

Integração das diversas Plantas Pilotos de Energias Renováveis e de Armazenamento da UHE de Porto Primavera da CESP

Integration of the Pilot Plants of Renewable Energies and Storage Facilities at the Porto Primavera Plant

Manoel Dias 20/03/2018

Vista aérea do parque de energias renováveis em Porto Primavera.
The Porto Primavera renewable energy park seen from above.



50kW em painéis rígidos policristalinos instalados com tecnologia de rastreamento.
50kW of polycrystalline Si panels with tracking technology.

ATs



50kW em painéis rígidos policristalinos instalados com tecnologia de rastreamento.
50kW of polycrystalline Si panels with tracking technology.

ATs



Pela manhã: orientação leste
Morning: panels facing east



Fim da Tarde: orientação oeste
Late afternoon: panels facing west

50kW em painéis rígidos policristalinos instalados.
50kW of polycrystalline Si panels.

ATs



50kW em painéis rígidos policristalinos instalados.
50kW of polycrystalline Si panels.

ATs



250kW em tecnologia de filme fino instalados (BASE).
250kW of thin film PV installed (BASE).

ATs



250kW em tecnologia de filme fino instalados (BASE).
250kW of thin film PV installed (BASE).

ATs



50kW instalados em flutuadores (ATS e BASE).
50kW of floating photovoltaics installed (ATS and BASE).

ATs



50kW instalados em flutuadores (ATS e BASE).

50kW of floating photovoltaics installed (ATS and BASE).

ATs

25kW Floating
Thin Film (BASE)



25kW Floating
Monocrystalline Si
ATS.



250kW em tecnologia Monocristalina instalados.
250kW of monocrystalline panels installed.

ATs



250kW em tecnologia Monocristalina instalados.
250kW of Monocrystalline panels installed.

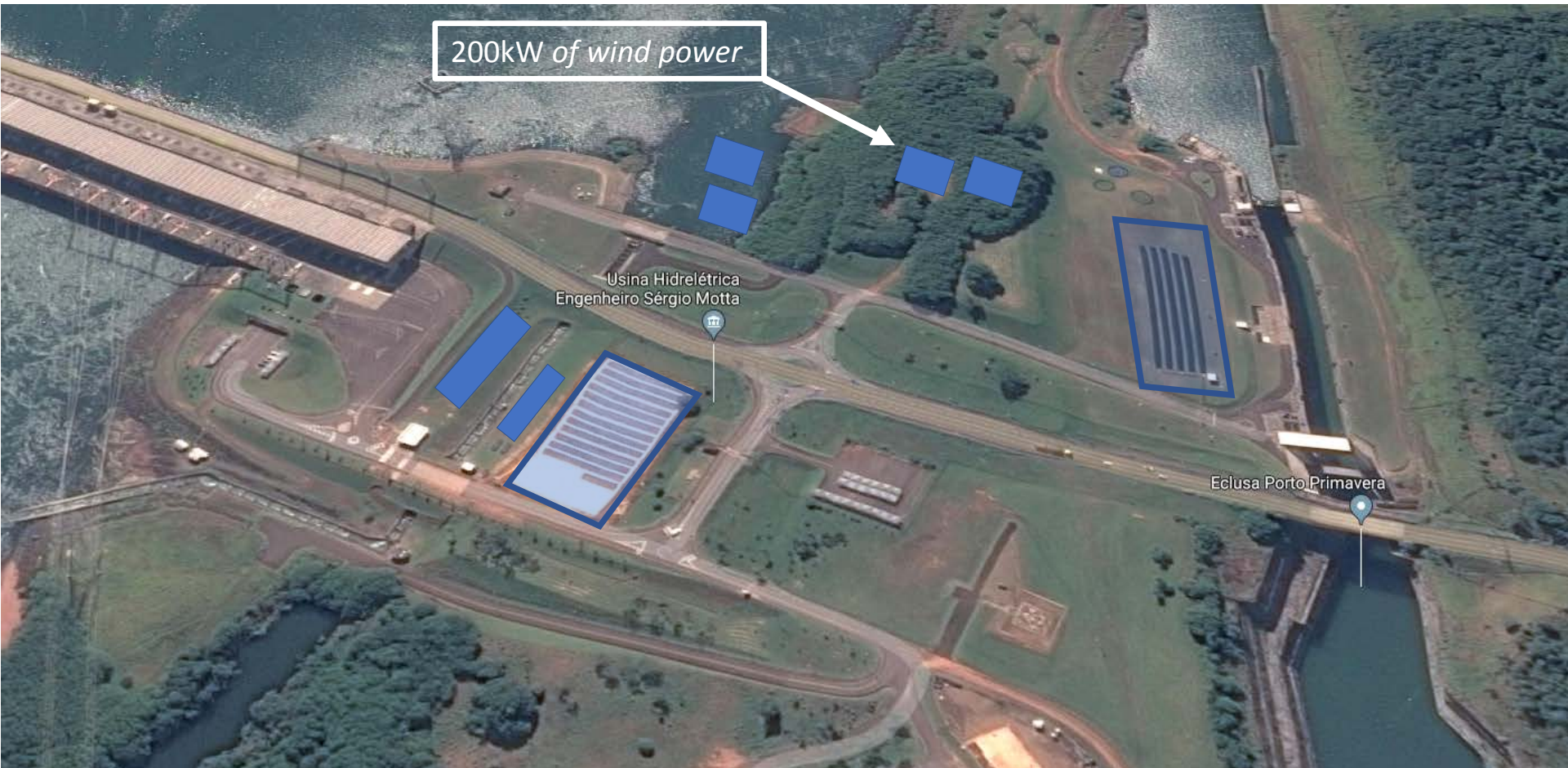
ATs



200kW em energia eólica instalados (realizado por RTB).

