

2050 Carbon Neutral Strategy of Incheon Metropolitan City

Environment and Climate Policy Division



인천광역시
Incheon Metropolitan City



환경특별시 인천

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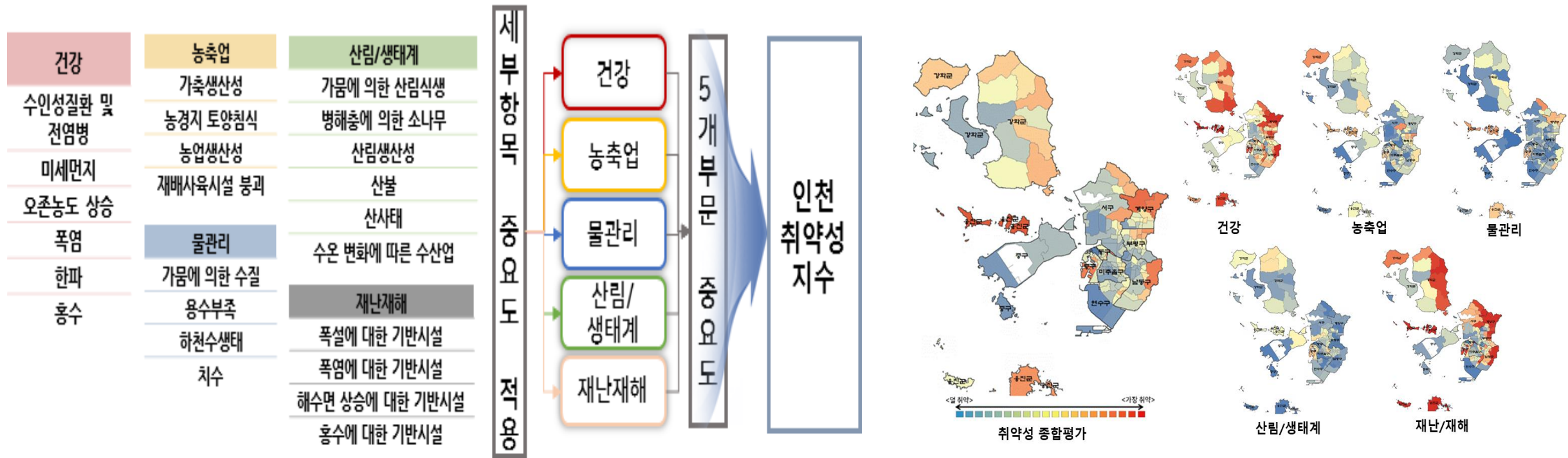


Chapter **1**

Incheon's Efforts to Respond
to Climate Change

❖ Assessment of Climate Change Impact and Vulnerability (1st in Korea)

- Assessment of optimized climate change adaptation measures and vulnerability based on regional conditions
- Set priorities for adaptation measures by sector and district (*gun, gu*) and identify key measures

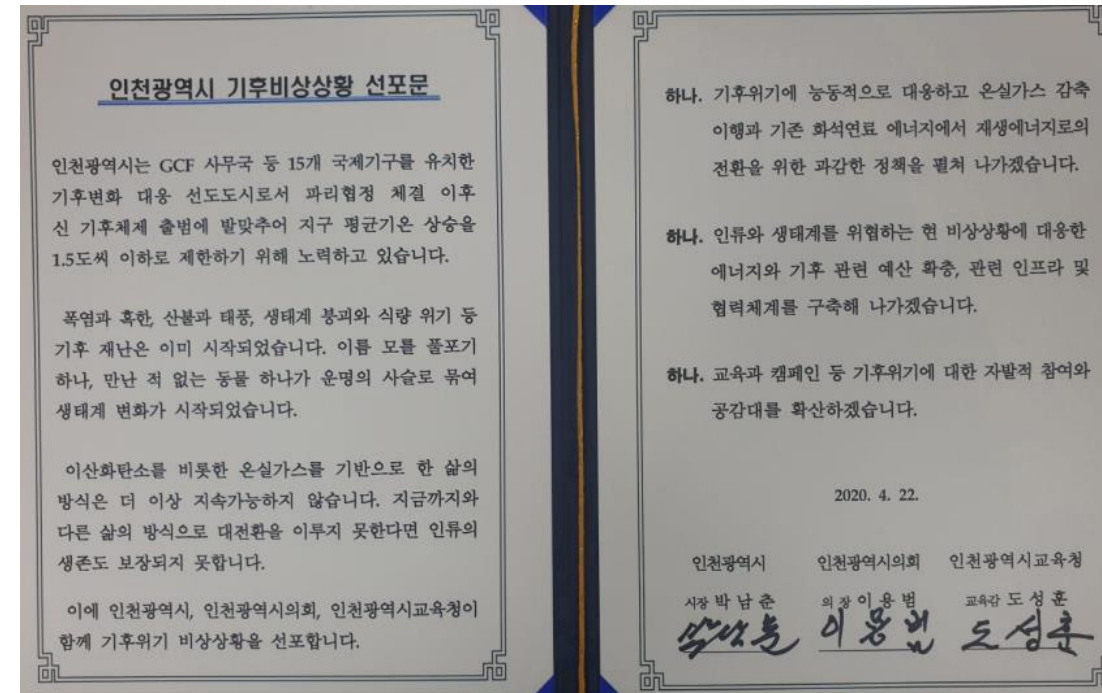


<Incheon Metropolitan City Climate Change Vulnerability Index Calculation Method>

