

## US AND EU INDUSTRIAL POLICY INSTRUMENTS TO FOSTER CORPORATE INVESTMENTS IN CLEAN TECHNOLOGY

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**Abstract:** After many years of a horizontal approach to industrial policy, the new issues such as supply chains distortions, energy crisis and climate change, provoke the two world economic leaders, the United States (US) and the European Union (EU), to shift their instruments towards sectoral. The policies are aimed at addressing two long-term problems: dependence on imports from insecure/unstable third countries and of increasing climate change. The objective of the paper is to identify differences in selected interventionist instruments of US and EU industrial policies in the face of continued climate transformation. By identifying the different measures applied by both leading countries, we point out that the industrial policy pursued by the US and the EU has changed its focus from strengthening competitiveness to creating a green economy. Identifying the scientific sources of validity and effects of the application of different industrial policy instruments in the US and the EU to foster corporate investments in clean technology, we analyse the measures introduced by their legal acts and strategic documents. We confronted them with concepts of the traditional theories of industrial policies. The study recognizes new approach to the objectives of industrial policy (environmental goals) in both countries, as relevant to companies and economies in the context of creating green technologies. However, the instruments are different for the two most important economies in the world - the measures introduced in the EU are far less interventionist compared to the tools in the US. The EU industrial policy should ensure a level playing field within the European Single Market. It remains an open question as to whether the green economy will ever make companies more competitive or whether it will always just mean higher operating costs.

Keywords: industrial policy, clean technology, net-zero technology, interventionism, subsidy

JEL codes: O14, O25, O51, P18

### INTRODUCTION

Climate change has forced action by the major players in international trade, including the European Union and the United States. The EU has always had an environmental strategy, but more recently, a pro-climate policy has dominated much of the work. These solutions are not adopted in isolation from international commitments, including consecutive UN Climate Change Conferences. The US, with some delay, has also taken steps to encourage companies to invest in green technologies. This is commanded by the policy goal to make the US economy zero-carbon by 2050. This approach is in line

with the EU's position, with the European Council several years earlier endorsing the goal of the EU becoming climate neutral by 2050, in accordance with the goals of the Paris Agreement (European Council, 2019).

The main initiative currently underway in the EU is the so-called Green Deal, i.e. a set of non-legislative and legislative initiatives to align EU economic and social policies to reduce greenhouse gas emissions by at least 55% by 2030 compared to 1990. On the US side, by contrast, greenhouse gas emissions were assumed to halve from 2005 levels by 2030, and electricity generation was assumed to be zero-emission in 2035 (The White House, 2023). Hence, the sudden turn of the US towards initiatives to reduce the negative impact of greenhouse gas emissions should cause rejoicing in a frontrunner like the EU. However, this has not been the case, as many of the solutions proposed in the US have been found to contravene WTO regulations.

In addition, the speed of the economy greening of both partners was undoubtedly influenced by the two crises: the COVID-19 pandemic and the war in Ukraine. It is worth noting that Russia's military aggression against Ukraine, has significantly affected the operation of businesses in the European Single Market. The resulting energy crisis has imposed on the one hand, measures to diversify external suppliers and, on the other hand, to accelerate previously taken measures to develop renewable energy sources, which together should ensure energy independence from uncertain suppliers from the East. To limit the negative effects of the sudden increase in energy prices in the EU, a special legal framework was adopted, making the existing criteria for granting state aid more flexible (European Commission, 2022).

Simultaneously to the aforementioned problems arising from the energy crisis, the EU faced a challenge thrown up by the United States of America. At the beginning of 2023, the US introduced the Inflation Reduction Act (IRA). Since 2021, this is the third set of legislation designed to increase the US economy's competitiveness. Despite its name, the IRA has little to do with anti-inflation policy. Instead, it is more alike legislation that supports investments, the environment, and, in many cases, is a continuation of the 2020 laws that were implemented with the goal of boosting the US economy in the aftermath of the epidemic. Among other things, it has a toolset to help companies with clean technology adoption, greenhouse gas emission reduction, and the development of renewable energy. Moreover, IRA significantly affects investments in electricity plants (in green energy), resulting in decrease in retail electricity costs (Bistline et al., 2023).

In response to the Inflation Reduction Act, the European Commission adopted a revised Temporary Crisis and Transition Framework (TCTF) (European Commission, 2023b) that makes the rules for investment aid to clean technology industries significantly more flexible, in combination with the draft

regulation on strengthening the ecosystem of zero carbon industries (*Net Zero Industry Act - NZIA*) (Regulation, 2024).

