2019-2020 Implementation Plan for National Carbon Emission Trading Total Allowances Setting and Allocation (Power Generation Industry)

(Draft for Public Consultation)

In accordance with the *National Carbon Emission Trading Market Establishment Work Plan (Power Generation Industry)* and based on the initial operation requirements of the national carbon emission trading market (hereinafter referred to as the national carbon market) and the current situation of China's carbon market construction, this Plan is hereby formulated.

I. List of Major Emitting Entities Included in Allowances Management

According to the verification results of enterprises or other economic organizations in the power generation industry (including self-supply power plants in other industries) with annual emissions reaching 26,000 tonnes of carbon dioxide equivalent (comprehensive energy consumption of about 10,000 tonnes of standard coal) or above in any year from 2013 to 2018, the major emitting entities that should be included in the 2019-2020 national carbon market allowance management list (see Attachment 3) was determined, and the directory management shall be conducted.

Carbon emissions allowances refers to the carbon dioxide emissions allowances for power generating units owned by major emitting entities, including direct carbon dioxide emissions from fossil fuel consumption and indirect carbon dioxide emissions from net electricity purchases. The limit of carbon emissions per unit of electricity generation (heat supply) for different types of units is referred to as the carbon emission baseline.

II. Types of Units Included in Allowances Management

The units in this Plan include pure-condensing generation units and cogeneration units. Self-supply power plants shall be governed with reference to the Plan and pure heating facilities without power generation capacity are not within the scope of the

Plan. The power generating units included in 2019-2020 allowance management include conventional coal-fired units above 300MW in capacity and unconventional coal-fired units (including coal-fired circulating fluidized bed (CFB) units) such as gangue-fired, slime-fired or coal water slurry (CWS)-fired units and gas generation units. For units that produce electricity (including cogeneration) by firing of fuels such as non-self-produced combustible gases (including the situation that the proportion of heat generated by co-firing of self-produced secondary energy is no more than 10% in a full compliance year), or those that produce electricity (including cogeneration) by mixed burning of biomass including waste, sludge, and etc., with the annual heat supply proportion not more than 10% in a full compliance year, their generation types shall be determined by their primary fuel source. The pure biomass generating units, special fuel generating units, generating units only using self-produced resources, mixed-burning generating units and other special generating units meeting the requirements of this Plan are not included in the allowance management for 2019-2020. The criteria for various types of units are shown in Attachment 1. In this Plan, the corresponding carbon emissions baseline is set for different types of units, and the allowances are allocated based on the unit types.

III. Total Amount of Allowances

The competent provincial level ecology and environment authorities shall verify the allowance quantity for each major emitting entity within its administrative region in accordance with the actual output of major emitting entities in 2019-2020, the allowance allocation method, and carbon emission baselines determined in the Plan; they shall then sum up the approved allowance quantities of all major emitting entities to obtain the total amount of allowances of the provincial administrative region. Finally, the total amount of allowances in China is obtained by summing up the total amount of allowances of all provincial administrative regions.

IV. Allowance Allocation Method

All allowances in 2019-2020 are allocated free of charge, and the allowance quantity of the units owned by major emitting entities is calculated by the baseline method. The allowance quantity of a major emitting entity is the sum of the allowance quantities for all its types of units.

(I) Allowance calculation formula

The formula for calculating the total amount of allowances of units via the baseline method is as follows:

The total amount of allowances of units = power supply baseline × actual power supply × correction factor + heating baseline × actual heat supply

The detailed allowance calculation method of various types of units is shown in the Technical Guide for Allowance Allocation (see Annexes 2 and 3).

(II) Correction factor

Given the inherent technical characteristics of units, the fairness of allowance allocation for the same type of units is further improved by introducing a correction factor. In consideration of the action target of each region to control greenhouse gas emissions, the region can tighten its own allowances based on the national unified allowance baseline through the regional correction factor (less than 1) in accordance with the local actual conditions. The regional correction factor shall be reported to the Ministry of Ecology and Environment (MEE) by the competent provincial level ecology and environment authorities, and released separately after being reviewed by MEE. The correction factor of allowance allocation for various types of units is shown in the Technical Guide for Allowance Allocation (see Annexes 2 and 3).

(III) Carbon emission baseline and determination principle

Given China's economic growth expectations, the achievement of the action target for controlling greenhouse gas emissions and the impacts of COVID-19 on economic and social development, the carbon emission baselines of various types of units in 2019-2020 are set as in Annex 4.