❖ Declaration of Climate Emergency

- Date: April 22, 2020
- Venue: Incheon City Hall
- Attendees: Mayor of Incheon, Chairman of Incheon Metropolitan Council, Superintendent of Incheon Metropolitan Office of Education, Incheon Climate Crisis Emergency Action

- ❖ Response to the climate crisis, efforts for greenhouse gas reduction goals, expansion of climate-related budget and infrastructure
- ❖ Increased voluntary participation in activities such as education and campaigns



I. Incheon's Efforts to Respond to Climate

❖ Joint Declaration on Carbon Neutrality at Inauguration Ceremony of Association of Local Governments for Carbon-Neutral Actions

- Date: Jul. 7, 2020
- Venue: COEX
- Host/Organizers: IPCC/ Meteorological Administration, Incheon Metropolitan City
- Participants: 80 metropolitan cities and local governments

인천시 “탄소중립 지방정부 실천연대” 발족식 참여

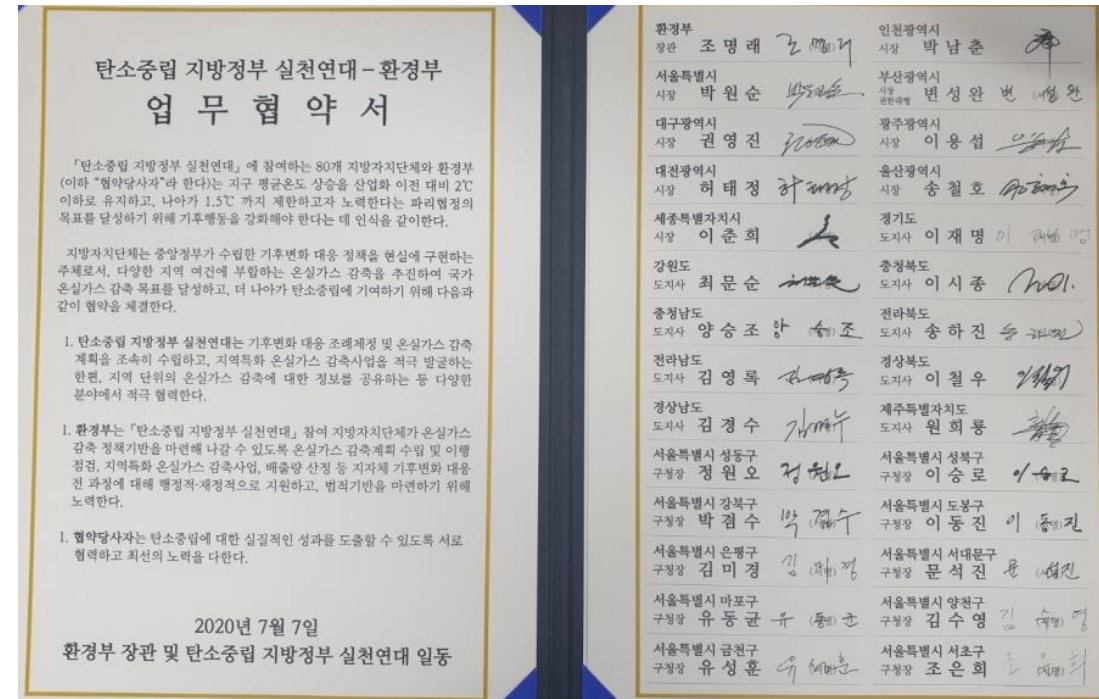
기후변화 대응 선도도시 인천... 온실가스 발생량 감축

이훈만 기자

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- ❖ Joint recognition of local governments' will for climate action
- ❖ Sharing of best practices and mutual cooperation

