicate the structure at the national level. At each level, they all receive guidance from the CCP such as the provincial party congress and committee as well as local-level party organizations.

Figure 1 – Overall governance structure between the CCP and government
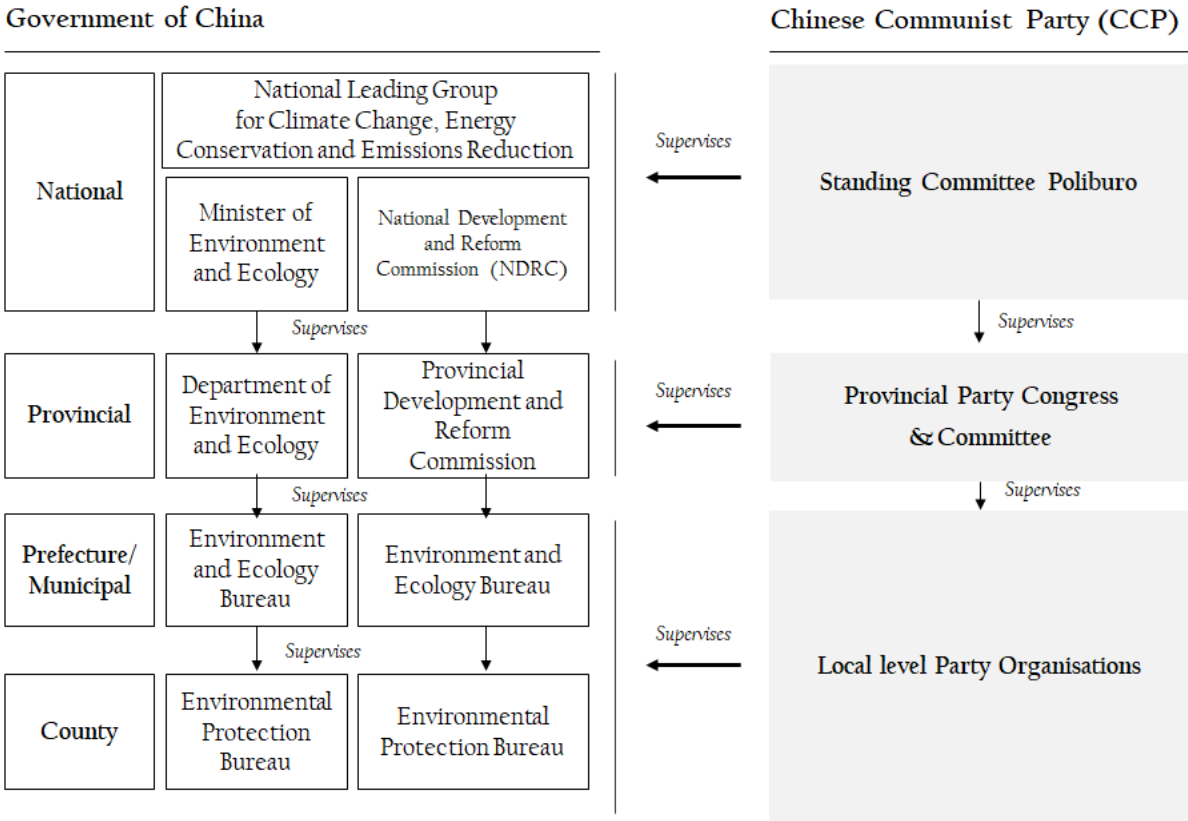
The central-local relationship in China, historically, has not been fixed. It shifts like a pendulum, swinging from decentralization to re-centralization. This swing can be reflected by the fiscal revenue distribution between the central and local governments. The 1980s witnessed a shift from the centralised arrangement for fiscal revenue and spending to a "separate accounting for income and expenditure" (分灶吃饭).

Reform and opening up and the expansion of market power allowed provincial and sub-provincial local governments to retain a larger proportion of their revenues and to spend them freely, leading to an overall decentralisation process (Z. Li, 2013). However, the 1994 tax reform transformed again the relationship between central and local government. The reform allowed the central government to share 75% of value-added tax and local government 25% of VAT, therefore giving the central government more control over fiscal revenue. As of today, the central government retains approximately half of the fiscal revenue, but local governments account for 85% of the general government budget (Wingender, 2018). This mismatch between revenue and spending results in an important mechanism for the central government to balance among, incentivise and control local governments: transfer payment. A transfer payment is a redistribution of fiscal income. The purposes are three folds: to promote equal development among regions, e.g. redistribute income to western and less developed areas; to support the provision of public goods via special transfer payment, such as in basic health care; and to incentivise specific policy goals e.g. environmental protection.

Therefore, contrary to the common belief that China is a highly centralised and top-down decision-making machine, many scholars have pointed out that the Chinese political system can be described as "fragmented authoritarianism" or "decentralised authoritarianism", where spaces for negotiation, bargaining and consultation exist within the system.

2.2.2 Multi-level governance model between central and provincial governments

This decentralised authoritarian system functions through three incentive mechanisms (Ren, 2018), as shown in figure 2, namely: political incentives through tasks and campaigns; financial incentives through transfer payment; and promotion incentives through target responsibility and cadre evaluation.

Figure 2– Three incentive mechanisms between Chinese central and local governments, Translated from (Ren, 2018)
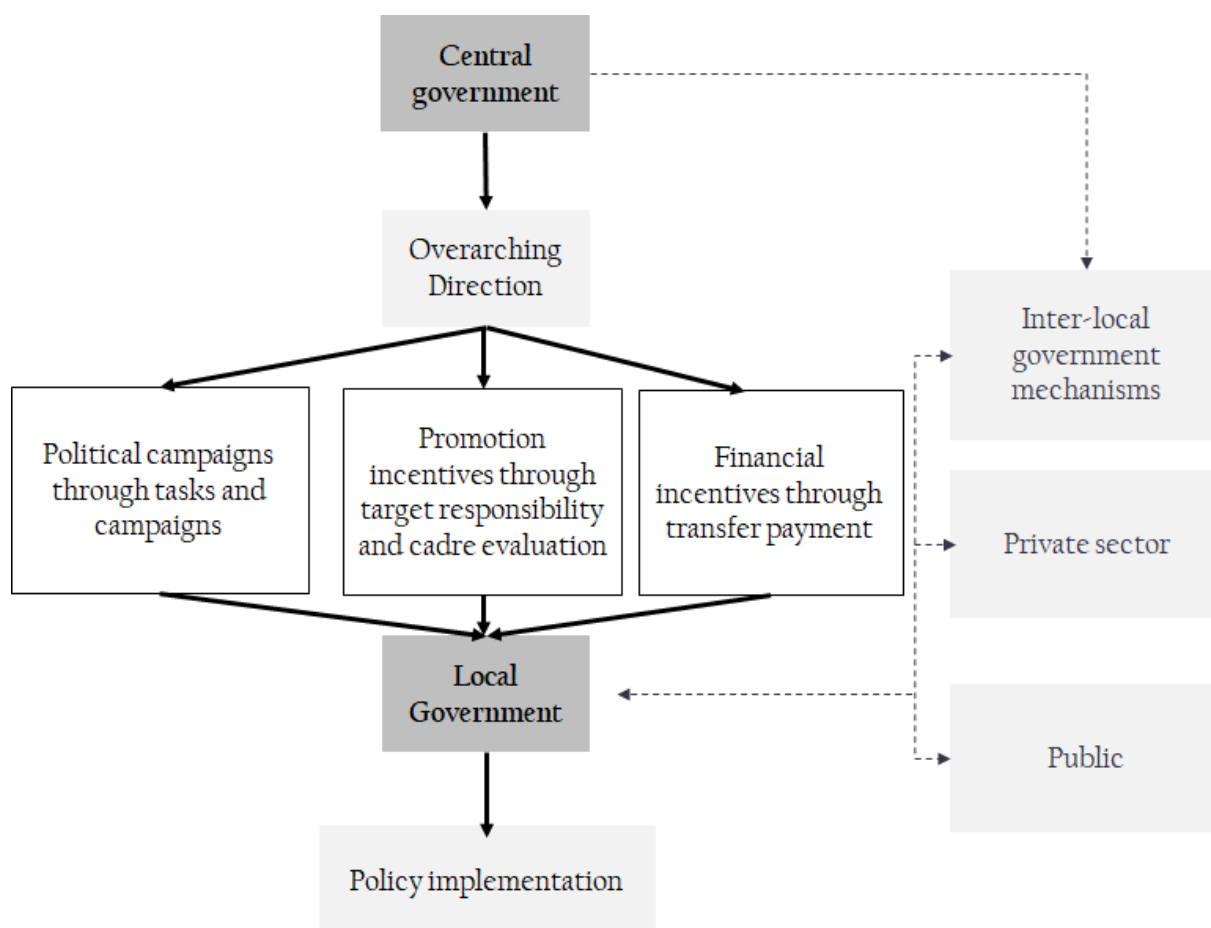
All three mechanisms play a central role in climate and energy governance. The characteristic of political campaigns is time-bound and is of paramount importance compared to other priorities. Implementing policies through political campaigns are effective to achieve short-term results, but are not sustainable for long-run changes. A case in point is the air pollution clean-up campaign during the 2014 Asia-Pacific Economic Cooperation (APEC) forum held in Beijing. To reduce air pollution and ensure blue sky in a short amount of time, the central government mobilized Beijing, Tianjin, Hebei, Shandong, Shanxi and Inner Mongolia. During the months before and during the forum, the priority of reducing air pollution outweighed economic growth. 9,298 factories in the regions surrounding Beijing were forced to suspend production and another 3,900 factories limited production. More than 40,000 construction sites were closed (Ye, 2015).

