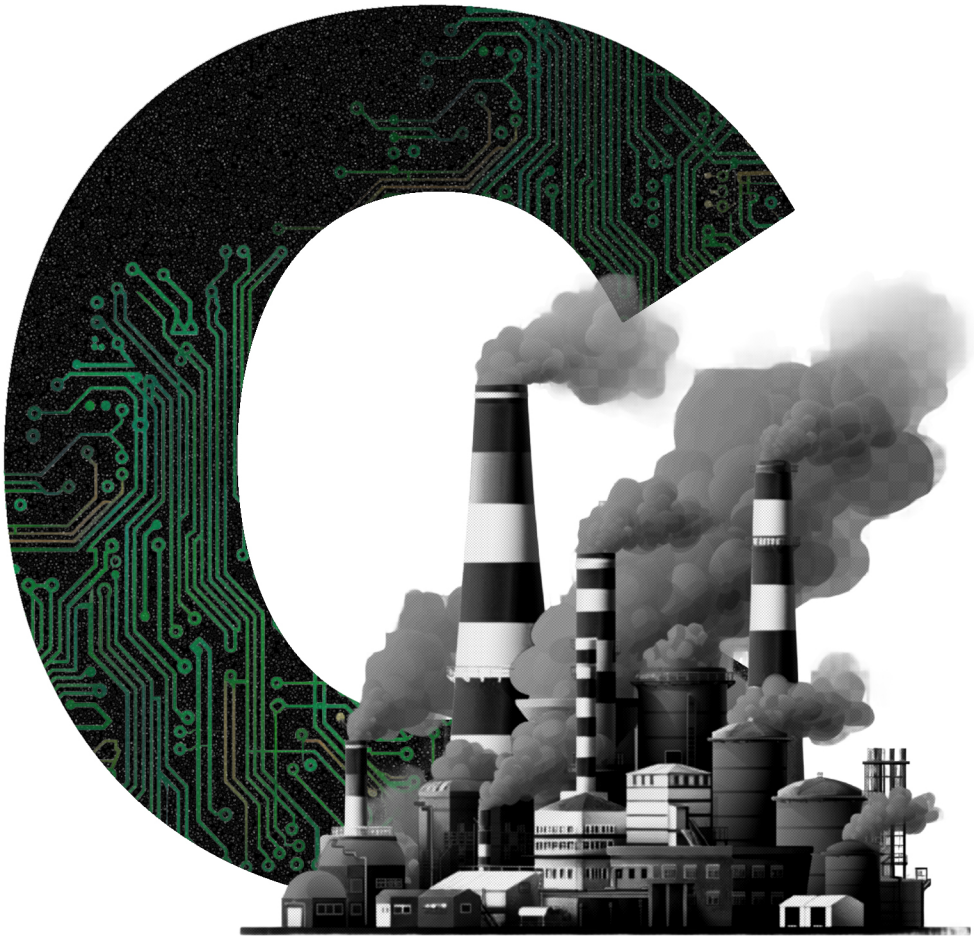
Issues with Fossil Fuel-Based Yongin National System Semiconductor Industrial Complex



° Issue Brief

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Solutions for Our Climate

On March 15th, the government announced plans for the creation of the Yongin National System Semiconductor Industrial Complex. Samsung Electronics will be the major investor, as it has more than 360 trillion KRW (US$2.6 trillion) lined up to create 6 new factories. By the time the new complex is completed in the late 2040s, it will require about 10GW of additional power. The government plans to build 3GW of LNG power plants to meet short-term demand, which goes against the global trend of semiconductor companies, including Samsung, competing to produce greener chips.

Given that Samsung's main competitors are rapidly transitioning to renewable energy to meet clients' demands for green chips, the fossil fuel-based electricity supply plan for the Yongin Complex would likely lead to Samsung losing clients and facing increased carbon costs, eventually resulting in a loss of competitiveness.

1. Yongin National System Semiconductor Industrial Complex

» Summary

On March 15th, 2023, the government announced plans for the Yongin National System Semiconductor Industrial Complex (hereinafter Yongin National Semiconductor Complex) during the 14th Emergency Meeting for Economy and Livelihood. The national complex is separate to Yongin Semiconductor Complex that is already under construction with investment from SK Hynix. Specifics of the Yongin National Semiconductor Complex are as follows.[1]

1 Korea Land and Housing Corporation, Yongin Advanced System Semiconductor Cluster National Industrial Complex Industrial Complex Plan Approval Application (Summary), 2024. 4.

- **(Title)** Development Project of Yongin National System Semiconductor Industrial Complex
- **(Location/Total Area)** Idong-eup and Namsa-eup, Cheoin-gu, Yongin-si, Gyeonggi-do, Republic of Korea / 7,280,863m²
- **(Land Use)** Area Under Management (37.1%), Urban Area (22.9%), Agricultural Area(40.0%)
- **(Developer)** Korea Land and Housing Corporation
- **(Budget)** 90,637 Billion KRW (exc. overhead cost)
- **(Date)** 2024 ~ 2031
- **(Sectors)** Electronic Part, Communication Equipment, Chemical Product etc.