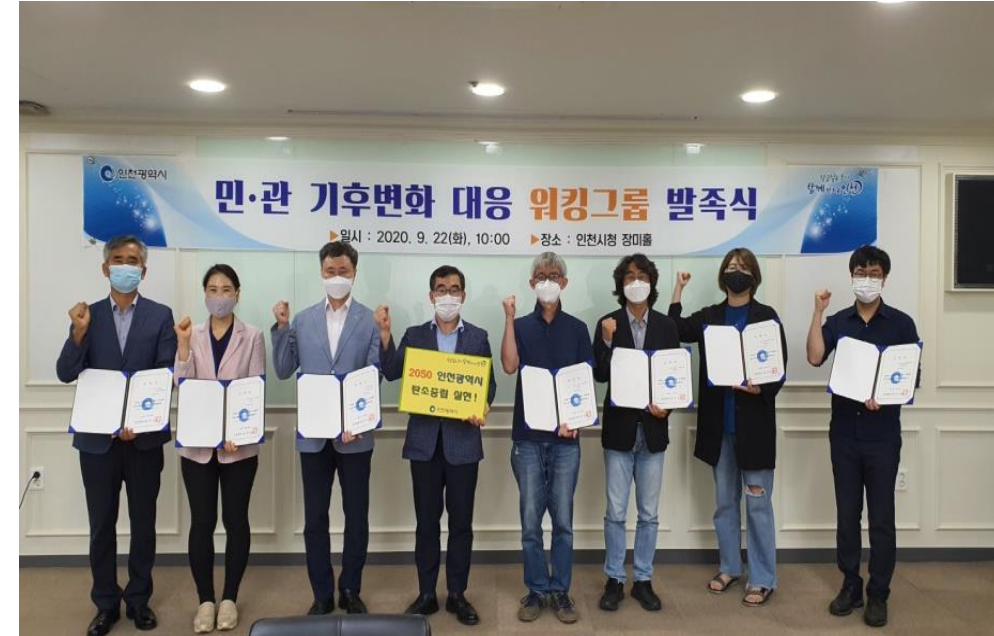


❖ Establishment of a Public-private climate working group

➤ Date: Sept. 22, 2020

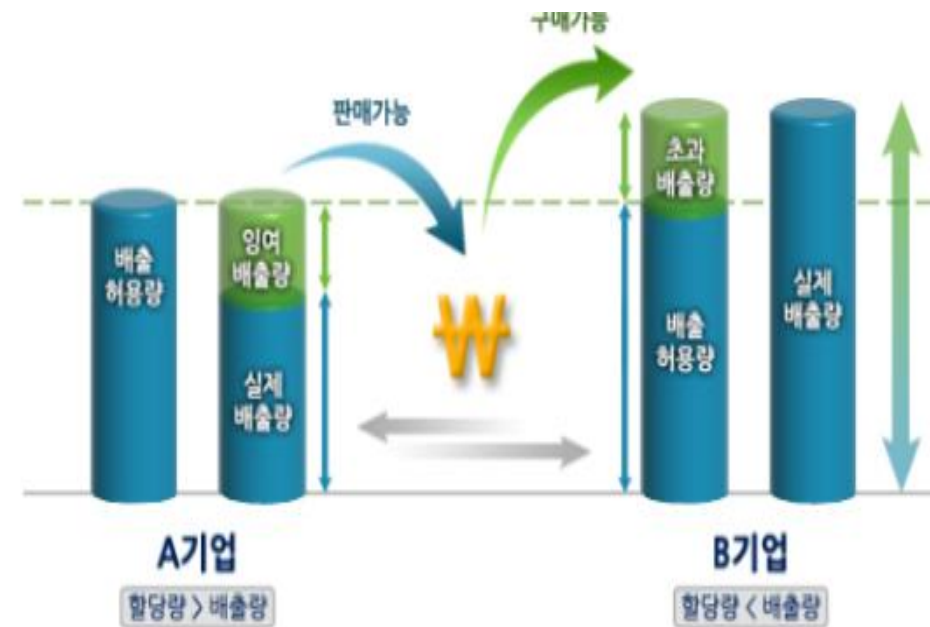
➤ Main Activities

- Policy advice and evaluation related to climate change response(adaptation)
- Discovering and consulting on GHG reduction measures in the industrial sector
- Discovering and consulting on GHG reduction measures in the non-industry sector (building, public sector, transportation, livestock, waste, etc.)



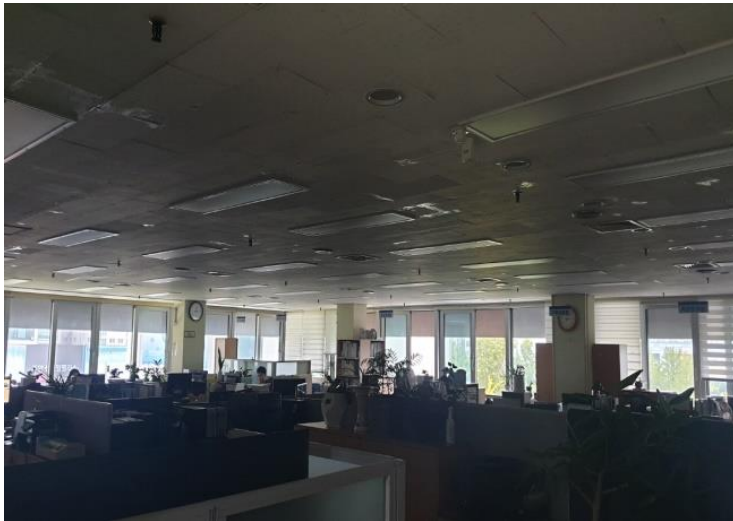
- ❖ Secured non-tax income of USD 664,390 through the GHG emission trading system
 - Target facilities: 34 basic environmental facilities (16 waterworks, 13 sewage facilities, 15 waste facilities)
 - Period: 2nd planning period (2018 – 2020, 3-year plan)
 - Goal: Comply with the government allocated emission quota in the 2nd planning period
 - Sold 52,417t (worth USD 664,390) out of 77,417t of emission credits, securing 25,000t

