COVID-19
and Green Recovery Policies
in South Korea

Summary of the collaborative research(2020)

FRIEDRICH EBERT STIFTUNG

Policy Institute of Justice Party
정의정책연구소

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I. Korea's reality and policy direction to cope with the climate crisis

Park Jin-hee

Professor at Dharma College, Dongguk University

Summary

Governments around the world are ramping up their policy efforts to fight climate change. Six countries, including the UK, have passed bills mandating carbon neutrality by 2050 with the aim of achieving net zero carbon emissions by 2050. Chile and European Union members including Spain also declared 2050 carbon neutrality as their policy goals. Korea, the world's seventh largest emitter, also joined international climate change response efforts following the President's official announcement of South Korea's target of becoming carbon neutral by 2050 in his National Assembly address in October 2020.

Despite international efforts, greenhouse gas emissions have continued to increase, accelerating the rise in sea levels across the globe and exacerbating the damage caused by extreme weather events. The IPCC warned that limiting average global temperature rise to below 1.5℃ is an imperative, underscoring that a 2°C rise by 2100 will raise average global temperatures both at land and sea, and increase rainfall in most residential areas and regions with extreme heat, while other regions will face droughts and lack of precipitation. Against this backdrop, countries jumpstarted efforts to launch 2050 net zero initiatives in 2019, leveraging various decarbonization strategies such as expanding renewable energy capacity, banning the sale of new petrol and diesel vehicles, and transitioning to low-carbon agriculture.

Furthermore, others call for an emergency wartime mindset, arguing that we should recognize the 'climate crisis' as a cataclysm that could eclipse the two world wars that devastated our world. Failure to act in the next decade before we reach 2030 may not only spell disaster for the entire international community, but disproportionately affect socially vulnerable and impoverished populations. Recognizing the gravity of the situation, governments began to launch Green New Deal policies, starting with the US Democratic Party. Green New Deal policies are being adopted not just at the state level, but also at the local government level as intensive decarbonization measures in an effort to halve carbon emission levels during the next decade leading up to 2030. The goal is to achieve both job creation and climate mitigation by building a new decarbonized economy through a cycle of transiting to renewable energy - transforming production industries - overhauling the urban structure - transforming demand and consumption patterns - changing the life cycle of citizens. Such measures place emphasis on a fair transition and recovery for those most vulnerable and disproportionately affected by the climate crisis, and thus require national fiscal strategies to this end.

At the current rate of greenhouse gas emissions, the average temperature in Korea will increase 4.4℃ by the end of the 21st century compared the timeframe between 1981 and 2010. As a result, the climate extreme index, which encompasses heat waves, tropical nights, and summer days will increase and the economic loss stemming from abnormal weather conditions will snowball. South Korea has contributed significantly to climate change. Korea is the world's seventh largest CO2 emitter as of 2017 and emission levels increased 24.6% compared to 2007, in stark comparison to the 8.7% drop in the total carbon emission level of OECD member countries during the same period. In terms of cumulative CO2 emissions, Korea ranks

17th in the world, which accounts for 1% of global greenhouse gas emissions, and per capita CO2 emissions in Korea (9.71t) is second only to the US (14.94t). As such, the international community has increasingly voiced its concern, urging Korea to take responsibility and since its inauguration in 2017, the Moon Jae-in administration has strived to incorporate climate action in government policies.

Established in the wake of the COVID-19 outbreak, Korea's Green New Deal is aimed at not only mitigating climate change, but also resolving social inequalities. Since coming into office in 2017, President Moon's energy transition policies have been 'aligned with the global trend to solve environmental problems such as greenhouse gas emissions and climate change'. Some examples include the Renewable Energy 3020 Implementation Plan' aimed at markedly expanding renewables, the 'Third Energy Master Plan', which embodies mid-to long-term visions for energy transition, and the 'Hydrogen Economy Roadmap' that contains policies aimed at expanding the use of hydrogen vehicles and fuel cells. Although these policies were geared towards climate change response, they failed to establish long-term greenhouse gas emissions reduction goals for 2050 and net zero policies. These limitations were addressed by the Green New Deal introduced in 2020 by the Korean government and the 2050 carbon neutrality goal announced by President Moon.

The Green New Deal made official the policy goals of 'transitioning from a carbon-dependent economy to a low-carbon economy' and 'accelerating a green and low-carbon transition across the economy'. It also laid out concrete greenhouse gas reduction plans, such as 'creating a foundation for scaling renewables and supporting a fair transition', 'promoting green mobility including electric and hydrogen vehicles', and 'building a smart grid for efficient energy management' in an effort to scale up low-carbon and distributed energy solutions. Furthermore, the government made clear that plans to innovate green industry ecosystems using a public-private fund aimed at developing technologies will contribute to job growth. The government also put in place policies to support coal-intensive regions where people may face job losses when brown industries are phased out. In line with Europe's fair energy transition scheme, the Korean government plans to help people switch to jobs or businesses in the renewable industry to achieve a 'fair transition'.