The other central-local governance mechanism is through financial incentives, especially through transfer payments. As mentioned before, the 1994 tax reform led to a mismatch between revenue and spending at local government levels. Transfer payments are an important income source for local governments, especially in western China and less developed regions to incentivise specific policy goals e.g. environmental protection. One environment-related transfer payment mechanism is the "ecological compensation mechanism" established in 2005, to incentivise key ecological functional regions to conserve and restore nature. In 2021, the fiscal budget for ecological transfer payments amounts to more than 13 billion USD (88.2 billion RMB). As the "dual carbon goals" rose to top priorities, specific transfer payments for net-zero goals were also planned. A statement from the Ministry of Finance in August 2021

committed to transfer payments to local governments to restore grasslands, wetlands and forests to increase carbon sequestration.

Apart from the aforementioned two mechanisms, at the centre of the Chinese central-local governance mechanism for climate and energy is the target responsibility, or the cadre evaluation system. It is the mechanism of evaluation of bureaucratic personnel which then determines the promotion or demotion. The target responsibility system can be best understood using an analogy to corporate management. Priorities and key performance indicators (KPIs) are set by top leadership, but tactics to reach the targets were left to the lower level's discretion. Each level of bureaucrats is evaluated every year against these KPIs, which may lead to either political promotion or demotion.

2.2.3 Deep dive in FYP target setting, implementation and evaluation

For China, the national priorities and targets are outlined in China's Five-Year Planning, a process led by the National Development and Reform Commission. Targets in the FYP are divided into two types: anticipatory targets and binding or obligatory targets. Anticipatory indicators are targets that the state desires to achieve, but the final results mainly depend on the autonomous behaviours of market players, such as the economy and well-being related targets. In comparison, binding indicators are targets that the state requires to achieve, such as environmental protection and food security-related targets. Only binding indicators are cascaded down to provincial and local level government and accountable ministries are designated.

Among the 20 key indicators laid out in the 14th Five-Year Plan (FYP) for 2020 to 2025, eight indicators are binding, among which four targets concern energy and climate targets, namely "Reduction in energy consumption per unit of GDP(%)", "Reduction of CO_2 emissions per unit of GDP (%)", "Forest coverage rate (%)" and "Comprehensive energy production capacity" (see table 2).

Table 2 – Main indicators of economic and social development during the 14th FYP period

Category	Indicator	2020	2025	Annual average	Nature
Economic development	GDP growth (%)	2.3	--	Keep it within the reasonable interval, each year depending on the situation	Indicative
	Labour productivity growth (%)	2.5	--	Higher than GDP growth	Indicative
	Urbanization rate (%)	60.6	65		Indicative
Innovation	Growth in R&D spending	--	--	Growth > 7 percent. Aim for a higher share in GDP than 2.2 %	Indicative
	Number of innovation patents per 10,000 people	6.3	12		Indicative
	Digital economy share of GDP	7.8	10		Indicative
Well-being	Growth in disposable income	2.1	--	In line with GDP	Indicative

	Urban (survey) unemployment rate	5.2	<5.5		Indicative
	Average years of education of the working-age population	10.8	11.3		Binding
	Number of licensed physicians per thousand population	2.9	3.2		Indicative
	Basic pension insurance participation rate (%)	91	95		Indicative
	Nurseries for infants under 3 years old per thousand people	1.8	4.5		Indicative
	Average life expectancy (years)	77.3	--	1 year (cumulative in 5 years)	Indicative
Ecology	**Reduction in energy consumption per unit of GDP (%)**	--	--	13.5% (cumulative in 5 years)	Binding
	Reduction of carbon dioxide emissions per unit of GDP (%)	--	--	18% (cumulative in 5 years)	Binding
	Share of days with good air quality in cities at prefecture level and above (%)	87	87.5		Binding
	Share of surface water at or better than class III (%)	83.4	85		Binding
	Forest coverage rate (%)	23.2%	24.1%		Binding
Security	Comprehensive grain production capacity			>650 million tons	Binding
	Comprehensive energy production capacity			>4.6 billion of coal equivalent	Binding

Target setting during the FYP follows a "stratified policy formulation" process (分层决策、 平行编制、 纵向引导) (Lv & Tang, 2018). Decisions are made horizontally at the central and local levels, but the central government gives strategic guidance to the local level.

Figure 3 – stratified policy formulation FYP process, translated from (Lv & Tang, 2018)
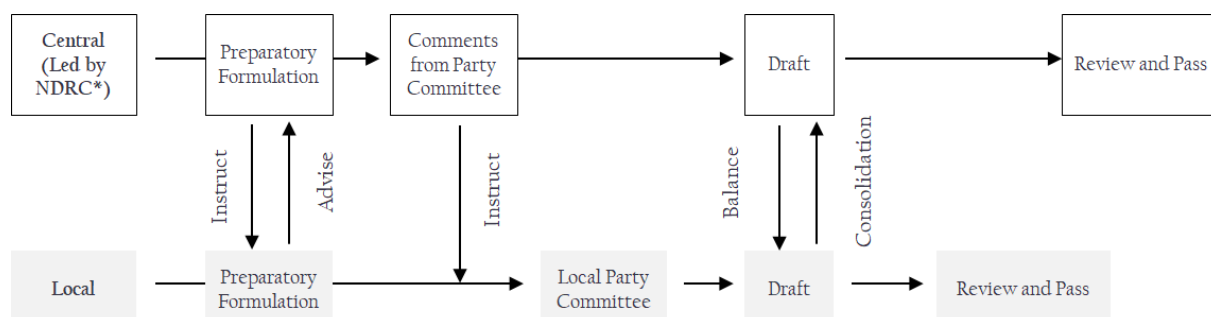
In short, it can be described as a multiple-round negotiation process between central and local, where the central government takes into account the voluntary target-setting submitted by provinces and gives draft targets with adjustments to ensure that nation-wide priorities are achieved (Figure 3). After the negotiation, targets are reviewed and officially approved in the official FYP documents, thus becoming binding for local governments. The actual performances are compared with the finalized binding targets, which are in most cases always achieved.

The evaluation of the targets is based on both results and efforts. Take the "Reduction in energy consumption per unit of GDP (%)" target in the 11th FYP as an example. Nation-wide energy reduction target is a 20% decrease by 2010 compared to the level in 2005. The evaluation score is calculated as follows: 40% is whether the province achieved the assigned binding target, and 60% is based on completion of the eight key "Energy Saving and Emission Reduction (ESER) 节能减排" initiatives (Lv & Tang, 2018).

