

Senergy CCI

Central Plant Controller

for the Italian Standard CEI 0-16

Higeco² More

Introducing the CCI: an important step toward a sustainable future

Sustainable Development Goals

The future of energy is renewable.

To support the ongoing energy transition, Italy is significantly boosting its installed capacity from renewable sources, with the goal of making the electricity system ever more sustainable, efficient, and secure. For this growth to be truly balanced, it is essential that distributed generation actively participates in grid balancing, contributing to the stability of the National Electricity System.

To make this evolution possible, the **Central Plant Controller (CCI)** was introduced: the connection point between distributed generation plants and the national electricity grid.



What is the CCI for?

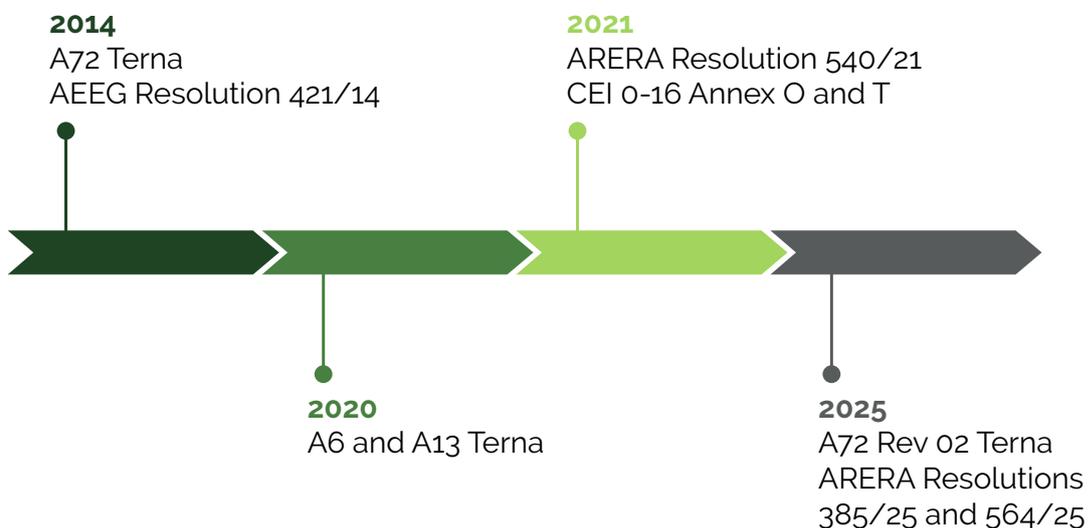
The CCI is installed at the delivery point and allows the monitoring of the main electrical quantities and remote control of the plant by the DSO (distributor), the TSO (Terna), and other authorised and potentially interested parties, such as the BSP.



Legislation

To enable this transition toward greater use of renewable energy, in recent years the National Electric System has introduced significant regulatory updates to ensure increased grid security and stability.

- **2014–2016 – Annex A72 and AEEG Resolution 421/14**
Between 2014 and 2016, with Annex A72 and ARERA resolutions, the Plan for the Reduction of Distributed Generation (RIGEDI) was defined, aimed at ensuring the security of the electric system in scenarios of excess production or limited regulating capacity.
- **2020–2022 – Annexes A6 and A13 and CEI 0-16 V1/V2 variants**
Subsequently, between 2020 and 2022, Annexes A6 and A13 of the Grid Code and the V1/V2 variants of the CEI 0-16 standard incorporated European guidelines on the observability of Distributed Generation, introducing the Central Plant Controller (CCI). This device is key to ensuring a safe and interoperable connection between plants and grid operators, enabling centralized, real-time control of distributed generation units.



- **2021 – ARERA Resolution 540/21**
In 2021, Resolution 540/21 made the installation of the CCI and activation of the PF1 monitoring functions mandatory for all medium-voltage plants with power above 1 MW, both new and existing.
- **2025 – A72 Rev 02 Terna and ARERA Resolution 385/25**
In 2025, Terna and ARERA, through the A72 Rev 02 Terna update and ARERA Resolution 385/25, introduced significant changes to the RIGEDI procedure, eliminating the GDPRO category (plants remotely disconnectable only by the producer upon DSO request) and introducing a new, more flexible and efficient load-shedding architecture.
- **2025 – ARERA Resolution 564/25**
Subsequently, ARERA Resolution 564/25 introduced a rescheduling of compliance timelines for the RIGEDI procedure, providing extensions and a revision of bonus time windows.