"근무시간에 주식 거래를?" 인천시 기후대응팀 오해의 일상



- ❖ Ranked 1st in the nation in terms of achieving GHG goals in the public sector (buildings, vehicles, etc.)
 - Target: Incheon Metropolitan City (a total of 774 public sector facilities nationwide)
 - Facilities: Buildings and vehicles (43 places including direct agencies)
 - Goal: 30% reduction compared to the emission standard by 2020
- ❖ Compared to the 2020 goal of 30%, Incheon achieved 55.4%

❖ Various efforts to reduce GHG emissions including turning off lights, adjusting heating and cooling temperatures, prohibiting use of disposable products in the city hall building, replacing LED lights, operating an automatic control system, and improving facilities





Chapter 2

Carbon Neutral Strategy of Incheon

1. 2030 Greenhouse Gas Reduction Plan
2. Establishment of 2050 Carbon Neutral Strategy
3. Coal Phase-out Strategy
4. Renewable Energy

1. GHG reduction goals for 2030 and 2040

❖ Establishment of the 3rd Comprehensive Climate Change Response Plan (Apr. 2021)

- Compared to 2018 emissions (66 million tons), 30.1% reduction by 2030, 80.1% reduction by 2040
- Targets can be achieved if reduction efforts are strengthened, coal-fired power plants are switched to, and closed 3-4 years earlier

⇒ Reduction projects by strategy: 3 major strategies, 160 detailed projects to reduce GHG emissions

| Vision | Incheon, a carbon-neutral city that safely overcomes the climate crisis with citizens | | |
|-----------------------------|--|--|--|
| Goals | Formation of leading carbon-neutral city infrastructure | Implementation of 1.5°C climate safety and green welfare | Building of citizen-participating infrastructure |
| Strategies | Realization of de-coal and expansion of clean renewable energy | Establishment of safe climate change adaptation system | Reinforcement of climate crisis response system through Incheon's Green New Deal |
| Initiatives & Main projects | Expansion of new renewable energy supply - Offshore wind farm development - Operation of landfill gas resource recovery plants - New renewable energy convergence support project | Strengthening of public health and healthcare response system - Establishment of safety nets against infectious diseases in response to climate change - Health care for vulnerable groups in preparation for heat and cold waves - Extensive provision of environmental welfare services for the vulnerable | Citizen-participating training and publicity, governance expansion - Green experience programs with citizens - Consulting on non-industrial sector GHG diagnosis - Operation of public-private-industry-academic councils for climate change response - Operation of global environmental cooperation network |
| | Revitalizing of energy circular economy - High-efficiency facility improvement and installation project - Waste recovery center operation - Eco-friendly, high-efficiency road lighting maintenance project | Improvement of response capability to climate crises and disasters - Ecological river improvement and restoration project - Extensive measures against fire caused by climate change and damage reduction facilities - Improvement in drainage capacity of sewage facilities in response to flooding | Strengthening the institutional basis for responding to the climate crisis - Citizen participating project for monitoring climate change - Revitalized creation of smart industrial complexes - Operation of an institution dedicated to GHG monitoring - Eco-Science Park creation |
| | Establishment of green buildings and green city infrastructure - GTX construction project - Extensive supply of eco-friendly low-carbon vehicles - Expansion of green buildings | Improvement of agricultural efficiency and living environment in island areas - Expansion of livestock manure joint resource facilities - Utilization of facility horticultural heating system - Expansion of seawater desalination facilities in island areas in need of water for climate change response | Funding for climate crisis response - Budgeting for climate change response projects using regional development tax - Installation and management of the Incheon Metropolitan City Climate Change Fund |
| | Green space creation and improvement in living environment - Expansion of urban green space and urban forests - Frequent inspection and management of vehicle exhaust gases - Low-NOx boiler replacement project | | |

