



CHIL MICROGRID TEST-BED

GUILHERME JUSTINO

PTI



PTI

Parque Tecnológico
Itaipu

USER SPOTLIGHT SERIES 2.0 BY 

OUTLINE

- Brief project overview
- Microgrid composition
- Microgrid operation logic
- Microgrid Test-Bed
- Lab tests results
- Field tests results
- Conclusion

PROJECT OVERVIEW

Companies

- Itaipu (funder)
- PTI
- CIBiogas
- Copel

Colombari Farm

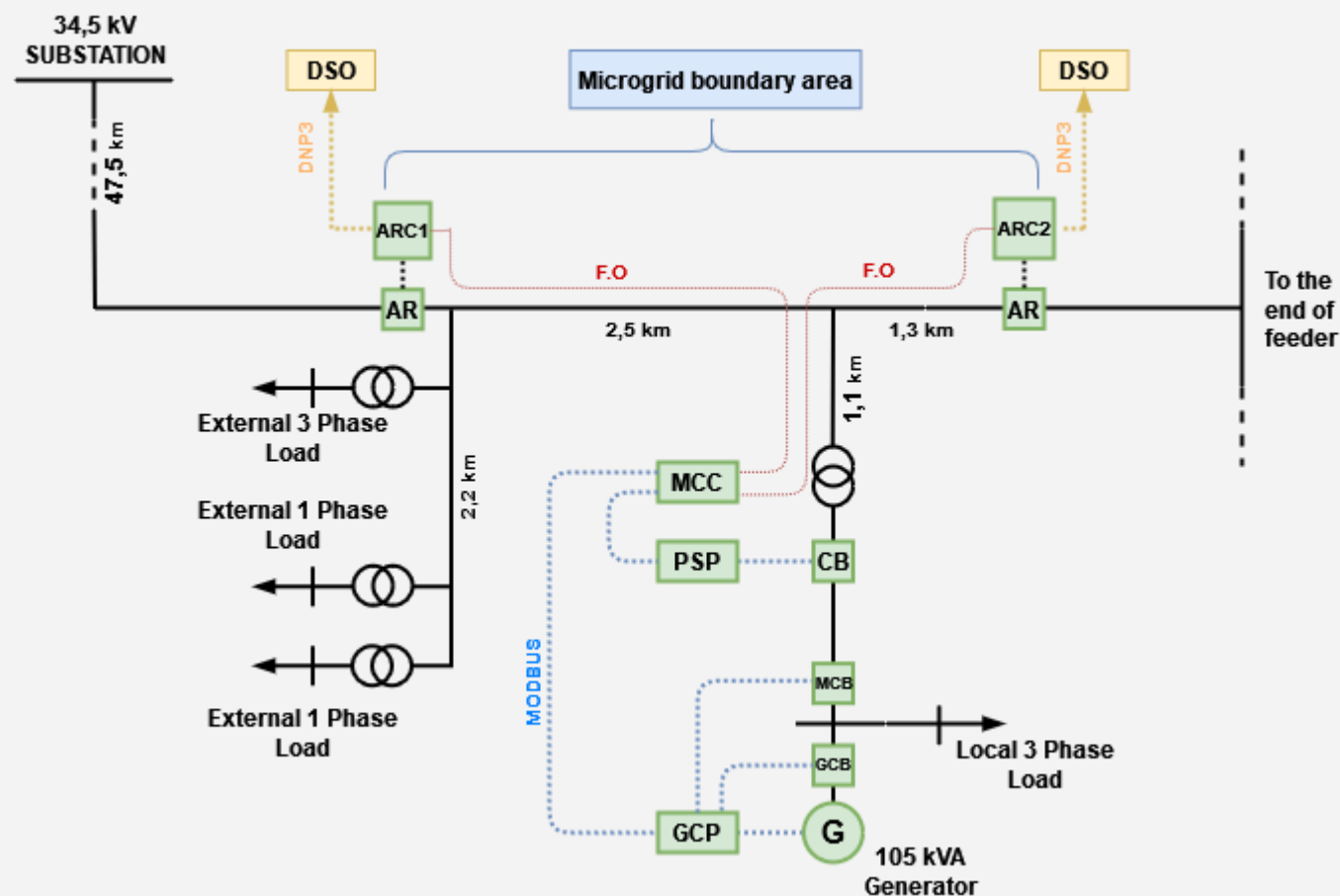
- 5000 pigs
- 350 head of cattle
- 1000 m³ biogas
- Location



MICROGRID COMPOSITION

Components:

- 6 km – 34,5 kV Feeder
- 2 Automatic Recloser – AR
 - ARC
- Synchronous Generator – 105 kVA
- Microgrid Central Controller - MCC
- Protection System Panel – PSP
 - CB
- GenSet Control Panel
 - GCB
 - MCB