However, the Green New Deal did not set forth greenhouse gas reduction goals for 2050 because it was focused on economic recovery and Korea's stance on carbon neutrality by 2050 had not yet been announced. In November 2020, discussions on a 2050 carbon neutrality scenario began for the first time in Korea following the President's declaration of 2050 carbon neutrality in October that year. This scenario aims to reduce the share of coal in the energy mix to 0% by replacing coal power with renewables, and achieve net zero carbon emissions by increasing the share of renewables to 65-80% and taking full advantage of carbon capture, utilization and storage, or CCUS technology to offset greenhouse gas emissions from LNG power plants. As the carbon neutrality discussion takes shape, it's expected that carbon neutrality strategies will complement the Green New Deal.

An evaluation of Korea's Green New Deal in terms of its climate response based on a common framework for assessment reveals the following areas of necessary improvement. Although the main goal stated by the Green New Deal is climate action, priorities are placed on job creation and the economic goal of building a foundation for new growth industries. Although emphasis is placed on transitioning to a low-carbon economy, the low-carbon transition is ultimately aimed at building an economic foundation, which is attested to by the fact that the largest portion of the budget is earmarked for 'the expansion of

electric vehicles, hydrogen vehicles, and other forms of green mobility'. Although expanding renewable infrastructure and enhancing energy management efficiency aimed at reducing greenhouse gas emissions should be at the forefront of the Green New Deal, funds have instead been directed to green mobility projects which are integral to Korea's export market.

Conclusive greenhouse gas reduction goals should be established for the Green New Deal to truly serve as a climate response. More specifically, the Renewable Energy 3020 Plan must set out more ambitious targets in line the new scenarios set forth by the 2050 Low Emissions Development Strategy. Furthermore, improvements to the power system should be made to increase renewable capacity and more support should be provided to research on energy storage technology. Hydrogen economy and energy transition initiatives must go hand in hand so that hydrogen can serve as an energy storage medium that helps strengthen the renewable power system. Furthermore, industrial decarbonization plans should be established as they are currently absent from the Green New Deal. The government should strive to innovate manufacturing processes in the nation's major emitting industries such as steel, petrochemicals, and cement by using hydrogen as an alternative. In addition, developing initiatives to adopt renewables as the main source of energy input in agricultural production, preventing indiscriminate rural development, and strengthening land and forest conservation policies to increase CO2 absorption potential are essential. Another mainstay of the Green New Deal is the transition to a circular economy with an emphasis on consumption, given the limitations of reaching net zero emissions simply by shifting to renewables. Therefore, we must build a circular economy and overhaul society as a whole to reduce the level of potentially harmful raw material input in the production process. Just transition policies should also be supplemented with the aim of strengthening infrastructure to improve resilience in local communities and designing renewable projects aligned with the local demand. Given the magnitude of financial resources that will be mobilized for the Green New Deal, which aims at reconstructing the social fabric, social consensus must be built around its policies. This calls for active citizen engagement in governance processes, through which the Green New Deal will be implemented. All of these necessary improvements will help lay the groundwork for achieving carbon neutrality by 2050.

II. Problems and Remedies: the Korean New Deal from a Green Recovery Perspective

Kang Eun-ju

Director of Research and Planning, Eco Horizon Institute

Summary

On July 14, 2020, the Korean New Deal was announced at the State Reception House (Yeongbin-gwan) of the Presidential Blue House. Underpinned by a reinforcement of social safety nets, the Korean New Deal rests on two pillars – the Digital New Deal and Green New Deal – and was conceived to provide Korea with a new engine of growth. Back in 2008, the Korean government came out with a 'green growth' program geared towards responding to global climate and environmental challenges and seeking new avenues of growth. With this in mind, the aim of this study is to evaluate the Korean New Deal from the perspective of 'green recovery,' a concept gaining momentum in the OECD, to identify its problems and suggest possible remedies.

'Green recovery' is not yet an academically established

concept. The concept emerged in 2020 in the context of discussing global responses to challenges such as the COVID-19 pandemic and its economic fallout, and the ever-worsening climate crisis. The global pandemic, though at its core a health care crisis, has had far-reaching repercussions throughout the globe and is still raging across the world. Global virus outbreaks are closely related to the destruction of ecosystems, shrinking fauna and flora habitats, and impacts of climate change and environmental contamination. Ecosystems destroyed by human activity is coming back to haunt us in the form of health crises.

As a way of responding to the double crisis of climate change (environmental problems) and economic devastation (increasing bipolarization) brought on by the global pandemic, the OECD has called for measures designed to foster economic recovery and strengthen the world's resilience to future threats. This call is premised on the notion that resolving environmental threats is key to boosting economic activity and reducing inequality. Smart environmental policies and green strategies will not only to promote broad-based social welfare by creating jobs and income, but also to reinforce the world's ability to bounce back from future crises and reduce greenhouse emissions.

The major principles of 'green recovery' as laid out by OECD, include combating inertia and resistance effects, assisting restructuring aimed at building a more equitable green economy, accelerating progress on existing initiatives, reforming fossil fuel subsidies and adopting carbon pricing policies with their distribution effects in mind, banning unsustainable infrastructure development and resources mining, transitioning to more sustainable and resilient agriculture systems, and fostering innovation. The OECD expects that measures grounded in these principles will boost job creation, and to this end, underscores the importance of finance and international cooperation.

The OECD has proposed a set of indicators for monitoring and evaluating the results of 'green recovery' measures. These indicators fall under three categories, which are each subdivided into performance indicators and policy indicators. The three categories are climate (carbon emission intensity, renewable energy in the energy mix, effective carbon rates, fossil fuel support), biodiversity (change in land cover, conservation zones, biodiversity-related economic mechanisms), and other environmental areas (exposure to air pollution, resource productivity, water scarcity, R&D, environment-related tax revenue, and environment-related official development assistance).

