

ENGINEERING  
TOMORROW



# The Green Restart Whitepaper:

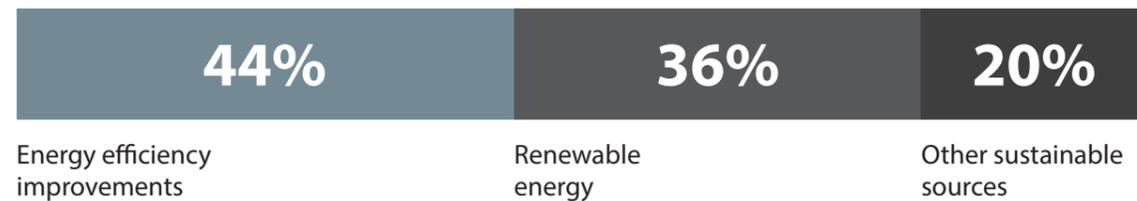
A fast-forward to sustainable growth in Korea



# A green restart – fueling economic opportunity and climate action

We were starting to forge a road towards carbon neutrality. Now we need to speed up on climate action while re-energizing the economy. By investing in a low-carbon world.

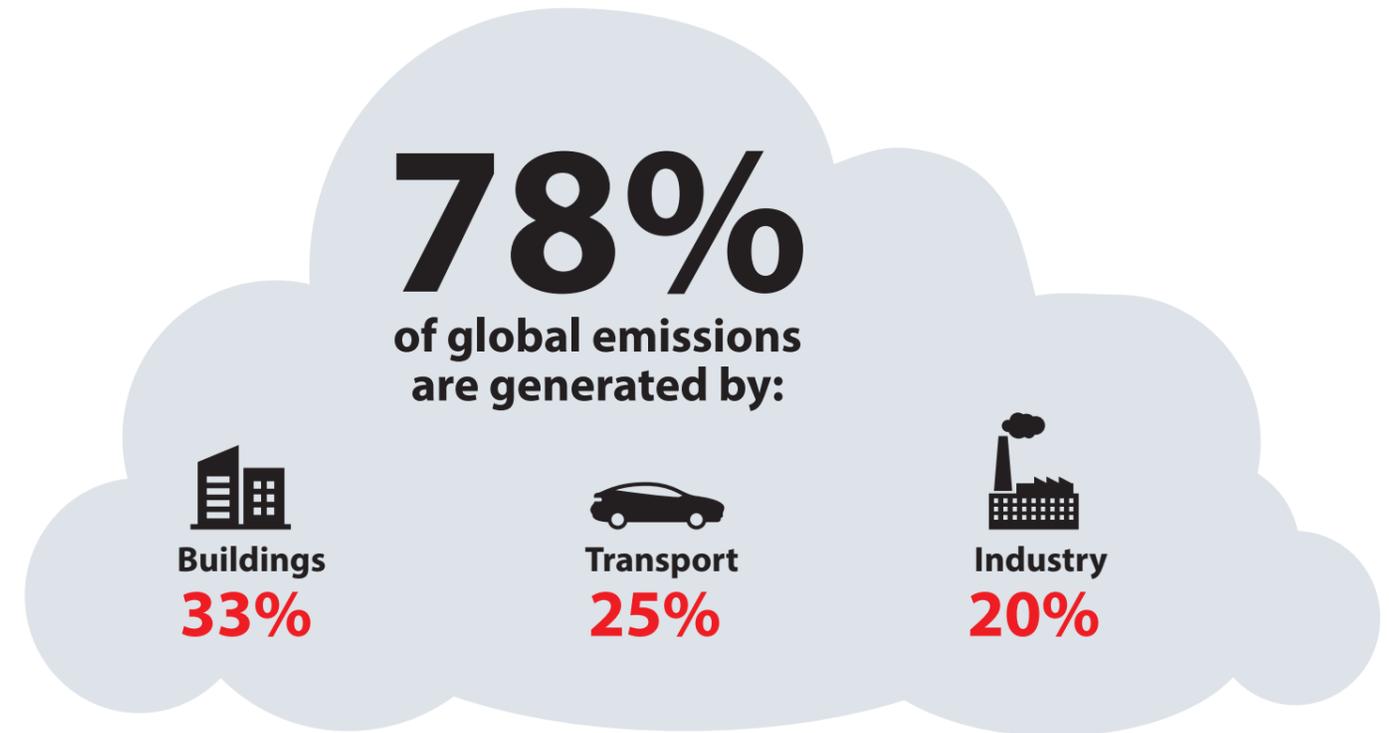
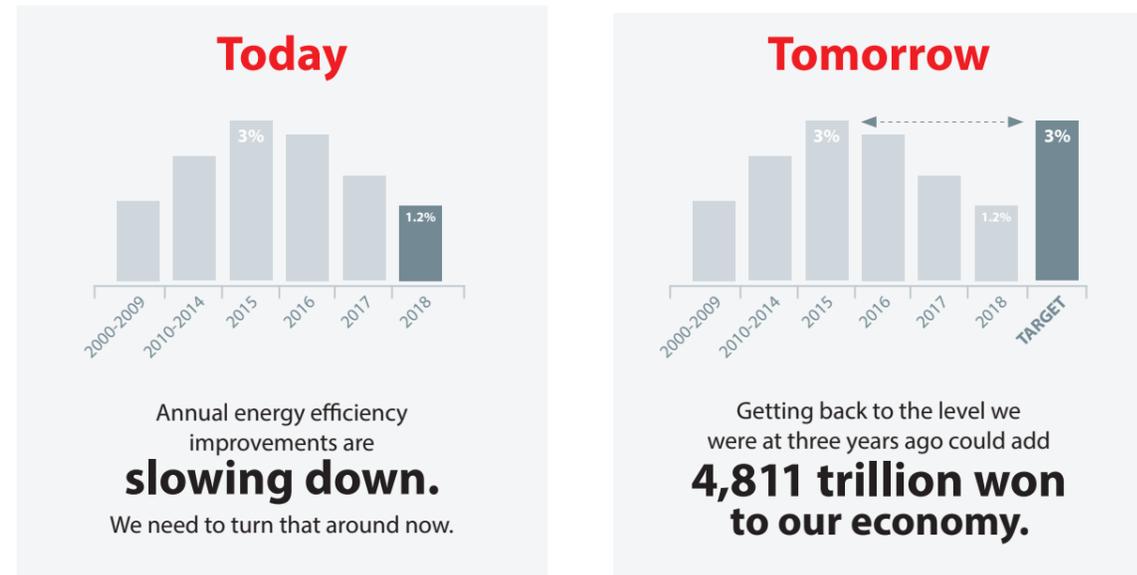
## How to achieve carbon neutrality