Examining potential interactions between recently introduced regulations on governmental subsidies to businesses in the US and the UE becomes necessary considering their shifting views on public interventionism, which has led to the establishing circumstances of public subsidies in the US and relaxing of previously restrictive rules for supporting domestic entrepreneurs in the EU. Therefore, the purpose of this article is to identify similarities and differences in industrial policy instruments proposed by the US and the EU to encourage corporate investments in clean technology. To this end, we have carried out an in-depth comparative analysis of the strategic policy documents and key legislation on industrial policy of both world economic leaders indicating their environmental objectives. Due to the data limitations on the implementation of the new instruments, we focused on capturing the concepts of the two policies and the main demand- and supply-side measures. The scarcity of scientific publications so far about differences after industrial policy approaches hinders an in-depth discussion of the results in the light of the existing output on the subject.

The article is constructed as follows. At the beginning a review of the literature was conducted primarily on the evolution of the approach to interventionism and the scope of industrial policy. Existing studies on both the US and the EU initiatives are also listed, but these publications are rather limited due to the short time of their initiation. The following section presents the results of an analysis of the legal basis and policy documents providing for the possibility of more intensive support for entrepreneurs in the US and EU concerning the ongoing climate transition. The study used original legislation and policy documents prepared by the EU institutions and the US administration. Next, there is the discussion based on publications on interventionism and the conduct of contemporary industrial policy. The study concludes with recommendations for policymakers and an indication of the area for further research.

## **LITERATURE REVIEW**

Over the past few years, industrial policy has been more prominent in public debate. The reason for this renewed interest is that governments are searching for practical tools and approaches to deal with the consequences of several growing crises, such as the COVID-19 pandemic and related supply disruptions, slow growth following the financial crisis, and rising geopolitical tensions and conflicts. Moreover, governments must deal with unfulfilled public demands for measures related to adaptation and mitigation of climate change.

The neoliberal era of the late 20th century, as market-oriented policies driven by, was characterized by a diminished role for industrial policy in many developed economies, as market forces were expected to drive industrial growth and innovation (Shapiro 2007; Rodrik, 2007; Lin,

2010). Nevertheless, the impact of industrial policy on economic development has already been a subject of considerable empirical analysis (Hirschman, 1958; Arndt, 1987; Suzigan & Furtado, 2006; Cimoni et al., 2009; Robinson, 2010;).

While proponents argue that targeted interventions can promote strategic industries, foster technological innovation, and create employment opportunities (Krugman, 1987; Tommaso et al., 2017; Aghion, Boulanger, Cohen, 2011; Lin, 2012). On the other hand, the critics raise concerns about market distortions, rent-seeking behaviour, and inefficiencies associated with government intervention (Krueger, 1990. Altenburg & Lütkenhorst, 2015; Bailey & Cowling, 2006.).

As Aiginger & Ketels (2024) observed, in recent years challenges deriving from economic development, as well as from external shocks increased the pressure on policy makers to respond in more directed ways. Reducing production costs by looking for ever cheaper places to manufacture finished goods and their components or raw materials has led to, on the one hand, globalization and the lengthening of production and value chains, and, on the other hand, a heavy reliance and dependence on third-country suppliers. In the face of successive external shocks triggered by both the COVID-19 pandemic and the war in Ukraine, there are increasing calls in developed countries for a more active and assertive industrial policy. At this same time, there is a distinct shift in the goals functioning for industrial policy towards broader societal goals, instead of competitiveness in more developed economies and a job creation in emerging countries. Parallely to changes in a concept of industrial policy, the green economy concept has arrived, as an alternative to the development of global business. The term “green economy” was introduced in the Report addressing the role of economics in strengthening environmental policy and sustainable development (Pearce et al., 1989). Since that time, the green economy issues have mainly appeared in UN agendas, European Union environmental programmes, and was the theme of the Earth Summit held in Rio de Janeiro in 2012.

This notion fits into the broader idea of sustainable development, pursued at both the macro and micro scales. The long-term trend of diminishing resources and rising energy and raw material prices is obvious. Therefore, the economic calculation (pursuit of profit) should consider concern for the natural environment and thus the external effects of business and reflect essential factors like clean air and water, species diversity, and social and generational equity. The linkages among economic growth, environmental degradation, and social inequity emphasize the need to move beyond traditional economic models based solely on GDP growth and instead focus on indicators that account for environmental and social well-being (Daly & Farley, 2004), while a green economy is an economy that increases human well-being and social equity while reducing environmental risks and resource scarcity.