200kW of wind power installed (RTB).

ATs



200kW em energia eólica instalados (realizado por RTB).

200kW of wind power installed (RTB).

ATs

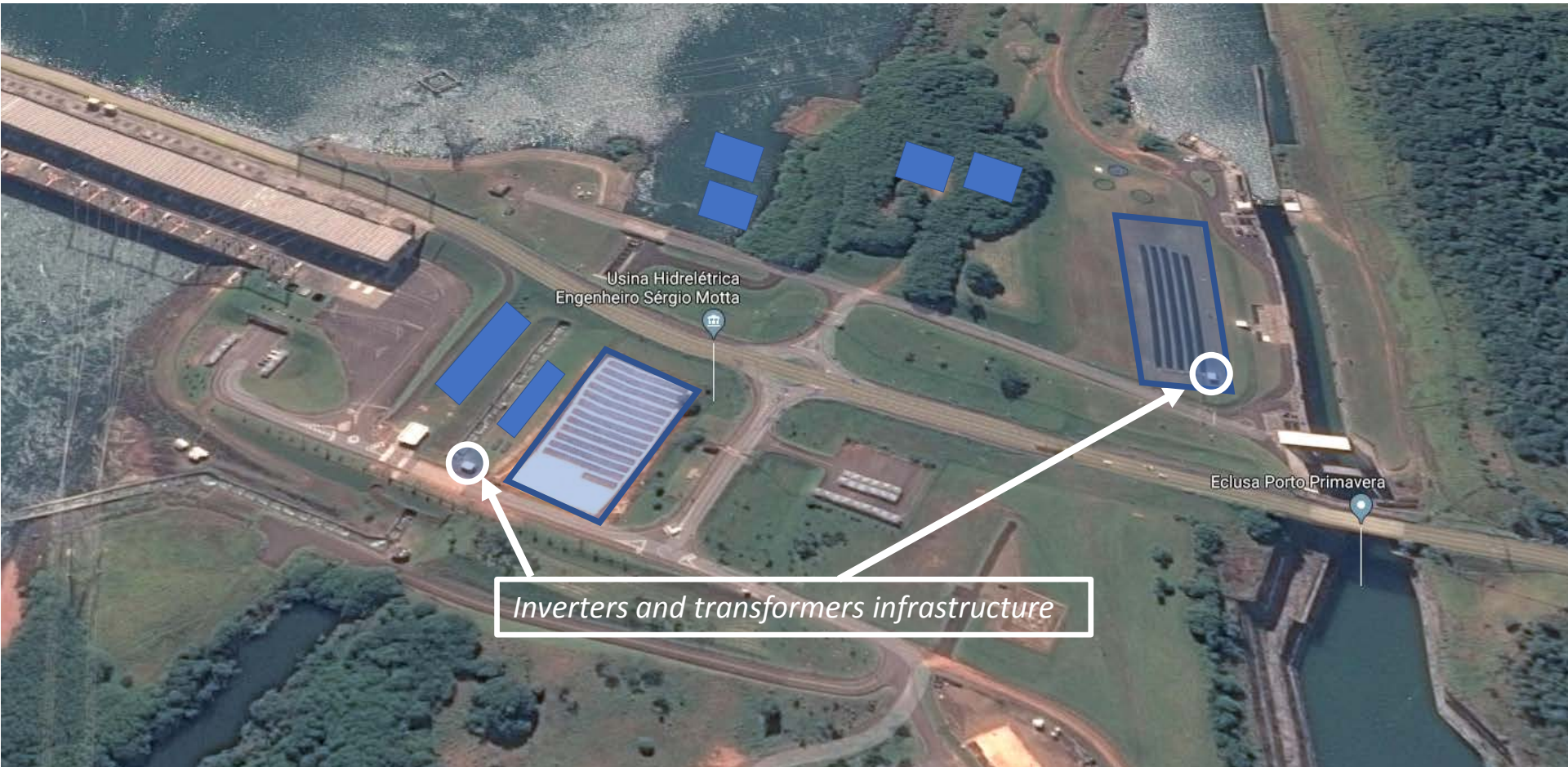


Duas torres eólicas de 100kW instalados.

Two wind generators, 100kW each installed.

Dois abrigos para inversores e transformadores já instalados.
Inverters and transformers housed in two sites at the plant.

