Rejuvenating Old and New Industrial Policy: The Entrepreneurial State in the Green Tech Race[1]

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The acceleration in the green tech race represents a sprint to invent, produce, and deploy green technologies, as well as a competition for leadership in future strategic industries. The US, EU, and China all play significant roles as framers in this race. The US Inflation Reduction Act (IRA) will invest at least USD 370 billion into clean energy, while the European Commission proposed a *European Union Green Deal Industrial Plan for the Net-Zero Age* to loosen the EU's restrictions on state aid. In 2021, China poured USD 380 billion of public and private investment into clean energy. Other players such as Korea and Japan have also entered with their own strategic plans. These countries are all entrepreneurial innovators in their own right.

This short paper seeks to address several questions: What explains the rapid acceleration of green technologies? How can we assess the developing mix of industrial policies in each country within the green tech race? And what are the implications of this renewed enthusiasm towards (green) industrial policy?

This paper argues/ I argue that the "race to go green" represents a reaffirmation of proactive green entrepreneurial states. This race is no longer dominated by the liberal market, as market fundamentalism is seen as insufficient in delivering a timely green transition to combat climate breakdown and succeed in the time-sensitive technology race. A paradigm shift has occurred: states have shifted from market fundamentalism to state activism, challenging the traditional primacy of the laissez-faire economic model. The nation that emerges victorious in this competition will lead the global economy in the 21st century, and falling behind puts a country at a disadvantage with slim chances of reclaiming a leading position. Thus, countries are now embracing state activism by revitalizing old and new tools of industrial policy to accelerate innovation in green technologies and enhance manufacturing capacity. This competition is not solely about addressing climate breakdown but also about securing jobs and economic positions in the coming decades. No country wants to fall behind.

[1] This short paper overlaps with the following work, Park and Tiberghien (2023), *The Green Tech Race Is a Story for the Entrepreneurial State*, ISPI Paper.

This paper presents three fundamental drivers at play in this green tech race: climate crisis, security concern, and industrial policy.[2]

1. Climate crisis:

The urgency of addressing climate change, as highlighted by reports from the Intergovernmental Panel on Climate Change (IPCC), sets ambitious climate goals. These targets include achieving a 1.5-degree target by 2030 or 2050, carbon neutrality, and reducing greenhouse gas emissions. Previously, countries' push for green energy primarily stemmed from climate concerns. However, the recent Ukraine Crisis has introduced another strong driver: energy security. Clean energy is now viewed as one last solution to current energy security challenges, reducing dependence on geopolitically sensitive exporting countries and promoting "the energy of peace," as described by Faith Birol.

2. Energy security:

In addition to historical pushes for green energy primarily driven by climate concerns, the recent Ukraine Crisis has introduced another strong driver: energy security. Clean energy is now viewed as one last solution to current energy security challenges, reducing dependence on geopolitically sensitive exporting countries and promoting "the energy of peace," as described by Faith Birol. The Ukraine Crisis, which began on February 24, 2022, triggered a global energy crisis across various energy resources, including oil, natural gas, coal, and even uranium. This crisis serves as a wake-up call for Europe, exposing its vulnerability due to overreliance on a single country for a strategic commodity. As a result, Europe has initiated efforts to increase the share of renewables as clean energy alternatives to replace Russian gas. While the crisis's impact is mostly concentrated within Europe, it demonstratsthe dangers of over-reliance on a single country for the rest of the world. China also raises concerns about over-reliance, as it currently dominates key minerals and technologies required for green energy production. To mitigate such risks, the US, EU, and other major countries have devised their own investment plans to incentivize domestic manufacturing of green technology within their territories. These countries seek independence by diversifying their sources, although achieving diversification itself presents a considerable challenge.

3. Industrial Policy:

Lastly, industrial policy plays a crucial role in the green tech race. Governments are rejuvenating old and new tools of intervention to avoid falling behind and maintain economic growth. China, in particular, aims to lead in the next chapter of industrial policy and has largely succeeded in doing so. Initiatives such as the IRA and the European Green Deal are driven by

[2] Interview with the IEA Director, Faith Birol, April 5, 2023, Paris.

both climate goals and competition with China. This competition exists not only between the US and China, but also between China and other countries.

With these three fundamental drivers, the paper proposes a theoretical framework of green entrepreneurial states to explain the active involvement of states in the green transition.[3] The framework posits that emerging green technologies, characterized by high risk and uncertainty, necessitate a role for governments beyond being mere fixers of market failures as defined by the neoliberal perspective. The entrepreneurial government takes on the role of a risk-taker with a clear direction:,an investor of first resort in research and development (R&D) and commercialization, and a coordinator among multiple stakeholders. It acts as a market creator with the "visible hand" of the state.

To showcase this framework in practice, empirical evidence from Korea and Japan demonstrates active participation in the renewables market alongside China, the US, and Europe. While these three countries lead overall investments, Japan ranks sixth and Korea seventh for investments specific to green technologies. Both countries have a high dependence on fossil fuels in their energy mix, making them vulnerable to external energy crises. However, they have implemented their own blueprints for the green transition.

In July 2020, the Moon Jae-in administration announced the Korean New Deal (K-New Deal 1.0), involving a significant investment of USD 135 billion in green and digital technologies. The government plays a central role as the first-resort investor, with public funding accounting for a substantial portion of the investment. Out of USD 135 billion, more than USD 117 billion come from the Korean Treasury and local governments. The Korean government also took the role of a risk-taker with a clear vision on emerging technologies such as hydrogen-powered fuel cells and substantial commitments to boost installed capacity of solar panels, wind turbines, and smart grids. The Moon administration had dual emphasis on the creation of a clean energy industry and phasing out fossil fuels. In July 2021, K-New Deal 2.0 was released which bumped the government investment from USD 135 billion to USD 186.2 billion.

Similarly, Japan has pursued its green transformation strategy. Since the 2011 Great East Japan earthquake and subsequent nuclear accident at Fukushima, the country has had to heavily rely on fossil fuels—mostly natural gas and coals. In October 2020, the Suga cabinet announced the commitment to achieve carbon neutrality by 2050. Following that speech, the Ministry of Economy, Trade and Industry released “Green Growth Strategy in line with Carbon Neutrality in 2050.” The strategy was designated as an industrial policy. The government identifies 14 sectors with high growth potential for the green transition and emphasizes the

[3] Mazzucato. 2021. *Public Purpose: Industrial Policy’s Comeback and Government’s Role in Shared Prosperity,* MIT Press; Mazzucato. 2015. *The Green Entrepreneurial State,* Science Policy Research Unit.

expansion of renewables, recovery of nuclear power, and deployment of new green technologies. On December 2022, based on the Suga cabinet's direction, Kishida announced the Green Transformation (GX) Strategy which renewed the focus on energy security and GHG emissions reduction.

Although continuity has been observed in both Korea and Japan, nuclear power remains a contentious issue. Since the Korean President Yoon took office in May 2022, the country has reversed the nuclear phase-out policy. Now, nuclear is seen as a key too to bolster the country's energy security while reducing its reliance on fossil fuels. In Japan, thanks to Suga's "invisible hands" over the Kishida cabinet, much of the GX strategy maintains consistency over time.[4] However, one exception is also Kishida's willingness to consider restarting conventional nuclear power plants and the construction of smaller nuclear reactors using advanced technologies. Based on the framework of green entrepreneurial states, my future work will include other major players such as the US, EU, and China, and create a typology of green industrial policies. It will also highlight the evolution of the discussion on the developmental state, embracing the concept of the entrepreneurial state in the context of the green tech race.

[4] Interview with a Japanese journalist, Feb. 2023.