Korea implemented the 'low-carbon green growth' policy from 2009 to 2013 as a growth strategy in the face of the 2008 Global Financial Crisis and climate change, at the cost of KRW 107 trillion (equivalent to 2 percent of national GDP). The policy program, however, fell short of achieving mid- and long-term objectives of transitioning to a low-carbon society. Greenhouse gas emissions exceeded target levels and the share of renewables in the energy mix did not grow substantially. These failures are largely blamed on disjunctions between policy goals and policy mechanisms. Most spending under the program was taken up by the Four River Restoration Project and other large-scale public works projects. Environmental regulations were relaxed and support for coal-fired power continued. The persistence of conflicting energy policies eroded public trust in governmental policy.

Meanwhile, Korean society is grappling with a double crisis of social inequality and climate threats. The economic crisis stemming from the COVID-19 pandemic has grown worse. Against this backdrop, how does Korea's current Green New Deal fare against the 2008 green growth policy, and will it enable the nation to overcome the current economic crisis?

The Korean New Deal, organized along the three axes of the Digital New Deal, Green New Deal, and strengthened safety nets, consists of 10 major tasks and 28 general tasks. The New Deal's implementation strategy calls for (1) pressing ahead with the Digital New Deal and Green New Deals while buttressing it with reinforced social safety nets, (2) improving systems and institutions in step with public investment while deriving and facilitating large investments from the private sector, and (3) leveraging the 10 major tasks as an initial springboard for bringing about positive change and ripple effects. Of the planned investment in the Korean New Deal totaling KRW 160 trillion, the lion's share of 45.8 percent (KRW 73.4 trillion) will go to the Green New Deal, with 36.4 percent (KRW 58.2 trillion) and 18.8 percent (KRW 28.4 trillion) set aside for the Digital New Deal and social safety reinforcement respectively.

Despite the emphasis placed on the Green New Deal, it is likely to go down the same path of failure that the green growth policy did, particularly when assessed from the perspective of green recovery. First off, it has failed to overcome the inertia of growth ideology because it focuses more on 'growth' than on green 'recovery.' The large part of the Green New Deal is a rehashing of conventional projects, which is not conducive to a transition to a low-carbon society. Along the same lines, the Digital New Deal is largely viewed as a new engine of growth, rather than as an effort to set a new path for the nation on the basis of critical introspection. The same can be said of carbon pricing and regulations from the perspective of socially inclusive policy. The Green New Deal fails to provide a roadmap or regulatory regime aimed at achieving substantive reductions in greenhouse gas emissions. Nor does it commit to reforming energy prices in support of renewable energy resources or scrapping fossil fuel subsidies. To the contrary, it commits to continued investments in unsustainable infrastructure. New coal power plants are being constructed with continued investments are being made in new projects. Removal of greenbelts is under discussion, and a variety of large-scale public works projects are being planned, including construction of roads and airports. Another key element missing in the Green New Deal is attention to sustainable agriculture. The Deal emphasizes job creation while paying little attention to a just transition to a green economy. The Deal includes financing measures such as the New Deal Fund, while failing to articulate ESG criteria and evaluation plans. The Deal lacks measures to foster biodiversity and existing measures have continuously been scaled back. The nation falls far short of the Aichi Biodiversity Targets and progress is painfully slow. This contrasts with the fact that the leisure tourism industry is included in the Green New Deal, repackaged as a 'green' industry.

Considering these shortfalls, how should we redirect the Korean New Deal and Green New Deal? The most important thing is to incorporate the concept of a just transition. The Green New Deal as it is laid out is aimed at a 'fair transition' in the context of 'supporting business sector transitions.' The 'transitions', however, need to be redefined clearly as a 'just transition.' Programs must be prepared to shore up local communities, workers, and socially marginalized people who are expected to lose out in the process of transitioning to a low-carbon society, by providing financial support, retraining, and reemployment assistance, in close partnerships with the business community. Setting up an independent organization to oversee such programs and promote social dialogue is urgent.

Second, the Korean New Deal and Green New Deal must act as platforms for mitigating the nation's serious social inequities and responding to climate change, and as a safety net against potential risks. Programs must be put into place to monitor, support, and protect the industries,

stakeholders, workers, the housing poor, and local communities that will be disproportionately affected by climatic and environment crises. Such programs can be broad-ranged encompassing health care, health service, and welfare.

Third, consideration should be given to adopting a budget system that takes carbon reduction effects into account. Such a system will estimate the climate and environmental impacts of projects and incorporate them in budget planning and spending. This measure will help to articulate policy targets, prevent market distortion, and establish an ex post facto evaluation scheme. This can also kickstart a comprehensive debate on tax and subsidy reforms.

Fourth, given that these policies are a new 'social pact', introspection befitting that nature is required. Addressing ecosystems devastations owing to human activities and responding to the climate crisis, infectious diseases, and increasing inequality and economic crises that have resulted must be preceded by self-examinations and repentance about past growth trajectories.