The Yongin National Semiconductor Complex aims to promote the growth of the semiconductor industry, which has been designated as one of the "National High-Tech Industries" due to its significant contribution to the Korean economy as the leading export industry over the last three years.[2] The government hopes that the Yongin National Semiconductor Complex will create synergies with the currently under-construction Yongin Semiconductor Complex (Invested by SK Hynix) and other existing semiconductor industrial complexes, all located in the Gyeonggi-do region.[3]

Samsung plans to make substantial investments in the national complex, pledging 360 trillion KRW (US$2.6 trillion) to construct 6 new factories (hereinafter fabs). Through the investment, it plans to close the gap with its main competitor, TSMC, which currently holds a dominant market share in the foundry sector. As of Q4 2023, the market share gap between the two companies widened: from third quarter's 45.5% to 49.9%. Samsung, despite being the second biggest foundry manufacturer, had a relatively lower market share of 11.3% compared to TSMC's 61.2%.[4]

2 E-Nation Index, Top 10 Export and Import Items (1996-2023),(https://www.index.go.kr/unity/potal/indicator/IndexInfo.do?idxCd=2455)

3 Korea Land and Housing Corporation, Yongin Advanced System Semiconductor Cluster National Industrial Complex Plan Approval Application, 2024. 4.

4 Kim Jung-nam, "Samsung's Kyung Kye-hyun 'Semiconductor turning point opportunity this year, AI will win', E-Daily, https://www.edaily.co.kr/news/read?newsId=01623606638884656&mediaCodeNo=257&OutLnkChk, 1 May 2024.

02. Fossil-fuel Expansion for Semiconductor Complex

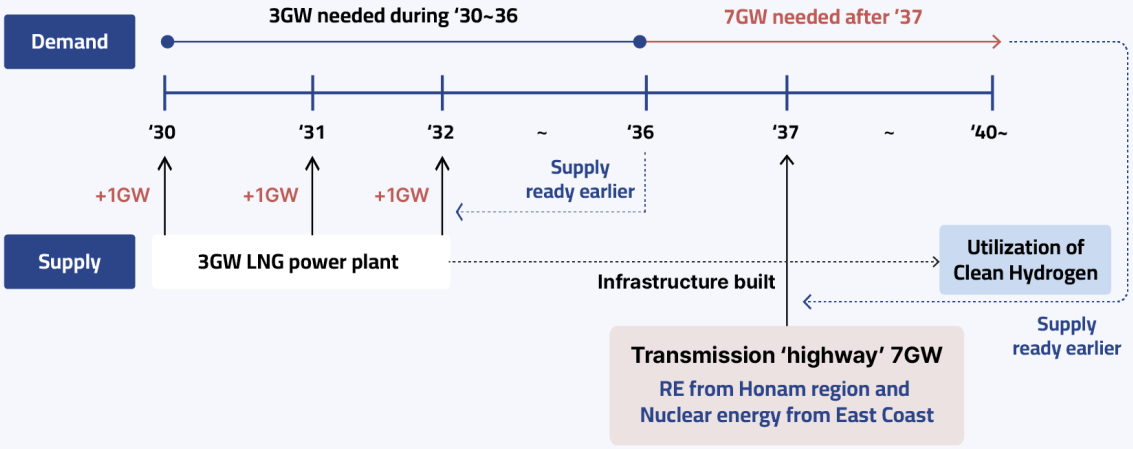
» Electricity Supply Plan with New LNG Power Plants

It is questionable whether the fossil fuel-based Yongin National Semiconductor Complex will be able to meet its objective of enabling the Korean semiconductor industry to take the next leap as competition to produce greener chips intensifies.

③ Electricity Supply Plan

- **Construction of power plants within the complex to meet short-term demand, expansion of long-distance transmission lines to follow**
- **Based on Carbon Free Electricity** (dependent on technological development)

