

# Green Electricity Certificate (GECs) of China

Technical Assessment Report | August 2020

## Abstract

This paper provides an overview of the Chinese GEC system and reviews the compliance of GECs with RE100 criteria.

In July 2017, China opened its Green Electricity Certificate (GEC) system as a pilot to allow businesses and individuals to buy renewable energy voluntarily. The system is designed and maintained by the China Renewable Energy Engineering Institute (CREEI). GECs allow companies to claim the environmental benefits associated with renewable energy generation. Currently, large scale onshore grid connected wind and solar PV projects receiving a Feed-in-Tariff (FiT) are eligible to participate in the GEC system. The renewable electricity (RE) generators participating in China's GEC system are also able to issue multiple environmental market instruments such as energy attribute certificates and GHG offsets for the same generation.

CDP assessment against the RE100 technical criteria finds that **making a credible renewable electricity usage claim with GECs requires ownership of all environmental attributes associated with the generation, and that none of these attributes have been sold off, transferred, or claimed elsewhere**. Therefore, it is required for the user of a GEC to redeem all instruments if issued to the same RE generation in order to achieve attribute aggregation and claim renewable energy usage in a credible manner.

## Background

The Green Electricity Certificate (GEC) system was launched as a pilot program in 2017-18 to develop a renewable electricity market-based mechanism in China. GECs allow companies to claim the environmental benefits associated with renewable electricity generation. By Sept 2017, China's GEC trading platform had issued 8 million certificates, corresponding to 8 billion kWh of on-grid wind and solar electricity, equivalent to what Beijing's residents consume in an average five months.

With this development, an increasing number of stakeholders are contacting CDP asking for a review of the Chinese GECs system using RE100 technical criteria. This short paper provides the requested review.

## The Renewable Energy Portfolio Standard (RPS)

In December 2016, The National Development and Reform Commission (NDRC), a Chinese government body, launched the 13<sup>th</sup> Renewable Energy Development Five Year Plan (for the period 2016–2020) which set targets to increase non-fossil energy to 15% by 2020 and 20% by 2030<sup>1</sup>

In 2018, the National Energy Administration (NEA) released a draft national policy: *Renewable Portfolio Standard and Assessment Methods* (NEA 2018). In 2019, the NDRC and the NEA published<sup>2</sup> a *Notice on the establishment and improvement of a safeguard mechanism for renewable electricity consumption ('Renewable electricity quota')* – a benchmark Renewable Energy Portfolio Standard (RPS) that was set to become effective in 2020 for the next five years. The notice makes it clear that the annual renewable electricity (RE) consumption quota is assigned to the provinces of China.

### The RPS sets two types of targets for each province:

- The minimum and encouraged target for the RE consumption; and
- The minimum and encouraged target for the non-hydro RE consumption.

### There are two types of obligated entities under the RPS:

- State owned electricity distribution companies, retail electricity companies and independent retail electricity companies;
- Electricity users who purchase electricity through the electricity wholesale/merchant market and companies that own their own power plants.

The target for the distribution companies and retailers corresponds to a percentage of the megawatt-hours of RE consumption to total electricity sales, whereas the electricity users have a target on their annual electricity consumption.

Obligated entities use GECs to meet their RPS targets and can also explore other options such as buying RE from other market entities that have surplus RE. Under this mechanism, a new certificate system might be introduced i.e. '*Certificate for Over-consumed Renewable Electricity (COCRE)*<sup>3</sup>, which captures the surplus RE sourcing by the entity that is above its RPS target. This will enable obligated entities to issue and trade the certificate which will be available for other obligated entities. However, as of August 2020, the process of registration, issuance, and redemption for this type of certificate has not been set up yet.

## The Green Electricity Certificate (GEC) System

In July 2017, China opened the GEC system as a pilot to allow businesses and individuals to buy renewable energy voluntarily. The system is designed and maintained by the **China Renewable Energy Engineering Institute (CREEI)**.

Currently, large scale onshore grid connected wind and solar PV projects receiving a **Feed-in-Tariff (FIT)** are eligible to participate in the GEC system. The Chinese government is

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<sup>1</sup> <https://chineseclimatpolicy.energy.columbia.edu/en/renewable-power>

<sup>2</sup> <https://chinaenergyportal.org/en/notice-on-the-establishment-and-improvement-of-a-safeguard-mechanism-for-renewable-electricity-consumption/>

<sup>3</sup> Based on discussion with China Renewable Energy Engineering Institute (CREEI), GEC and COCRE will not be issued to the same renewable electricity generation, thus avoiding double counting of renewable energy attribute" - Zhu Yu Yu, CREEEI, Date: 07<sup>th</sup> April 2020.

planning<sup>4</sup> to launch subsidy-free wind and solar projects, and there is the possibility that these projects will be eligible to issue GECs. The GEC system does not cover distributed RE generation.