| 추진전략 | 추진과제 | 세부사업 분류 | |
|---------------------------------|---------------------------|---------------------------|--|
| 탈석탄 실현 및 청정한 재생에너지 확충 (131개) | 신재생에너지 보급 확대 (43개) | 특정지역의 발전시설 (35개) | -태양광(10), 풍력(2), 수소연료전지(1), 폐자원(20), 기타(2) |
| | 에너지 순환경제 활성화 (59개) | 구역 및 마을단위 발전시설 (8개) | -태양광(7), 수소연료전지(1) |
| | 녹색건축물 및 그린 도시 인프라 구축(16개) | 기업 영역 (47개) | -공정설비 효율화(38), 고효율 조명교체 사업(9) |
| | | 시민생활 영역 (12개) | -자원순환 활성화(7), 에너지 효율화(2), 에너지 복지사업 확대(3) |
| 녹지 조성 및 생활환경 개선 (13개) | 대중교통 영역 (10개) | -철도교통(6), 도로교통(2), 자전거(2) | |
| | 개인 교통수단 (4개) | -개인교통수단(4) | |
| 안전한 기후변화 적응체계 구축 (4개) | 녹색건축물 (2개) | -녹색건축물(2) | |
| | 녹지 및 생태 조성 (11개) | -녹지공간 확충(8) | |
| 인천형 그린뉴딜을 통한 기후위기 대응체계 강화 (25개) | 대기 및 생활환경 개선 (2개) | -녹지활용 서비스(3) | |
| | 대기 및 생활환경 개선 (2개) | -이동수단(1) | |
| 인천형 그린뉴딜을 통한 기후위기 대응체계 강화 (25개) | 영농 효율화 및 도서지역 생활환경 개선(4개) | -생활 영역(1) | |
| | 영농 효율화 및 도서지역 생활환경 개선(4개) | 농축산 (3개) | -영농 효율화(1), 에너지 공급(2) |
| 인천형 그린뉴딜을 통한 기후위기 대응체계 강화 (25개) | 해양 및 도서 (1개) | 해양 및 도서 (1개) | -해양도서지역 생활환경 개선, 기후변화 대응 역량 강화(1) |
| | 교육 (5개) | 교육 (5개) | -시민 대상(3), 기업 대상(2) |
| 인천형 그린뉴딜을 통한 기후위기 대응체계 강화 (25개) | 홍보 (6개) | 홍보 (6개) | -정보 공유(3), 시민참여(3) |
| | 국내외 협력 (5개) | 국내외 협력 (5개) | -지역협의체 및 거버넌스 운영(1), 국제협력(4) |
| 인천형 그린뉴딜을 통한 기후위기 대응체계 강화 (25개) | 기업의 제도적 지원 (3개) | 기업의 제도적 지원 (3개) | -기업의 제도적 지원(3) |
| | 신산업 육성 지원 (1개) | 신산업 육성 지원 (1개) | -신산업 육성 지원(1) |
| 인천형 그린뉴딜을 통한 기후위기 대응체계 강화 (25개) | 공공부문 | 공공부문 | -공공부문 |
| | 민간부문 | 민간부문 | -민간부문 |

1. GHG reduction goals for 2030 and 2040

- Incheon Metropolitan City set targets taking into account power generation, industry, buildings (home, commercial/public, etc.), transport, livestock, waste, sinks and additional renewable energy generation

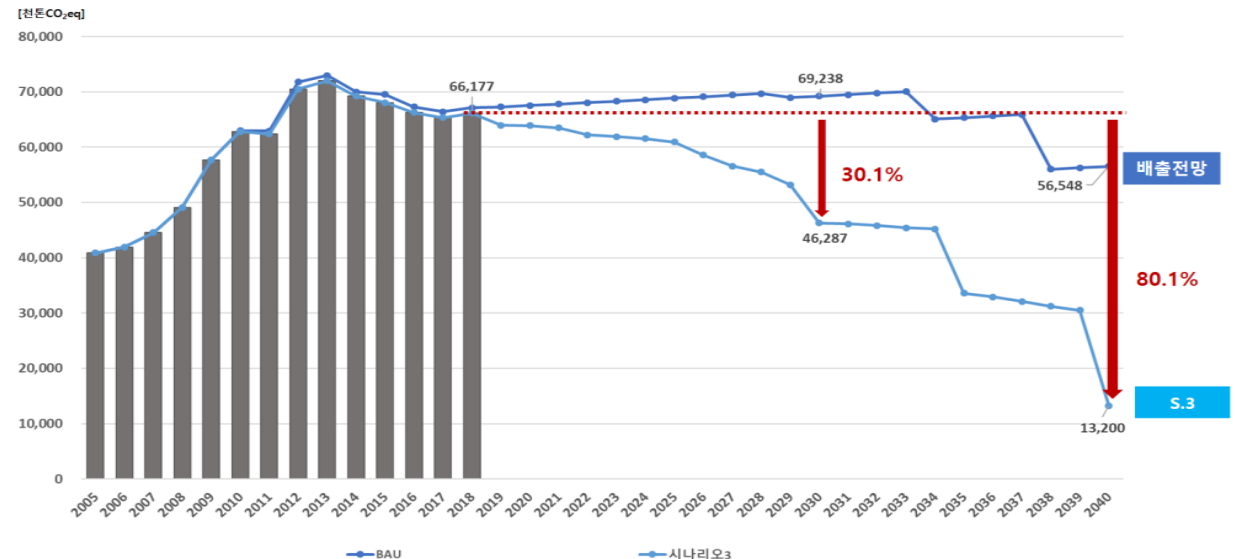
<GHG reduction targets by 2040 are reviewed according to three scenarios>