The concept of new industrial policy amounts to intervening in the economy not only through regulatory but also financial instruments. Environmental goals, including moving away from fossil fuels, cannot be met by relying solely on market forces or traditional environmental pollution policies (such as price and/or regulations) (Jenkins et al., 2022). This comes at a time of increased pro-environmental movements seeing further problems for societies in the climate change. As a result, the term green industrial policy is increasingly being used (Allan et al., 2021; Hallegate et al., 2013; Karp & Stevenson, 2012; Rodrik, 2014; Tagliapietra & Veugelers, 2020).

Hence, we can now see the building of strategies to support clean tech sectors within new industrial policy. All clean technology become affordable as part of a climate industrial strategy. The less political will require to remove obstacles, the more affordable climate action is. The good news is that costs of batteries, solar, and wind power has dropped significantly during the last decade: around 90% for solar and batteries, and 70% for wind power. Thus, the administration is putting in place several incentives to quicken the pace of cost-cutting and lower the price of all the technologies needed to achieve net-zero economic growth by 2050, such as advanced nuclear and geothermal energy, clean hydrogen, and long-duration energy storage.

The prior review of legal and strategic documents issued by the US and the EU allowed to assume the following research hypothesis: H: The external shocks (COVID-19 pandemic and war in Ukraine) trigger the US and the EU to reshape their industrial policy, including state interventions in the market. Due to ongoing energy transformation, those measures were directed to support the clean tech investments to tackle climate change.

## RESULTS

### *American approach*

The United States earlier than the EU proposed legal solutions for support to produce clean technologies. Indeed, the IRA introduced funding programs in the form of grants and tax credits directly aimed at boosting the economy through domestic production of clean energy technologies (Bistline et al., 2023). To this end, the Energy Infrastructure Reinvestment Financing program was set up, with a budget of \$5 billion in direct subsidies on loans totalling \$250 billion to modify or replace energy infrastructure to reduce greenhouse gases.

In addition to *stricte* infrastructure measures, the US legislation provides support in the form of tax credits for advanced energy investment projects - the establishment, expansion, or equipping of energy production facilities and related to equipment and components for grid upgrades. As a result, the greenhouse gas emissions of the mentioned plants should fall by at least 20% until 2031.

A separate industry envisaged for support under this scheme is the production of electric, hybrid vehicles weighing less than 14,000 lbs (6 tonnes), and fuel cell-powered vehicles, as well as the associated charging infrastructure. The condition for tax credit is at least 40% of the capital expenditure is allocated to projects in regions where a coal mine or coal-fired power plant has closed. The above measures are to be implemented under the Advanced Energy Project Credit Programme, for which \$10 billion has been earmarked.

Investments by critical materials processing or recycling facilities are also eligible for this tax credit to support the production of clean technologies. The basic amount of the credit is 6% of eligible costs and can be increased to 30% in the case of wage guarantees (wage rule). This tool is a continuation of the support introduced by the American Recovery and Reinvestment Act of 2009, which provided \$2.3 billion for this purpose. This has now more than quadrupled to \$10bn under the IRA Act.

It is noteworthy that the provisions of the IRA Act introduce special support for selected new technology industries at the level of supply of raw materials, production components as well as final products. Firstly, it is about the application of the tax credit in question for plants producing domestic components for solar energy (thin-film and crystalline photovoltaic cells, wafers, modules, panels) and wind energy (windmill blades, nacelles [turbine drive train housing], windmill towers, offshore windmill bases, offshore wind energy vessels)<sup>1</sup>.

In addition, the IRA provides support in the form of a tax credit of 10% of production costs for producers of critical minerals used in the manufacture of the aforementioned renewable energy-related equipment (metals and semi-metals): aluminium, antimony, barite, beryllium, cerium, caesium, chromium, cobalt, dysprosium, europium, fluor spar, gadolinium, germanium, graphite, indium, lithium, manganese, neodymium, nickel, niobium, tellurium, tin, tungsten, vanadium, yttrium and others<sup>2</sup>. According to the IRA, the minerals listed must be produced in the United States<sup>3</sup>.