Table 3 – 11th FYP "Reduction in energy consumption per unit of GDP (%)" target

Provinces (not exhaustive)	Voluntary target setting by provinces	The draft target from the central government	Finalized binding target in FYP	Actual performance
Guangxi	9.6	15	15	15.22
Yunnan	12.6	17	17	17.41
Guangdong	13,2	16	16	16.42
Beijing	15	20	20	26.59
Tianjin	15	20	20	21.00
Zhejiang	15	20	20	20.01
Hubei	20	20	20	21.67
Chongqing	20	20	20	20.95
Henan	20.5	20	20	20.12
Jiangsu	20.8	20	20	20.45
Shandong	22	22	22	22.09
Shanxi	25	25	22	22.66
Jilin	30	30	22	22.04

As a result of the cadre evaluation, bureaucratic personnel such as provincial governors or municipal mayors compete with each other for good performances. The leaders who can achieve or over-achieve targets are expected to receive awards, recognitions and promotions, whereas leaders who fail to achieve binding targets can face consequences such as rectification, correction, or suspension of new high-energy-consuming projects in the area. If the region fails to reach the target after rectification and correction, the government officials will be held accountable by supervisory departments.

2.3 The EU:

2.3.1 Polities of climate and energy governance in the EU

The institutional set-up of the EU includes three pillars: the European Parliament, the Council of Ministers and the European Commission. In principle, the national leaders within the European Council set priorities. The Commission proposes new laws and budgets, and the Parliament and Council of Ministers adopt them. The Commission and the Member States then implement them, and the Commission ensures that the laws are properly applied and implemented. Within the EU Commission, the Vice-President for the European Green Deal leads the work on the various legislative instruments under the overall package.

The governance mechanism between the Union and the Member States depends on where the competence lies. The EU has several exclusive competencies that are relevant to external third countries, such as customs and trade policies. In this case, the Commission can negotiate and the Council can conclude international agreements. In other cases, such as energy and international climate issues, the competence is shared between the Community and the Member States. This also means that international agreements must be ratified by Member States (Szapiro & Kaeding, 2013). However, the greater part of this competence, such as for energy policy, lies with the Member States (Vogler, 2009). Whereas the EU has the responsibility to ensure the security of supply, it is up to the Member States to determine the structure of their energy supply and their choice of energy sources.

2.3.2 Multi-level governance model between the Union and the Member States

The EU climate and energy governance model is first and foremost underpinned by legislation. The European Green Deal serves as a comprehensive policy package to set EU-wide goals, i.e. achieving climate-neutrality by 2050 and reducing net greenhouse gas (GHG) emissions by at least 55% by 2030. The European Green Deal was first presented in December 2019 by the European Commission, following which the European Climate Law was published in the Official Journal on 9 July 2021 and entered into force on 29 July 2021, which made both the new emissions reduction targets and the climate neutrality goal binding. In July 2021, the European Commission unveiled a new climate action plan "fit for 55", which consists of 13 legislative proposals.

The new "fit for 55" is built on many revisions to existing regulations and directives, such as the Emissions Trading Directive (ETS), the Effort Sharing Regulation (ESR), the Regulation on Land-use, Land-use Change and Forestry (LULUCF), the Energy Efficiency Directive, the Renewable Energy Directive, and a Governance Regulation for the process of planning, reporting and review. The ETS, ESR and LULUCF split the GHG emission coverage. ETS covers mainly the power sector and heavy industry and only has an EU-wide cap without national sub-targets. ESR covers transport, buildings and agriculture and has national sub-targets, which are based on "burden-sharing" negotiation within the council. Lastly, LULUCF ensures that accounted GHG emissions from land use are entirely compensated by an equivalent accounted removal of GHG from the atmosphere through action in the LULUCF sector.

Apart from these six regulations/directives, the package also includes a combination of initiatives to reduce road transport, maritime and aviation emission, as well as a revision of the Energy Taxation Directive and setting a Carbon Border Adjustment Mechanism.

It is worth pointing out that there are different levels of legislation. Primary legislations are treaties and secondary legislations include three types of law: regulations, directives and decisions. "Regulations" are passed solely by the Commission or jointly by the Council and the Parliament. "Directives" are passed by the Council and the Parliament. The difference between the two is that regulations require that the Member States must implement uniformly by a shared deadline, whereas the directives allow certain flexibilities for the Member States with varying deadlines based on different national conditions.

Apart from legislation, financial incentives are another important mechanism in the EU climate and energy governance. For example, 30% of the programs in the EU's 2021-2027 €2 trillion Multiannual Financial Framework (MFF) will provide support for climate action. 37% of the €723.8 billion Recovery and Resilience Facility will also finance Members states' climate action. Finally, a new Social Climate Fund proposed within the "Fit for 55 packages" proposes to provide €72.2 billion in current prices for the period 2025-2032 in the EU budget from the new Emissions Trading System (*European Commission,* 2021). The fund aims at helping EU citizens meet the social and economic costs of the climate and energy transition, especially the decarbonisation initiatives in the transport and building sector where vulnerable households, micro-enterprises and transport users might be directly affected.

2.4 US:

2.4.1 Polities of climate and energy governance in the US

In the US, the climate and energy governances are based on the congressional legislation process, as well as the regulation and enforcement carried out by the implementing agencies such as the Environmental Protection Agency (EPA) and the Department of Energy (DoE).

The executive branch includes the Office of Special Presidential Envoy for Climate Change and the Office of Domestic Climate Policy. Both have direct access to the president and are expected to work with various councils such as the national security council, the national economic council, the council on environmental quality and work with Congress. Similar to China's National Leading Group for Climate Change, Energy Conservation and Emissions Reduction, the US Climate Policy Office also convenes the National Climate Task Force, which assembles Cabinet-level leaders from across 21 federal agencies and departments. Under the National Climate Task Forces, various working groups were established to advance specific priorities, such as the Climate Innovation Working Group to foster affordable, game-changing technologies to combat climate change.

Compared to China and the EU, the climate change policies are more fragmented and there is a lack of comprehensive federal control of GHG emission. Congress is responsible for the legislative process, authorizing laws and overseeing the implementation of energy acts through the Senate and House of

Representatives. However, the problem is that the chamber committee structures don't fit climate well into anyone's competence. One committee that has a macro approach to climate change in its totality is the House Select Committee on the Climate Crisis, but the committee cannot draft legislation. They can only make policy recommendations for the standing committees. So far, legislative proposals have included carbon pricing frameworks such as the emission trading system and the carbon tax, sectoral initiatives such as for standard development or research funding, and also budget bills such as the Build Back Better framework, which includes $555 billion for climate investment. One example is the Clean Air Act, which provides the foundation of many existing GHG emission policies. In 2007, the Supreme Court found that the Environmental Protection Agency (EPA) has the authority to regulate GHG emissions from motor vehicles as air pollutants. This has significant implications for executive power because the Biden administration can increase the stringencies for emission efficiency. For example, the EPA proposed rule to strengthen federal GHG emissions standards for passenger cars and light trucks by setting stringent requirements for reductions through the Model Year 2026 (EPA, 2021).

One of the key instruments for climate action from the executive branch is the Executive Order (EOs), a way to issue federal directives from the President and requires no approval from Congress. However, they are subject to judicial review and may be overturned. Previously, EOs were used by the Trump administration to undo Obama-era rules by rolling back the limit on potent greenhouse gas emissions from oil and gas fields and pipelines. Under the new Biden Administration, the president signed multiple EOs to strengthen climate change actions, such as the Executive Order on Tackling the Climate Crisis at Home and Abroad, Executive Order on Strengthening American Leadership in Clean Cars and Trucks, and the recently published Executive Order on Climate-Related Financial Risk (*U.S. Climate Change Policy*, 2021).