ATs

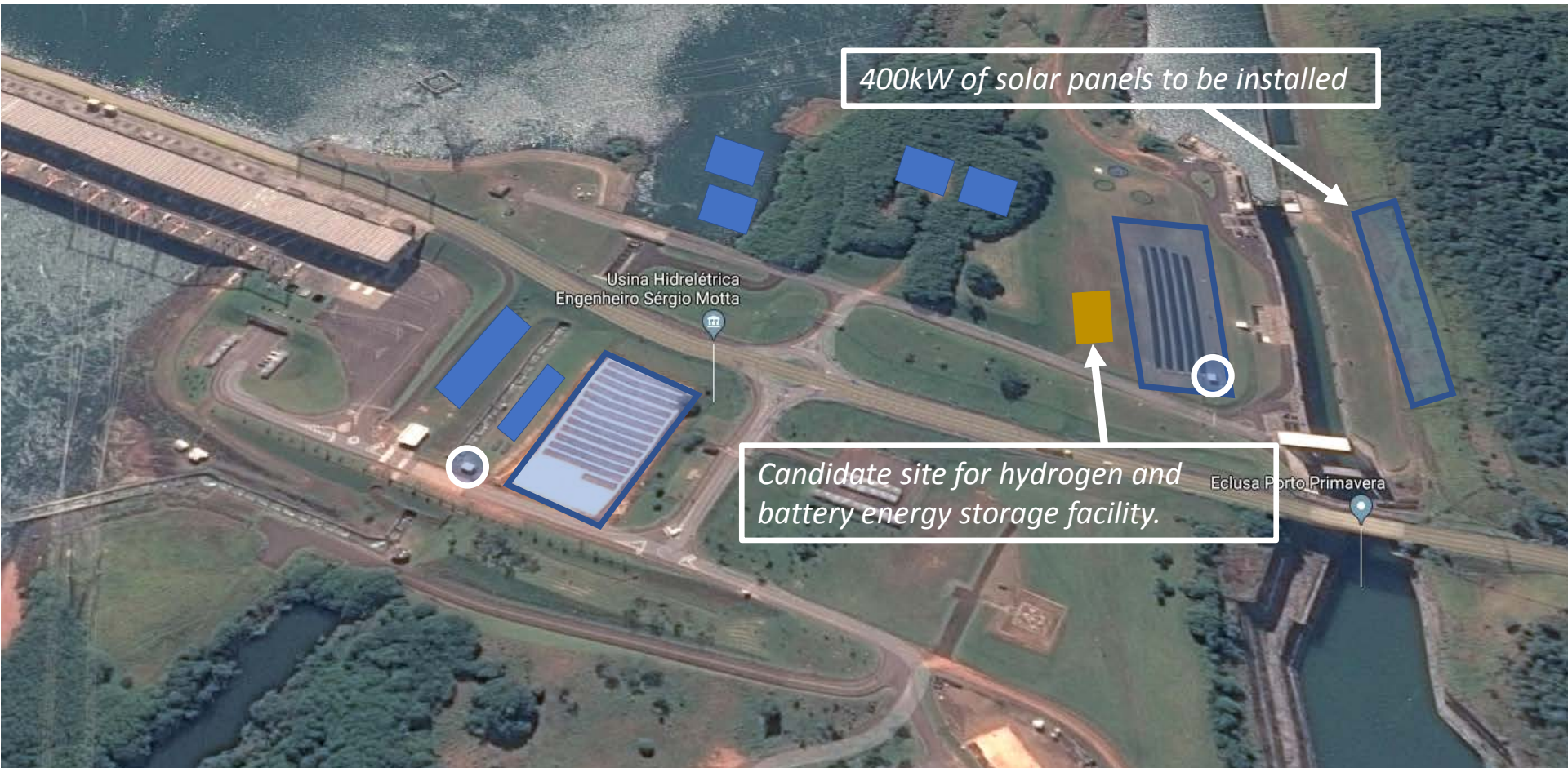


Dois abrigos para inversores e transformadores já instalados.
Inverters and transformers housed in two sites at the plant.