〈 Electricity Supply Plan 〉



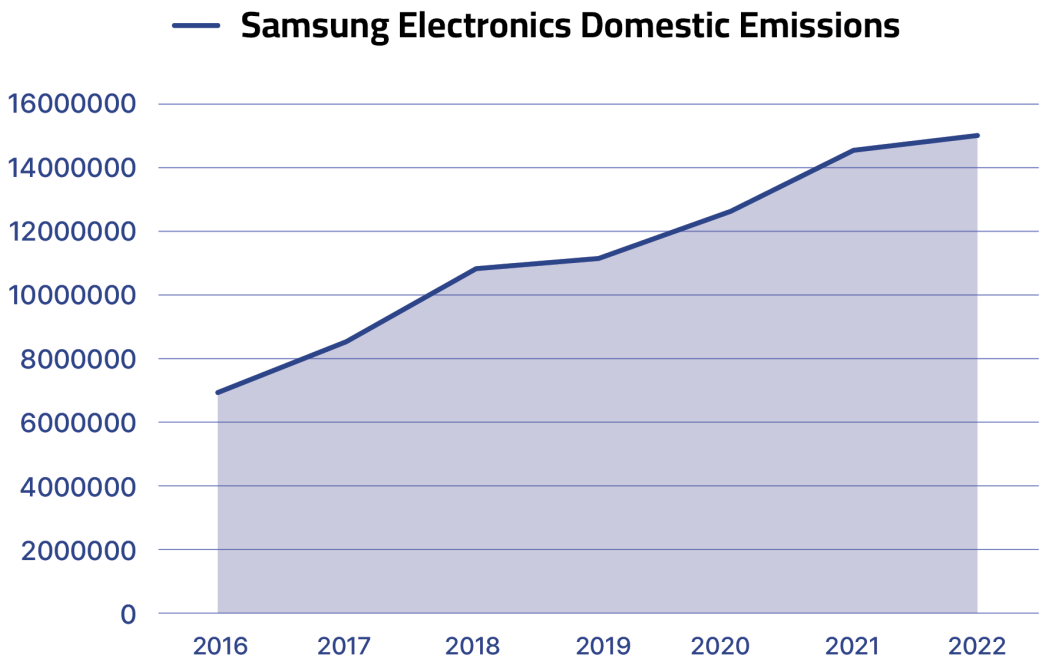
The government expects that the Yongin National Semiconductor Complex will require about 10GW of electricity upon its completion in 2050. To meet short-term electricity demand, the government plans to build 3GW of LNG power plants.[5] In the medium term, the government intends to make use of the East Sea HVDC transmission line, currently under construction,[6] to tap into the underutilized coal-fired power plants due to delays

5 Ministry of Trade, Industry and Energy, Timely supply of electricity to high-tech specialised complexes, one-team response press release, 27 February 2024.

6 Park Sang-yong, "Strategic Industrial Competition in Korea from AI to Semiconductors...The Key is 'Electricity'", KBS https://n.news.naver.com/article/056/0011700470?sid=102, 12 April 2024

in completion of the East Sea HVDC.[7] As such, the government's current plan mainly relies on fossil fuel power plants, with promises for clean energy transition after 2037. The current plan essentially postpones the responsibility for energy transition to future administrations.

» Samsung Electronics' RE100 Progress



Source: 뉴스워치[8]

Samsung Electronics' emissions in Korea have increased rapidly from 2016 to 2022, making it the biggest electricity consumer and the 8th biggest emitter of greenhouse gases. According to Samsung's report to the Carbon Disclosure Project (CDP), based on 2022 data, 93% (14.92million tCO_2-eq) of Samsung's total emissions were emitted in Korea and 60% (8.94million tCO_2-eq) of the emissions were from Scope 2 emissions based on electricity and steam consumption.[9]

7 Ryu Ho-joon, "Even if I produce electricity, I can't send it"...East Coast coal power plant transmission disruption 'serious', https://n.news.naver.com/article/087/0001042062?sid=102, 2024. 05. 02.

8 Choi Yang-soo, "[Carbon Neutrality White Paper ② - Samsung Electronics] Backtracking on carbon neutrality, 'New Samsung' with only slogans...but there is hope", Newswatch, https://www.newswatch.kr/news/articleView.html?idxno=67637, 25 March 2024

9 CDP, Samsung Electronics - Climate Change 2023, 2023

Samsung is relying heavily on the Green Premium option to procure renewable energy in South Korea. However, this option has known greenwashing risks as it has very low additionality and is not recognized as emissions reduction in Korea.[10] According to Samsung's Sustainability Report 2022, its current progress in procuring renewables in Korea is as follows:

> *"Our Suwon and Giheung business sites are equipped with 1.9MW-capacity and 1.5MW-capacity photovoltaic power generators, respectively. Our Pyeongtaek business site has a 0.4MW-capacity photovoltaic power generator and a 200RT-capacity geothermal power generator. In 2021, we installed a 0.08MW-capacity photovoltaic power generator at the Onyang business site, and we plan to install 0.2MW at the Onyang business site, and 0.15MW at the Gumi business site in 2022. Additionally, we purchased 490GWh of renewable energy through the Green Premium program introduced in 2021. We plan to keep installing photovoltaic and geothermal power generators and to expand our Green Premium purchase."* [11]

» Korea's Power Sector Decarbonization

In 2022, solar and wind energy accounted for only 5.4% of Korea's power mix at 32TWh.[12] This means that for Samsung Electronics to achieve RE100, it would need to purchase 67% (21.7TWh) of all the solar and wind energy available in Korea. Combined, RE100 companies in Korea currently have more than 60TWh of electricity demand[13] and total corporate demand for renewables is expected to increase to between 157TWh and 2TWh by 2030.[14] Hence, the current share of renewable energy in Korea is insufficient to meet the renewable energy demand of RE100 companies. The 2030 renewable energy

10 Hyunkyung Kim, Is Greenhouse Gas Reduction through Green Premiums "Greenwashing"?, ESG Economy, https://www.esgeconomy.com/news/articleView.html?idxno=6059, 11 March 2024.