- Scenario 1 (S1): Efforts for GHG reduction are made in current conditions according to mid- to long-term plans (e.g. the 9th basic plan for electricity supply and demand).
- Scenario 2 (S2): Maximum efforts for GHG reduction are made according to current conditions and mid- to long-term plans.
- Scenario 3 (S3): Along with Scenario 2, the fuel conversion and shutdown period of coal-fired power plants is advanced by 3 to 4 years.
 - * Yeongheung Thermal Power Plant Units 1 and 2: Fuel to be converted by 2034 → by 2030
 - * Yeongheung Thermal Power Plant Units 3 and 4: Life cycle ends by 2038 → by 2035
 - * Yeongheung Thermal Power Plant Units 5 and 6: Life cycles ends by 2044 → by 2040

<시나리오별 온실가스 감축목표>

(단위 : 천톤CO₂eq)

| 시나리오 | 구분 | 2018 | 2030 | 2040 |
|------|--------------|--------|--------|--------|
| S1 | 배출량 | 66,177 | 69,238 | 56,548 |
| | 감축량 | - | 10,826 | 18,866 |
| | 감축후 배출량 | - | 58,413 | 37,682 |
| | 2018년 대비 감축률 | - | 11.7% | 43.1% |
| S2 | 배출량 | 66,177 | 69,238 | 56,548 |
| | 감축량 | - | 17,716 | 29,155 |
| | 감축후 배출량 | - | 51,522 | 27,393 |
| | 2018년 대비 감축률 | - | 22.1% | 58.6% |
| S3 | 배출량 | 66,177 | 69,238 | 56,548 |
| | 감축량 | - | 22,952 | 43,348 |
| | 감축후 배출량 | - | 46,287 | 13,200 |
| | 2018년 대비 감축률 | - | 30.1% | 80.1% |



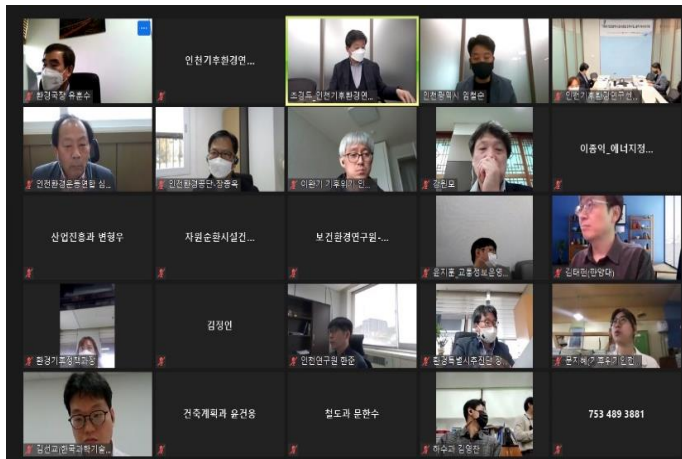
2. Establishment of 2050 Carbon Neutral Strategy

- Period: Apr. 2021 – Feb. 2022
- Conducted by: Incheon Institute
- Major Activities : Operation of the 2050 Carbon Neutral Vision Forum

❖ Reflection of the ongoing national carbon-neutral scenarios

※ 2050 탄소중립 비전 포럼 운영

- 기간 : 2021. 6. ~ 2022. 2.
- 구성 : 7개 분과, 8명 포럼 위원
 - * 총괄, 전환, 산업, 건축, 교통·물류, 비에너지, 청년
- 내용 : 학계, 산업계, 시민사회, 청년 등 다양한 이해관계자의 탄소 중립 달성 비전 및 추진과제 선정 참여
 - 1차~3차 포럼 개최
 - * '21. 6. ~ 9. : 전환, 산업, 건축, 교통, 비에너지, 청년부문 포럼 개최



3. Coal Phase-out Policy

❖ Joining PPCA (Nov. 2020) and Declaration of Coal-Free Finance (Dec. 2020)

- Participate in national and international efforts such as transition to green energy and establishment of a low-carbon society
 - Prohibit adding new coal-fired power plants, phase-out of existing facilities
- Reduce coal finance, the source of coal power generation, and participate in efforts to spread climate finance and climate action
 - Adding "coal phase-out" and "renewable energy" investments as criteria for selecting banks for city and public agencies



3. Coal Phase-out Policy

- ❖ Plan for earlier phase-out of coal-fired power plants by 3-4 years
- Urge the government for earlier closure through civil organizations, environmental groups, other local governments, and public petitions
- Active efforts for the early closure proposal to be reflected in the Basic Plan on Electricity Demand and Supply
- Prepare for a just transition to minimize the impact on the local economy (contract research on regional economic impact analysis, establishment of a just transition fund, etc.)