SOURCE: International Energy Agency

By switching to more energy efficient solutions, we reduce our overall need for energy – and reduce the need for extra capacity and investments in renewables. This is the most cost-effective and most efficient path to long-term success.

## The potential of energy efficiency is ready to be unleashed



## The benefits of going green

### BUILDINGS

**30%**

reduction in energy use through modern HVAC systems.

**9-30**

jobs in manufacturing and construction would be created for every 1.1 billion won invested in retrofits or efficiency measures in new build.

### TRANSPORT

**28%**

reduction in emissions needed to meet the Paris Agreement goals could be achieved with electric transport.

**4.2 million**

barrels of oil products displaced per day from electric vehicles uptake in the IEA Sustainable Development Scenario.

### INDUSTRY

**40%**

reduction in energy use achievable through smart technology optimizing systems.

**2x**

more value produced per unit of energy used in 2040.



# Korea – an economic powerhouse set on a Green Restart

Korea is an economic powerhouse: since the 1960s, the country's economy has grown at a remarkable pace, and it is currently the 12th largest in the world. This rapid industrial growth over decades has, however, taken its toll on the environment and the Seoul Metropolitan Area is among the most polluted cities in the world. Moving towards green energy is therefore essential to sustain the country's economy while reducing greenhouse gas emissions (GHG) to improve the population's living environment, not least air quality.