11 Samsung Electronics, Sustainability Report 2023, pg. 23, n.d.

12 Ember, Global Electricity Review 2023, 2023. 04. 12.

13 Solutions for Our Climate, "[Press Release] Renewable Energy Demand Rapidly Increasing...Electricity Consumption of RE100 Companies in Korea Exceeds 10% of Total", https://forourclimate.org/sub/news/보도자료-가파르게-늘어나는-재생에너지-수요-국내-re100-기업들-전력-소비-전체-10-넘어섰다, 7 March 2024.

14 Plan 1.5, 2030 Domestic Renewable Energy Demand Forecast Report, 2023. 3.

target under the 11th Basic Electricity Supply and Demand (Draft) is also not enough to meet future corporate renewable energy demand.[15] The government's decision to build LNG power plants in the Yongin National Semiconductor Complex, which will operate well past 2050, makes it very challenging for corporations investing in the cluster to achieve decarbonization.

» Risks to Samsung Electronics' Competitiveness

There are two major risks that Samsung faces from its investment in the fossil fuel-based Yongin National Semiconductor Cluster:

> *1) Loss of market share from failing to meet clients' demand*
>
> *2) Lower profitability from increasing carbon and renewable energy procurement costs.*

1) Loss of market share from failing to meet clients' demand

The NEXT Group's report "Climate Risks Faced by Korean Industry, Profit and Loss Analysis" concluded that approximately 19% of Samsung's semiconductor sales would be exposed to climate risks.[16] This analysis was based on the fact that semiconductor consumers have, on average, set their RE100 target for 2028 and hence are expected to start excluding suppliers that fail to meet their demand for renewable energy use beginning in 2025.

15 Ministry of Trade, Industry and Energy, 11th Electricity Supply and Demand Basic Plan Working Draft, 31 May 2024.

16 NEXT Group, Profit and Loss Impact Analysis of Climate Risks Facing Korean Industries, 28 January 2022.

Samsung Electronics Device Solution (DS) Division Clients' Carbon Neutrality Progress

Corporation	Apple	Qualcomm	Dell Technologies	Microsoft
Sign-up to RE100	○		○	○
100 Percent Renewable Energy Progres	100% (2018)	N/A	2040 100% RE Target	100% (2014)
Scope 3 Emissions Reduction Target	100% Reduction by 2030	100% Reduction by 2040	45% Reduction by 2030 from Bought Services and Goods	100% Reduction by 2030

Source: Website and sustainability report of each corporation, reorganized by SFOC

Samsung Semiconductor's major clients have earlier and more ambitious RE100 and Scope 3 emissions reduction targets than those of Samsung Electronics. To meet these targets, clients are expected to start measuring the emissions profile of different suppliers and only purchase from suppliers who are aligned with their reduction target. This is a big issue for Samsung because it trails behind its competitors in renewable energy usage. This means that unless Samsung rapidly increases renewable energy uptake, it would start losing market share to its competitors.

Main Competitors to Samsung's DS Division Renewable Energy Uptake

Corporation	TSMC	Intel
Sign up to RE100	O	O
100 Percent Renewable Energy Progress	10% (2022)	93% (2023)
100 Percent Renewable Energy Target	100% Renewable Energy Target by 2040[17]	100% Renewable Energy Target by 2030[18]

Source: Website and sustainability report of each corporation, reorganized by SFOC

17 TSMC, "TSMC Accelerates Renewable Energy Adoption and Moves RE100 Target Forward to 2040", 2023. 09. 15

18 Intel, "Intel Technology Helps Power Solution for a More Resilient Grid", 2023. 11. 27

In September 2023, TSMC announced that it would increase its 2030 renewable energy target from 40% to 60%, while moving forward its 2050 RE100 target to 2040.[19] TSMC also announced the signing of a 920MW scale offshore wind PPA with Orsted,[20] and a 20,000GWh scale Solar PPA with Ark Power for 20 years.[21] Considering that the share of solar and wind energy in Taiwan's energy mix is similar to Korea at only 5 percent,[22] TSMC's large-scale investment shows its effort to solidify its leading position in the foundry sector.