V. Allowance Allocation

The competent provincial level ecology and environment authorities shall pre-allocate the 2019-2020 allowances to major emitting entities in its administrative region at

70% of 2018 power (heat) supply volume of the units through the national carbon emissions registration and settlement system (hereinafter referred to as the registration system) in accordance with the allowance calculation method and pre-allocation procedures. After the verification of emissions data in 2019 and 2020, the allowances shall be finally verified in accordance with the actual power (heat) supply volume of the units in 2019-2020. If the final approved allowance quantities are inconsistent with the pre-allocated ones, the quantity of final approved ones shall prevail, and a return of the excess allocations or compensation for a shortage of allocations shall be implemented in the registration system. The allowance calculation method, pre-allocation procedures and verification processes are outlined in Annexes 2 and 3.

VI. Allowance Surrendering

In order to reduce the compliance burden on major emitting entities with large allowance shortages, an upper limit for allowance compliance shortages is set for allowance surrendering, which is equivalent to 20% of the verified emissions of major emitting entity. When an allowance shortage accounts for more than 20% of its verified emissions, the maximum allowance surrendering is the sum of its owned free allowance quantity plus 20% of its verified emissions.

To encourage the development of gas generating units, if the verified emissions are not less than the approved free allowance quantities when conducting the unit's allowance surrendering, its allowance surrendering amount is equivalent to all the free allowance quantities obtained; if the verified emissions are less than the approved free allowance quantities, its allowance surrendering amount is the free allowance quantities equal to the verified emissions.

In addition, the major emitting entities included in the allowance management shall surrender the allowances in an amount no less than the verified emissions to the competent provincial level ecology and environment authorities in the place where its production and operation premises are located according to the registration system, within the specified time limit, to fulfill the allowance surrendering obligation. The specific requirements of related work shall be issued separately.

VII. Solutions on Mergers, Restructuring and Closures of Major Emitting Entities

If a major emitting entity included in the national carbon market allowance management is merged, undergoes restructuring, closes or moves out of the provincial administrative region where its production and operation premises are located, it shall report to the competent provincial level ecology and environment authorities for approval of this change within 30 days from the date of making the decision. The competent provincial level ecology and environment authorities shall then adjust the free allowances it has obtained based on the actual conditions and report it to the Ministry of Ecology and Environment and release the relevant information to the general public. The application conditions and approval methods for allowance changes are as follows.

(I) Mergers of Major Emitting Entities

In the case of a merger between major emitting entities, the newly established major emitting entity shall inherit both parties' allowances and fulfill their surrendering obligation. The carbon emission boundary after the merger is the sum of the carbon emission boundaries of major emitting entities before the merger.

If a major emitting entity is merged with an economic organization not in the allowance management, the newly established major emitting entity shall inherit the allowance and fulfill the surrendering obligation. The carbon emission boundary of 2019-2020 is still defined as the carbon emission boundary before the merger of major emitting entities, and after 2020 it shall be re-approved.

(II) Restructuring of Major Emitting Entities

If a major emitting entity undergoes a restructuring wherein it splits from a parent company, the carbon emission boundary and allowance quantity of each entity after the separation shall be clearly defined and reported to the provincial competent department of ecology and environment in the place where its production and operation premises is located for approval. The separated emitting entities shall be issued the corresponding allowances in accordance with this Plan and fulfill their respective surrendering obligations.

(III) Closure or Relocation of Major Emitting Entities

If a major emitting entity closes or moves out of the original provincial administrative region, it shall report to the competent provincial level ecology and environment authorities for its area of origin and area of destination for approval within 30 days from the date of making the decision. For the carbon dioxide emissions generated in the year before the closure or relocation, the competent provincial level ecology and environment authorities of the place where the closed entity is located or the place where the entity moves to out shall carry out verification, allowance allocation, trading and performance management. If the major emitting entity no longer exists after its closure or relocation, the remaining allowances for 2019-2020 shall be withdrawn by the competent provincial level ecology and environment authorities of the place where its production and operation premises are located, and no allowances shall be issued to it after 2020.

VIII. Miscellaneous

(I) Major Emitting Entities in Pilot Carbon Markets

Major emitting entities that have been allocated 2019's local carbon market emissions allowances but have not been allocated 2020's local carbon market allowances are not required to participate in 2019's allowance allocation or surrendering for the national carbon market. Major emitting entities that have been allocated 2019's and 2020's local carbon market allowances are not required to participate in 2019's and 2020's allowance allocation and surrendering for China's national carbon market. After the Plan is issued, local carbon markets shall no longer issue allowances to major emitting entities that have been covered by the national carbon market.