MICROGRID OPERATION LOGIC

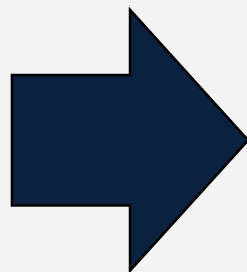
Connected to Islanded

AR

- Dead Bus
- No current trip
- Trip Loop Scheme
- AR Status Open

PSP

- CB Status Open
- Dead Bus and Dead Line



MCC

- Allows Islanded Operation

GCP

- Allows MCB Closing

PSP

- Change Setting Group 1 to 2

MICROGRID OPERATION LOGIC

Islanded to Connected

AR

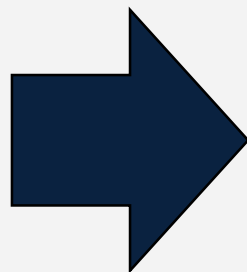
- Live Bus

GCP

- Any Trip

PSP

- Any Trip



MCC

- Blocks Islanded Operation

GCP

- Blocks MCB Closing

PSP

- Change Setting Group 2 to 1

MICROGRID TESTBED

Equipment:

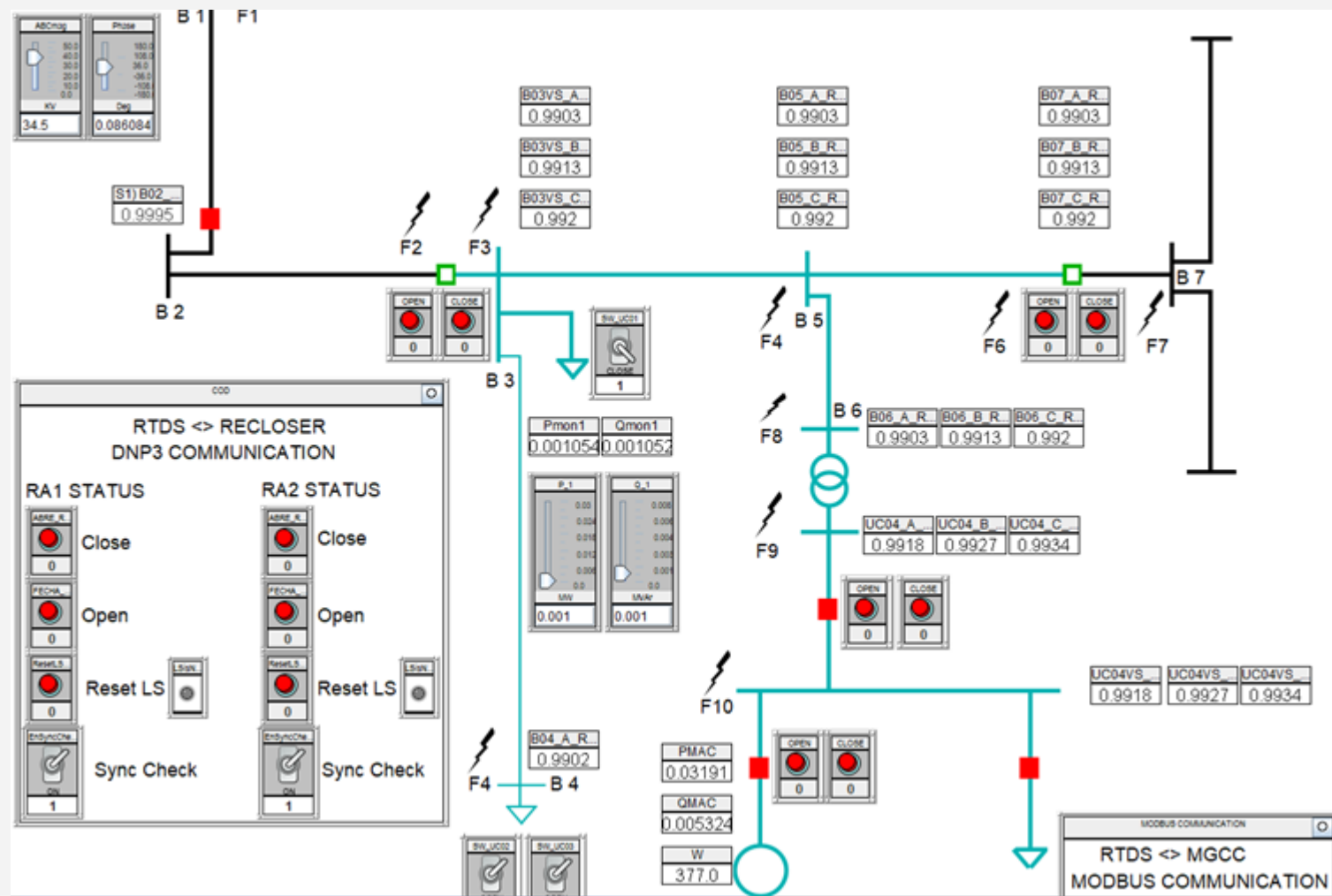
- 1 - RTDS NovaCor
- 2 - Automatic Recloser Control
- 3 - Microgrid Central Controller
- 4 - Generator Voltage Control
- 5 - Protection System Panel Relay
- 6 - Distribution System Operation
- 7 - GPS