Thirdly, the Inflation Reduction Act, under the *Advanced Manufacturing Production Credit* program, introduces a tax credit for domestic component manufacturers in the supply chain of solar modules, wind turbines, battery cells and modules, and companies that process critical minerals. A separate *Enhanced Use of Defence Production* under IRA is extended to investment projects for new

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<sup>1</sup> For a thin-film photovoltaic cell or crystalline photovoltaic cell, \$0.04 per watt (W) of direct current power; for photovoltaic wafers, \$12 per square metre; for polycrystalline silicon, \$3 per kilogram; for polymer laminate, \$0.40 per square metre; for photovoltaic modules, \$0.07 per watt (W) of direct current power. For components for wind energy production, for vessels - the amount of the tax credit is 10% of the sales price. For other components: \$0.02 for windmill blades, \$0.05 for nacelles, \$0.03 for towers, \$0.02 for fixed platforms and \$0.04 for floating platforms (based on: <https://www.idsupra.com/legalnews/the-ira-s-transformative-tax-incentives-4082010/> (access: 14.02.2023).

<sup>2</sup> In October 2022, President J. Biden announced a programme called the American Battery Materials Initiative, which aims to secure the supply of so-called 'critical minerals' to produce batteries for electric vehicles. An additional \$7 billion (in addition to the IRA) has been provided for this purpose.

<sup>3</sup> However, this condition may be relaxed as in March 2023. The US and the EU have begun negotiations to allow minerals from EU countries to qualify for tax credits under the US law. In an announcement on 10 March 2023, US President Joe Biden and European Commission President Ursula von der Leyen said the pact would cover materials mined or processed in the EU that are then used to manufacture electric vehicles in the US.

plants producing heat pumps (air or ground source), heat pump water heaters, or components. In this case, subsidies are expected to total \$250 million.

### *European approach*

The EU's political response to the US legislation was the European Council Conclusions of December 2022, in which European leaders underlined "the importance of safeguarding Europe's economic, industrial and technological base and of preserving the global level playing field (...) in the current global context of (...) the green and digital transitions". Therefore, the European Council invited the Commission "to conduct an analysis and to make proposals (...) to mobilize all relevant national and EU tools as well as to improving framework conditions for investment" (European Council, 2022).

As a result, the European Commission presented one policy document and two legal acts. The first was the Green Deal Industrial Plan, which included the concept of targeting industrial change to support the delivery of both climate and digital transformations (European Commission, 2023a). The second was the draft of the Net Zero Industry Act - (NZIA) (Regulation, 2024), aimed to establish a legal framework common to all Member States to ensure access to the supply of net-zero technologies. Firstly, it was proposed to increase the production capacity and ensure the resilience of the supply of cleantech technologies by creating preferential rules for net-zero strategic projects. In this respect, maximum time limits for the issuing of permits were introduced, the establishment of net-zero industry valleys with the support of the necessary infrastructure and administrative services was made possible. Secondly, an expansion of the CO2 capture, injection and storage system was proposed, ensuring an open and fair formula for access. Thirdly, the possibility of public procurement policy is profiled in terms of preference for clean tech technologies. It does not discriminate non-EU suppliers, but some mechanisms have been put in place to limit reliance to single third-country suppliers whose share exceeds 50% of supply. However, this solution does not extend to signatories of the 2012 Government Procurement Agreement (including the US and Japan), but does apply, for example, to Asian countries, including China.

In terms of financial support mechanisms, the NZIA mentions primarily private funds, EIB and EBRD support, relevant EU funding programmes, but also Member State instruments and programmes. It is worth noting that both demand-side and supply-side support is proposed. In the former case, financial compensation of up to 5 % of the final product cost of clean tech is proposed, with the possibility of raising the ceiling to 15 % for citizens living in energy poverty. It is important to emphasize that these programmes have to operate under open and non-discriminatory formula, and include the purchase of products, regardless of their origin, the key condition being the criterion of net-zero technology.

Regarding supply, the NZIA provides for introduced the possibility of granting state aid from national sources to strategic carbon-neutral technology projects to increase the production capacity of the cleantech industry value chain. At the same time, the third document was the Temporary Crisis and Transformation Framework (TCTF) (European Commission, 2023b). As a part of the revision of the 2021 Temporary Crisis Framework (issued to tackle the energy crisis), the Commission emphasized the need for measures that have a direct effect on the production needed for the transition towards a net-zero economy. Consequently, the Commission introduced the possibility of providing state aid for direct investment in net zero technologies manufacturing projects in all EU Member States.