2) Lower profitability due to increasing carbon and renewable energy procurement costs

McKinsey & Company identified three key factors for a country to attract semiconductor companies: 1) supply chain security, 2) sustainability, and 3) subsidies. It points out that when it comes to sustainability, Asian countries have relatively higher renewable energy costs compared to the US. Companies aiming to achieve 100% renewable energy usage would likely have to pay two to four times more in Asia than in the US.[23] For instance, based on 2022 data, the Levelized Cost of Electricity (LCOE) of Solar PV projects exceeding 20MW (cheapest) was 128,000 KRW per MWh[24] in Korea, which is 1.8 to 2.3 times more expensive than in the U.S, where it ranges from US$40 to US$50 per MWh.[25]

Samsung has been benefitting from lenient emission regulations under the Korea Emissions Trading Scheme (K-ETS). Between 2015 and 2022, Samsung earned 237 billion KRW from surplus emissions credits.[26] However, the government has set the industrial emissions reduction target to drastically

19 TSMC, "TSMC Accelerates Renewable Energy Adoption and Moves RE100 Target Forward to 2040", 2023. 09. 15

20 Orsted, "Ørsted and TSMC sign the world's largest renewables corporate power purchase agreement", 2020. 08. 07

21 TSMC, "TSMC Signs 20,000 GWh Renewable Energy Joint Procurement Contract with ARK Power", 2023. 04. 21

22 Gavin Maguire, Taiwan aims to shed dirty power reputation with big wind push, Reuters, 2023. 09. 29.

23 McKinsey Consulting, "Exploring new regions: The greenfield opportunity in semiconductors", 2024. 01. 29.

24 Geun-Dae Lee and Ki-Hwan Kim, Establishment and operation of a mid- to long-term LCOE forecasting system for expanding renewable energy supply, 2020

25 Bloomberg NEF, The 2024 Sustainable Energy in America Factbook, 2024. 02. 28.

26 Plan 1.5, [Climate Proposal] The Last Emergency Exit to the 1.5 Road: How to Reform the Emissions Trading System for the Fourth Plan Period, 8 February 2024.

increase from 2029, which will lead to significant financial burden for companies like Samsung. Worse still, Korea does not include NF3, a greenhouse gas emitted during semiconductor manufacturing and 17,200 times more potent than CO2, in the emissions trading scheme. However, because NF3 is internationally recognized under the climate-related disclosure standard ISSB S2, Korea would need to change its emissions standard to include NF3 moving forward.[27] Once this change takes place, Samsung's emissions would further increase, leading to an even bigger financial burden under the K-ETS.

On May 12th, 2024, Net Zero Industrial Policy Lab at Johns Hopkins University released a report titled 'South Korea's promise and pitfalls in the cold war clean energy race: autos, batteries and chips supply chains' showing that Korea is losing the Green Semiconductor race to Taiwan and Japan. The report warns that "there is a long lead time to making chips fabs and clusters, so there is a high risk of future stranded investments if the wrong electricity choices are made now."[28] Samsung's investment into the LNG-based Yongin National Semiconductor Complex would likely fall under the case of choosing the 'wrong electricity' type.

Despite making significant investments in the Yongin National Semiconductor Complex that will lead to substantial emissions increases, Samsung Electronics has yet to announce a roadmap to achieve the 2050 RE100 target. Hence, there is growing concern that Samsung Electronics would face a decreasing market share and increasing costs. To mitigate such financial risks, Samsung Electronics needs to actively invest in building a renewable energy-based Yongin National Semiconductor Complex and announce a transparent pathway for procuring renewables in the medium to long term.

27 Kim Yang-hyuk, "Semiconductor, Display Manufacturing Core 'NF3' Greenhouse Gas Designated..."No Alternative Candidates", Shipbuilding Business,

28 Net-Zero Policy Lab, "South Korea's promise and pitfalls in the cold war clean energy race: autos, batteries and chips supply chains", 2024. 05. 12

3) Yongin National Semiconductor Complex Prevents Korea's Carbon Neutrality

LNG and Yearly Emissions Expected from Yongin National Semiconductor Complex

According to Solutions for Our Climate (SFOC)'s report, to limit global warming to 1.5 °C above pre-industrial levels, emissions from Korea's power sector needs to be zero by 2034. This means that power generation from LNG power plants needs to decrease by 60% by 2030 from the 2022 baseline, and LNG power plants need to be phased out by 2034. However, under the 10th Basic Plan for Electricity Supply and Demand, the government plans to transition 14.1GW of coal-fired power plants to LNG power plants.[29] Of this, 3GW is planned to be built in the Yongin National Semiconductor Complex to meet its electricity demand.[30]

Expected emissions of the complex

(Unit : tCO2eq/year)

Sector	Expected Emissions			Note
	2032'	2040'	2050'	
Net Emissions(A-B)	17,224,265.52	23,845,913.52	33,776,876.40	-

29 Ministry of Trade, Industry and Energy, 10th Basic Plan for Electricity Supply and Demand, 13 January 2023.

30 Kang Hee-jong, "6 LNG plants in Yongin Semiconductor Complex...14.7 trillion won in policy finance for four industries", https://www.asiae.co.kr/article/2023122210174638790#:~:text=%EC%A0%9C4%EC%B0%A8%20%EA%B5%AD%EA%B0%80%EC%B2%A8%EB%8B%A8%EC%A0%84%EB%9E%B5%EC%82%B0%EC%97%85%EC%9C%84%EC%9B%90%ED%9A%8C%20%EA%B0%9C%EC%B5%9C&text=%EC%A0%84%EB%A0%A5%20%EC%88%98%EA%B8%89%EB%82%9C%EC%9D%B4%20%EC%98%88%EC%83%81%EB%90%98%EB%8A%94,%EA%B8%88%EC%9C%B5%EC%9D%84%20%EC%A7%80%EC%9B%90%ED%95%A0%20%EC%98%88%EC%A0%95%EC%9D%B4%EB%8B%A4.