Deadlines and Compliance Obligations

The main deadlines established by ARERA Resolution 564/25 vary depending on plant size, as shown in the table below:

Plant size	Compliance deadline	Obligation
$P \geq 1000$ kW	31 December 2026	Activation of PF2 functionality
$1000 > P \geq 500$ kW	31 December 2027	CCI installation and activation of PF2 functionality
$500 > P \geq 100$ kW	31 March 2028	CCI installation and activation of PF2 functionality



All information on bonuses, updates, and in-depth regulatory guidance is available on our website: www.higecomore.com.

CCI Functionalities

The functions required by the legislation are divided into three groups: PF1, PF2 and PF3.



The first group, PF1, refers to the monitoring functions. The CCI must monitor the active and reactive power, the status of the DG and DI, and communicate the collected data to the DSO (Distribution System Operator) with a sampling time of 4 seconds. For new plants only, monitoring of the active power of individual generators (or inverters) is required.

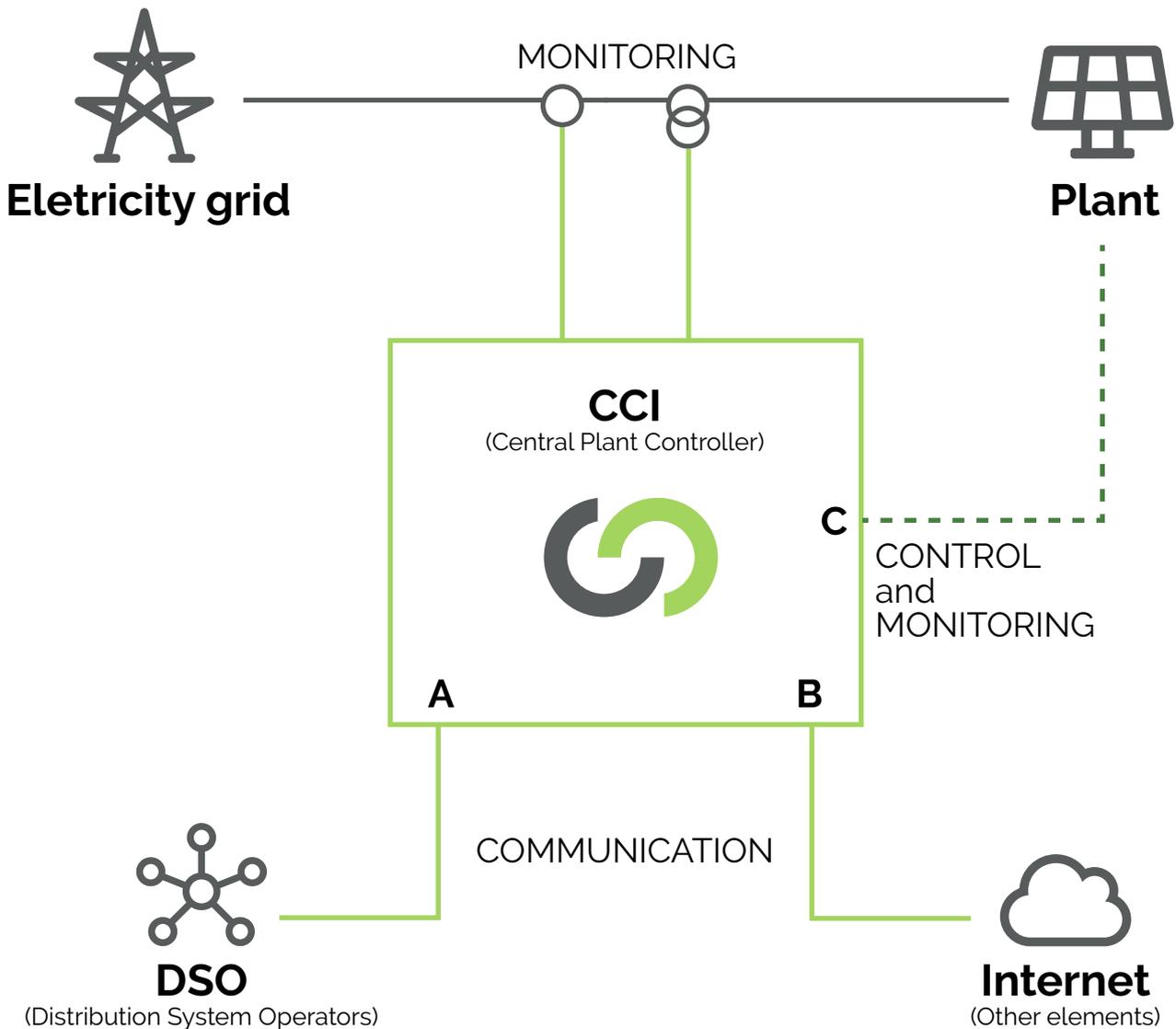


The second group, PF2, relates to the remote control of the plant, for the purpose of regulating grid voltage and frequency. The function of active power limitation is mandatory for all plants, regardless of size, while the other PF2 functionalities are optional and activated at the DSO's discretion.



The PF3 functionalities, whose activation is at the producer's discretion, relate to the plant's participation in dispatching services markets, optimized plant management, and load pickup during startup or reconnection.

The CCI communicates, on the one hand, with the production units, and on the other, with the DSO distributor through the IEC 61850 protocol, using the secure transport profile defined by IEC 62351. The diagram below illustrates the basic connection between the main elements in the system.



- Eletricity grid
- Monitoring (PF1 functions)
- - - Control (PF2 functions) and Monitoring (PF1)

The Higecco More solution

The Higecco More CCI is the optimal and flexible Made In Italy solution. This CCI has been designed, implemented and tested to meet the technical requirements established by the CEI 0-16 standard and network operators. Higecco More integrates in a single product, all the functions required by the standard for monitoring and control. This is thanks to considerable hands-on experience in countries where these functions are part of the Network Code.

Higecco More is a member of the Higecco Group and boasts years of hard-earned know-how in power plant control. And the expertise shows: clients with a Higecco CCI are up and running from day zero to meet all their monitoring and control needs. The Higecco CCI is flexible and can adapt to any renewable energy power plants existent or under construction.