The targeting of public support to the clean-tech industry was considered by the Commission as a financial public intervention due to the occurrence of a market failure. This consisted of the low investment attractiveness, not of the underdeveloped lagging regions, as it was previously, but of the EU as a whole, compared to subsidies offered in other countries around the world (the United States and China). Consequently, the legal basis became Article 107(3)(c) of the Treaty on the Functioning of the EU (TFEU), which states that “aid to facilitate the development of certain economic activities (...) may be authorized, where such aid does not adversely affect trading conditions to an extent contrary to the common interest”. In this case, it was in the common interest to reduce the risk of investment leaks of strategic net-zero industries outside the EU. That appears to have been a direct allusion to protecting the EU market from the damaging effects of Chinese investment support programs and the US IRAs.

According to the TCTF, strategic net-zero industries in investments can be subsidies, including the production of equipment, as well as its key components, and related critical raw materials, for the transition towards a net-zero economy, namely batteries, solar panels, wind turbines, heat-pumps, electrolysers, and equipment for carbon capture usage and storage (CCUS). The aid in question can be granted in the form of direct grants, tax advantages, subsidized interest rates on new loans, or guarantees on new loans. As regards the latter measure, one should ensure that the aid was passed on directly, to the largest extent possible, to the final beneficiaries.

The eligible costs include a wide range of investment costs in tangible (such as land, buildings, plant, equipment, and machinery) and intangible assets (such as patent rights, licenses, know-how, or other intellectual property) required for the production or recovery of the goods as mentioned earlier of strategic net-zero industries. The EU rules also provide for the verification of the occurrence of the so-called incentive effect, consisting in the risk that the entrepreneur would not carry out such an investment at all or not as much as after receiving support.

The Commission has established a maximum aid intensity ceiling to guarantee that state aid, as previously noted, does not distort competition in the EU Single Market: 15% of the eligible costs, and



the total value of the support must not exceed EUR 150 million per company. However, in the case of less developed regions (under Article 107(3)(a) and (c) TFEU), higher ceilings of up to 35% and 20% respectively, and investment limits of EUR 350 million and EUR 200 million were allowed. An additional increase in state aid intensity of 5 p.p. is acceptable, if the aid is granted in the form of tax benefits, loans, or guarantees (thus excluding grants), as well as 20 p.p. for investments by small companies and 10 p.p. for medium-sized companies. The EU laws stipulated that the recipient of the funding must certify that the firm has not relocated in the past two years and would not do so for another two years following the completion of the investment in order to reduce the likelihood of reallocation of investments inside the EU (EEA).

As an extraordinary exception to the above rules, the Commission has provided for the possibility of notifying individual cases of aid where the beneficiary might receive aid in a third country outside the European Economic Area (EEA). In such a situation, the investment would have to be carried out either in the least developed regions 'a' or 'c', as defined in the regional aid maps based on article 107 of the TFEU, or in at least three EEA Member States, with a significant part of the investment being carried out in at least two areas, including regions 'a' as defined in the aforementioned regional aid maps.

## **DISCUSSION**

The rule concerning investment-related financial support for clean technology marks an uncommon shift from EU state aid regulations. Previously, investment support was only allowed in the least developed regions as one of the cohesion instruments within the EU (European Commission, 2021). This was in line with the concept of eliminating market failures based on the need to improve the investment attractiveness of lagging regions in the EU, and the public aid provided was only to compensate for the additional costs that occurred in areas with a low-quality labour force, and poor infrastructure. That aid was primarily available in the Central and Eastern European countries that have joined the EU in 2004 (Ambroziak, 2023). The current extension of the possibility of investment support to the entire EU is dictated by another objectives: to ensure the security of zero-net technology production to reduce dependence on third-country partners, while reducing negative impact on climate in Europe. It is difficult to see that support as a reference to traditional market failures in the face of both awareness of the need for such investment and increasing demand (Bator, 1958). Like the EU in terms of increasing independence and achieving climate goals, public support in the US does not consider market failures. It is focussed on tax credits and subsidies for businesses' capital and operating expenses (often referred to as Capex and Opex). This is very different from earlier the US industrial policy approach, which typically related to capital investment for things like building a factory, updating a production line, or replacing certain pieces of equipment. This time

around, for instance, production subsidies are being implemented, meaning that the amount of the subsidy will depend on the volume of production, as would be the case, for instance, with energy or equipment used in the energy sector.

