Glow V2 Phase 1

WHITEPAPER

00
Overview

Glow V1 featured a novel proof of work mechanism called the competitive recursive protocol. Using this mechanism, V1 was able to incentivize the construction of more than $18 million worth of solar farms around the world.

Though effective, Glow V1 was singularly focused on producing as many carbon credits as possible, with no capability to accommodate specialized interests such as producing carbon credits within a specific country.

Glow V2 introduces a control mechanism that allows impact buyers to allocate the GLW token rewards to specific specialized interests. Phase I is the first iteration of Glow V2, implementing the control mechanism along with several other features that make Glow more effective.

01
Core Protocol Updates

Perhaps the biggest and most important update is the introduction of the control mechanism, which allows impact buyers to allocate GLW token rewards to specific regions and even specific infrastructure objectives. A token called the Glow control token, or GCTL, is being added to govern the control mechanism.

Because the GCTL token has been introduced, Glow is deprecating both impact power and the Glow Carbon Credit token, often called the GCC token. The deprecation is effective as of August 1st 2025, and all owners of impact power and GCC tokens will be given GCTL tokens as compensation.

In addition to these changes, the solar farm rewards structure is being upgraded to allow solar farms to make their protocol deposits using their choice of USDG tokens, GLW tokens, or GCTL tokens. The rewards period is also being reduced from 208 weeks to 100 weeks.

GLW Token Updates

No major changes are being introduced to the GLW token supply or inflation rate during Phase I. In fact, the same ERC20 contract is being used, which means that current GLW token holders do not need to take any action during Phase I.

The total rate of inflation is not changing, however the structure of the inflation is being adjusted. More specifically, the 175,000 GLW tokens that get distributed to solar farms each week are being wrapped in a control mechanism that allows them to be steered to different regions of the world. Aside from that, the 40,000 GLW tokens per week that go to the grants pool will be kept the same, and the 15,000 GLW tokens per week that go to the Glow Foundation will be kept the same.

GCTL Introduction

A critical part of the control mechanism is a new token called Glow control, or GCTL. Holders of GCTL tokens get to choose how the 175,000 mining tokens are distributed between different Glow projects.

During Phase I, GCTL tokens can be minted for a price that is equal to the square root of the current GLW token price in USDG, rounded up to the nearest 5 cents. The GLW token price will be measured from the USDG/GLW Uniswap pool using an EDGAP (exponentially decayed geometric average price) with a 100 hour half life.

GCTL tokens cannot be transferred or traded during Phase I.

Protocol Deposit Updates

A key part of the Glow incentive design is the protocol deposit. When a solar farm joins the Glow protocol, it has to make a deposit as a pledge that it will produce a competitive quantity of carbon credits. The deposit is typically quite large, often equal to the amount of capital required to construct the solar farm.

During Glow V1, the deposit always had to be made in USDG tokens. Starting in Glow V2 Phase I, the protocol deposit can be made using USDG tokens, GLW tokens, or GCTL tokens. Solar farms will only compete with other solar farms that made their protocol deposit using the same type of token.

To make a protocol deposit in GLW or GCTL, a reference price must be established for the GLW token. The auditor will use an EDGAP with a 100 hour half life from a public USDG/GLW Uniswap pool to establish the reference price as the final step of the audit.

Once the reference price of GLW has been established for a solar farm, it will not be updated even if the actual price of GLW changes. This reference price will be used during the entire 100 week rewards period to determine how many rewards the solar farm should receive.

Impact Power Updates

Glow V1 featured a soulbound credit called impact power. Users could obtain impact power by retiring GCC (Glow Carbon Credit) tokens. Impact power is being deprecated, effective August 1st 2025.

All impact power owners as of August 1st 2025 will receive GCTL tokens as compensation for their deprecated impact power. For each dollar that they spent buying impact power, users will receive $3 of GCTL.

GCC Updates

Glow V1 featured an ERC20 token called the GCC, or Glow Carbon Credit. One GCC token was auctioned off for each appraised ton of CO2 emissions reductions that was created by Glow solar farms.

Like impact power, the GCC token is being deprecated, effective August 1st 2025. All GCC holders as of August 1st 2025 will receive GCTL tokens as compensation for their deprecated GCC. For each GCC token that they owned on August 1st 2025, users will receive $500 worth of GCTL.