The GEC system primarily helps reduce FIT subsidies from the government via driving a market-based mechanism. Obligated entities can use GEC to meet their RPS targets, thus creating demand for GECs in the market. **Voluntary buyers such as corporates and individuals can also demonstrate their support for renewable energy via GEC purchase and fulfil voluntary sustainability targets.**

#### Key details of the GEC system:

- The GECs are issued to **large-scale grid connected onshore wind and solar PV plants (excluding distributed power plants)**. Each GEC represents 1 MWh of RE generation.
- RE generators receiving FIT can issue GECs. However, once they sell the GECs on CREEI's electronic platform, they **forego government subsidy (FIT)**. If they are not able to sell their GECs, the associated generation is still eligible to earn government subsidy ensuring the **RE generator receives one revenue stream only**.
- **The Government subsidy payment rate acts as a price cap for GECs**. In March 2019 GECs ranged from \$20–45 USD for onshore wind, and \$45–104 USD<sup>5</sup> for solar energy.
- Currently, GEC is the only attribute certificate which can be owned and used to comply with the RPS target. There might be another certificate system in future (i.e. *Certificate for Over-consumed Renewable Electricity* or “COCRE”) to capture over-consumption of RE by obligated entities (consumption that exceed the RPS target, but this hasn't been set up yet).
- **The National Renewable Energy Information Management Centre (the Centre)**, an independent third-party organisation **provides verification services for GEC system**.
- The GECs convey basic information to its users such as resource/fuel type (e.g. wind, solar), serial ID, generator ID, generator name, generator location, vintage (date of generation), and issuance date.
- The environmental attributes captured through GEC include the **GHG emission rate of electricity, sulphur dioxide and nitrogen oxide, which represent the replacement effects of coal-fired power generation**.
- The RE generators participating in GEC system are also eligible to participate in **China's Emission Trading System (ETS)**.
- **The GEC has no expiry date**, however under the RPS, the validity period of the GEC corresponds to the period of annual target assessment. The GECs are valid only within the assessment period of that year.

The following diagram explains the GEC market and various stakeholders. As discussed above, 'COCRE' might be issued to the obligated entities to capture any over-consumption of renewable electricity. COCRE will be a consumption certificate rather than a production certificate and only obligated entities are eligible to receive COCRE. Currently, there is no process to issue COCRE, but when developed, the GEC and COCRE systems **will be administered separately**;

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<sup>4</sup> [http://www.nea.gov.cn/2019-04/10/c\\_137965487.htm](http://www.nea.gov.cn/2019-04/10/c_137965487.htm)

<sup>5</sup> <https://resource-solutions.org/wp-content/uploads/2019/11/Accelerating-Corporate-RE-Engagement-in-China.pdf>

the two systems will have a data exchange mechanism and rules to be put in place, to avoid double counting<sup>6</sup>.

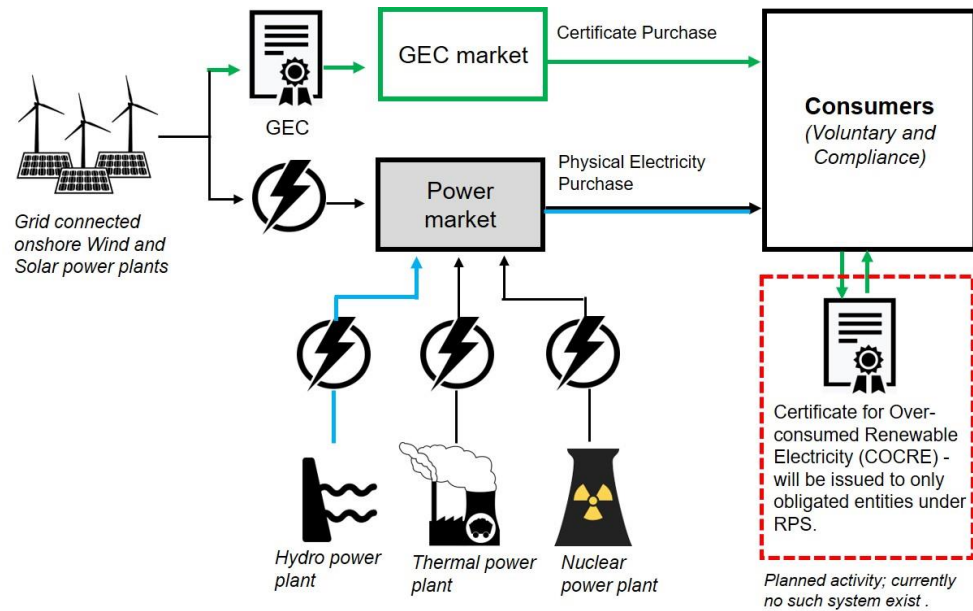


Figure 1: GEC System

### Compliance of GECs with RE100 Technical Criteria

The [RE100 Technical Criteria](#) define what counts as renewable electricity for the purpose of participation in the RE100 initiative. RE100 defines renewable electricity consumption as the ability to make unique claims on the use of renewable electricity generation and its attributes. Making credible RE use claims depends largely on effectively tracking RE attributes, verifying exclusive delivery by generators and suppliers, and verifying exclusive ownership of attributes by grid customers buying RE. The RE100 [requirements](#) for a credible RE usage claim and the criteria for contractual allocation of Energy Attribute Certificates (EACs) are as follows:

Table 1: Criteria and alignment

Sr. No.	Criteria	Alignment
1.	Credible generation data;	Meets the requirements
2.	Attribute aggregation;	Meets the requirements, with a condition (table 2)
3.	Exclusive ownership (no double counting) of attributes;	Meets the requirements
4.	Exclusive claims (no double claiming) on attributes;	Meets the requirements, with a condition (table 2)
5.	Geographic market limitations of claims; and	Meets the requirements
6.	Vintage limitations of claims.	Meets the requirement, but have a recommendation

<sup>6</sup> Based on discussion with China Renewable Energy Engineering Institute (CREEI) on 07<sup>th</sup> April 2020.

Table 2: Further requirements and recommendations to meet RE100 criteria

Criteria	Requirements/ Recommendation to enable credible RE usage claims
Attribute aggregation, Exclusive claims	<p><b>Requirement:</b> The RE generators participating in GEC system are able to issue multiple environmental market instruments such as energy attribute certificate and GHG offsets for the same generation.</p> <p>Making a credible RE usage claim requires ownership of <b>all environmental attributes</b> associated with the generation that can be owned, and that <b>none of these attributes have been sold off, transferred, or claimed elsewhere.</b></p> <p>If separate instruments have already been created for different attributes of power generation (e.g. carbon attributes), attribute aggregation can be achieved by bringing these instruments together – by demonstrating ownership and retirement of all instruments that make up a RE usage claim.</p> <p>To meet the RE100 criteria, <b>GEC users are required to redeem all instruments e.g. GHG offset and any other certificate (if issued to the same RE generation).</b></p>
Vintage limitations of claims	<p><b>Recommendation:</b> GECs will convey the date of generation (but no expiry date of the certificate). To make a credible RE claim, users of GEC should check the vintage of the certificates which should be reasonably close to the reporting year of the electricity consumption to which it is applied.</p> <p>For reference, companies can consider Green-e Framework for Renewable Energy Certification. Green-e® Energy Certified sales that are made in a given calendar year must be generated within the 12 months of that calendar year, the six months before the calendar year began, or the three months after the calendar year has ended. This creates a 21-month window of eligible generation dates from which renewable energy generation can be used toward Green-e® Energy Certified sales in any given calendar year. Please check more information here: <a href="https://www.green-e.org/faq">https://www.green-e.org/faq</a></p>

## Conclusion

As the RE100 technical partner, CDP undertook a preliminary technical assessment of the Chinese GEC system. (See appendix for more details). Though the GEC provides most of the necessary information to its user, it is still not robust enough to guarantee exclusive claims by the user. This is due to the potential for double counting of environmental attributes across GEC, GHG offsets, and other certificate systems operating in China. Further, due to the existence of the emission cap-and-trade system (ETS), GEC users might not be able to make avoided GHG emissions claims associated with their renewable energy consumption. Additionally, there is no mechanism in place to restore the avoided emissions claim to the GEC buyer.

**Therefore, to avoid double-counting and to enable credible claims by the user of GEC, RE100 can only accept claims made using GECs if the user of GECs follows the “Requirement” provided in table 2, that it is required for the user of GEC to redeem all other instruments e.g. GHG offset and any other energy attribute certificate (if issued to the same RE generation) in order to achieve attribute aggregation and claim renewable energy usage in a credible manner.**

**Note:** The information used to develop this report is provided by China Renewable Energy Engineering Institute (CREEI).