Lastly, the nation needs to put behind its development and growth-oriented past. The main reason the green growth policy in 2008 failed was the mismatch between policy goals and instruments that sugarcoated what was basically construction projects aimed at boosting the economy as 'green.' Korea has consistently failed for the past decades to meet its greenhouse gas reduction targets. Environmental policies and measures have been viewed as unnecessary restrictions to business activity. The need to transition to a low carbon society are viewed not so much in the context of responding to climate change, as opportunities to foster new industries and find new growth drivers. We must discard this growth-oriented mentality driven by the desire to boost GDP.

Without the remedies listed above, the Korean New Deal and Green New Deal are nothing more than a repackaging of failed past policy programs such as 'Green Growth,' 'the Human New Deal,' and 'Creative Economy.' The American 'New Deal' as the name suggests was a social covenant achieved as a result of prudent political planning, which was aimed at refining the state's role. Likewise, what Korea needs to successfully respond to the on-going double crisis is a well-thought-out vision about the state's role guided by strategic political planning.

III. Designing a Carbon Tax Scheme in Korean to Address the Climate Crisis

Lee Dong-han

Researcher, Policy Institute of Just Party

Summary

With Biden in the White House, the US has committed itself to net-zero carbon emissions, following the lead of the EU and China. For the first time in history, all major economic powerhouses in the world have declared carbon neutrality. That has ushered the world into a 'green' era in which carbon neutrality will be the foundation for competition and cooperation among nations. In this era, all carbon-emitting product prices will have to incorporate the social costs incurred by their carbon footprint.

Today's humanity is struggling with two most pressing threats – inequality and climate crisis. These two challenges must be the first order of business for states and individuals when making political, social and economic choices. In economics, individuals' choices boil down to the question of which is most rational under their budgetary constraints. Likewise, the goal of achieving carbon neutrality by 2050, along with the goal of limiting global temperature rise to

1.5°C, must act as a circumstantial constraint under which the economic efficiency of choices is weighed. Put differently, when making decisions, the cost of the negative external effects of carbon emission must be weighed against the cost of efforts to cut it back.

Two important theories for analyzing environmental problems are negative external effects and the prisoner's dilemma. The reason economic players continue to produce harmful substances when given complete freedom is that they are not required to pay a fair price for the damage they inflict on others while the reaping benefits. The prison's dilemma clearly shows that such a 'free-rider' problem never resolves itself in a market economy. The most telling fact demonstrated by the prison's dilemma is that the self-centered behavior of individuals with prodigal intellectual abilities brings about the greatest inefficiencies in society.

Traditionally, two radical remedies were prescribed to overcome problems like the prisoner's dilemma. One was direct regulation by a state with absolute power capable of water-tight oversight, and the other a completely free market. Censorship and punishment by a state turned out to be extremely costly and occasionally led to excessive suppression of individuals' freedoms. The 'free market' approach invariably resulted in fiascos no better than the prisoner's dilemma.

The past decades of environmental activism and government policies have failed to bring the world any closer to resolving the prisoner's dilemma presented by the climate crisis. Lately, however, scholars working from evolutionary perspectives have come out with the notions of cooperative consensus or cooperation-inducing institutions as a way of tackling the prisoner's dilemma. Another approach proposed by scholars researching the evolutionary development of institutions calls on the state to implement policies that reflect the opinions of society's stakeholders while eliminating elements incentivizing a 'free ride'. Carbon taxes are highly compatible with these latest scholarly approaches.

A carbon tax is levied on products or production processes for the greenhouse gases they produce, for example, the amount of CO2 generated. The tax is intended to induce taxpayers to shift to a more efficient mode of consumption or to cleaner fuels. In other words, the tax acts as a positive monetary incentive for consumers to alter their consumption patterns or cut back emissions in order to save on tax payments. In 2019, the US Climate Leadership Council issued a statement describing carbon taxes as "the most cost-efficient" way of achieving carbon reduction targets. As of May 2020, the statement was endorsed by 3,589 economists including three sitting members of the Federal Reserve Board of Governors, 27 Nobel laureates, and 15 former chairpersons of the Council of Economic Advisers.

The first thing to decide on in introducing a carbon tax is defining whom to tax and how much. The tricky part of this process is determining the social costs of carbon emissions, which is the basis for levying the tax. It is very difficult to accurately assess the cost of the agony human-emitted carbon dioxide imposes on society by contributing to climate change. The task is further complicated by the fact that such costs are bound to increase with time. This means that a carbon tax must be regularly adjusted in consideration of progress made towards meeting carbon reduction targets. Furthermore, governments need to announce a tax schedule for the midterm in advance to help consumers consider the tax in making energy choices.

The biggest challenge in adopting a carbon tax is averting its potentially regressive nature. The tax is likely to impose a greater economic burden on the lower-income class by driving up energy prices, which will force them to spend

more on energy. For this reason, a carbon tax must be introduced along with measures to neutralize its potential regressive effect. One such measure is to return the tax revenue evenly to all tax-paying residents in the term of 'dividends.' This also resolves the issue of how to spend the revenue from a carbon tax scheme. In other words, a tax is levied on sources of carbon emissions, and its revenue is distributed to all citizens as dividends. Switzerland already has such a system in place, and discussions are underway in the US to adopt a similar approach.