The experience of COVID-19 state aid revealed that larger and richer EU Member States provided relatively more support as opposed to less wealthy countries. Until the end of 2023, the EU Member States have been quite cautious with state aid, using the possibility of financial support due to the energy crisis much more readily than investment in new technologies. This was mainly due to ongoing negotiations among the Council of the EU and the European Parliament on the Net Zero Industrial Act, which is a framework for strategic projects on net-zero technologies. Hence, the EU Commission, being aware of the potential negative impact on competition within the European Single Market, introduced limitations in terms of supported industries, intensity, and duration of aid. So far, unequivocal interest has been expressed by Spain, Germany, Italy, and Slovakia in preparing aid programs strictly based on the TCTF (Table 1). The substantial German budget is especially notable at this point, which can cause other EU members to worry about maintaining fair competition in the European Single Market.

Table 1. State Aid Schemes for cleantech industry approved by the European Commission under the TCTF by the end of 2023.

Decision	Date of the EC decision	Forms of state aid	Budget	Scope
Spain SA.107094 (2023/N)	11.05.2023	- direct grants - loans	837 million EUR, including: - 550 million EUR in direct grants - 287 million EUR in loans	- Production of batteries and components for EV - Production or recovery of the related critical raw materials
Germany SA.108068 (2023/N)	19.07.2023	- direct grants - tax advantages - subsidised interest rates on new loans - guarantees on new loans	3 000 million EUR	as it is provided by the TCTF
Italy SA.108953 (2023/N)	9.10.2023	- direct grants;	100 million EUR (available through the Recovery and Resilience Facility (RRF))	- Production of electrolysers
Slovakia SA. 109989 92023/N)	14.12.2023	- direct grants, - income tax reliefs - transfers or leases of immovable property for a price below market value	1 000 million EUR	as it is provided by the TCTF

Source: European Commission decisions on State Aid under the TCTF (<https://competition-cases.ec.europa.eu/>, access: 01.01.2024).

As regards the US, scale of public support is incomparable to any industrial aid programmes - neither after the Great Depression nor after the war. The United States Congressional Budget Office and Credit Suisse have assessed that the cost of the subsidies to GDP in 2023—the first year of the Individual Retirement Account—will be between 0.04% and 0.1% of GDP. These might already be 0.1% and 0.3% of GDP in 2023, respectively, based on the aforementioned organizations. Subsidies in

budgetary expenditure alone are projected to reach 1.3% of GDP (Credit Suisse) or 0.4% of GDP (Congressional Budget Office) by 2030.

Table 2. Annual costs of IRA in the US GDP and the US federal budget expenditures.

	SUBSIDIES IN US GDP	SUBSIDIES IN US FEDERAL BUDGET EXPENDITURES
2023	0.04-0.01%	0.2-0.5%
2030	0.1-0.3%	0.4-1.3%

Source: Own collaboration based on the data by Congressional Budget Office and Credit Suisse Bank.

As regards the scope of production eligible for aforementioned state aid under the TCTF in the EU, it is worth noting, that the guidelines do not provide the opportunity to support other strategic net-zero technologies, which are within the scope of the NZIA: for example, sustainable biogas and biomethane technologies and nuclear fission energy technologies. It is conceivable that as the NZIA has been adopted, this list in the Commission's guidelines would be expanded. However, it states in contrary to the Commission's position to limit a relaxation of state aid, as it is extended to only 2025 (European Commission, 2023c).

The scope of the US legislation in low-carbon technologies includes those systems and procedures that lessen the adverse effects on the environment, or what is known as the environmental footprint. These technologies also encompass renewable energy sources as defined by the IRA Act. Thus, the IRA support extends to the development of energy storage and renewable energy, energy-saving technologies, green transportation, improved materials for low-carbon production, low-carbon production processes, and ecologically friendly agriculture and recycling.

Another limitation on the impact on competition in the European Single Market is the ceiling of the intensity of state aid. Some preference can be found here for less developed regions in the form of an increase in the level of aid intensity, but this is still well below the already applicable ceilings of the regional investment state aid in most cohesion countries (Ambroziak, 2023). Consequently, if investments in clean-tech industries were to emerge in these regions, then one would expect them to be covered by normal regional investment aid offering higher levels of support. The problem, however, is that, by their very nature, these investments require not so much subsidies as a highly educated and qualified workforce, which less developed regions usually cannot provide. It is also worth noting that clean-tech support solutions in the EU provide some preference for repayable forms of aid, which are not as popular in lagging regions as subsidies.