In terms of law enforcement and implementation, the implementation agencies, such as EPA and DoE undertake the tasks and enforce the law. For example, the EPA works with states to reduce GHG emissions under the Clean Air act. The DoE with the private sector to research, develop and deploy clean energy technologies and establish standards for energy efficiency under the energy policy law. These agencies can also shape regulations interpreted from the drafted law.

2.4.2 Multi-level governance model between the Federal government and States

Similar to the EU, the US federal-state governance is mostly driven by legislation. The federal and state governments share certain authorities for making and enforcing laws. Under the Trump administration, the US federal climate policy was largely lacking or moving in the wrong direction, which gives more leeway for states to step in. For example, by April 15, 2020 states and territories have taken legislative or executive action to move toward a 100 per cent clean energy future. The California carbon Cap-and-Trade system is another example of an ambitious state taking more proactive actions. Launched in 2013, the California emission trading system was the 4th largest program in the world. This state-level pioneering initiative also provided valuable insights and learnings for further policy diffusion in other states. The Mayors within the US also have robust climate policies. During the movement of 'We are still in', 125

cities joined the coalition with nine states and hundreds of businesses and universities to sign an open letter to show support (Holden, Mulkern, 2017). Today, the Climate Mayors has established a network of 470 U.S. mayors, representing 48 states and 74 million Americans to demonstrate cities' leadership in climate actions.

In terms of law implementation, although the EPA has the authority to enforce policies through fines, sanctions, and other measures granted by the federal government, they often delegate monitoring and enforcement to states. In general, the state environmental agencies are cumulatively more sufficiently funded and have more capacity. For example, at the federal level, 15,000 people work in the U.S. EPA; whereas New York City's Department of Environmental Protection has a staff of 6,000. The federal EPA has an annual budget of $8 billion. In comparison, New York EPA spends about $1.5 billion a year (Cohen, 2018).

Financial incentives through procurements, subsidies, investments and taxes are another key mechanism of the governance between federal and state governments. For example, the budget bill for the "Build Back Better" agenda introduced by the Biden administration in October 2021 includes around $555 billion for climate change. The climate change provisions include tax credits for utility-scale and residential clean energy, investments for resilience and climate adaptation, clean energy technology, manufacturing and supply chain investments and clean energy procurement. However, it is worth noting that 90% of U.S.-originated climate finance comes from private sources, including 57% of which comes from corporations including project developers and utilities (*The Landscape of Climate Finance in the United States*, 2021).

3   Comparison between China, the EU and the US

China, the EU and the US have all made over-arching climate action pledges. To make sure that these top-level commitments can be achieved, they need to be implemented effectively at the middle admin-unit level, such as provinces in China, Member States in the EU and states in the US. The first paper in this series (Noussan et al., 2021), showed that although the three blocs are all moving to decarbonisation targets, the variability of electricity generation mix at the middle admin-unit level within each bloc is huge in terms of energy sources (thermal, hydro, wind, solar, nuclear) and the balance between energy demand and supply. Such complexity is the result of the different economic, (geo)political, environmental and societal development stages in each of the middle admin-unit levels. This variability has implications for the effectiveness of policy implementation. For example, wind power is gaining share in the generation mix, especially in the North and North-west region. However, wind output curtailment has been a severe problem in China, amounting to 11% in 2015 and 10% in 2016. The loss in economic and energy efficiency is partially due to the fragmented institutional authorities and responsibilities, resulting in mismatches in investment in installed wind power capacity and power transmission networks between provinces (Qi, 2019). Therefore, middle admin-level policies and the governance model play a big role in determining the effectiveness of decarbonisation policies. It is thus imperative to put more emphasis on analysing the multi-level governance model, in addition to national or supra-national level targets and policies.

3.1 Comparison of the overall multi-level governance model

The three blocs all have different multi-level governance models to ensure effective implementation of these targets, yet the three also share certain commonalities.

China aims to reach a carbon emissions peak before 2030 and to become "carbon neutral" before 2060. In China, this overarching goal is set forth by the National Leading Group for Climate Change, Energy Conservation and Emissions Reduction with strategic guidance from the CCP Standing Committee Politburo. The ministries responsible at the central level are NDRC and MEE, with their corresponding administrative unit being responsible at the provincial level, such as the provincial DRC and provincial department of ecology and environment. The multi-level governance model consists of three main instruments: political campaigns, target responsibility system demonstrated by the Five Year Plan (FYP), and financial incentives mainly through transfer payment.

The EU has pledged to cut greenhouse gas emissions by at least 55% by 2030 to set Europe on a responsible path to becoming climate neutral by 2050. The Commission, Parliament and Council of Ministers work together to translate the overarching goal into the European Green Deal, a comprehensive package of 13 regulations and directives. However, the enforcement mechanism for the European Union to control the Member States is weak. For all the directives, the Member States have an obligation to make national laws that give it effect, but they have a choice as to precisely how and when to do so. Nevertheless, according to the Governance regulation, all Member States are required to submit National Energy and Climate Plans (NECPs) to outline their climate and energy goals, policies and measures. Financial incentives are also a key instrument for the Union to incentivize the Member States and ensure burden-sharing.

The US has pledged to achieve carbon neutrality by 2050 and cut its greenhouse gas emissions 50 per cent to 52 per cent below 2005 levels by 2030. The commitment is set forth by the Executive Office of the President working closely with Congress to make sure the commitment can be translated into concrete Executive Orders and Laws. Implementation agencies such as EPA, Department of Energy and Department of Agriculture also issue regulations and policies, and they enforce the laws at the state level either through their regional offices or through delegating to the states. The federal government also provides financial incentives in the form of procurement, subsidies or taxes. The financial packages are also introduced as budget bills and need to be passed by Congress.

3.2 Advantage and disadvantage of target responsibility system versus legislation

The most significant difference between the Chinese and the European and US government models is the role of legislation in China. Despite the official rhetoric of the importance of "Rule of Law" in China, until today, the bureaucratic target responsibility system remains at the centre of China's governance apparatus especially when it comes to climate change and energy-related issues, and legislation taking a secondary role. This ambivalence attitude towards law can be explained by partially political concerns, such as loss of control to courts, concerns about negative foreign influence on the legal system, or courts becoming a

focus of citizen "rightful resistance". It could also be attributed to capacity challenges, such as poorly trained judges, low levels of lawyer professionalism etc (Wang, 2012). However, instead of reforming and developing China's legal system, the Chinese government relies on top-down party-state bureaucratic mandates to drive the performance of new dual carbon goals. Laws are used more as a lagging indicator to "memorialize or legalize" the priorities already established and operationalized by the target responsibility system. For example, in 2020 the Department of Climate Change under the Ministry of Environment and Ecology is finally starting to formulate Chinese climate action law. As early as 2012, the Institute of Law of the Chinese Academy of Social Sciences (CASS) already drafted the Law of the People's Republic of China on Climate Change Response. The draft originally contained more than 200 clauses, but after several rounds of consultations and review, the clauses were simplified and reduced to only 50, all remaining at a relatively high level. It lost most of the specificities and practicalities and remained a draft (Cao & Zhang, 2020). Thus, laws in China can be viewed more as an expressive statement of the priorities and values that the party and the state cares about, rather than an instrument to implement the priorities.

There are certain advantages of using target responsibility and cadre evaluation mechanisms for multi-level governance. First, it provides more flexibility to change targets than law. The FYP is formulated every five years and does not require complex and cumbersome law-making processes. Effectiveness can also be argued. For the past forty years, the system was able to motivate and identify stellar performers, while generating at least a minimal level of performance from most bureaucrats. Lastly, it is historically familiar. The FYP has been the central tool of China's governance model since the 1st FYP from 1953-1957.