HSC (Higecco Security Controller)
our high-performance RTU

MONITORING OF THE MAIN ELECTRICAL MEASUREMENTS AT THE DELIVERY POINT AND FOR A SINGLE GENERATOR

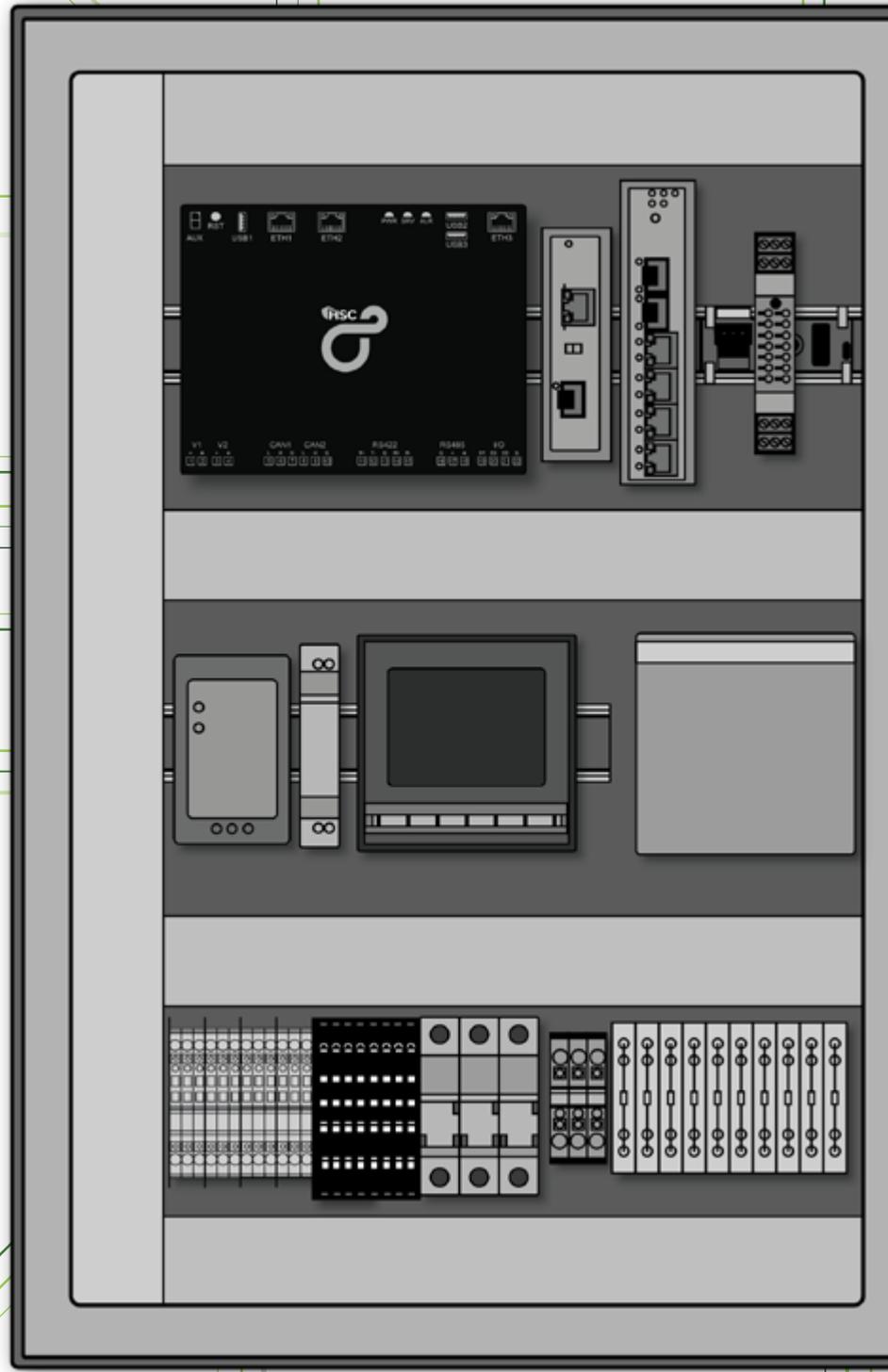
ACTIVE POWER CONTROL

REACTIVE POWER CONTROL

POWER FACTOR CHECK

RESPONSE TO VARIATIONS IN FREQUENCY AND VOLTAGE

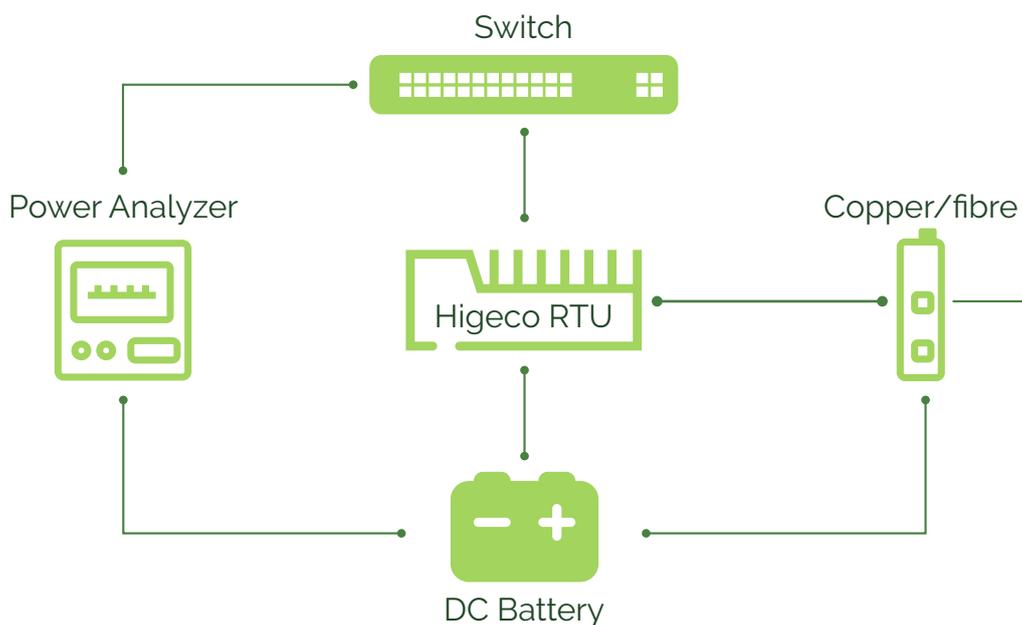
CONFIGURABLE CONTROL POLICY



Architecture of the Higeeco More CCI

The Higeeco More CCI consists of:

- **The HSC** (Higeeco Security Controller) is an RTU (Remote Terminal Unit) that collects the monitoring data and implements the control functions. It communicates with the plant and the DSO (Distributor System Operators) using the communication protocols established by the standard;
- **Power analyzer** measures the electrical parameters at the connection point;
- **Battery** guarantees the functionality of the CCI even in the event of power outages;
- **Switch** interconnects the interface C with the system network;
- **Copper/fibre ethernet converter** guarantees the extension of copper connections over optical fibre.



Technical Data

ENCLOSURE

Mounting	Wall
Material	Sheet Metal
WidthxHeightxDepth (mm)	406x606x250
Weight (Kg)	26,5

AC VERSION Q01-HSC-4T2F-10DI-PA

AC Power Supply Voltage	230Vac (207Vac - 252Vac)
Power Supply Frequency	50/60Hz
Backup battery	12Ah 4h@25W
Average consumption	0.25A @230Vac
Maximum consumption	10A
IP protection AC version	IP 50

DC VERSION Q01-HSC-4T2F-10DI-PA-DC

DC Power Supply Voltage	110 Vdc (67.2 - 154 Vdc)
Average consumption	0.52A @110Vdc