It is worth mentioning that EU regulation is therefore only a legal framework that Member States can use to prepare their national support programmes for net-zero technology projects. A different approach was adopted by the US. The US IRA provided specific amounts of subsidies - and so for energy production (from renewable sources): an amount of \$0.015 per kWh (this value can be

increased fivefold if the rule from the Davis-Bacon Act on wages is met<sup>4</sup>), or investments tax credits dependent on the plan establishing year<sup>5</sup>. In addition to these incentives, the IRA additionally provides tax credits for rural and domestic green electricity production, as well as for nuclear, hydrogen and clean fuel (such as natural gas) production. The basic amount of the tax credit is \$0.003 per kWh.

Additionally, the Inflation Reduction Act renames the comparable production tax credits (PTCs) and investment tax credits (ITCs) that were already in place in the US to the Clean Energy PTC and Clean Energy ITC, respectively, and extends them until the end of 2023 and 2024. These policies aim to support low-income populations by incentivizing investment in renewable energy in less developed areas and by offering comparatively attractive compensation for newly created jobs.

The US energy production tax credit (Clean Energy PTC) is intended to cover projects whose construction (development) begins before January 1, 2025. The credit is available to producers of electricity from wind, biomass, geothermal, solar, landfill, hydropower, marine and hydrokinetic renewable energy. The basic amount of the refund is \$0.003 per kW. The relief increases by 5 times for projects that meet the requirements under the Davis-Bacon rule. In addition, the relief increases by 10 p.p. if the production facility is in a region known as an “energy community”<sup>6</sup>.

A fundamental change in the European approach to controlling state aid in the EU is considering the real risk that productive investment will not take place in the EU (EEA) due to higher subsidies in a third country. This is an obvious response to both the US IRA and the Chinese subsidy mechanisms. This implies an additional condition for the Commission to analyse the competitive position not only within the EU but also vis-à-vis third countries. It is left in the hands of the Commission to balance the negative effects on competition in the European Single Market and the positive effects of accepting aid at the level of a non-EU offer. Accordingly, the EU rules provide for the acceptance of such an investment in the EU made in the least developed areas, which should both protect competition and ensure cohesion within the EU. Moreover, the EU legislation currently underway foresees that Member States should jointly work out ways of obtaining investment financing to build cross-border value chains, i.e. the participation of different companies from different Member States. (European Commission, 2023b).

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<sup>4</sup> A rule introduced in the Davis-Bacon Act (in 1931) meaning that employees, working on projects under federal public works contracts in excess of \$2,000, should be paid no less than the locally agreed wage for similar projects.

<sup>5</sup> Plants whose construction commenced in 2022 receive a 10% tax credit, (b) plants whose construction commenced after 31 December 2022 receive a 12.5% tax credit, (c) and for plants built after 31 December 2023 - the relief is 15%.

<sup>6</sup> Based on the IRA, Energy Community is one of three categories: 1) post-industrial site - as defined in certain sections of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA);

(2) statistical area - a metropolitan statistical area (MSA) or non-metropolitan statistical area (non-MSA) that has an unemployment rate at or above the national average for the previous year; and has 0.17% or more of direct employment related to the extraction, processing, transportation or storage of coal, oil or natural gas, or 25% or more of local tax revenues related to the extraction, processing, transportation or storage of coal, oil or natural gas; and 3) coal mine site - a coal mine closed after 1999 or a coal-fired electricity generating unit retired after 2009.

In the case of the US, the local content requirement appears with regards to the mentioned part (Clean Energy PTC). It consists of ensuring that the products used in the construction of the plant (PTC tax credit) (including steel, iron or finished goods are "components of such plant after construction") have been manufactured in the United States. Based on the provisions of the Act, it can be assumed that, for example, power generation equipment must be manufactured in the US. The size of the relief increases when there is a so-called domestic component in the investment. In this case, the increase in relief is 10 p.p. if US-manufactured materials (steel, iron and finished goods used in the construction of the facility) were used in the construction of the facility ("manufactured product which is a component of such facility upon completion of construction")<sup>7</sup>.