The most complicated problem in adopting carbon taxes occurs in international trade due to differences in effective carbon rates among countries. An effective carbon rate consists of carbon taxes, carbon emission trading, and energy taxes. Circumstantial factors affecting these three elements differ from nation to nation. Carbon emissions trading prices are incidental and unique to individual transactions and cases because they are determined in the process of local trading between emitters. This makes them an unreliable basis for determining the social cost of carbon emission. In contrast, carbon taxes can be kept constant within individual nations because they are calculated by the state to be commensurate with the social costs carbon emissions incur. Yet, the magnitude of such social costs differs among nations due to differences in the taxable base used to determine tax rates. These inherent gaps in effective carbon rates among nations are likely to be a source of friction in international trade. For example, they can lead to carbon leakage with businesses transferring production to countries with laxer emission constraints in an attempt avoid stricter reduction requirements and heavier social cost. In return, countries with higher effective carbon rates will likely seek to impose carbon border taxes on goods imported from 'free-riding' countries with lower effective carbon rates. When these patterns spread globally, they may eventually cause effective carbon rates to converge on the same level, thereby accelerating global decarbonization. Yet, differences in technological capabilities and carbon-related social costs among countries risk stirring up serious conflicts in international trade.

Carbon taxes and dividends as policies carry some significant meanings. First, Carbon taxes serve to internalize the external effects of carbon emissions, inducing individuals and businesses to make economic choices conducive to reducing carbon emissions. Second, carbon dividends alleviate the economic burden of carbon taxes on the economically marginalized class, thus contributing to easing economic bipolarization. Third, the process of gaps in effective carbon rates narrowing over time can give rise to a new cooperative international trading system.

Conclusively, carbon taxes and dividends have significant implications for the world as policy alternatives. They can drive economic entities toward voluntary, yet more rational energy consumption choices and offer universal solutions at national and international levels to today's global economic challenges such as climate crisis, economic inequality, and trade disputes.

VI. Korea's Policy Challenges in Reaching 40 Percent Renewables by 2030

Lee Hun-seok

Researcher, Energy Justice Actions

Summary

With climate crisis ever intensifying, a growing number of countries around the world are signing on to carbon neutrality. Carbon neutrality involves drastically reducing fossil fuel usage, curtailing energy use by boosting energy

efficiency, and achieving carbon offsetting through carbon absorption. Since the Paris Agreement in 2015, major countries around the world have integrated carbon neutrality into their climate policies.

Korea committed to carbon neutrality in October 2020, when President Moon declared '2050 Carbon Neutrality.' Over the years, Korea failed to meet its national greenhouse gas reduction targets, despite the fact that the targets were not very aggressive. To the contrary, its emissions have kept growing. This has earned Korea the infamous label of a 'climate villain' from international climate advocacy groups. Against this backdrop, President Moon's carbon neutrality declaration signals a major shift in Korea's energy policy.

Over the years, Korea's renewable energy policy has been greatly distorted. Fossil fuel-based energy sources such as hydrogen and IGCC have been labeled 'new energies' and then packaged together with renewable energies like solar, wind, and biomass as 'new & renewable energies' to be eligible for policy support. Until 2019, renewable energy statistics had been distorted by including non-renewable waste such as scrap vinyl and tires in new and renewable energy sources, which resulted in misdirected policy support. That statistical categorization is no longer used, but policy support for new energy sources is still in place and the term 'new and renewable energy' is still very much in use.

At present, new and renewable energy accounts for 3.4 percent of Korea's primary energy. Of this, 93.1 percent was renewables as of 2019. As of 2019, new and renewable energy accounted for 5.62 percent of Korea's electricity. Of this, 5.1 percent is taken up by renewable energy. Among renewables, solar is the largest contributor, followed by biomass, hydroelectricity, and wind.

Coal (both bituminous and anthracite included) accounts for 41.8 percent of the electricity generated in Korea, making it the most important energy source for power generation (as of 2019). In 2017, shortly after its inauguration, the Moon administration announced the '2030 Renewable Energy Action Plan' which calls for the renewables' share in total electricity generation to be increased to 20 percent by 2030. Yet, the 20 percent target by 2030 is not aggressive enough to enable Korea to reach net-zero by 2050. Carbon neutrality can be achieved more efficiently by pushing for decarbonization in power generation, because decarbonizing can progress faster in that industry than in others as demonstrated by successful precedents set by other nations.

The present study estimates the demand for renewable energy in 2030 under the scenario of completing decarbonization in electricity generation by 2030 in order to move up the 2050 net-zero target to an earlier date. Under this scenario, a power supply plan is set up on the basis of the 8th Basic Plan for Long-term Power Supply and Demand established in 2017, which envisages phasing out coal-fired power generation while increasing power generation from renewable sources. The plan calls for a step-by-step shutdown of all 77 coal power plants, starting with seven built in 1990 and followed by 25 plants constructed 1990, 22 plants built in the 2000s, and 23 plants that were commissioned after 2010. Under this scenario, power generation capacity from renewable sources needed to make up for decommissioned coal-based power plants must be 4.5 times greater than what is targeted under the 2030 Action Plan. The estimated capacity accounts for both installed capacity and peak contributions. Electricity generation from renewables is affected by conditions different from those influencing coal or nuclear power generation. Solar plants can work only during the day when sunlight is available, and both solar and wind farms are affected by weather conditions. This means even when all renewable power plants run at full tilt to meet peak hour demand, their total output will always

fall short of their combined installed capacity.