Source of Emissions	Total Emissions(A)		17,223,510.96	23,845,158.96	33,777,630.96	-
	Transportation		2,871.83			Emissions from daily traffic
	Public/ Commercial		6,444.20			Emissions from public/ commercial fuel and electricity use
	Industrial		17,169,147.82	23,790,795.82	33,723,267.82	Emissions from industrial fuel and electricity use
	Residential		30,045.54			Residential emissions from fuel and electricity use
	Waste		15,001.57			Emissions from waste disposal
	Agricultural		NO			No agricultural land within the complex
Carbon Sink	Total absorbed(B)		754.56			-
	LULUCF	Absorbed	754.56			Carbon absorption from parks and green space

Annotation

1. Expected emissions for 2032, 2040 and 2050 calculated based on Samsung Electronics' FAB operation plan
2. NO: Not Occurring
3. LULUCF: Land Use, Land-Use Change and Forestry
4. Emissions calculated based on Samsung Electronics' FAB operation plan

According to the Climate Change Impact Assessment Report for the Yongin National Semiconductor Complex, yearly emissions from the complex are projected to amount to 17.2 Million tCO_2-eq by 2032, 23.8 Million tCO_2-eq by 2040, and 33.7 Million tCO_2-eq by 2050.[31] Without a complete overhaul of the current plan to signifcantly reduce its emissions, the current Yongin National Semiconductor Complex is incompatible with the National Framework Act On Carbon Neutrality And Green Growth For Coping With Climate Crisis that sets the national goal of achieving carbon neutrality by 2050.

Global Methane Pledge

LNG is composed mainly of methane (80 to 90%), and methane is the second-biggest source of climate change after carbon dioxide. Methane reduction is especially important because it has 82 times bigger Global Warming Potential (GWP) than carbon dioxide, which means that about 25% of today's global warming is driven by methane from human actions.[32] Korea, as the third-biggest LNG importer, relies heavily on foreign energy sources; a significant amount of methane emissions come from leakage that takes place during LNG fracking, liquification, and transportation.[33]

Korea joined the Global Methane Pledge, promising to cut its methane emissions by 30% from 2020 levels by 2030. Based on 2020 data, 21.7% of its total methane emissions (5.9 million tons) came from the energy sector, and the government plans to reduce methane emissions by 28.6% (1.8 million tons) by 2030.[34] To achieve this objective, the government will need to reduce methane leakage through the utilization of capture technology, and more importantly, reduce LNG generation and LNG demand. However, the current plans to expand LNG would make it very difficult for Korea to achieve its target under the Global Methane Pledge.

31 Korea Land and Housing Corporation, Yongin Advanced System Semiconductor Cluster National Industrial Complex Industrial Complex Plan Approval Application (Summary), 2024. 4.