There are also disadvantages. First of all, the government bureaucrats are responsible for targets, but not directly held accountable to the people because they are not elected officials. This might sometimes create dilemmas between "achieving the targets" and "ensuring the well-being of the constituents". For example, in the winter of 2017-18, China's central government launched an ambitious plan to convert large numbers of coal-fired boilers to natural gas (or electricity heating). Hebei, which surrounds the capital Beijing, has been on the front line of a campaign to cut smog. To reach the target of "coal-to-gas conversion", more than 2.5 million households across Hebei were converted from coal to electricity or natural gas in 2017. The province also closed as many as 36,000 coal-fired boilers over the year. But gas shortages and a lack of infrastructure have disrupted the operations of industrial firms across northern China, and left some villages without heat amid sub-zero temperatures this winter, forcing authorities to suspend the conversions (Li J., 2017). Another recent example is the power cut in the northeast of China in 2021. Residents in the north-eastern area of China experienced a lack of heating and power cut-off without warning. The shortage of power across China is mainly due to the rising price of coal due to the reduced coal production to achieve carbon goals. In addition, a provincial "report card" was released for the provincial performances of energy consumption and energy intensity. Many provinces have been identified as off-track of meeting the targets and are expected to act immediately to get back on track. (Fishman, 2021). In both cases, when potential conflicts between achieving targets and ensuring the well-being of the citizens, the target responsibility system might incentivise bureaucrats to optimize for
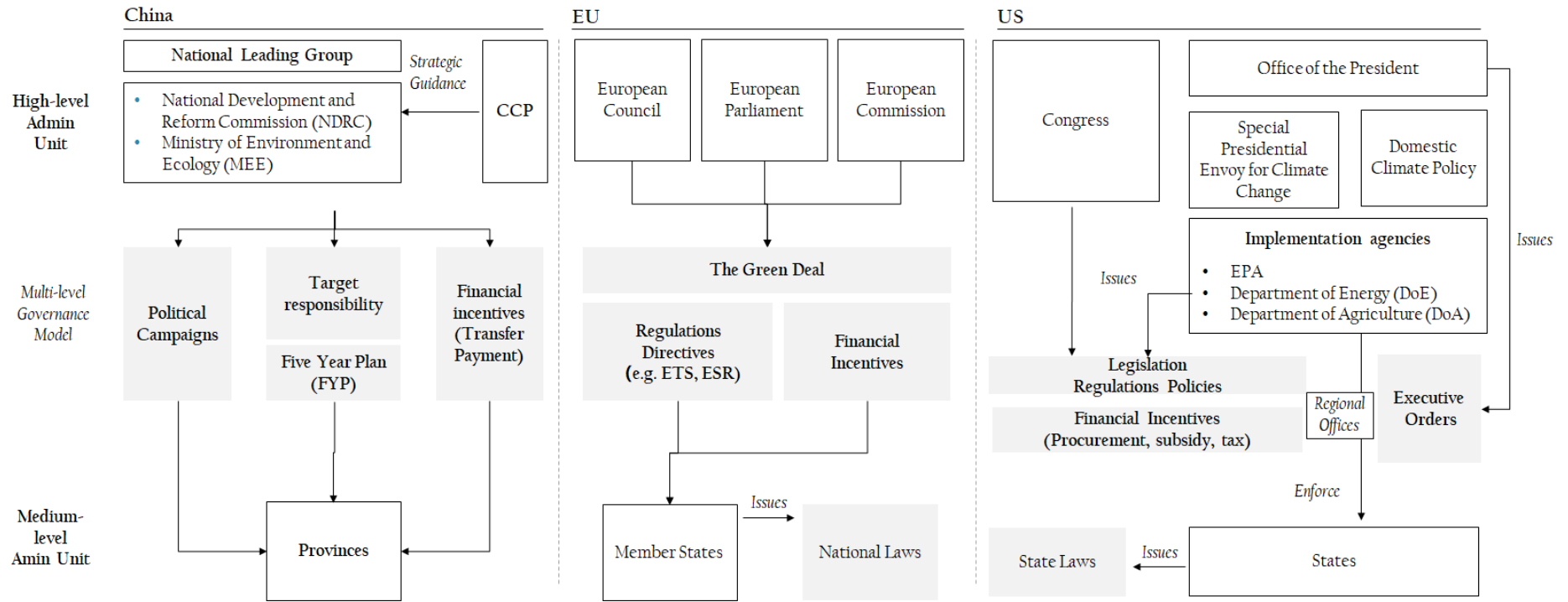
performance, as long as the citizen discontent or unrest can be controlled and do not evolve into nation-wide scandals. The second disadvantage of target responsibility is that it creates an incentive for local governments to fake statistical numbers. For example, Zhang (2021) analysed the target responsibility system's impact on the accuracy of Energy intensity measured by energy consumption per unit of GDP, a key binding target in the 14th FYP. The paper concludes that government target assessment can affect the quality of statistical data, but the overall quality of statistical data has improved. Finally, not all climate or environmental goals are quantifiable, and the quantified targets may not be the best proxies.

3.3 Other differences

Apart from the biggest difference in the role of legislation, there are several other notable differences between the three political bodies.

First, the level and extent of policy enforcement are different. In China, the enforcement of central-level policy at the local level is the strongest. The power is derived from promotion and demotion incentives. In the US, the federal and state governments share authority. Although federal laws are also enforced by implementation agencies such as the EPA or DoE, the enforcement is relatively weaker due to limited capacity and funding at their regional offices. In comparison, the states not only have the authority to make laws when the federal action is lacking or not comprehensive, but they are also better capacitated and funded to enforce the state regulations and laws. In the EU, although the European Union can impose financial or non-financial sanctions on the Member States when nonconformity or non-compliance arises, the mechanism is the weakest compared to in China or the US.

Secondly, both the European Member States and the US states have the authority to make new laws, thus allowing them to take more proactive or progressive climate actions when there is a vacuum at the higher admin-unit level. This also incentivizes more local-level policy innovations and encourages strong networks and collaboration among states or cities. In contrast, in China, although the provinces have the leeway to achieve the targets assigned by their superiors, they only have the freedom to design tactics, but the overall direction must be aligned with central guidance. The policy innovation is also more of a top-down process. The central government picks a pilot region /area, allows piloting temporary rules, or encourages the demonstration of a certain policy.

China

High-level Admin Unit

| National Leading Group |
| • National Development and Reform Commission (NDRC) |
| • Ministry of Environment and Ecology (MEE) |

Strategic Guidance

CCP

Multi-level Governance Model

Political Campaigns

Target responsibility / Five Year Plan (FYP)

Financial incentives (Transfer Payment)

Medium-level Amin Unit

Provinces

EU

European Council

European Parliament

European Commission

The Green Deal

Regulations Directives (e.g. ETS, ESR)

Financial Incentives

Member States — *Issues* → National Laws

US

Congress

Office of the President

Special Presidential Envoy for Climate Change

Domestic Climate Policy

Implementation agencies
• EPA
• Department of Energy (DoE)
• Department of Agriculture (DoA)

Issues

Legislation Regulations Policies

Financial Incentives (Procurement, subsidy, tax)

Regional Offices

Executive Orders

Issues

Enforce

State Laws ← *Issues* — States

4. Public participation in multi-level energy and climate governance

The need for wider public participation in energy and climate governance has become almost an international consensus: whether top-down or bottom-up governance processes are pursued, public participation is an essential part of multi-level governance, considering that public participation has been included in various versions of the United Nations Framework Convention on Climate Change (e.g., Article 6 of the 1992 UNFCCC and the 2015 Paris Agreement) (Sprain, 2016). Two arguments justify public participation in energy and climate governance: firstly, that participation is a democratic right that contributes to policy credibility and enhances capacity building; and secondly, that the inclusion of different stakeholders and perspectives from different social groups is seen as beneficial to energy and climate policy development and implementation, as wider participation helps to mobilise more knowledge and voices (Sprain, 2016). However, there is no fixed and agreed pattern of public participation in energy and climate governance. On the contrary, due to different "politics" as analysed above sections, as well as distinct shapes of respective civil societies, public participation plays different roles in energy and climate governance in China, the EU, and the US, and the depth and impact of participation vary.