영흥화력발전소 발전설비 현황 (5080MW)

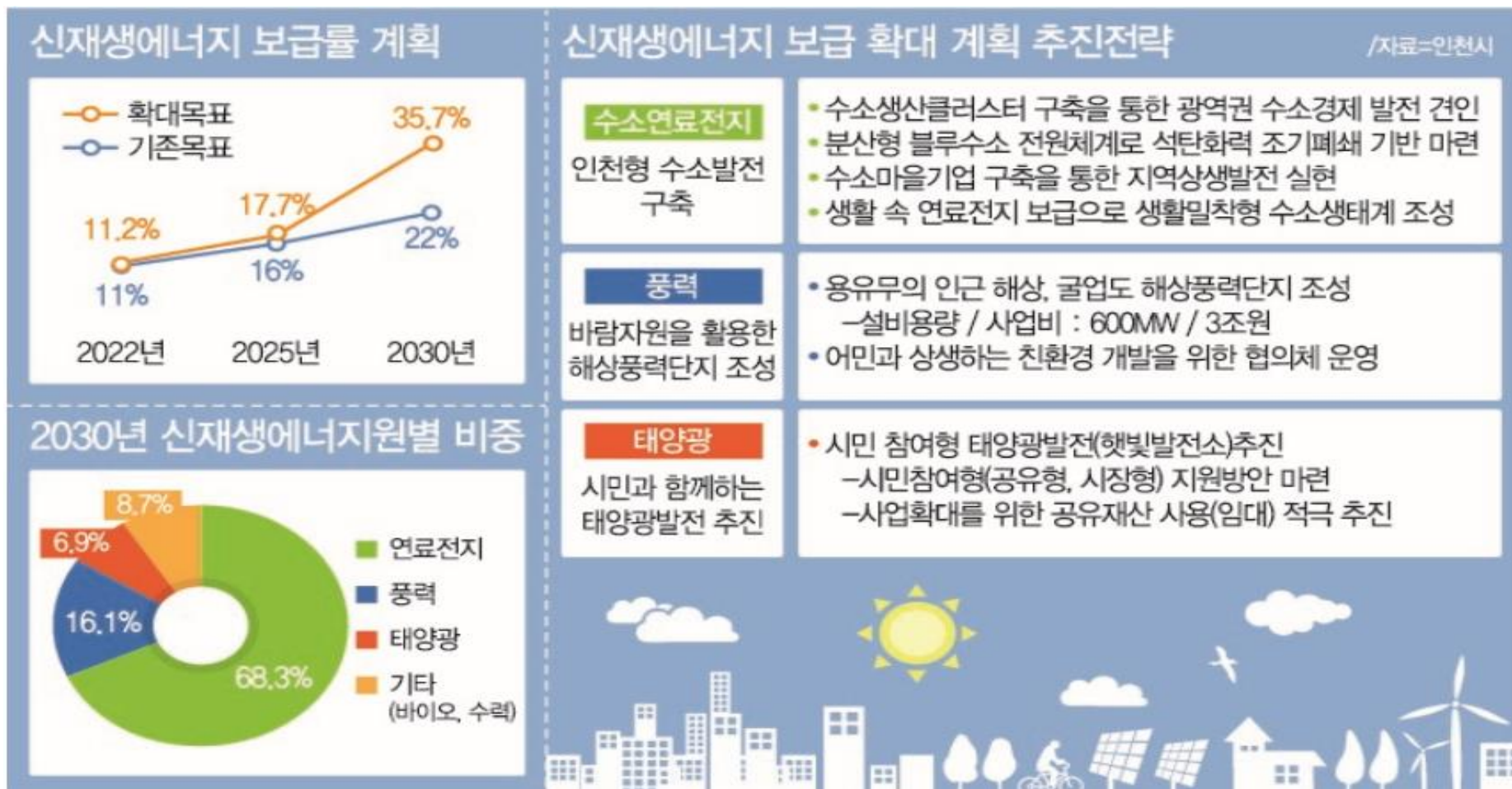
| 발전방식 | 발전원 | 설비용량 | | 준공년도 |
|------|-----|------|-------|---------|
| 기력 | 유연탄 | 1호기 | 800MW | 2004. 9 |
| | | 2호기 | 800MW | 2004.11 |
| | | 3호기 | 870MW | 2008. 6 |
| | | 4호기 | 870MW | 2008.12 |
| | | 5호기 | 870MW | 2014. 6 |
| | | 6호기 | 870MW | 2014.11 |



4. Increased Supply of New and Renewable Energy

❖ Raise the renewable energy penetration rate target by 2030 from 22% to 35.7%

➤ Main strategies: hydrogen fuel cell, offshore wind power, solar power, etc.