## Contact

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## Appendix: Basic Technical Assessment of GEC System

Criteria	Check Point	Preliminary Observations	Further Requirement
Credible generation data	<ul style="list-style-type: none"> <li>Whether the third party verify static data - (developer details, fuel type, location, commissioning date) and Metered/dynamic data - (quantity of generation).</li> </ul>	<ul style="list-style-type: none"> <li>The National Renewable Energy Information Management Centre (the Centre) is responsible for third party verification of the static and metered/dynamic data for the RE projects during the registration and issuance process.</li> <li>Large scale, on shore, grid connected solar and wind energy projects are eligible to issue GEC.</li> <li>Large scale, on shore, grid connected solar and wind energy projects are eligible to issue GEC.</li> <li>The GEC represents 1 MWh of RE generation.</li> </ul>	N/A

Criteria	Check Point	Preliminary Observations	Further Requirement
Attribute aggregation	<ul style="list-style-type: none"> <li>• Whether the Energy Attribute Certificate includes all environmental and social attributes that can be owned, and no attributes have been sold off, transferred, or claimed elsewhere.</li> <li>• If separate instruments have already been created (e.g. carbon attributes, other compliance instrument under state RE target).</li> </ul>	<ul style="list-style-type: none"> <li>• The environmental attributes aggregated includes- GHG emission rate for carbon dioxide, sulphur dioxide, and nitrogen oxide, representing the replacement effects of coal-fired power generation.</li> <li>• There is a plan to issue Certificate system for over-consumed Renewable Electricity. The 'COCRE' will be issued to obligated entities under the RPS to capture over-consumption of physical renewable electricity by them (exceeding their targets under RPS). The COCRE will be a consumption certificate rather than production certificate and can be used by the other obligated entities to meet their RPS target. Currently, COCRE system does not exist yet.</li> <li>• China has a functional Emission Trading System (ETS). The RE generators participating in GEC system are also eligible to participate in Emission Trading System, and <b>these generators would receive GHG emission offset and GEC for the same generation.</b></li> <li>• In China, emissions from the power sector is "capped" under ETS and there is no mechanism in place to restore the avoided emissions claim to the GEC buyer. Therefore, avoided GHG emissions attribute effectively equal zero for GEC.</li> <li>• GEC will be issued to the FiT generator. However, generators can't receive FiT and revenue from GEC sales for the same generation. Therefore, there is only one source of revenue for the RE generator (either via GEC or FiT).</li> </ul>	<p>It is required for the user of GEC to retire all instruments (if issued to the same RE generation) to claim credible RE uses.</p>



Criteria	Check Point	Preliminary Observations	Further Requirement
Exclusive ownership (no double counting) of attributes;	<ul style="list-style-type: none"> <li>Whether the Certificate provide standardized information includes- resource/fuel type (e.g. wind, solar, etc.), Serial ID, generator ID, generator name, generator location, vintage (date of generation), issuance date to its user.</li> </ul>	<ul style="list-style-type: none"> <li>GECs convey basic information on each certificate such as resource/fuel type (e.g. wind, solar, etc.), Serial ID, Generator ID, Generator Name, Generator Location, Vintage (date of generation), Issuance Date.</li> <li>GEC is being issued to the RE generator directly after the verification procedure.</li> <li>Electronic trading platform is available to facilitate the registration, issuance, and redemption of GEC from the generator to the consumer. The electronic system is developed to provide exclusive issuance, trading, and retirement of attributes to support credible claims.</li> </ul>	N/A
Exclusive claims (no double claiming) on attributes	<ul style="list-style-type: none"> <li>Ability of consumer to retire by or on behalf of its supplier and that there are no other usage claims being made on the generation attributes for example, by the electricity supplier to meet a RE delivery target or in marketing that RE is being delivered to customers.</li> <li>Need to retire GHG offsets if created.</li> </ul>	<ul style="list-style-type: none"> <li>There is a reliable electronic trading system can track the transfer of GEC from a generator to a consumer. The system can provide exclusive issuance, trading, and retirement of attributes to support credible claims.</li> <li>GEC can be used for targets under RPS and for voluntary targets. Once the GEC is purchased by the user, it can't be traded again, and hence considered redeemed by the user.</li> <li>RE generators is able to issue multiple instruments (GHG offset, other certificates, GEC) for the same generation.</li> </ul>	It is required for the user of GEC to retire all instruments (if issued to the same RE generation) to claim credible RE uses.
Geographic market limitations of claims	<ul style="list-style-type: none"> <li>Whether the Energy Attribute Certificate system has defined market boundary for the purpose of transacting and claiming attributes.</li> </ul>	<ul style="list-style-type: none"> <li>The market boundary for the Chinese GEC system is only Mainland China.</li> </ul>	Since the GEC system operator defined the market boundary, GEC should be used only in Mainland China.



Criteria	Check Point	Preliminary Observations	Further Requirement
Vintage limitations	<ul style="list-style-type: none"> <li>Whether the Energy Attribute Certificate is able to communicate vintage related information (date of generation).</li> </ul>	<ul style="list-style-type: none"> <li>GEC will convey the date of generation (but no expiry date of the certificate). However, under the renewable quota system, the validity period of China GEC corresponds to the period of annual quota assessment.</li> </ul>	To make a credible RE claim, user of GEC should have to check the vintage of the certificates which must be reasonably close to the reporting year of the electricity consumption to which it is applied.