Each time it draws up a new Basic Plan for Long-term Power Supply and Demand, the Korean government has been calculating peak contributions in planning the amount of power capacity to be newly added. The same method is replicated in the present study's scenario. Additionally, the study allows for a situation where demand control successfully prevents abrupt surges in power demand and causes power generation to level off or start declining. Taking such potential situational variables into account is an established practice in nations like the UK and Japan, but has not been incorporated into Korea's Basic Plan for Long-term Power Supply and Demand thus far.

Considering all these variables, the present study projects that the nation's renewable power generation capacity needs to increase 15-fold by 2030 compared to 2020. The capacity multiplied 25 times from 2009 to 2019 and is still on a steep upward trajectory, although the pace of increase slowed a little in recent years as the total installed capacity continues to expand. Given these statistics, the projected 15-times increase in renewable power generation capacity is achievable, particularly if the government is strongly committed to pushing forward with the Green New Deal and other policies aimed at achieving carbon neutrality.

This study suggests a number of measures that need to be taken if the scenario laid out above is to become a reality. They include setting the desired share of variable energy sources in the nation's total energy mix as a political decision, overhauling its grid, appointing a new presidential aid to oversee carbon neutrality policy, and newly establishing a ministry of climate and energy. Additionally, the study suggests that the public sector supply at least 50 percent of newly added renewable power capacity so that an optimal balance can be achieved between public and private sector in renewable power generation. This will address the problem of the present Basic Plan relying too heavily on the private sector for delivering new renewable energy capacity. The study also calls on the government to reform the power industry and establish an 'Energy Regulatory Commission.' Other policy recommendations include giving serious thought to reforming energy taxes and prices as suggested by some experts in the interest of boosting the renewable energy sector, and restructuring the nation's power grid and linking it to other neighboring countries' grids in an effort to ensure supply stability against the projected increase in renewable energy's share in the nation's total energy mix.

V. Policy Recommendations for Green Mobility in Korea's Major Cities

Kim Byung-gwon

Policy Institute of Just Party

Summary

The term 'green new deal' is used as a term for all initiatives taken by states to set themselves on a path of breaking away from reliance on fossil fuels and moving toward a decarbonized society. Yet, the 2020s version of green new deal policies are set apart from Obama's green new deal in the US or the former Korean president Lee Myung-bak's green growth policy a decade earlier. First, today's green new deals are aimed at halving global carbon emissions by 2030 and achieving net-zero by 2050 to prevent global temperatures from rising more than 1.5 °C. States (that is the public sector) are required to be at the forefront of implementing the green new deals as 10-year state projects, armed with a quasi-war-like sense of crisis. Third, the deals call for a wholesale transition away from coal-based industries, cities and lifestyles to net-zero economies as the

most important instrument for drastically cutting back carbon emissions.

A cardinal component of a green new deal is a shift from fossil fuel-based mobility to 'green mobility.' Transportation means developed in the 20th century are responsible for 23 percent of global greenhouse gas emissions (13.5 percent in Korea). Cars and trucks consume two thirds of global crude oil supply. Most transportation modes, regardless of whether by land, air or sea, rely on fossil fuels. For these reasons, the transition to green mobility will be as sweeping as the one that ended the age of coal-powered trains and coaches in the late 19th century and ushered the world into an age of combustion-based automobiles in the 20th century. In other words, we are now at a point where the world is required to put an end to a century of combustion vehicles and move toward a new mode of mobility called 'green mobility'.

In initial stages, green mobility would entail reducing the use of combustion vehicles and migrating toward green transportation means like electric vehicles. Needless to say, this shift would reshape the automotive industry as we know it and unleash great changes in the design and infrastructure of cities developed around automobiles. The wave of transformation would not stop there. The transition to green mobility would accelerate shifts in lifestyle and culture across the world. This would reduce the world's reliance on individually owned vehicles, adding momentum to efforts to develop environment-friendly mobility solutions. That would amount to breaking away from 'automotive culture.'

Yet, the part of Korea's green new deal that touches on green mobility is too limited in scope. It does not specific any long-term vision or concrete plan. All it amounts to is a small heading that states 'Promoting Green Mobility Solutions Including Electric and Hydrogen Vehicles' under which some policy support is spelled out for those vehicles. For example, the plan aims to increase the cumulative supply of electric passenger and freight vehicles to 1.13 million and that of hydrogen vehicles to 200,000, along with expansion of charging infrastructure for both types with EV fast-charging stations increased to 15,000 and hydrogen charging stations to 450. At the same time, old diesel vehicles are to be either replaced with LPG or electric vehicles, or scrapped as early as possible. Theis narrow scope hardly qualifies as a reputable green mobility plan.

To speed up the phasing out of combustion vehicles, strong regulatory action needs to be taken against them, along with incentives for switching to electric vehicles. The most common regulatory solution is to ban them from entering downtown areas in cities. Amsterdam and other major global cities have already announced plans to prohibit not only diesel but also gasoline vehicles from entering urban downtowns. No city in Korea is on the record for considering such a plan. The only close case is Seoul that bans diesel vehicles on roads inside a 'green traffic zone' spanning 16.7㎢.