4. Increased Supply of New and Renewable Energy

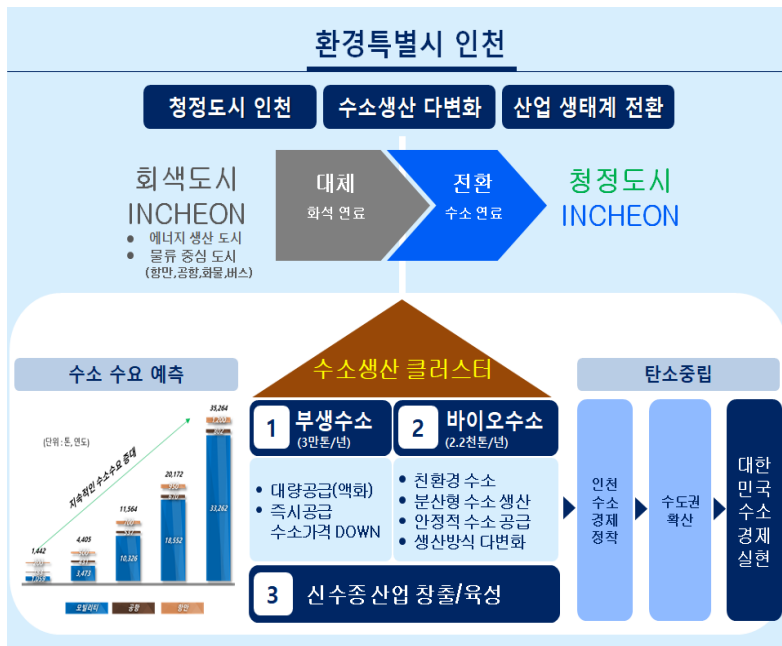
❖ Hydrogen Fuel Cell: Incheon-type Hydrogen Power Plant

- A project to build a hydrogen production base with annual capacity of 30,000t of byproduct hydrogen and 1,400t of bio-hydrogen in Cheongna, Seo-gu, to create a hydrogen ecosystem by attracting hydrogen-related companies
- Annual hydrogen production of 31,400t can power 210,000 hydrogen cars, which has the effect of planting 12.6 million pine trees by 2040
⇒ The effect of creating 165 Songdo Central Parks

인천시, 친환경 수소 대중교통 시대 본격 개막

☎ 김정호 기자 kjh6114@kmaeil.com | 📅 승인 2021.10.05 21:25 | 🗣️ 댓글 0

수소 시내버스 5대 첫 도입, 10.6일 05시부터 간선버스 노선에 운행 개시
2030년까지 모든 시내버스 수소 버스로 전환, 수소 충전소도 지속 확충



4. Increased Supply of New and Renewable Energy

❖ Incheon-type Offshore Wind Power Generation Project

- Improve environment and safety and create new growth engines through Incheon Green New Deal
 - Establishment of an off-shore wind power generation complex in the waters near Incheon with a capacity of 3.7GW (18.5 trillion won)



4. Increased Supply of New and Renewable Energy

- Hydrogen fuel cell vehicle, electric vehicle, solar power, forest creation



▲ 인천시 제1호 수소시내버스(FCEV).





Chapter 3

Incheon's International Cooperation

1. Hosting of the 48th IPCC Session

- Date: Oct. 1 - 5, 2018
- Venue: Songdo Convensia
- Host/Organizers: IPCC/ Meteorological Administration, Incheon Metropolitan City
- Participants: 195 member countries and 500 observers
- Main Activity: Final approval of the Special Report on Global Warming of 1.5°C



- ❖ Limit global warming to 1.5°C
- ❖ Reduce emissions by at least 45% by 2030 and achieve net zero emissions by 2050

2. Korea Global Adaptation Week 2019

- Date: April 8 – 12, 2019
- Venue: Songdo Convensia
- Host/Organizers : Ministry of Environment/UNFCCC, Incheon Metropolitan City, Korea Environment Institute (KEI), Korea Adaptation Center for Climate Change (KACCC)
- Participants: 667 people including government representatives from 195 countries, international organizations, and experts
- Programs : NAP Expo 2019, Adaptation Vision Forum, Adaptation Committee Forum, Technical Expert Meeting

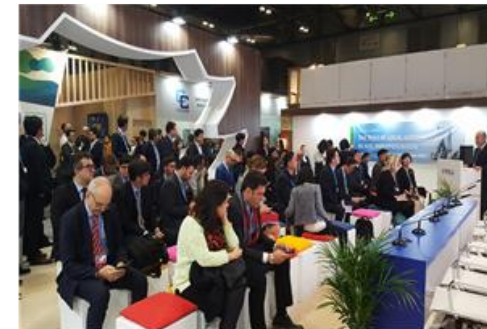
❖ Enhancing partnerships and sharing experiences among stakeholders related to climate change adaptation



3. International Seminar at COP25

- Date : Dec. 10, 2019 (Tue.)
- Venue : Madrid, Spain (the Korea Pavilion)
- Host/Organizers: Incheon Metropolitan City/Incheon Climate & Environment Research Center (ICERC), ICLEI Korea Office
- Attendees: About 70 people including experts and staff from international organizations
- Programs
 - Activities of local governments to meet the NDC
 - Incheon City's greenhouse gas reduction policy and strategies
 - Greenhouse gas reduction case of Tainan City, Taiwan

- ❖ Strengthen global climate response capabilities
- ❖ Higher reputation of Incheon as a climate response hub by securing trust from the international community



An aerial night view of Incheon, South Korea. The background features a dense skyline of modern skyscrapers with glowing windows and blue-tinted lighting. In the foreground, there is a traditional Korean architectural complex with dark tiled roofs and wooden structures, illuminated with warm lights. A river or canal flows through the scene, reflecting the city lights. The overall atmosphere is a blend of modern urban development and traditional heritage.

**Incheon is here
to achieve 2050 NET-ZERO!**

Thank you for your attention