02
The Control Mechanism

Phase I introduces a control mechanism to Glow which manages the 175,000 GLW tokens per week which get distributed to Glow miners. In Glow V1, all of those tokens went to solar farms that were participating in a strictly global carbon credit competition, which caused most of the GLW tokens to flow towards the single most competitive region (India).

In Glow V2, a new control mechanism allows for the creation of different rewards pools, called infrastructure projects. Each infrastructure project works much like a mini version of the Glow V1 rewards program, where solar farms compete with each other to earn rewards, however each solar farm is only competing with other solar farms within their own infrastructure project.

During Phase I, each infrastructure project receives a portion of the 175,000 GLW tokens that are used to reward solar farms. The number of GLW tokens that goes to each infrastructure project is decided by the GCTL holders through staking.

Infrastructure Projects

Most of the infrastructure projects in Phase I are region-locked clones of Glow V1. This means that solar farms must undergo the same audit process, make the same protocol deposit, will earn GLW tokens based on the size of their protocol deposit, and will earn their deposit back based on their expected carbon credit production.

To participate in a region-locked infrastructure project, a solar farm must be constructed within the corresponding region. Furthermore, because the rewards pools of different infrastructure projects are not mixed, that solar farm will only be competing with other solar farms within the same region.

When Phase I launches, there will be four infrastructure projects. The first one will be the Clean Grid Project, which is the original global carbon credit compe- tition from Glow V1. All solar farms that onboarded to Glow before January 1st 2025 will live on the Clean Grid Project. The other three infrastructure projects will be region-locked clones of the Clean Grid Project for the regions of Utah, Colorado, and Missouri.

Impact Credits

Each infrastructure project produces its own impact credit. In Glow V1, the impact credit was the Glow Carbon Credit, which represented one ton of CO2 that was not emitted into the atmosphere thanks to the clean energy produced by Glow's solar farms.

The region-locked clones of Glow V1 also produce carbon credits, however each region will produce its own carbon credit. For example, the Utah infrastructure project will produce Utah Carbon Credits.

During Phase I, impact credits cannot be transferred to other users, however they can be used within the impact marketplace.

GCTL Staking

Each week, 175,000 GLW tokens are distributed to the different infrastructure projects. The number of GLW tokens that get distributed to each project is proportional to the amount of GCTL that is staked to that infrastructure project.

This means that, in aggregate, GCTL holders have full control over the 175,000 GLW tokens each week. Someone that owns 10% of the GCTL supply gets to decide how 17,500 GLW tokens each week are allocated between projects. If GCTL is unstaked, it can immediately be staked to any infrastructure project. GCTL will remain staked until an unstaking transaction is submitted by the GCTL owner.

When GCTL is unstaked, it unstakes gradually over a period of 100 weeks. Each week, 1% of the GCTL becomes unstaked. If desired, a user can choose to automatically restake their unlocked GCTL to a new infrastructure project each week as it unstakes from the old project.

GCTL Staking Rewards

During Phase I, all of the impact credits that are produced by an infrastructure project will be distributed to the GCTL stakers that are supporting that infrastructure project.

When a new solar farm joins an infrastructure project, the Glow auditors will appraise the lifetime number of impact credits that the solar farm is expected to produce. These impact credits will then be distributed to the GCTL stakers supporting the infrastructure project over a period of 100 weeks, with 1% of the impact credits being distributed each week. The impact credits will be distributed evenly between all of the actively staked GCTL each week, meaning new GCTL stakers can come in and participate in receiving those impact credits.

03
The Impact Marketplace

In the traditional carbon credit world, individuals and corporations can declare their commitment to the climate by retiring carbon credits. The act of retiring a carbon credit functionally destroys it, taking it out of circulation so that the owner can never again make a profit by selling it. Because the owner agrees to never sell it, they can claim the corresponding climate benefits that resulted from the production of the carbon credit.

The problem with retiring carbon credits is that it reduces the owner's total impact to a single number: the total number of carbon credits that the owner has retired. This number is devoid of context, and carbon credits have vastly varying quality. Someone who retires 10,000 low quality carbon credits has the same final number as someone who retired 10,000 high quality carbon credits, which props up disingenuous climate actions and de-values genuine climate efforts.

Glow's solution is to upgrade the act of retiring credits in a way that directly associates the retired credits with a specific solar farm. This means that on Glow, to retire any impact credits, you have to retire them to an unbound solar farm, and you have to retire exactly as many impact credits as that solar farm is expected to produce over its lifetime.