4.1 China

For both the government and academia, Chinese society is still exploring what role citizens can play in the fight against climate change. The white paper "China's Policies and Actions to Address Climate Change (《中国应对气候变化的政策与行动》)" published in October 2021 mentions that China's response to climate change is "people-centred" and takes fully into account "people's aspirations for a better life and their expectations for a better environment". This white paper has been published annually since 2008, and almost every year a chapter has been devoted to emphasizing the public participation of Chinese society in addressing climate change. "Strengthened government leadership, increasing social awareness and public participation" is the main feature of the activities summarized in these chapters.

At the institutional and legal levels, the Chinese government is actively promoting the construction of a legitimate social action system for all people to participate in environmental protection (including energy transition and climate action) through the formulation of guiding opinions and normative documents. A policy issued by the MEE in 2010 supports the involvement of non-profit social organisations in environmental governance, while another guideline published by MEE in 2014 made it clear for the first time that a sound public participation mechanism for environmental protection should be established to encourage the general public to participate in environmental governance. In 2015, the amended Environmental Protection Law stipulated the principle of public participation, while in the same year, the Measures for Public Participation in Environmental Protection set out in detail the procedures for public participation in environmental protection.[8]

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[8] This is based on a policy summary made in the MEE's response to the opinion on whether Chinese environmental social organizations are involved in environmental governance, https://www.mee.gov.cn/hdjl/hfhz/201603/t20160315_332892.shtml.

These laws and policies have paved the way for environmental non-governmental organisations (NGOs) to engage in climate activities in China. Currently, environmental NGOs are an important player in Chinese civil society's engagement with climate change. Taking one milestone as an example: the locally based "China Civil Society Group on Climate Change (中国公民社会应对气候变化小组)" was established in 2007, led by seven civil society organisations.[9] They jointly published the "2009 China Civil Society Position on Climate Change (《2009 中国公民社会应对气候变化立场》)" in 2009, and the achievement was recognised in the 2010 version of China's Policies and Actions to Address Climate Change as a spontaneous climate initiative by local NGOs. NGOs have formed a partnership with the government in addressing climate change and joined global climate negotiations. However, in an overall challenging and top-down dominated political environment, the space for NGOs to engage in campaigns such as lobbying remains limited, especially for those organisations that lack a government-backed background. In addition to the lack of funding, intellectual support and management, they also face a society where perceptions and awareness of climate change are still evolving (Liu et al., 2020).

Another evidence of civil society involvement in energy and climate governance is the think tanks. China has seen a boom in the development of think tanks in the field of climate change as a result of China's identification of a "new type of think tanks with special characteristics" as a national strategy in 2015 (State Council, 2015) and the rise of energy and climate issues. In addition to environmental NGOs acting as think tanks and think tanks transformed from government organs, there has been an impressive development of climate change think tanks set up by academic institutes and universities, such as the Institute of Climate Change and Sustainable Development, Tsinghua University (清华大学气候变化与可持续发展研究 and the Institute of Energy, Peking University (北京大学能源研究院) (Liu, 2021).

Despite their late start, these think tanks are playing an increasingly important role in China's climate policy-making and climate communication to the public today: for example, the Institute of Climate Change and Sustainable Development, Tsinghua University released a forward-looking report, namely "China's Long-term Low-carbon Development Strategies and Pathways" last year with important policy implications for the achievement of China's carbon neutrality pledge, the formulation of the 14th Five-year Plan, and the updates on China's 2030 Nationally Determined Contributions (Ma, 2020) However, the development of think tanks is a long-term project since they are expected to undertake the mission of knowledge empowerment for government, media, NGOs, and the public. It is supposed to take a long time for China's climate and energy-related think tanks to become a bridge between these actors (Liu, 2021).

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[9] The seven NGOs are namely Chinese branches of Friends of Nature, Beijing Global Village, Green Earth Volunteers, Institute of Public and Environmental Affairs, Greenpeace, Oxfam, and ActionAid, https://blog.sciencenet.cn/home.php?mod=space&uid=475&do=blog&quickforward=1&id=271542

The participation of NGOs and the emergence of think tanks do not clearly answer the question of how individuals as social atoms, or the wider public, can directly participate in energy and climate governance without relying on agents such as government-approved social organizations, and what legitimate channels are available for them to express their opinions. If a more inclusive carbon-neutral pathway is to be achieved in China, these issues may need to be addressed.

4.2 The EU

The ambitious European Green Deal not only emphasises that all sectors in all countries will be part of the green transition, so "leaving no one behind", but also stresses that "everyone can contribute to finding solutions" (European Commission, 2021). The European Climate Pact launched in March 2020 sets out a concrete roadmap for action on this vision.

The European Climate Pact aims to provide an inclusive platform for people to share information and knowledge, develop and promote solutions to climate change and give a voice to citizens and stakeholders. A Secretariat under the leadership of the European Commission will assist the Commission with the implementation. The European Climate Pact focuses on spreading awareness and supporting action. In terms of spreading awareness, the European Commission will establish the role of Climate Pact Ambassador, translate science-based information into practical climate action for the benefit of communities, integrate climate knowledge into the education system, combat climate disinformation, develop online and in-person climate activities to strengthen collective climate consensus, and include vulnerable groups and regions in climate activities. Climate actions under 'The European Climate Pact' aim to involve individuals and organisations who are empowered to launch their climate initiatives and pledges or join others' initiatives through an online platform. Meanwhile, digital technologies and the contribution of young people are additionally advocated (European Commission, 2021). The creation of this platform has been able to stimulate more inclusive discussions and debates on energy and climate, however, respondents are also urging that the platform can become an umbrella for local climate pacts, to scale up successful local practices, and to focus more on local initiatives and engagement (EUROCITIES, 2020).

Apart from the newly developed Pact, as early as 2008, a network for climate action was started between EU Member States through the New Covenant of Mayors, which brings together thousands of European cities committed to action to support the implementation of the EU's target to reduce greenhouse gas emissions by 55% by 2030, and by 2050 builds a fairer, climate-neutral Europe for all. The New Covenant of Mayors aspires to build a network that engages citizens, businesses, academics and all levels of government while connecting with mayors and local leaders in Europe and beyond. The New Covenant of Mayors' daily activities includes a wide range of workshops, discussion meetings, citizen voice platforms, etc. It continues to operate after the European Climate Pact was implemented.

In addition to citizen engagement on climate at the EU level, member countries' governments are also actively promoting citizen engagement on the climate agenda. Citizens' Assemblies are an increasingly

popular format, such as Ireland's Citizens' Assembly on Climate Change, which started in 2017, and the Citizens Convention for Climate in France initiated in 2018. They can represent the wider general public and bring them together to debate, draft proposals and vote on climate issues of concern. Citizens' Assemblies establish a formal process to encourage citizens' climate participation, but whether the public opinion they convey can be incorporated into political decisions depends on the attitude of decision-makers (Colli, 2021).

4.3 The US

While the US federal government under Trump's tenure has been absent from the collective efforts of the global climate community and energy transition, a number of energy and climate-relevant proposals promoting an inclusive clean transition have still emerged from within the US. The House Select Committee on the Climate Crisis was established by the House of Representatives in 2019 to make policy recommendations to the US Congress to reduce pollution and address the climate crisis. In June 2020, the Committee presented its final proposal to Congress: 'Solving the Climate Crisis: The Congressional Action Plan for a Clean Energy Economy and a Healthy and Just America'. Creating a climate solution with equity and justice at its heart is one of the core elements of the proposal - keywords such as "public participation", "engagement", "inclusion" and "community" appear frequently throughout the 500-page report. And it argues that expanded, broad-based public consultation is necessary for policy development related to the climate and energy transition. For example, in the section "Build the Capacity of Organizations and Communities Working Toward Environmental Justice", the Committee recommended that Congress provide more funding and training to "build the capacity of non-profit organizations and community leaders in environmental justice communities" (House Select Committee on the Climate Crisis, 2020).