Maximum consumption	175A
IP protection DC version	IP 54

ENVIRONMENTAL CONDITIONS

Operative Temperature range	da 0°C a +40°C
Relative humidity	da 10% a 95%

COMMUNICATION

CCI - Ethernet (No switch/bridge)	2xEth 1000Base-T 1xEth 100Base-T
CCI - Serial Ports	2xRS485 2xCanbus (optional) 3xUsb
CCI - Digital Ports	13xDI
Ethernet Medium Converter	100/1000Base-X SFP a 100/1000Base-T
Ethernet Switch	2x100/1000Base-T 2x100/1000Base-X SFP
Communication Protocols	IEC 61850, IEC 60870-101, IEC 60870-104, Modbus CanOpen, Opc UA, DNP3

AMPEROMETRIC AND VOLTAMMETRIC INPUTS

Maximum Voltage	400V TV terminals
Maximum Current	5A TA terminals
Isolation	2.5kV Power Analyzer inputs

FEATURES

Power Analyzer	Control EMA-go-N Class 0.2S, 1-5A, 30-400VIn, 24Vdc, 96x96, 200ms data refresh, door mounting
Visualization User Interface	Web Based
Configuration User Interface	USB
CCI - Monitoring functions	MCI Software License
CCI - Control functions	CCI Software License
PPC - Control functions	PPC Software License
Data Export	IEC 61850 toward DSO, Modbus, DNP3, IEC 60870-104 toward third-party systems
GPS receiver for time synchronization	GPS/GLONASS 32dB, IP66, 5m cable, outdoor -40°C - +85°C

CERTIFICATIONS

Conformity CEI 0-16	Annex O 2022-03 Annex T 2022-03
PMD Conformity	CEI/EN 61557-12
Cyber Security	IsaSecure SDLA for IEC 62443-4-1 IsaSecure CSA for IEC 62443-4-2
Cryptographic Component	FIPS 140-2 Level 3
IEC 61850	Test Certificate from UCA User Group
Secure Transport profile IEC 62351-3	Test Certificate IEC 62351-100-3