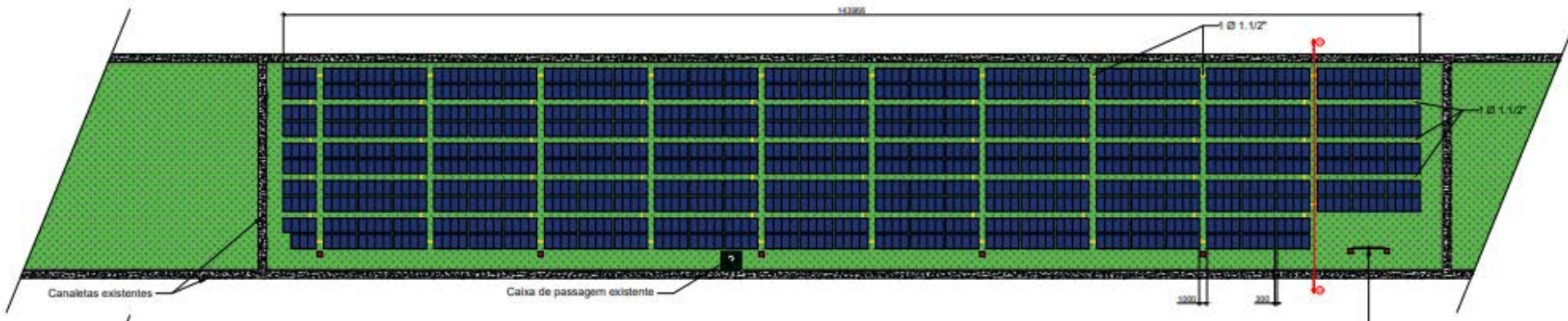
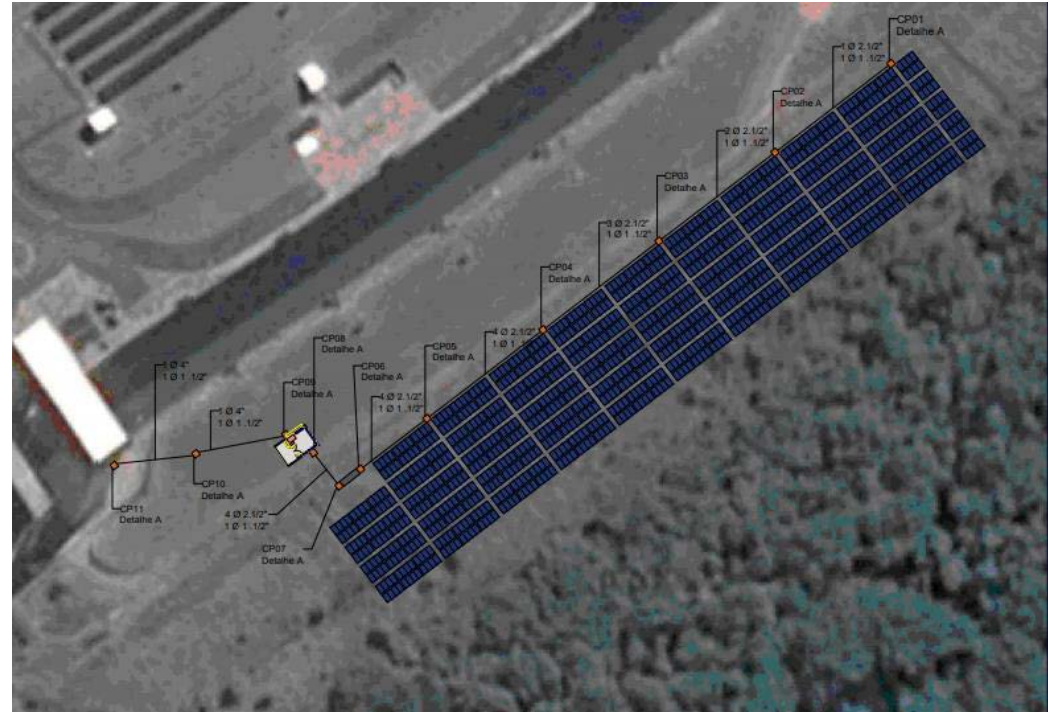
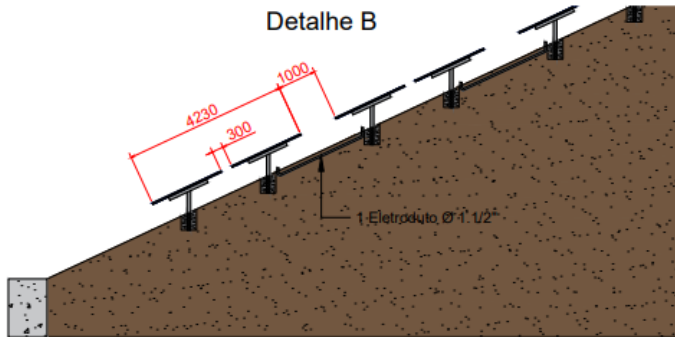
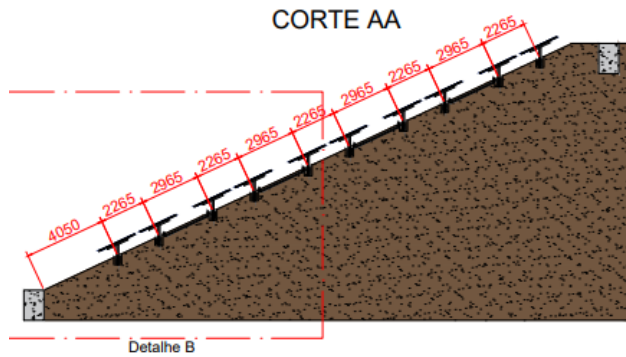
ATs



400kW de PV em processo de instalação.
400kW of PV under construction.



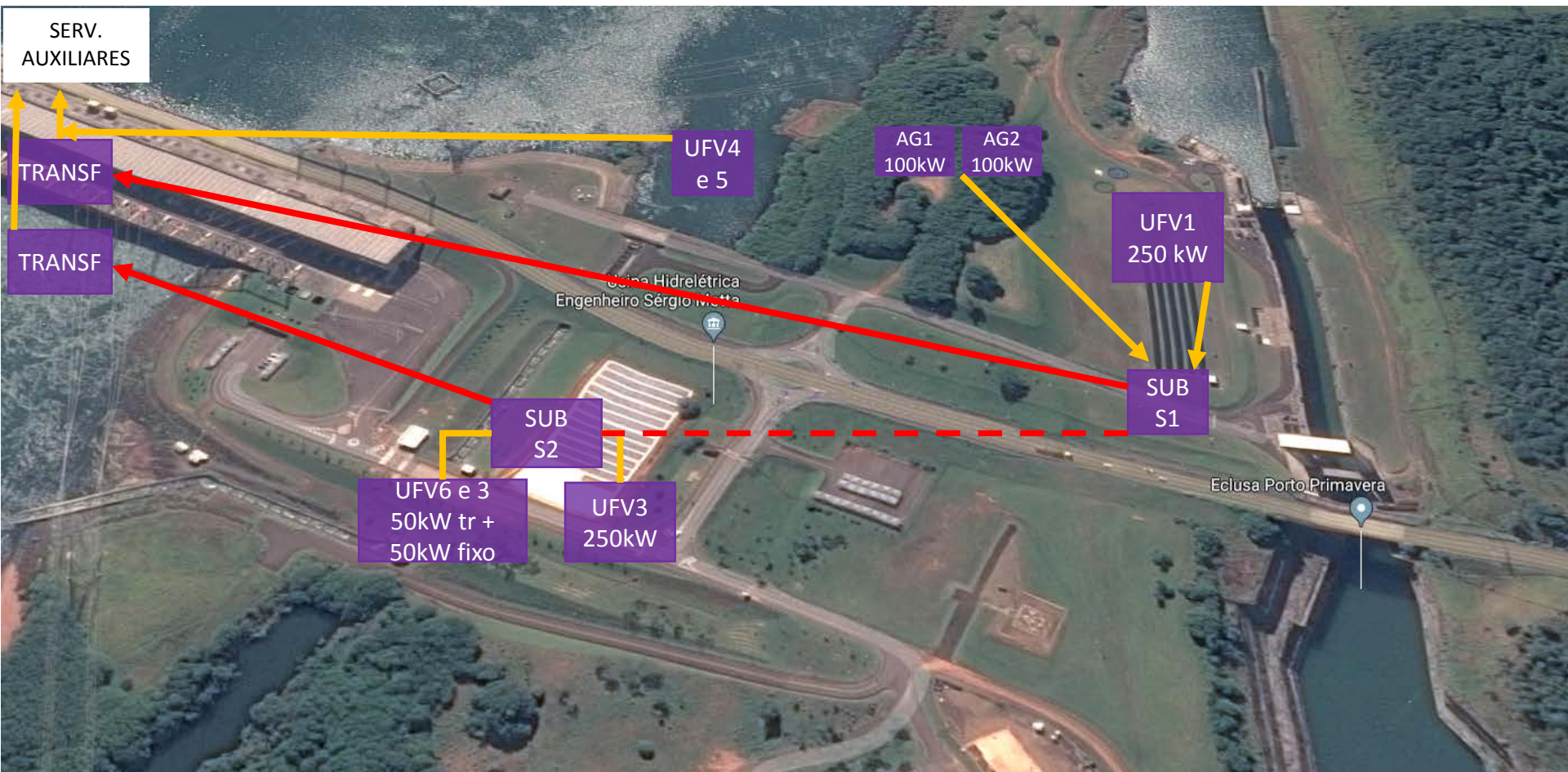
400kW de PV em processo de instalação. 400kW of PV under construction.