Along with bans on combustion vehicles in downtowns, an increasing number of countries and local governments are planning to prohibit the sale of combustion vehicles. Norway has announced that they will ban sales of combustion vehicles beginning in 2025, the Netherlands in 2030, and the UK and France in 2040. China is set to enforce such a ban beginning in 2035. In the case of Japan, the Ministry of Economy, Trade and Industry has recently begun mapping out a plan to reduce the number of gasoline vehicles on roads to zero at least by 2035. In Korea, the National Climate and Environment Council, a presidential advisory group, proposed a policy in November 2020, that would limit new vehicles sales to pollution-free and plug-in hybrid vehicles or just to the former beginning

in 2035 or 2040.

Another priority action for accelerating the transition to green mobility is making cities more pedestrian- and bicycle-friendly. The 'Tta-rung-i' program in Seoul is a successful example. The public bike rental service has over the years expanded greatly to reach one million in the number of registered users (one tenth of the city's population), making it the icon of the city's innovation drive. The public bike rental program is killing two birds with one stone by easing traffic congestion while contributing to reducing dust and carbon emissions.

Another key policy response for green mobility is transitioning public transportation toward electricity. Particularly, a push should be made to switch all transit buses running within or between cities to electricity, along with drastic measures to attract people to public transportation such as making it free of charge for all users. Already, some 100 cities around the world are offering free public transportation services. In Korea, Hwasung became the first city to put in place such a service on an experimental basis. To further accelerate the switch to green public transportation, a traffic congestion tax, the kind already in operation for close to 20 years in London, can be introduced.

A green new deal strategy revolves around gradually reducing the demand for vehicles while pushing for a speedy transition from combustion-based to electric vehicles. By most estimates, electric vehicles will account for 32 percent of all passenger cars sold in the world by 2030. This means the decade of 2020s will mark a threshold point where the century-long period of fossil fuel-based combustion vehicles will come to an end, giving way to an era of electric vehicles. This transition has implications going beyond shifts in transportation modes. It will entail an overhauling of existing urban infrastructures built around automobiles and bring seismic changes to the automotive industry, one of the core traditional manufacturing industries.

VI. A Just Transition in Agriculture and Food Industries to Meet the 1.5℃ Target

Park Eung-du

Chairperson, Agriculture and Fisheries Committee, Justice Party

Summary

Mother Earth in Crisis

Environment experts warn that we must keep global warming below 1.5°C until 2100 to prevent a cataclysmic disaster. This requires us to reduce carbon dioxide emissions by 45 percent in ten years compared to 2010 levels and reach net zero by 2050.

At the core of this looming crisis, climate change is threatening biodiversity, human health, and food supply. It is gaining speed with each passing year, with extreme weather events occurring more frequently, driving the world toward a crisis beyond our control.

Particularly, natural disasters unleashed by climate change are giving rise to new social problems by intensifying food crises, exacerbating inequality in food access, and driving up the cost of medical treatment for adult diseases resulting from malnutrition among the economically marginalized population.

The climate crisis and the agricultural and food industries are interlocked in a triangular relationship of offenders, victims, and mediators.

Globally, the agricultural and food industry spanning

production, processing and consumption is said to be responsible for 18 to 37 percent of greenhouse gas emissions.

In Korea, the industry's estimated contribution to greenhouse gas emissions is arbitrarily played down to 3 percent by leaving out of the calculation fuels or other energy source consumption in the industry and emissions from the process of agricultural products being delivered to consumers, consumed and discarded as waste.

It is in this context that the Moon Administration's Green New Deal is superficial, with its focus primarily on renewable energy. It fails to address the root causes of today's climate crisis in agriculture in the way Europe and the US do - by pushing for decarbonization to shift the agricultural and food industry to eco-friendly systems in harmony with nature; establishing stability in farmers' income and a virtuous cycle of food supply and consumption (that reduces inequalities); and fostering food self-sufficiency and overcoming the shortcomings of the WTO system.

Under the Paris Agreement, Korea is obligated to submit a plan (called LEDS) to the US by the end of this year which spells out its strategies for achieving net-zero by 2050. Under this schedule, the government is in the process of mapping out detailed long-term low-carbon development strategies for the entire society including the agricultural and food industry, following up on the 2050 Net-Zero Declaration made by the President on October 28.

The 2050 target as it applies to the agriculture and food industry is a big challenge because the industry is directly related to the climate crisis, and voluntary efforts to reduce carbon emissions are difficult to induce. This means the way to net-zero will be marred with trials and errors, but in the end, a fully just transition will be achievable.

The shifts in the agricultural and food landscape brought on by the COVID-19 pandemic underscores the imperative of accelerating such a just transition.

The global social and economic crises unleashed by the pandemic are having wide-ranging repercussions throughout the world. They are plunging economies into depression, triggering unemployment crises by forcing massive layoffs, dismantling the international division of labor, and fanning nationalistic trade protectionism. This turmoil in the global economic and trade environments have such a direct bearing on Korea's agricultural and food industry that it could wipe out its potential for sustainability unless fundamental responses are promptly put into place.

Additionally, Korean society is facing economic disparities between urban and rural areas, a rapidly aging population resulting in ghost towns in provincial areas, and economic polarization widening the gap between the rich and poor. All these problems combine to further undermine the sustainability of farming villages. Mitigating these problems to protect the livelihoods of farming and fishing households is vital to ensuring balanced national development and safeguarding the people's basic right to access food.