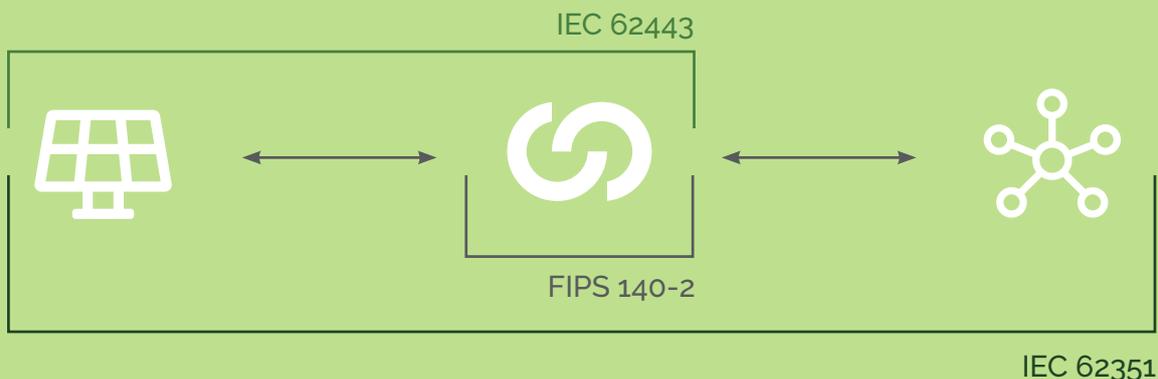
Cybersecurity

The Higecco More CCI was developed according to the "Security By Design" principle, in order to ensure the 3 pillars of security: Confidentiality, Integrity and Availability of data.

Management of the entire product life cycle, from design to updates and technical support, was built with cybersecurity as a priority along with IsaSecure SDLA certification for compliance with IEC 62443-4-1.

The heart of the CCI is the Higecco RTU Datalogger, a high-performance RTU, which implements a cryptographic component. FIPS 140-2 level 3 certified capable of resisting physical tampering, a firewall and any intrusions. Application Prevention Systems to prevent, detect and actively block cyber threats and attacks. IsaSecure CSA certification for compliance with IEC 62443-4-2.

Communication between the CCI and DSO is based on a secure profile defined by IEC 62351-3 of the IEC 61850 protocol.



Advantages of the Higeeco More solution



FLEXIBILITY

Modular solution that allows Higeeco More to meet the needs of any type of system, both new and existing, along with CT or VT supply.



COMPLETE SOLUTION

Higeeco professionals manage the supply of HW and SW components, installation, start-up, and compliance according to operational regulations (RDE).



EXPERIENCE

In-depth expertise acquired over years of implementing control systems for renewable power plants (PPC) abroad.



SPEED

Guarantee of timely access to the ARERA bonus thanks to the in-house design and production of hardware and software products.



CONTROL

Immediate and effective functionality: synonymous with the Higeeco Group.



SAFETY

Attention to continuous improvement of cybersecurity to ensure maximum protection of data and systems.

C E R T I F I C A T E
of Conformity



Registration No.: AK 60169282 0001

Report No.: IT234ETC 001

Holder: **HIGECO MORE S.R.L.**
VIALE EUROPA 71
32100 BELLUNO BL
Italia

Product: Electrical Equipment
Controllore Centrale di Impianto

Identification: Trademark: HIGECO MORE
Designation: CCI Q01-HSC-4T2F-10DI-PA

According to Annex O and Annex T

Tested acc. to: CEI 0-16:2022-03
CEI 0-16; V1:2022-11

The certificate of conformity refers to the above mentioned product. This is to certify that the specimen is in conformity with the assessment requirement mentioned above. This certificate does not imply assessment of the production of the product and does not permit the use of a TÜV Rheinland mark of conformity.

Date 20.03.2023



TÜV Rheinland LGA Products GmbH - Tillystraße 2 - 90431 Nürnberg

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