Climate change and the clean energy transition were hot topics in the 2020 presidential election, with then-Democratic nominee Joe Biden releasing his $1.7 trillion clean energy revolution and environmental justice plan in June 2019, which referred to the need for "every American can participate in the clean energy economy", while "all agencies to engage in community-driven approaches to develop solutions for environmental injustices affecting communities of colour, low-income, and indigenous communities". Since coming to power, President Biden has been doing his best to reverse the deregulation of the environmental screening and abandonment of inclusion that developed under the Trump administration, and there is also a significant re-emergence of public participation in the content of policymaking at the domestic level concerning climate, environmental justice and energy transition issues. In numerous new executive directives, the Biden administration proposes to make stakeholder participation an important part of decision-making by the authorities. For example, an Office of Public Participation under the Federal Energy Regulatory Commission was proposed to create for the first time, and this office aims to increase the engagement of landowners and communities affected by infrastructure development, environmental justice communities and tribal interests, as well as ordinary energy consumers and consumer advocates (Vizcarra, Perls, 2021).

At the same time, the breadth and depth of sub-national climate actions in the US have been increasing over the past years, with sub-national actors (including states, cities and businesses) making significant climate commitments accounting for approximately 70% of US GDP (Hultman, Gross, 2021). Civil society groups have played an important role in the development of climate commitments by these sub-national actors. Take Charlotte, North Carolina as an instance. In the Charlotte Future 2040 Comprehensive Plan, which is a long-term plan that guides the city's investments and developments in the coming 20 years, the city used Community Conversations to gather the public's voice to inform policy development, as well as organising a variety of events such as virtual reality demonstrations, information sessions, neighbourhood meetings and "Becoming an Ambassador" to ensure residents are integrated into the Plan. In addition, the City of Charlotte also works with partners and community leaders to promote equity and inclusion and expects to reach out to the 1% of the population through face-to-face meetings over a two-year process to develop a shared vision for Charlotte's future (García, Khandke, 2019).

5. Conclusions

China, the EU and the US have all made over-arching climate action pledges. To make sure that these top-level commitments can be achieved, they need to be implemented effectively at the middle admin-unit level, such as provinces in China, Member States in the EU and states in the US. This paper argues that middle admin-level policies and the governance model play an important role in determining the effectiveness of decarbonisation policies. It is thus imperative to put more emphasis on analysing the multi-level governance model, in addition to national or supra-national level targets and policies.

By analysing the polities and politics of climate and energy multi-level governance within the three blocs, the paper highlights the difference between the role of target responsibility and cadre evaluation mechanism embedded in the Five-year Planning in China, and by contrast, the dominant role of legislation in the EU and the US. Comparing these two multi-level governance models, there are certain advantages of the target responsibility system, such as more flexibility and effectiveness in policy implementation. However, the target responsibility system might incentivise bureaucrats to optimize for performance, sometimes sacrificing the well-being of the citizens, or incentivising local governments to fake statistical numbers.

The next natural question to be asked is: given the difference in their multi-level governance models, which bloc is the most effective and efficient in decarbonising their economy and reaching their respective climate goals. On the one hand, it is still early to reach a conclusion or even give a comprehensive comparison on the progress so far. The European Union established the goal to reduce GHG emissions by 15% in 2010 compared to the 1990 level in preparation for the Kyoto COP in 1997. The latest Green Deal with a long-term carbon neutral goal in 2050 was first brought forward only two years ago in 2019, and the European Climate Law was passed in 2021. Similarly, although China already established the Leading Group for Climate Change, Energy Conservation and Emissions Reduction in 2007, the overarching "Dual Carbon Goals" was only voiced in 2020. The latest US climate goal was set by the Biden Administration in 2021. In short, it is too soon to assess the progress of three blocs' long-term

emission reduction targets. On the other hand, plenty of literature has compared the effectiveness of certain climate policies in the three blocs. For example, Zhang, M (2017) compared the carbon emission trading schemes (ETS) in the EU and China, by comparing specific design aspects of the ETS such as cap determination, the coverage, allocation methods, trading participants and allowance category etc. However, the article was not able to identify which ETS is better or worse due to the difference in the two countries' political and economic status as well as the development stage of the ETS. Compston (2014) compared the climate policy strength in six economies: China, the US, the EU, India, Russia, and Japan. The article chose six key policy instruments: carbon taxes, emissions trading, feed-in tariffs, renewable energy quotas, fossil fuel power plant bans, and vehicle emissions standards. It was found that each economy leads in one or more areas, challenging the belief that anyone economy or governance system has a clear advantage over the others in all areas in climate policies. Another article from the World Economic Forum intended to compare the climate action between the US and China based on two criteria: investment in clean energy and innovation capacity. The difficulties in comparing climate policy effectiveness are two folds. First, one can only compare certain specific climate policy instruments as proxies, and the choice is arbitrary. Secondly, it remains debatable whether the effectiveness should be based on absolute carbon emission, emission per capita or energy intensity. Another question is the choice of baseline year and whether historical emission should be taken into account. These criteria have implications, considering China has a much larger population base and is still in the stage of rapid urbanization and high economic growth. In conclusion, it is difficult to assess which countries' climate policy is more effective, and thus difficult to conclude which multi-level climate governance model is better.

Nevertheless, it is safe to say that all three economies can draw valuable lessons from the governance model in the other regions. For example, China can and has already embarked on a journey to strengthen its environmental legislation and litigation system. The development of Environmental NGOs (ENGOs) has drawn the attention of worldwide scholars, especially their role in environmental public interest lawsuits to monitor polluters and enforce environmental laws at local and provincial levels(Wilson, 2016) (Matsuzawa, 2012). Similarly, China can strengthen civil society participation in its climate action. Participation is not only a democratic right that contributes to policy ownership and credibility, but also enhances capacity building. Moreover, the inclusion of different stakeholders and perspectives from different social groups is beneficial to developing and implementing policies that take everybody's concerns into account and guarantee a just transition. Due to distinct developmental stages of respective civil societies, public participation plays different roles in energy and climate governance in China, the EU, and the US, and the depth and impact of participation vary. On the other hand, it is worth questioning whether the US and the EU can learn from China's Five-Year Planning in that it creates long-term and stable policy expectations that give the private sector incentives to transform their business model or double down green investments.

By analysing the "polities" and "politics", this paper sheds light on the features, differences and similarities between the EU, US and China in the top-down and bottom-up decision-making process for climate policy, the central-local mechanism to ensure implementation of its policies, and citizens' participation in the multi-level governance in these three blocs. It remains too early and difficult to draw the conclusion which governance model is the most effective, but all three economies' multi-level climate and energy governance models are tailored to suit their respective cultural, social and economic development status, and each has something to learn from the other two.

REFERENCES

Cao, M., & Zhang, T. (2020, May 22). 气候变化立法工作进展及建议.

http://www.zhhjw.org/a/qkzz/zzml/202004/fmbd/2020/0522/7477.html

China's new NDC - E3G responds. (2021, October 28). E3G. https://www.e3g.org/news/china-s-new-ndc-e3g-responds/

Cohen, S. (2018, July 16). The State and Local Role in Protecting America's Environment. State of the Planet. https://news.climate.columbia.edu/2018/07/16/state-local-role-protecting-americas-environment/

Colli, F. (2021). A transition for the citizens?: Ensuring public participation in the European Green Deal. Egmont Institute. http://www.jstor.org/stable/resrep30276

Compston, H., & Bailey, I. (2016). Climate policy strength compared: China, the US, the EU, India, Russia, and Japan. Climate Policy, 16(2), 145-164.