Estado atual do parque de energias renováveis.

Current renewable energy park.

ATs



— Média Tensão 13,8 kV

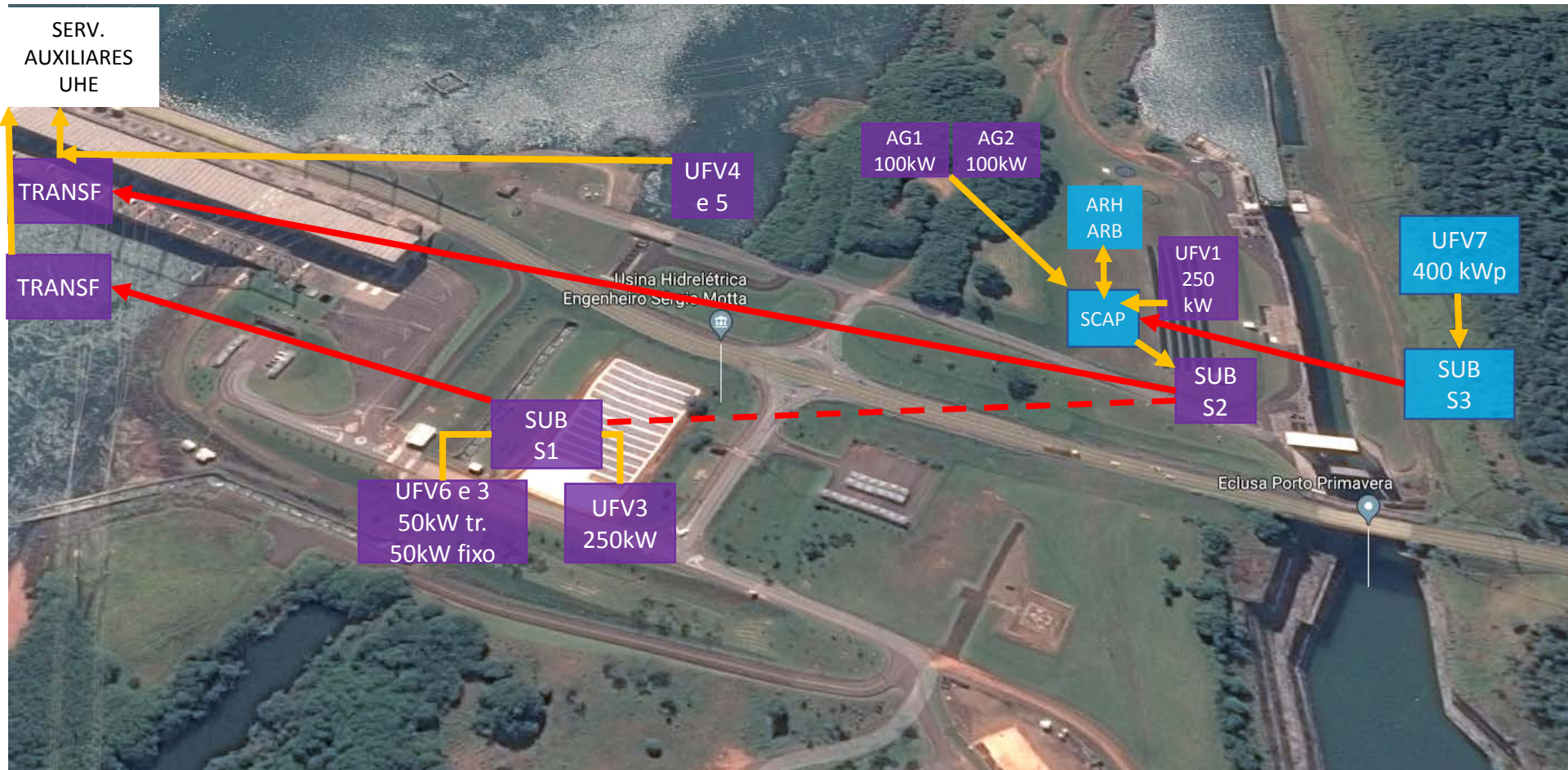
— Baixa Tensão 460/266V

■ Já existentes / already installed

UFV – Usina Fotovoltaica. AG – Aerogerador. SUB (S) – Subestação
SCAP – Sistema de Controle e Automação da Planta. ARB(H) – Armazenamento
Com Baterias (H – Hidrogênio).