The transition to net-zero in the agricultural and food sector must be geared to the following objectives to ensure its sustainability - transition to agricultural and fishing practices conducive to net-zero and the restoration of ecological systems; reasserting the nation's food sovereignty by reducing inequalities in food access and ensuring a reliable supply of safe food; improving the residential conditions of agricultural and fishing villages by efficiently leveraging their ecological resources and developing new regional growth engines through renewable energy sources; reinforcing income safety nets for farming and fishing households to support their sustainable lives. The movement toward these objectives must engage farming

and fishing stakeholders as primary participants in accordance with the principles of public interest, democracy, and universality (being inclusive as opposed to exclusive).

To achieve the aforementioned objectives, this study proposes the following four policy recommendations:

- Redesign renewable energy projects in such a way that they are supportive of the economic self-sufficiency of farming households, tied in closely with farming practices, friendly to the environment, and led by local residents;

- Use profits from renewable energy projects as a fund (based on the notion of commonly owned wealth) for providing local residents with basic income in order to ensure sustainability in the farming and food industry;

- Use carbon tax revenues as a fund for providing local residents with participation income to maintain eco-friendly communities and ensure food safety;

- Introduce basic income for farming households to mitigate income inequalities and guarantee social dignity.

The three ideas of commonly owned wealth, participation income, and basic income must be given top priority in government policy to achieve a just transition in the agricultural and food industry as a way of contributing to global efforts to limit global warming to 1.5 °C.

VII. Public Sentiment on the Climate Crisis and Their Implications

Kim Bong-shin

Executive Director, Realmeter

Summary

This exploratory study reports the findings of a recent public survey on climate change. The survey showed that public awareness of the gravity of the global crisis brought on by climate change is widespread, with 90 percent of the polled population agreeing that the climate crisis is serious. This contrasts with a 2008 survey in which waste and other environmental problems were at the forefront of people's minds.

In conjunction with this, a greater percentage of Koreans agreed compared to their counterparts in other countries, to global warming-related statements like 'Climate change is causing global warming,' 'Global warming is a product of human activity,' and 'Global warming poses a grave threat to humanity.' Yet, the survey also revealed that Koreans were more pessimistic than people in other countries about responding to climate change when they were asked if they agreed to statements like 'It is too late to curb climate change.' This finding may be taken to indicate that Koreas are more prone to resign themselves to accepting climate change as a fate. Conversely, the skepticism could fuel calls on the government to take stronger action against climate change than in other nations.

Nonetheless, economic problems ranked top when the surveyed were asked to pick the most serious problems in Korean society. Environmental problems ranked third. Those who picked economic problems amounted to 75 percent of the respondents, leaving a big gap with those who picked economic problems as their second- and third-ranked

choices. The latter groups together represented 29 percent of those polled. This tells us that climate change is not yet perceived as a matter of life and death.

While perceiving climate change as a grave issue, more respondents were negative than positive about the efforts put forth by various entities to fight climate change. This was true of the central and local governments' efforts. Similarly, fewer respondents said the corporate sector was responding appropriately to climate change despite them being the main culprit of the environmental threat.

This contrasts with the finding that approximately a half of the surveyed positively evaluated the international communities' responses to climate change, revealing mounting public disappointment in the public sector and corporate community. In addition, the survey highlighted that while people positively assessed individual efforts, that was not the case for the collective effort made by the population as a whole.

This finding ties in with the fact that more respondents saw taking tougher legal action against climate change as more urgent than energy transition. For instance, the ideas of regulating 'disposable products' and 'plastic throw-away containers' received strong support. This signifies that the public awareness of the need for a decarbonization shift toward renewable energy is not as mature as one would desire.

However, when the survey included youths, 90.6 percent of the polled agreed to the net-zero goal with regard to greenhouse gas emissions, with 81.6 percent opposing the construction of new coal-based power plants. Similarly, 90.7 percent supported ending coal power generation and transitioning to renewable energy. The broad base of support for a transition to renewable energy, however, is tempered by concerns about a possible hike in energy bills. Two out of ten respondents suggested 'less than KRW 10,000' as an acceptable increase in electricity price for clean energy transition, with four proposing an increase of at least KRW 10,000 and less than 20,000.

In summary, a sense of crisis about climate change is broadly shared in Korean society, with the gravity of the crisis well recognized by the public. Nevertheless, the public is poorly informed of specific actions or policy responses in place or under planning to tackle climate change.

Conclusively, public awareness of climate change-related issues is largely at a general level, far from being concrete enough to support an effective public debate. This means that most Koreans are not adequately equipped with information to evaluate government policies either positively or negatively. Public campaigns by progressive political parties or relevant expert groups are required to prevent this situation from spawning an attitude of self-resignation amongst the public, which would lead them to believe that 'it is too late to fight climate change.'

Policy Institute of Justice Party is a think tank of Justice Party of Republic of Korea. This Policy Institute works to find solutions for inequality and climate crisis and to suggest visions for progressive values and principles.

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Rm. 1101, 88, Yulgok-ro, Jongno-gu
Seoul, 03131 Republic of Korea

Responsible:
Henning Effner I Resident Representative
t +82 (0) 2-745-2648
f +82 (0) 2-745-6684
E-mail: info.korea@fes.de
Homepage: korea.fes.de