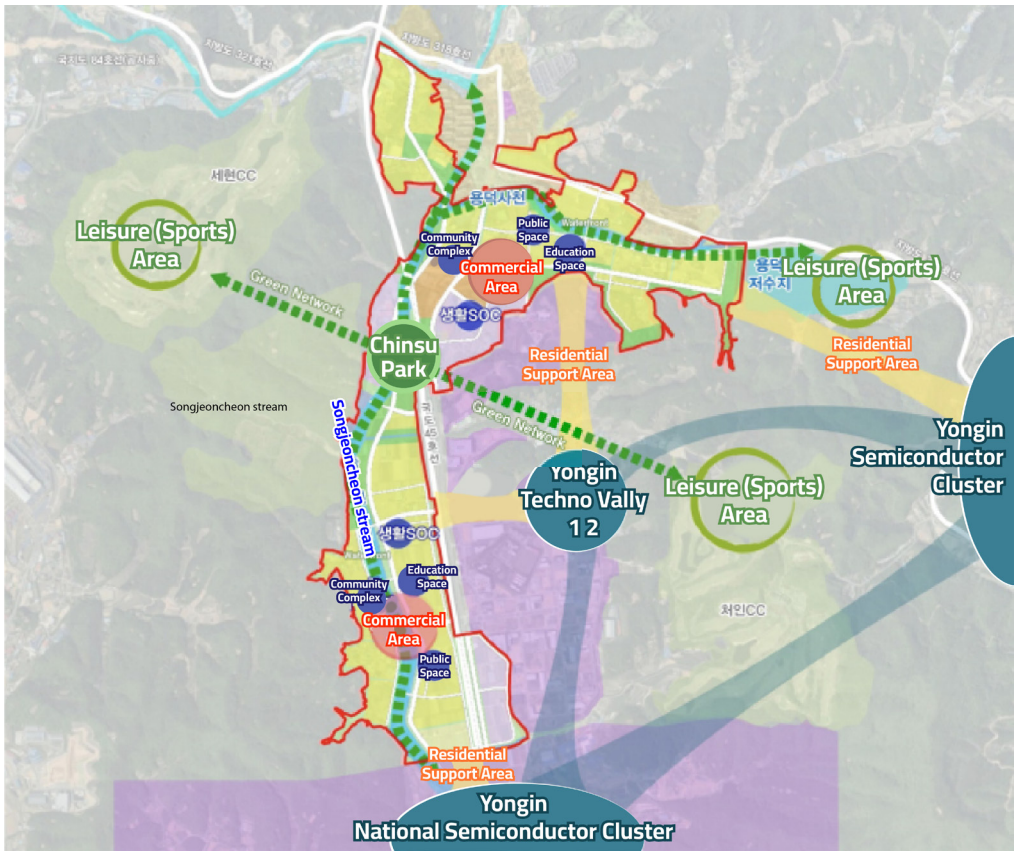
32 Environmental Defense Fund, "Methane: A crucial opportunity in the climate fight", n.d.

33 Solutions for Our Climate, " Industry Trends Brief No.2 - Unmasking the Hidden Culprit Beyond CO2: Methane", 31 May 2023.

34 Ministry of Foreign Affairs, "Joining efforts to reduce methane to combat the global climate crisis", 25 October 2021

Health Impact of LNG Power Plants

Under the Yongin National Semiconductor Complex plan, a residential area for 270 households would be built within the complex.[35] In addition, Yongin City plans to build Idong New Town adjacent to the Semiconductor Complex, where about 16,000 households would be moving in.[36] There are significant health concerns associated with building 3GW LNG power plants right next to a highly populated residential area.



Source: 서울경제

According to SFOC's report "Bridge to Death: Air Quality And Health Impacts of Fossil Gas Power," under the policy scenario based on the 9th Basic Plan for

35 Korea Land and Housing Corporation, Yongin Advanced System Semiconductor Cluster National Industrial Complex Industrial Complex Plan Approval Application (Summary), 2024. 4.

36 Seoul Economic Daily, Yongin Mobile Public Housing District Completion Time Delayed by 2-3 Years, https://www.sedaily.com/NewsView/2D7ZXUQ6C8#:~:text=%EC%9A%A9%EC%9D%B8%EC%8B%9C%EB%8A%94%20'%EC%9A%A9%EC%9D%B8%20%EC%B2%A8%EB%8B%A8%20%EC%8B%9C%EC%8A%A4%ED%85%9C,%EC%A0%84%EB%A7%9D%EB%90%9C%EB%8B%A4%EA%B3%A0%2021%EC%9D%BC%20%EB%B0%9D%ED%98%94%EB%8B%A4, 2024. 21. April

Electricity Supply and Demand, gas power generation is estimated to cause up to 859 premature deaths per year and 23,200 premature deaths until 2064.[37] The main source of premature death was identified as nitrogen dioxide (NO2), which the World Health Organization identifies as one of the "pollutants with the strongest evidence for public health concern."[38] Most importantly, children are most severely affected by NO2, with research showing that about 4 million cases of child asthma each year can be attributed to NO2 emissions.[39] The 3GW of LNG power plants would likely pose significant health risks to residents of Idong New Town.

4. Way Forward

For the Yongin National Semiconductor Complex to achieve its goal of enabling the Korean semiconductor industry's next leap without derailing Korea's 2050 carbon neutrality pathway and infringing upon Idong New Town residents' rights to health, the paper proposes the following actions:

— *The government, along with Gyeonggi-do and Samsung Electronics, should draw up a roadmap for a renewable energy (RE)-based Yongin National Semiconductor Complex and implement it.*

— *Following the roadmap for the RE-based Yongin National Semiconductor Complex, the government should move quickly to enable the permitting of new renewable energy projects and ensure that the grid operation plan is adapted accordingly. In addition, any budget allocations and changes in relevant regulations needed to carry out the roadmap should be promptly implemented.*

— *Gyeonggi-do, under the Gyeonggi RE100 campaign, should proactively support the creation of a RE-based Yongin National Semiconductor Complex. Gyeonggi-do has*

37 Solutions for Our Climate, Bridge to Death: Air Quality And Health Impacts of Fossil Gas Power, 2021

38 WHO, Air quality, energy and health, https://www.who.int/teams/environment-climate-change-and-health/air-quality-and-health/health-impacts/types-of-pollutants, n.d.