The onset of the COVID-19 pandemic looked to challenge all efforts to address these challenges. Korea was one of the first countries to be hit but had a swift and effective policy response to flatten the epidemic curve. However, the pandemic left Korea – and the world – with the challenge of recovering economies.

The Korean government was one of the first in the world to realize the need to act on the climate and economic challenges with one common plan. In July 2020, it presented the Korean New Deal. The plan aims to achieve net-zero emissions by 2050 and to accelerate the transition towards a low-carbon green economy by investing 160 trillion won (close to 143 billion USD) and creating 1.9 million jobs by 2025. Its two main policies – the Digital New Deal and the Green New Deal – form the vision of a smart, green restart. Now it needs to be put in to action.

**“The Korean New Deal is a declaration of the Republic of Korea's great transition into a leading nation. It is the Government's strong commitment to fundamentally transform the Republic of Korea – from a fast follower-type economy into a pace-setting one; from a carbon-dependent economy into a low-carbon one; and from an unequal society into an inclusive one.”**

**– Moon Jae-in**  
President of Korea





## Transitioning Korea to a low-carbon society

The starting point of the Korean green transition and recovery is from an economy dominated by fossil fuels. Fossil fuels accounted for 85% of total primary energy supply in 2018. The most cost-effective way to transition the Korean economy is by putting energy efficiency first. Because the most sustainable energy is the one you don't need. At all.

Currently, Korea's energy use per capita is among the highest in the world and its energy intensity ranks 33rd of OECD countries. That also means, however, that the potential for improvement is significant, and solutions to make the needed change are ready – and a perfect fit for the Korean New Deal.

## Energy efficiency is a job creator

The transition to a low-carbon economy needs to be people-centered. The Korean New Deal is about ensuring prosperity and well-being for the people of Korea with the creation of 1.9 million jobs by 2025 and stronger social safety nets. Energy efficiency can help deliver on this.

Investing in energy efficiency in buildings is a cost-effective way of creating good, local jobs while transforming into a low-carbon society. According to the IEA, 9-30 jobs are created for every 1.1 billion won (1 million USD) invested in energy efficiency in buildings, making it the most labor-intensive means of ensuring a green recovery. These are mostly local jobs, ranging from the architects and engineers planning the buildings and retrofits, to the construction workers turning plans into reality.

On top of that, investing in better and more sustainable buildings comes with the added benefit of better indoor climate, resulting in higher productivity and increased well-being of occupants.

In other words, investing in energy efficiency in buildings means investing in people.

**9-30 jobs are created  
for every 1.1 billion  
won invested in energy  
efficiency in buildings**





## Buildings are essential

### Investing in energy efficiency in buildings also means investment in a low-carbon future

According to the Korean Energy Economics Institute, in 2017 the energy consumption of the building sector was 19% of the total national energy consumption. Heating and cooling account for a substantial part of this and contributes a significant amount of CO<sub>2</sub> reductions. Improving energy efficiency therefore holds a large potential. 37% of the Korean building stock is over 30 years old, and most of the buildings standing today will also do so in 2050. That means that while efforts towards higher standards for new buildings are important, the bulk of the potential gain in terms of energy savings and emissions reductions is through retrofitting.

Korea is already experiencing the impacts of a changing climate. Heat waves have been occurring more frequently and with it the number of days when cooling of buildings is needed. The hot summer of 2016 saw a surge in cooling days by 87.2% year-on-year, increasing the total energy use by 5.9% and that of buildings by 9.6% in August. 2018 brought another heat wave – the most extreme since the introduction of the national weather forecast – increasing the number of cooling days by a further 35.6% compared to 2016.

With these trends, it is an absolute necessity to make heating and cooling of buildings as efficient as possible to avoid excessive cost and further pollution while maintaining comfortable and safe indoor environments.

Finally, as we digitize our societies, we also increase demand for a specific type of buildings: data centers. The International Energy Agency estimates that 1% of all global electricity is used by data centers and that by 2025, data centers will consume 1/5 of the world's power supply. This makes it vital that we reduce electricity use in data centers and implement more efficient energy solutions to create data center sustainability and cut CO<sub>2</sub> emissions.