Estado Futuro.

General plan including upcoming structures.



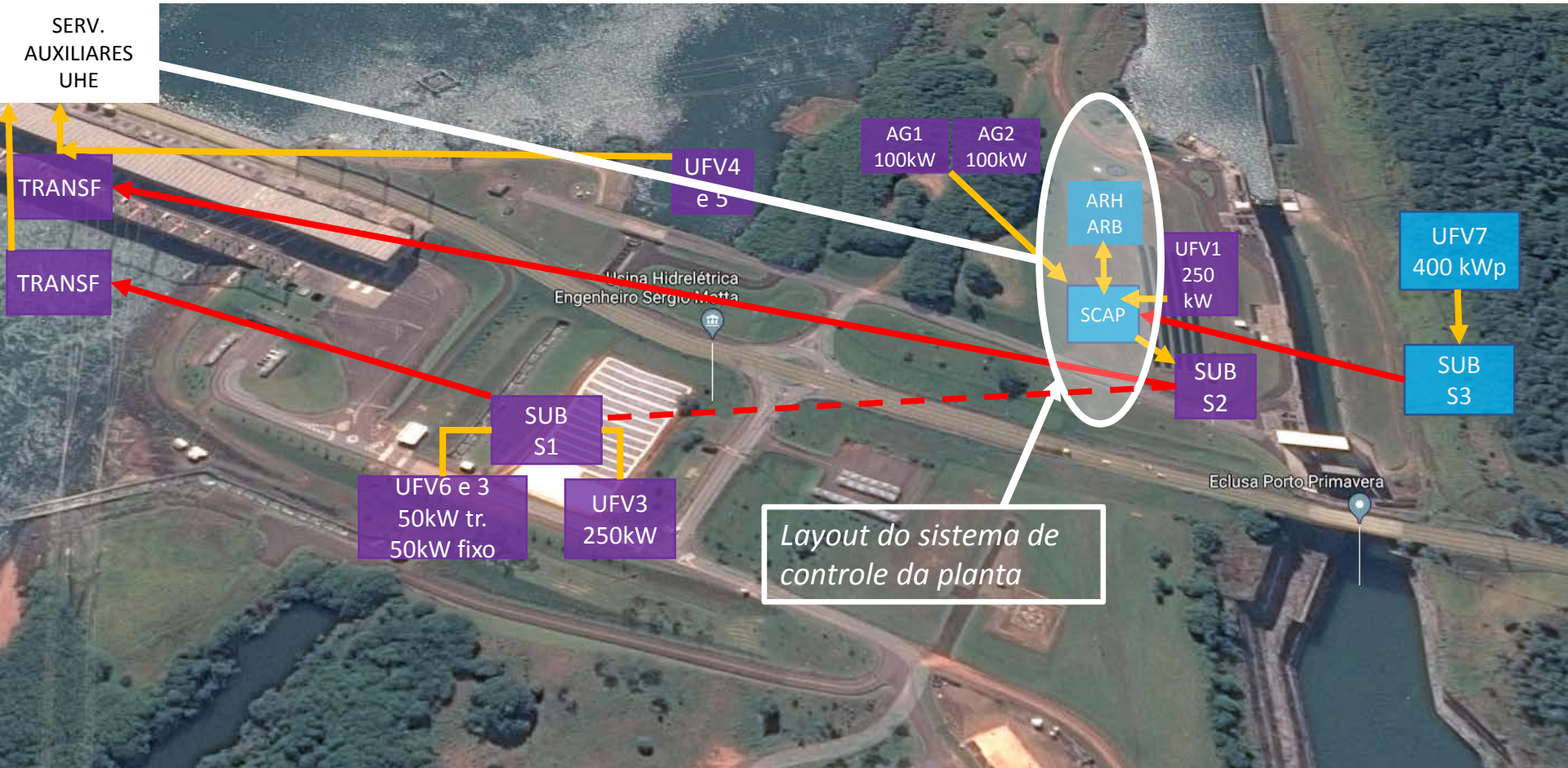
— Média Tensão 13,8 kV
 — Baixa Tensão 460/266V
 Já existentes / already installed

 A serem instalados / To be installed

UFV – Usina Fotovoltaica. SE – AG – Aerogerador. SUB (S) – Subestação
 SCAP – Sistema de Controle e Automação da Planta. ARB(H) – Armazenamento Com Baterias (H – Hidrogênio).

Estado Futuro – Sistema de controle da Planta

General plan including upcoming structures – Control System



— Média Tensão 13,8 kV — Baixa Tensão 460/266V Já existentes / already installed

 A serem instalados / To be installed

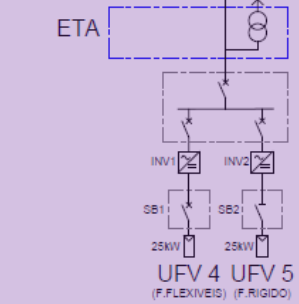
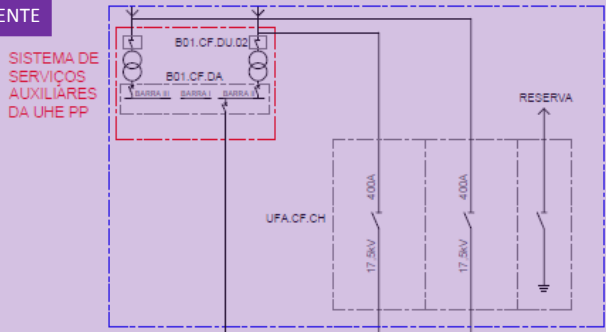
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DIAGRAMA UNIFILAR – ESTADO FUTURO / ONE-LINE DIAGRAM