This process "binds" the solar farm to the impact credit owner, permanently associating the solar farm and all of its positive externalities with the impact credit owner.

Once an impact credit owner has bound one or more solar farms, they get a webpage hosted on glow.org which showcases all of the solar farms that they have bound, as well as an aggregation of all of the known positive externalities associated with the solar farms. The webpage provides links to the audits of each solar farm, creating a high degree of transparency that allows anyone to see exactly what climate actions have been taken on behalf of the impact credit owner.

The Glow Foundation maintains legal agreements with each solar farm to establish exclusivity and ensure that the Glow impact credit owners are the only ones able to make claims about the climate benefits and other positive externalities of the solar farms. This helps to prevent double counting and greenwashing.

Acquiring Impact Credits and Binding Solar Farms

Every time that a solar farm joins the Glow protocol, exactly enough impact credits are distributed to GCTL stakers to cover the solar farm's expected lifetime impact credit production. This means that the total number of impact credits that get issued to GCTL stakers is exactly enough to bind every solar farm.

One way that a user can bind a solar farm is to stake GCTL to an infrastructure project and passively accumulate enough impact credits until they have enough to bind the solar farm.

The user can also make a "binding purchase". If the user wants to bind a solar farm but does not have enough impact credits to complete the binding, they can substitute USDG instead. Each infrastructure project has a hardcoded quantity of USDG that must be used for each impact credit that is missing.

For example, if a user has 10 impact credits and wants to bind a solar farm with a lifetime production of 20 impact credits, they can bind that solar farm with a binding purchase by substituting USDG for the 10 missing impact credits. If the hardcoded price is 10 USDG per missing credit, then the total cost to the user for binding the solar farm will be 10 impact credits and 100 USDG tokens.

This does two things. First of all, it binds a solar farm without eliminating enough corresponding impact credits. This means that if all solar farms get bound, there will be 10 impact credits held by GCTL stakers who are unable to bind them to a solar farm, because no solar farms will remain. But it also creates an inventory of 100 USDG tokens, and that inventory can be used to buy impact credits from the GCTL stakers.

At any point in time, impact credit owners can exchange their impact credits for a portion of the USDG inventory. The exchange rate is on a pro-rata basis: if the user exchanges 10% of the remaining impact credit supply, they will receive 10% of the USDG inventory. This means that the exchange rate decreases each time a new solar farm joins the protocol, it increases each time someone binds a solar farm with pure impact credits, and it also increases each time someone makes a binding purchase.

04
The Mining Marketplace

Phase I of Glow V2 pilots a new platform for adding solar farms to the Glow protocol: the mining marketplace. Any audited solar farm can list itself on the mining marketplace, openly offering a portion of its rewards to any collaborator that wishes to make the protocol deposit for that farm.

The marketplace itself lists a set of solar farms, each with different rewards properties. Because Glow uses expected production values to distribute rewards, the competitive strength of the solar farm is fully known in advance of making the protocol deposit, and does not depend on the actions of the solar farm owner.

Each solar farm earns two types of rewards. The first type of rewards are the deposit rewards, where the solar farm earns back its protocol deposit based on its expected impact credit production, and the second type of reward is the GLW reward, where the solar farm earns GLW tokens based on the size of its protocol deposit.

For marketplace solar farms, the person that makes the protocol deposit always earns 100% of the deposit rewards, including all surplus if the solar farm is more competitive than its peers. They also have full discretion over what type of token is used to make the protocol deposit.

The second type of rewards are the GLW rewards, which are distributed to solar farms proportional to the size of their protocol deposit. Marketplace solar farms split the GLW rewards between the solar farm and the person that made the protocol deposit.

If a solar farm would rather collect all of the rewards for itself, it can elect to make its own protocol deposit rather than list on the mining marketplace, or even elect to participate in an arbitrary third party marketplace.