39 Pattanun et al.,Global, national, and urban burdens of paediatric asthma incidence attributable to ambient NO2 pollution: estimates from global datasets, 2019. 04

> *an important role in updating the distancing regulation for solar PV generation and proposing ways to utilize the province's renewable energy potential. Gyeonggi-do's role in facilitating a profit-sharing scheme between Gyeonggi residents and corporations would be crucial for the success of the RE-based Yongin National Semiconductor Complex.*
>
> *— Samsung Electronics should expedite its investment to achieve its 2050 net-zero target and create a RE-based Yongin National Semiconductor Complex. In particular, Samsung needs to lay out a transparent medium to long-term decarbonization plan in Korea and carry it out responsibly.*

The creation of the RE-based Yongin National Semiconductor Complex would reduce emissions not only for Samsung but also for other major semiconductor suppliers hosted in the complex. This means that Samsung would likely be able to reduce its scope 3 emissions while strengthening the domestic semiconductor industry's position in the race for greener chips. Most importantly, it would greatly reduce health threats to nearby residents. Hence, it is time for the government, Gyeoggi-do, and Samsung to create a strong public-private partnership to make the RE-based Yongin National Semiconductor Complex a reality.

1 Korea Land and Housing Corporation, Yongin Advanced System Semiconductor Cluster National Industrial Complex Industrial Complex Plan Approval Application (Summary), 2024. 4.

2 E-Nation Index, Top 10 Export and Import Items (1996-2023),(https://www.index.go.kr/unity/potal/indicator/IndexInfo.do?idxCd=2455)

3 Korea Land and Housing Corporation, Yongin Advanced System Semiconductor Cluster National Industrial Complex Plan Approval Application, 2024. 4.

4 Kim Jung-nam, "Samsung's Kyung Kye-hyun 'Semiconductor turning point opportunity this year, AI will win', E-Daily, https://www.edaily.co.kr/news/read?newsId=01623606638884656&mediaCodeNo=257&OutLnkChk, 1 May 2024.

5 Ministry of Trade, Industry and Energy, Timely supply of electricity to high-tech specialised complexes, one-team response press release, 27 February 2024

6 Park Sang-yong, "Strategic Industrial Competition in Korea from AI to Semiconductors...The Key is 'Electricity'", KBS https://n.news.naver.com/article/056/0011700470?sid=102, 12 April 2024

7 Ryu Ho-joon, "Even if I produce electricity, I can't send it"...East Coast coal power plant transmission disruption 'serious', https://n.news.naver.com/article/087/0001042062?sid=102, 2024. 05. 02.

8 Choi Yang-soo, "[Carbon Neutrality White Paper ② - Samsung Electronics] Backtracking on carbon neutrality, 'New Samsung' with only slogans...but there is hope", Newswatch, https://www.newswatch.kr/news/articleView.html?idxno=67637, 25 March 2024.

9 CDP, Samsung Electronics - Climate Change 2023, 2023

10 Hyunkyung Kim, Is Greenhouse Gas Reduction through Green Premiums "Greenwashing"?, ESG Economy, https://www.esgeconomy.com/news/articleView.html?idxno=6059, 11 March 2024.

11 Samsung Electronics, Sustainability Report 2023, pg. 23, n.d.

12 Ember, Global Electricity Review 2023, 2023. 04. 12.

13 Solutions for Our Climate, "[Press Release] Renewable Energy Demand Rapidly Increasing...Electricity Consumption of RE100 Companies in Korea Exceeds 10% of Total", https://forourclimate.org/sub/news/보도자료-가파르게-늘어나는-재생에너지-수요-국내-re100-기업들-전력-소비-전체-10-넘어섰다, 7 March 2024.

14 Plan 1.5, 2030 Domestic Renewable Energy Demand Forecast Report, 2023. 3.

15 Ministry of Trade, Industry and Energy, 11th Electricity Supply and Demand Basic Plan Working Draft, 31 May 2024.

16 NEXT Group, Profit and Loss Impact Analysis of Climate Risks Facing Korean Industries, 28 January 2022.

17 TSMC, “TSMC Accelerates Renewable Energy Adoption and Moves RE100 Target Forward to 2040”, 2023. 09. 15

18 Intel, “Intel Technology Helps Power Solution for a More Resilient Grid”, 2023. 11. 27

19 TSMC, “TSMC Accelerates Renewable Energy Adoption and Moves RE100 Target Forward to 2040”, 2023. 09. 15

20 Orsted, “Ørsted and TSMC sign the world’s largest renewables corporate power purchase agreement”, 2020. 08. 07

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Solutions for Our Climate (SFOC) is an independent nonprofit organization that works to accelerate global greenhouse gas emissions reduction and energy transition. SFOC leverages research, litigation, community organizing, and strategic communications to deliver practical climate solutions and build movements for change.