EU economy and society to meet climate ambitions. (2021, July 14). [Text]. European Commission - European Commission. https://ec.europa.eu/commission/presscorner/detail/en/IP_21_3541

EU Commission (2021, July 14), COM(2021) 550 final, 'Fit for 55': delivering the EU's 2030 Climate Target on the way to climate neutrality https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52021DC0550&from=EN

European Commission. (2021). European Climate Pact. https://ec.europa.eu/clima/eu-action/european-green-deal/european-climate-pact_en#ecl-inpage-645

EUROCITIES. (2020, May 14). EUROCITIES reaction to the European Climate Pact – Eurocities. https://eurocities.eu/latest/eurocities-reaction-to-the-european-climate-pact/

EPA (2021 August 10), Regulations for Emissions from Vehicles and Engines, https://www.epa.gov/regulations-emissions-vehicles-and-engines/proposed-rule-revise-existing-national-ghg-emissions

Fishman, D. (2021, September 28). The three causes of China's power outages. SupChina. https://supchina.com/2021/09/28/the-three-causes-of-chinas-power-outages/

Froggatt, A., & Quiggin, D. (2021). China, EU and US cooperation on climate and energy. 33.

Fues, T., & Liu, Y. (Eds.). (2011). Global governance and building a harmonious world: A comparison of European and Chinese concepts for international affairs. Deutsches Institut für Entwicklungspolitik in cooperation with China Institute of International Studies.

García, I., & Khandke, D. (2019). Cities and civil society as allies for the energy transition in the EU and US - Energy Cities. https://energy-cities.eu/publication/cities-and-civil-society-as-allies-for-the-energy-transition-in-the-eu-and-us/

Gong, X., Liu, Y., & Sun, T. (2020). Evaluating Climate Change Governance Using the "Polity–Policy–Politics" Framework: A Comparative Study of China and the United States. Sustainability, 12(16), 6403. https://doi.org/10.3390/su12166403

Holden, E., & Mulkern, A. C. (n.d.). Trump Ignites Climate Pledges with Paris Withdrawal. Scientific American. Retrieved December 5, 2021, from https://www.scientificamerican.com/article/trump-ignites-climate-pledges-with-paris-withdrawal/

Hultman, N., & Gross, S. (2021, March 1). How the United States can return to credible climate leadership. https://www.brookings.edu/research/us-action-is-the-lynchpin-for-successful-international-climate-policy-in-2021/

House Select Committee on Climate Crisis. (2020). Solving the Climate Crisis: The Congressional Action Plan for a Clean Energy Economy and a Healthy and Just America. https://climatecrisis.house.gov/sites/climatecrisis.house.gov/files/Climate%20Crisis%20Action%20Plan.pdf

Li J. (2017, December 22). 什么导致了 2017 年"气荒"？. China Dialogue.

https://chinadialogue.net/zh/4/43861/

Li, Z. (2013). 当代中国的中央与地方关系：趋势、过程及其对政策执行的影响.pdf (Vol. 30, page 177-190). Public Administration and Development.

Liu, L., Wang, B., & Wu, T. (2020, November 18). 非政府组织在中国气候治理中的角色-发展研究院. https://fzyjy.swufe.edu.cn/info/1094/2294.htm

Liu, Y. (2021, September 1). 【智库研究】我国智库在气候传播中的角色定位与行动策略_中国网. http://www.china.com.cn/opinion/think/2021-09/01/content_77727293.htm

Lv, J., & Tang, X. (2018). "碎片化"还是"耦合" 五年规划视角下的央地目标治理 (Vol 4). 《管理世界》.

Noussan, M., Hafner, M., Campbell, L., Lu, X., Raimondi, P. P., & Zhu, E. (2021). Towards the decarbonization of the power sector – a comparison of China, the EU and the US based on historical data. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.3941000

Matsuzawa, S. (2012). Citizen environmental activism in China: Legitimacy, alliances, and rights-based discourses. ASIANetwork Exchange, 19(2).

Ma, T. (2020, October 13). Researchers unveil roadmap for a carbon neutral China by 2060. https://chinadialogue.net/en/climate/researchers-unveil-roadmap-for-a-carbon-neutral-china-by-2060/

Qi, Y., Dong, W., Dong, C., & Huang, C. (2019). Understanding institutional barriers for wind curtailment in China. Renewable and Sustainable Energy Reviews, 105, 476–486. https://doi.org/10.1016/j.rser.2019.01.061

Ren, B. (2018). 地方政府环境政策执行的激励机制研究：基于中央与地方关系的视角.pdf. Chinese Public Administration.

State Council. (2019). 国务院办公厅关于调整国家应对气候变化及节能减排工作领导小组组成人员的通知（国办函〔2019〕99号）. http://www.gov.cn/zhengce/content/2019-10/12/content_5438830.htm

State Council. (2015). 中共中央办公厅、国务院办公厅印发《关于加强中国特色新型智库建设的意见》_滚动新闻_中国政府网. http://www.gov.cn/xinwen/2015-01/20/content_2807126.htm

Szapiro, M., & Kaeding, M. (2013). The European Commission: A Practical Guide. What is it, what it does, and how it does it.

Sprain. (2017). Paradoxes of Public Participation in Climate Change Governance. The Good Society, 25(1), 62. https://doi.org/10.5325/goodsociety.25.1.0062

Tan, X., & Lee, H. (2017, February). Comparative Assessment of China and U.S. Policies to Meet Climate Change Targets. Belfer Center for Science and International Affairs. https://www.belfercenter.org/publication/comparative-assessment-china-and-us-policies-meet-climate-change-targets

The Landscape of Climate Finance in the United States. (2021, March 18). Climate Policy Initiative. https://www.climatepolicyinitiative.org/the-landscape-of-climate-finance-in-the-united-states/

U.S. Climate Change Policy. (2021). Congressional Research Service. https://crsreports.congress.gov/product/pdf/R/R46947

Vogler, J. (2009). Climate change and EU foreign policy: The negotiation of burden sharing. International Politics, 46(4), 469–490. https://doi.org/10.1057/ip.2009.9

Vizcarra, H., & Perls, H. (2021, May 11). Biden's First 100 Days of Climate Action—Report—EELP - Harvard Law School. http://eelp.law.harvard.edu/wp-content/uploads/Bidens-First-100-Days-FINAL.pdf

Wang, A. (2012). The Search for Sustainable Legitimacy: Environmental Law and Bureaucracy in China. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.2128167

Wingender, P. (2018). Intergovernmental Fiscal Reform in China. IMF Working Papers, 18(88), 1. https://doi.org/10.5089/9781484351109.001

Wilson, S. (2016). Environmental participation in the shadow of the Chinese state. Economic and Political Studies, 4(3), 211-237.

Xiong, L., Shen, B., Qi, S., Price, L., & Ye, B. (2017). The allowance mechanism of China's carbon trading pilots: A comparative analysis with schemes in EU and California. Applied Energy, 185, 1849–1859. https://doi.org/10.1016/j.apenergy.2016.01.064

Ye J. (2015, August 18). 七省份万余企业停产 "阅兵蓝"能否刷新"APEC 蓝"？. JieMian. https://www.jiemian.com/article/355854.html

You, X. (2021, June 3). Explainer: China creates new 'leaders group' to help deliver its climate goals. Carbon Brief. https://www.carbonbrief.org/explainer-china-creates-new-leaders-group-to-help-deliver-its-climate-goals

Young, O. R., Guttman, D., Qi, Y., Bachus, K., Belis, D., Cheng, H., Lin, A., Schreifels, J., Van Eynde, S., Wang, Y., Wu, L., Yan, Y., Yu, A., Zaelke, D., Zhang, B., Zhang, S., Zhao, X., & Zhu, X. (2015). Institutionalized governance processes: Comparing environmental problem solving in China and the United States. Global Environmental Change, 31, 163–173. https://doi.org/10.1016/j.gloenvcha.2015.01.010

Zhang, M., Liu, Y., & Su, Y. (2017). Comparison of Carbon Emission Trading Schemes in the European Union and China. Climate, 5(3), 70. https://doi.org/10.3390/cli5030070

Zhang, P., Yu, T., Lu, S., & Huang, R. (2021). How Does Target-Based Performance Evaluation Affect the Accuracy of Energy-Saving Data: Evidence From China. Frontiers in Energy Research, 9, 323. https://doi.org/10.3389/fenrg.2021.704317

Zhang, M., Liu, Y., & Su, Y. (2017). Comparison of carbon emission trading schemes in the European Union and China. Climate, 5(3), 70.

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