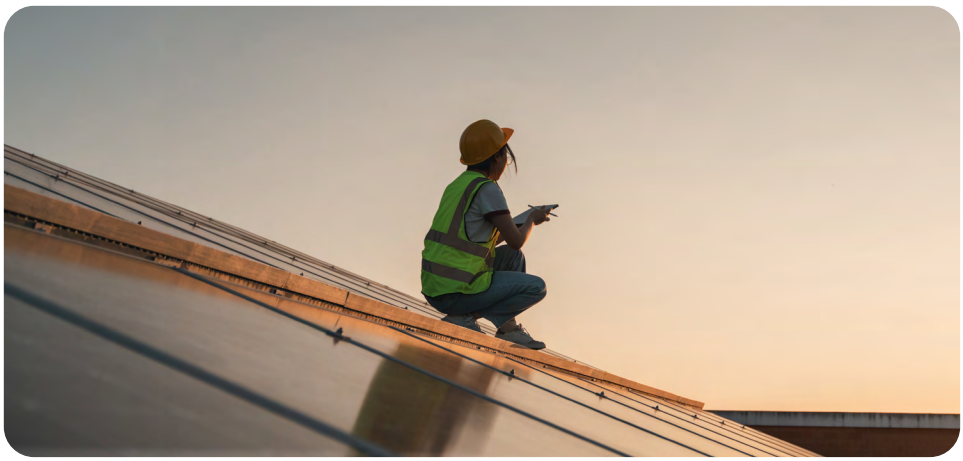
05
Launching Infrastructure Projects

Right at the beginning of Phase I, there will be the Clean Grid Project and three region-locked clones of the Clean Grid Project for Utah, Colorado, and Missouri. An automated workflow will also exist that allows anyone to stand up their own region-locked clones of the Clean Grid Project.

To launch a new infrastructure project through the automated workflow, the following criteria must be met:

- $10,000 of GCTL must be staked to the region, if it is a US state
- $100,000 of GCTL must be staked to the region, if it is a non-US country
- At least 1 Glow certified solar installer must support solar construction across the entire region
- At least 10 solar farms must have started the audit process, including paying the audit fee and beginning development
- At least 1 solar farm must have completed construction and made its protocol deposit

Anyone can kick off a collaborative effort to launch a region by staking at least 10% of the required GCTL to that region. Once kicked off, that region will have a dedicated webpage that tracks the progress of the region and provides tools to help the region hit its launch criteria. The region will be automatically submitted to the GVEs for approval once all criteria are reached, and if approved the region will launch.



06
The Glow Endowment

Each time that someone mints GCTL, the money is sent to the Glow Endowment, a fund that, by mandate, keeps roughly 50% of its portfolio value in USDG and roughly 50% of its portfolio value in GLW tokens at all times.

Any time that the GLW price changes, the balance of the portfolio will change. If the balance shifts so that more than 52% of the portfolio value is in one token, the portfolio will execute a rebalancing operation.

During Phase I, GCTL can only be minted using USDG. This sends USDG tokens to the Endowment which must then be converted into a portfolio of half USDG and half GLW. If the Endowment is able to acquire GLW tokens below the price of GLW at the time the GCTL was minted, it will do so. Otherwise, it will acquire GLW tokens over a 30 day period using a dollar cost averaging strategy.

07
Solar Farm Transition

In Glow V1, solar farms earned rewards over a 208 weeks period. In Glow V2, solar farms earn rewards over a 100 week period. This means that solar farms will begin earning rewards roughly 2.08 times as quickly after transitioning to Glow V2. For example, a solar farm which had 104 weeks of rewards remaining on Glow V1 will have 50 weeks of rewards remaining on Glow V2, and they will recover 2.08x more of their protocol deposit each week versus what they were recovering in Glow V1.

Solar farms that onboarded to Glow before January 1st 2025 will be migrated into the Clean Grid Project, independent of where they were constructed. Solar farms that onboarded to Glow after January 1st 2025 will be migrated into the most appropriate regional zone based on their location.

To help bootstrap Phase I, all solar farms that pay their audit fee between September 15th, 2024 and September 15th, 2025 will receive a grant of 4,000 GLW tokens.

08
GCTL Distribution

Anyone who bought impact power during Glow V1 will receive $3 of GCTL per $1 they spent on impact power before August 1st 2025. Additionally, anyone who owned GCC tokens on August 1st 2025 will receive $500 of GCTL per GCC token that they owned.

In total, that's $133,738.59 of GCTL which will be distributed to impact power owners and GCC token owners. The GCTL will be automatically staked to the Clean Grid Project. For these GCTL owners only, the GCTL can be instantly unstaked from the V1 infrastructure project one time.

Glow captures the same magic that allowed Bitcoin to build millions of mining machines and uses it to instead build millions of solar farms.

glow.org