(II) Circumstances in which allowances shall not be issued and free allowances shall be withdrawn

In the case of any of the following circumstances for major emitting entities' power generating units, allowances shall not be issued. If the enterprises to which the allowances have been issued show one of the following circumstances after their

verification is complete, the allowances shall be withdrawn in accordance with the relevant provisions.

1. Construction in violation of the relevant provisions of national regulations or those of the province (district or city) where it is located;

2. Units that fail to close after being ordered to close by the relevant national regulations or those of the province (district or city) where it is located.

Annex: 1. Determining Criteria for Various Types of Units

2. 2019-2020 Technical Guide for Coal-Fired Units' Allowance Allocations

3. 2019-2020 Technical Guide for Gas Generating Units' Allowance Allocations

4. 2019-2020 Carbon Emission Baselines for Various Types of Units

Annex 1

Determining Criteria for Various Types of Units

Table 1. Determining Criteria for Types of Units Included in Allowance Management

Unit Types	**Criteria**
Conventional coal-fired units above 300MW in capacity	Generating units with bituminous coal, lignite, anthracite and other conventional electric coals as the primary fuel source and rated power no less than 400MW
Conventional coal-fired units of 300MW in capacity or below	Generating units with bituminous coal, lignite, anthracite and other conventional electric coals as the primary fuel source and rated power less than 400MW
Unconventional coal-fired units (including coal-fired circulating fluidized bed (CFB) units) such as gangue-fired, slime-fired or coal water slurry (CWS)-fired units	Generating units (including coal-fired circulating fluidized bed (CFB) units) with unconventional electric coal such as coal gangue, slime, or coal water slurry as the primary fuel source (the annual average proportion of heat generated by unconventional fuel shall be more than 50% in the full compliance year)
Gas generating units	Generating units with natural gas as the primary fuel source (the annual average proportion of heat generated by mixed burning with other fuels shall not exceed 10% in the full compliance year)

Notes:

1. For combined reporting of units, the unit type shall be determined by which is least favorable in terms of allowance allocation.

2. For fossil fuel units with an annual average proportion of heat generated by mixed burning with

biomass fuels (including waste, sludge, etc.) accounting for no more than 10% in the full compliance year, the unit type shall be determined by its primary fuel source.

3. For power generating units with co-firing of fossil fuels (including those with the proportion of heat generated by co-firing of self-produced secondary energy reaching no more than 10% in the full compliance year), the unit type shall be determined by its primary fuel source.

Table 2. Determining Criteria for Types of Units Not Included in Allowance Management

Types	**Criteria**
Biomass generating units	1. Pure biomass generating units (including waste and sludge incineration generator sets)
Mixed burning generating units	2. Generating units burning biomass mixed with fossil fuel:
	Generating units with the annual average proportion of heat generated by mixed burning of fossil fuel and biomass (including waste and sludge) being higher than 50% (including waste and sludge incineration generator sets) in the full compliance year
	3. Generating units burning fossil fuel mixed with biomass (including waste and sludge): Fossil fuel units with the annual average proportion of heat generated by mixed burning with biomass fuels (including waste and sludge) being higher than 10% but no more than 50% in the full compliance year
	4. Generating units with mixed fossil fuel burning and self-produced secondary energy
	Fossil fuel units with the annual average proportion of heat generated by the co-firing of self-produced secondary energy being more than 10% in the full compliance year
Special fuel generating units	5. Generating units only using coalbed methane (coal mine gas), semicoke tail gas, carbon black tail gas, coke oven gas (raw coke oven gas), blast furnace gas, converter gas, oil field gas, oil shale, oil sand, combustible ice and other special fossil fuels

Generating units using self-produced resources	6. Generating units only using self-produced exhaust gas, tail gas and coal gas
Other special generating units	7. Gas generating units formed by coal-fired boiler transformation (except for direct conversion to gas turbine);
	8. Oil-fired units, integrated gasification combined cycle (IGCC) generating units, internal combustion generating units

Annex 2

2019-2020 Technical Guide for Coal-Fired Units' Allowance Allocations

I. Allowance Calculation Method

The calculation formula of CO_2 emissions allowances for coal-fired units is as follows:

$$A = A_e + A_h$$

Where:

A-total amount of CO_2 emissions allowances for the units, unit: tCO_2

A_e- quantity of units' CO_2 emissions allowance for power supply, unit: tCO_2

A_h- quantity of units' CO_2 emissions allowance for heat supply, unit: tCO_2

The CO_2 emission allowance calculation for power supply is:

$$A_e = Q_e \times B_e \times F_l \times F_r \times F_{de} \times F_f$$

Where:

Q_e- power supply of the units, unit: MWh

B_e- power supply baseline of the unit type, unit: tCO_2/MWh

F_l-correction factor of the unit's cooling mode, if the condenser cooling mode is water cooling, the correction factor of the unit's cooling mode is 1; if it is air cooling, the correction factor is 1.05.