**It is an absolute necessity to make heating and cooling of buildings as efficient as possible to avoid excessive costs and further pollution while maintaining comfortable and safe indoor environments**

Let's not go back  
to what we had,  
**but forward to  
what we want**

This is how we do it...



## What are the solutions?

The good news is there are many solutions available today to help cut the energy use of buildings, reduce emissions, improve air quality, and create jobs. And they are already being put to use.

### **A new generation of HVAC**

Heating and cooling have entered a new generation with digitalization and connected systems. Today we have the solutions to create highly energy efficient HVAC systems through continuous monitoring and active energy management. This is possible through combining hardware with data collection and connecting the solutions to the cloud. New technologies such as the The NovoCon® digital IoT actuators and Danfoss AB-QM Pressure Independent balancing and Control Valves uses real-time HVAC data and Internet of Things technology to create smart connected buildings.

Take Consplant Tower in Kuala Lumpur, Malaysia as an example. This 20-storey commercial building was retrofitted with a new and efficient cooling solution by Danfoss. This cooling solution resulted in energy savings of 67%. It also increased the comfort of the users of the buildings and the lifetime of the cooling system itself. And it was a good business case as well: it had a pay-back time of only two years. This means we are not only cutting emissions but also cutting costs.

In the Keppel Bay tower in Singapore retrofits using Danfoss solutions have resulted in 43% energy savings using high efficiency fans, motors and variable frequency drives.

For data centers, chillers and heat pumps featuring Danfoss Turbocor® technology allow them to be cooled up to 30% more efficiently. In addition, Danfoss has innovative solutions for heat recovery. Excess heat is generated by server equipment as part of data center operation and is discharged into the atmosphere. Utilizing this excess heat for use in heating applications, instead of allowing it to escape, represents a massive opportunity.

### **Artificial intelligence in buildings**

The green and the digital transformations go hand in hand – also when it comes to buildings. By connecting the hardware sensors via The Internet of Things and using Artificial Intelligence, Danfoss Leanheat software can reduce energy use with 10-20% in the HVAC system. The software optimizes energy use with data on weather, ventilation, and the living patterns of the occupants. This allows the system to forecast the heating and cooling demand based on previous behavior and shows the path to a low-carbon transformation.

## Working together

To move faster towards a strong low-carbon economy, businesses and governments need to work together, creating an ambition loop where bold business commitments support bold policies – in turn, supporting even bolder business action. This will unlock faster progress and decisions on climate goals, fuel market opportunities, and thus combine climate objectives and economic recovery in a positive way.

At Danfoss, higher climate and energy ambitions have been on our agenda for many years. It makes sense for our climate and for our business: the green growth agenda is expected to create 29,000 won (USD 26 trillion) worth of opportunities.

We also practice what we preach and have committed to becoming carbon neutral by 2030 in our own operations. To get there, we will take an 'energy efficiency first' approach, using many of our own solutions and optimizing our buildings. This will be coupled with 100% renewable energy sources and electric vehicles. This same mix of levers can be used in Korea.

**“We are engineering tomorrow with solutions available today – solutions that can help increase energy efficiency, lower carbon emissions and save money. Sustainability is not an add-on to our business – Our business is sustainability.”**

**– Kim Fausing**  
President and CEO, Danfoss



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## Conclusion

The opportunity is here: to accelerate towards carbon neutrality and mark this moment as a historical turning point. The solutions are ready and proven. Now, it all comes down to the scale and speed of implementation.

The economic upside of investing in a low carbon economy is clear. So, let's focus on driving energy efficiency in our buildings and industry. To accelerate electrification of transport systems – moving goods and people on land and at sea, while also enabling smart sector integration in our cities. All in addition to creating the green jobs of the future, and ensuring we move closer to achieving our goals.

### **This is where the transformation starts**

Join the transformation and continue the conversation on [danfoss.com](https://danfoss.com)