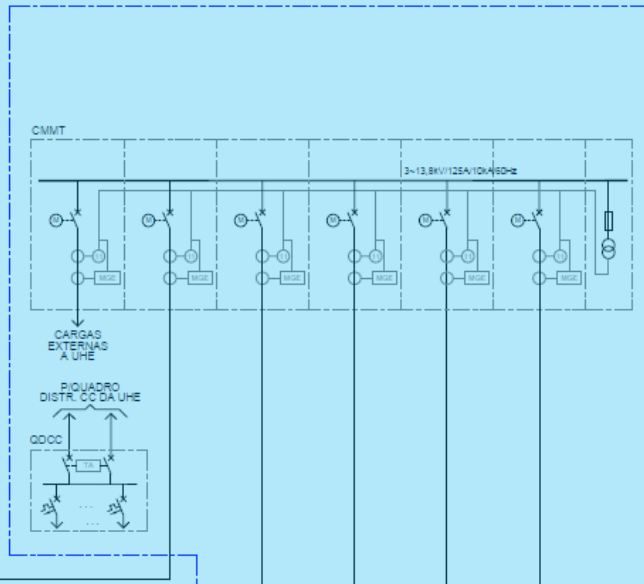
ESCOPO EXISTENTE

ESCOPO NOVO

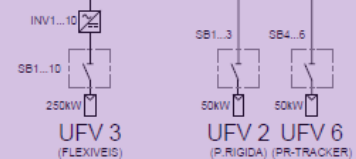
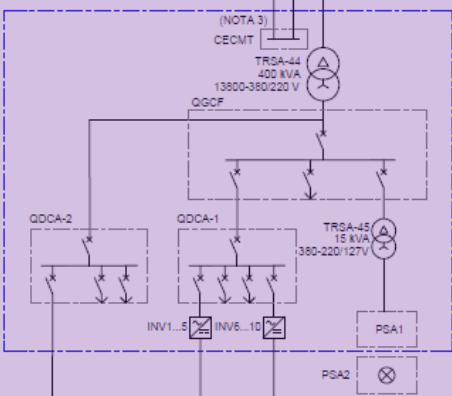
CASA DE FORÇA



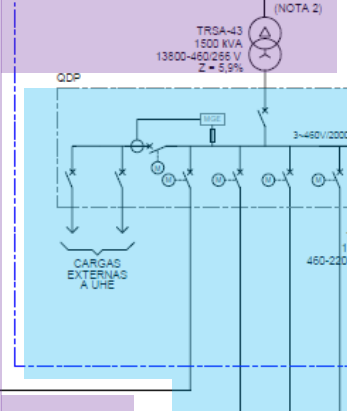
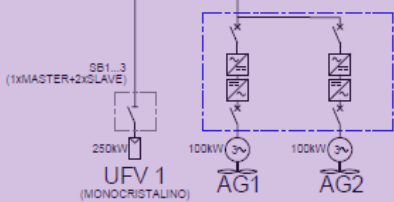
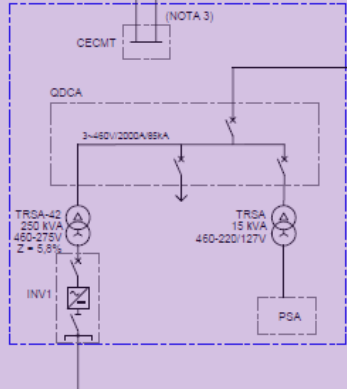
SUBESTAÇÃO 3



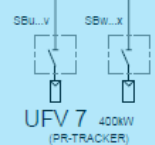
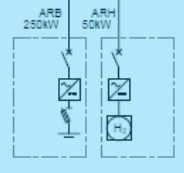
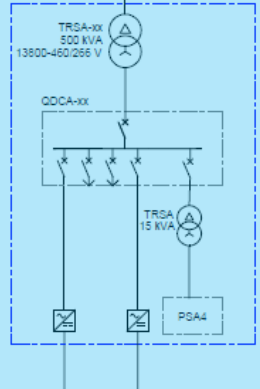
SUBESTAÇÃO 2