F_r-correction factor of the unit's heat supply. The correction factor of heat supply for coal-fired units is 1-0.22×heating ratio.

F_{de}—correction factor for regional power supply emissions allowances, which is set by the local ecological and environmental authorities to a number less than 1, in accordance with local conditions

F_f—correction factor of unit load (output) factor

Referring to the *Norm of Energy Consumption Per Unit Product of General Coal-*

Fired Power Set (GB21258-2017), the correction factor of the load (output) factor for general coal-fired pure-condensing generation units shall be selected in accordance with Table 1; the correction factor of other types of units is 1.

Table 1 Correction Factor of Load (Output) Factor of General Coal-Fired Pure-Condensing Generation Unit

Unit load (output) factor in statistical period	**Correction factor**
F≥85%	1.0
80%≤F < 85%	1+0.0014×(85-100*F*)
75%≤F < 80%	1.007+0.0016×(85-100*F*)
F < 75%	$1.015^{(16-20F)}$
Note: F is the unit load (output) factor, unit: %.	

The CO_2 emissions allowance calculation for heat supply is:

$$A_h = Q_h \times B_h \times F_{dh}$$

Where:

Q_h - heat supply of the units, unit: GJ

B_h - heat supply baseline of the unit type, unit: tCO_2/GJ

F_{dh} - correction factor for regional heat supply emissions allowances, which is set by the competent provincial level ecology and environment authorities to a number less than 1, in accordance with local conditions

II. Allowance Pre-Allocation and Approval

(I) Allowance pre-allocation

For pure-condensing generation units:

Step One: Verify the cooling mode of the condenser (air cooling or water cooling), and the load factor and power supply (MWh) data of the unit in 2018.

Step Two: 70% of the unit's power supply in 2018 is multiplied by the power supply

baseline of the unit type, cooling mode correction factor, heat supply correction factor (actual value is 1), regional correction factor and correction factor of the load factor to obtain the pre-allocated power supply emissions allowance quantity for the unit.

For cogeneration units:

Step One: Verify the cooling mode of the condenser (air cooling or water cooling), and the heating ratio, power supply (MWh) and heat supply (GJ) data of the unit in 2018.

Step Two: 70% of the unit's power supply in 2018 is multiplied by the power supply baseline of the unit type, cooling mode correction factor, heat supply correction factor, regional correction factor and correction factor of the load factor (actual value is 1) to obtain the pre-allocated power supply emissions allowance quantity for the unit.

Step Three: 70% of the unit's heat supply in 2018 is multiplied by the heat supply baseline of the unit type to obtain the pre-allocated heat supply emissions allowances quantity for the unit.

Step Four: Sum up the calculation results of Step Two and Step Three to get the pre-allocated allowance total for the unit.

(II) Allowance Approval

For pure-condensing generation units:

Step One: Verify the cooling mode of the condenser (air cooling or water cooling), and the load factor and actual power supply (MWh) data of the unit in 2019-2020.

Step Two: The unit's actual power supply in 2019-2020 is multiplied by the power supply baseline of the unit type, cooling mode correction factor, heat supply correction factor (actual value is 1), regional correction factor and correction factor of the load factor to check the unit's allowance total.

Step Three: If the final approved allowance quantity is inconsistent with the pre-allocated quantity, the final approved quantity shall prevail, and a return of the excess allowances or compensation for a shortage of allowances shall be implemented.

For cogeneration units:

Step One: Verify the cooling mode of the condenser (air cooling or water cooling), and the actual heating ratio, power supply (MWh) and heat supply (GJ) data of the unit in 2019-2020.

Step Two: The unit's actual power supply in 2019-2020 is multiplied by the power supply baseline of the unit type, cooling mode correction factor, heat supply correction factor and regional correction factor to check the heat supply emissions allowance quantity for the unit.

Step Three: The unit's actual heat supply in 2019-2020 is multiplied by the heat supply baseline of the unit type to check the heat supply emissions allowance quantity for the unit.

Step Four: Sum up the verification results of Step Two and Step Three to get the verified total allowance quantity for the unit.