## CONCLUSIONS

On the base of our research, we found out that the US and the EU's industrial policies are evolving. It was therefore vital to raise the question of similarities and differences in tools proposed by the US and the EU to encourage corporate investments in clean technology during external shocks and recessions. This is important because both partners were affected by similar problems resulting from the COVID-19 pandemic and the energy crisis caused by the war in Ukraine, which prompted them to intervene in the market, and due to the climate transformation, they were focused on supporting the clean tech market.

The goal of the US and the EU is similar: to make both economies more self-sufficient while simultaneously addressing the energy transition. Grants, tax exemptions, and subsidies for building factories and developing infrastructure should be assessed as a means of lowering the reliance of the US and EU economies on foreign suppliers, particularly regarding components and raw materials. Therefore, it can be said that both US legislation and EU regulation and guidelines explicitly highlight the importance of domestic manufacturing in economic policy, which is supported by the growing supply chain instability. From a non-economic standpoint, the origins of such a policy can be traced to shifting global power dynamics and evolving geopolitical conditions.

However, from an EU standpoint, it is extremely challenging to implement concept, because of the requirement to consider the circumstances of all 27 Member States, something that the US ignores by permitting one state to experience greater economic progress at the expense of another. A formulated statute in the US that permits the assistance of entrepreneurs provides the basis for both the acceptance and the provision of financial assistance. However, things are not the same in the

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<sup>7</sup> The required share of the domestic component increases depending on the commissioning date of the specific investment: a) for a facility whose construction begins before January 1, 2025, it is 40%; b) for a facility whose construction begins between January 1, 2025 and December 31, 2025, it is 45%; c) for a facility whose construction begins after December 31, 2025 and before January 1, 2027, it is 50%, and d) for a facility whose construction begins after December 31, 2026, it is 55%.

European Union, where the fundamental necessity to ensure level playing field for all businesses within the European Single Market is taken into account when developing criteria regarding the admissibility of state aid. The aim of this rule is to minimize distortion of competition within the Union. Following the EU's removal of traditional trade barriers, including physical, technical and fiscal, state aid became the most effective means of factitious altering competitiveness within the EU market. As a result, the final aid measures in each of the Member States are developed and can be granted to entrepreneurs, as they are compatible with the EU state aid law and approved by the European Commission. Therefore, while Industrial Policy and State Aid Policy are in exclusive competence of EU Member States, all provisions of EU regulations or guidelines must be applied. Moreover, such a measure (its presence and amount) depends on national budgets and the will of governments. In addition, the provisions introduced in the EU mean that investment aid (for net-zero technologies) will be available throughout the EU and not only, as was previously the case, in lagging regions. This reduces the investment attractiveness of the latter and consequently negatively affects socio-economic and territorial cohesion in the EU. The consequence could be a distortion of competition within the EU, which is not being highlighted in the US.

Regarding the IRA regulations, its primary goals were to promote investment in local manufacturing capacity, support domestic procurement of essential commodities, and expedite the development and commercialization of cutting-edge, clean energy technology. Measures introduced by the US, including those stimulating demand, clearly favour American producers, discriminating against non-US manufacturers. At the same time, the EU instruments do not contain such criteria, with the result that it may be easier to achieve the climate objectives, but the European industry will not be as protected as it is in the US. Therefore, one can assume that the US legislation has been crafted to guarantee the global operation of the home economy and, consequently, the presence of the US businesses on international markets by establishing notable artificially competitive advantages through, among other things, technological innovations. The status of individual states in intra-US trade is not mentioned in this instance because factors such as socioeconomic issues, degree of economic development, and state-specific differences are not taken into consideration.

As regards implications for policy makers it can be stated that the EU-US relationship is entering yet another subsidy war. This will affect the economies on both sides of the Atlantic far more deeply and intricately than the subsidies to produce wide-body passenger aircraft. After the first shock of the IRA and the previous regulations discussed in this paper, the EU government has given up on forceful and conflict-busting strategies, such as initiating a trade dispute and filing a complaint with the World Trade Organization. Negotiations between the US and the EU, the two heavyweights, aimed to

construct a new trade deal that would give China and Russia a considerably lesser role in the global economy and to establish mutually accepted standards for the allocation of state aid.

Further research on real effects, as only data is available. The question for future research remains whether the green economy will ever make businesses more competitive or whether it will always just mean higher business costs.

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