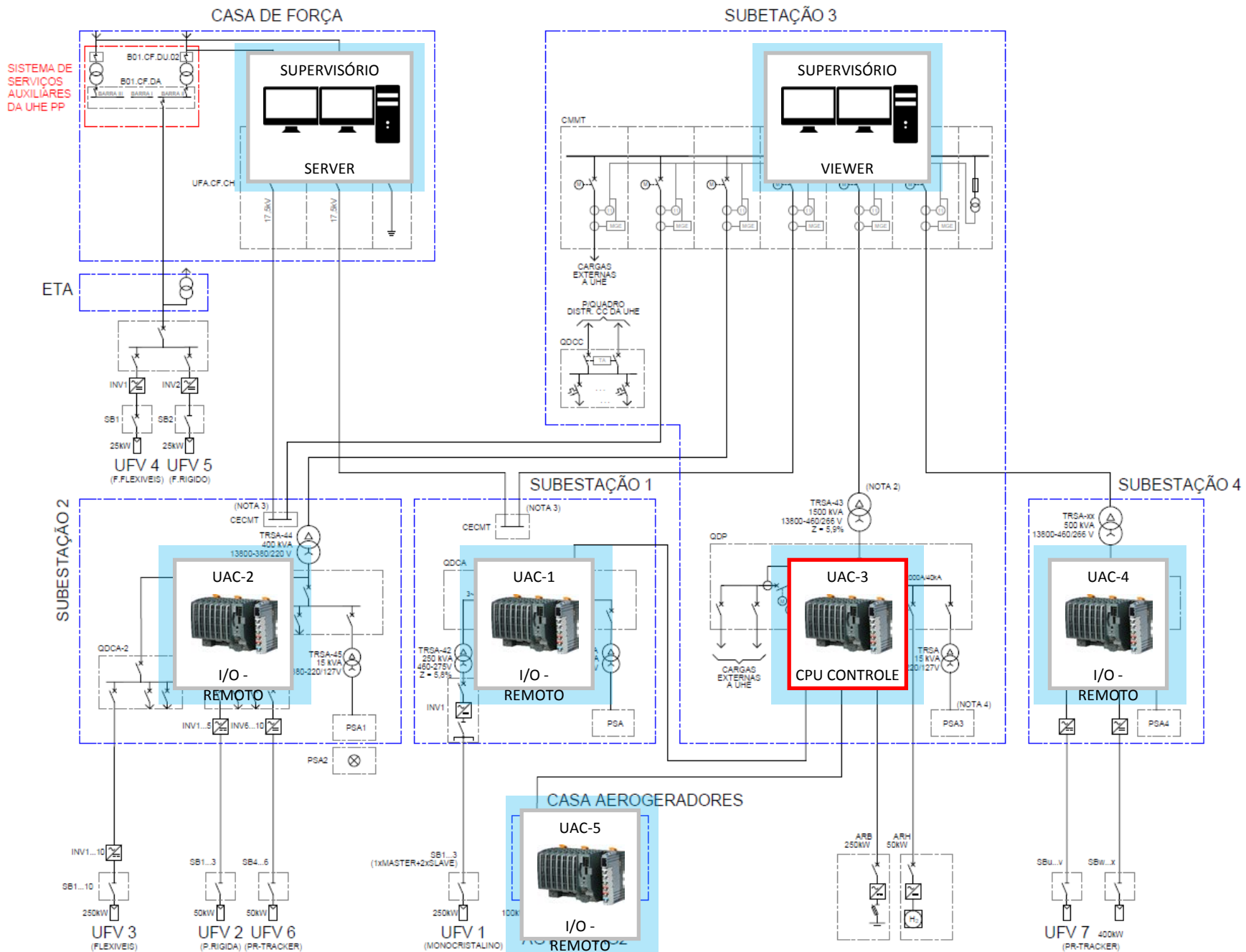
SUBESTAÇÃO 1



SUBESTAÇÃO 4



SISTEMA DE CONTROLE – UAC's e SUPERVISÓRIO - LOCALIZAÇÃO



CONDIÇÕES DE CARGA

- NÃO CARREGADA
- PGT MAIOR DO QUE A DEMANDA DA BATERIA (EVITAR CARREGAR BATERIA COM ENERGIA DA USINA)
- ENERGIA EXCEDENTE DIRECIONADO PARA A CARGA

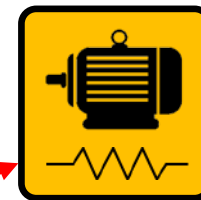
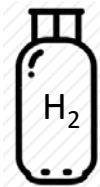
CONDIÇÕES DE DESCARGA

- CARREGADA
- CONDIÇÕES DE DESCARGA SERÃO DEFINIDAS NO SISTEMA DE CONTROLE
 - QUANDO CARGA É MAIOR QUE ENERGIA GERADA
 - PRÉ-DEFINIDO (HORÁRIO, TAXA DE DESCARGA, DURAÇÃO, ETC)
 - OUTRAS

ARB
ARMAZENAMENTO
BATERIAS

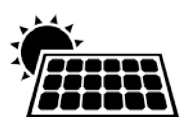
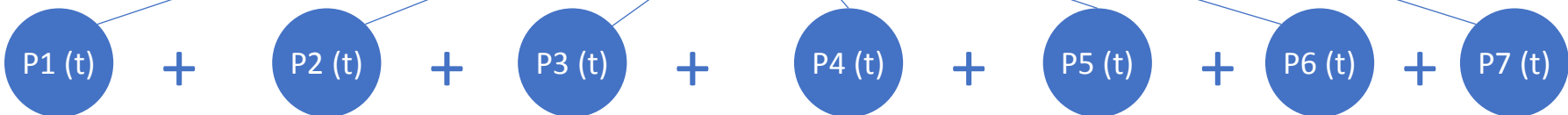


ARH
ARMAZENAMENTO
HIDROGÊNIO



CARGA
SERVIÇOS AUXILIARES
DA USINA

Potência Gerada Total



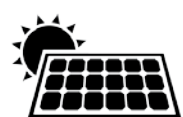
UFV-1
ECLUSA
250 kWp
MONOCRISTALINO



UFV-2
ESC. PEIXES
50 kWp
POLICRISTALINO



UFV-3
ESC. PEIXES
250 kWp
FLEXÍVEL - AMORFO



UFV-6
ESC. PEIXES
50 kWp
POLICRISTALINO
TRACKER



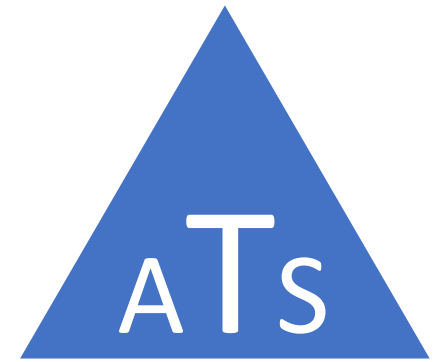
UFV-7
ECLUSA
400kW



AG-1
100kW



AG-2
100kW



Obrigado

Thank You