Step Five: If the final approved allowance quantity is inconsistent with the pre-allocated quantity, the final approved quantity shall prevail, and a return of the excess allowances or compensation for a shortage of allowances shall be implemented

Annex 3

2019-2020 Technical Guide for Gas Generating Units' Allowance Allocations

I. Allowance Calculation Method

The calculation formula of CO_2 emissions allowances for gas generating units is as follows:

$$A = A_e + A_h$$

Where:

A-total amount of CO_2 emissions allowances for the units, unit: tCO_2

A_e-units' quantity of CO_2 emissions allowance for power supply, unit: tCO_2

A_h-units' quantity CO_2 emissions allowance for heat supply, unit: tCO_2

The CO_2 emission allowance calculation for power supply is:

$$A_e = Q_e \times B_e \times F_r \times F_{de}$$

Where:

Q_e- power supply of the units, unit: MWh

B_e- power supply baseline of the unit type, unit: tCO_2/MWh

F_r- correction factor of unit heat supply. The correction factor of heat supply of gas generating units is 1-0.6×heating ratio.

F_{de} - correction factor of regional power supply emissions allowances, which is set by the competent provincial level ecology and environment authorities to a number less than 1, in accordance with local conditions

The CO_2 emission allowance calculation for heat supply is:

$$A_h = Q_h \times B_h \times F_{dh}$$

Where:

Q_h- heat supply of the units, unit: GJ

B_h- heat supply baseline of the unit type, unit: tCO_2/GJ

F_{dh}—correction factor of regional heat supply emissions allowances, which is set by the competent provincial level ecology and environment authorities to a number less than 1, in accordance with local conditions

II. Allowance Pre-allocation and Approval

(I) Allowance pre-allocation

For pure-condensing generation units:

Step One: Verify the power supply (MWh) data of the unit in 2018.

Step Two: 70% of the unit's power supply in 2018 is multiplied by the power supply baseline of gas generating units, heat supply correction factor (actual value is 1) and regional power supply emissions allowance correction factor to obtain the pre-allocated allowance quantity for the unit.

For cogeneration units:

Step One: Verify the heating ratio, power supply (MWh) and heat supply (GJ) data of the unit in 2018.

Step Two: 70% of the unit's power supply in 2018 is multiplied by the power supply baseline of the unit, heat supply correction factor, regional power supply emissions allowance correction factor and regional heat supply emissions allowance correction factor to obtain the pre-allocated power supply emissions allowance quantity for the unit.

Step Three: 70% of the unit's heat supply in 2018 is multiplied by the heat supply baseline of gas generating units to obtain the pre-allocated heat supply emissions allowance quantity for the unit.

Step Four: Sum up the calculation results of Step Two and Step Three to get the pre-

allocated allowance total for the unit.

(II) Allowance Approval

For pure-condensing generation units:

Step One: Verify the power supply data of the unit in 2019-2020.

Step Two: The unit's actual power supply in 2019-2020 is multiplied by the power supply baseline of gas generating units, heat supply correction factor (actual value is 1) and regional power supply emissions allowance correction factor to check the allowance quantity of the unit.

Step Three: If the final approved allowance quantity is inconsistent with the pre-allocated quantity, the final approved quantity shall prevail, and a return of the excess allowances or compensation for a shortage of allowances shall be implemented.

For cogeneration units:

Step One: Verify the heating ratio, power supply (MWh) and heat supply (GJ) data of the unit in 2019 -2020.

Step Two: The unit's actual power supply in 2019-2020 is multiplied by the power supply baseline of gas generating units, heat supply correction factor, regional power supply emissions allowance correction factor and regional heat supply emissions allowance correction factor to check the power supply allowance quantity for the unit.

Step Three: The unit's actual heat supply in 2019-2020 is multiplied by the heat supply baseline of gas generating units to check the heat supply emissions allowance quantity for the unit.

Step Four: Sum up the calculation results of Step Two and Step Three to get the final allowance quantity for the unit.

Step Five: If the final approved allowance quantity is inconsistent with the pre-allocated quantity, the final approved quantity shall prevail, and a return of the excess allowances or compensation for a shortage of allowances shall be implemented.

Annex 4

2019-2020 Carbon Emission Baselines for Various Types of Units

Types	**Type name**	**Power supply baseline (tCO_2/MWh)**	**Heat supply baseline (tCO_2/GJ)**
I	Conventional coal-fired units above 300MW in capacity	0.877	0.126
II	Conventional coal-fired units of 300MW in capacity or below	0.979	0.126
III	Unconventional coal-fired units (including coal-fired circulating fluidized bed (CFB) units) such as gangue-fired, slime-fired or coal water slurry (CWS)-fired units	1.146	0.126
IV	Gas generating units	0.392	0.059