LABORATORY TESTS

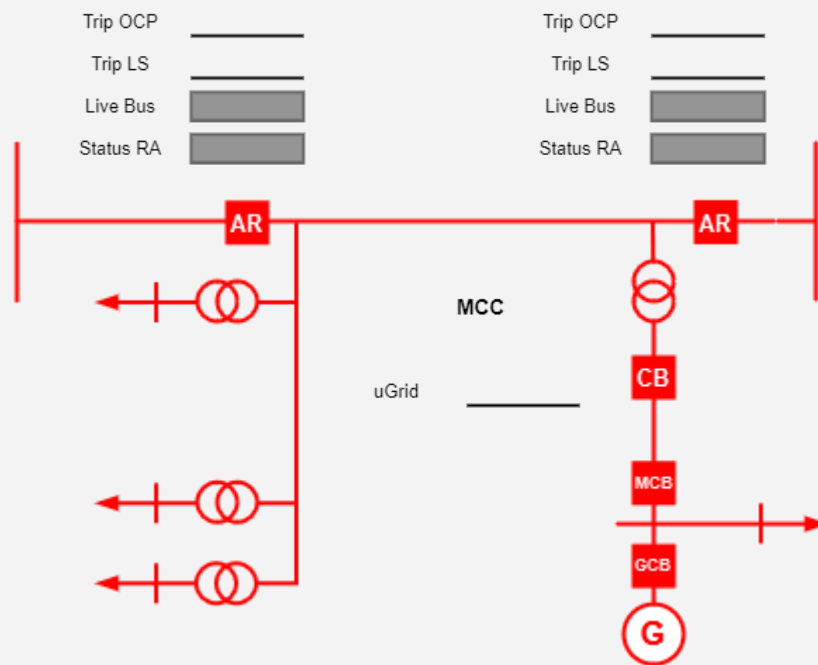
Objective: Overall evaluation

- Communication
- AR Logic and Protection
- MCC Logic
- PSP Relay Logic and Protection



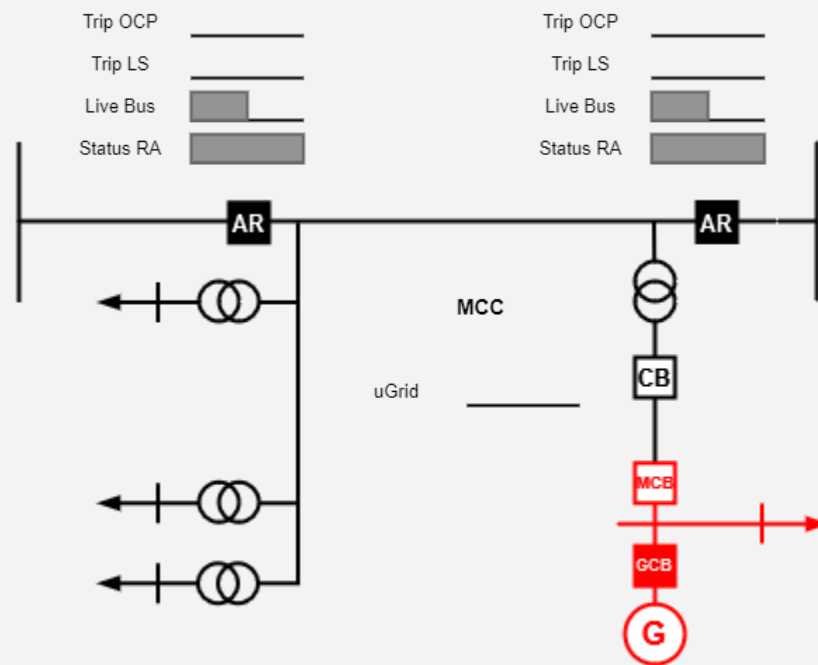
FIELD TESTS

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2021-10-03 08:52:44.102	SEL_16DO_1_ECAT.SET_GROUP.status	MGC - Islanded Operation on
2021-10-03 08:53:35.568	SEL_24DI_1_ECAT.LIVE_BUS_RA2	RA2 - Live Bus on
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2021-10-03 11:02:46.283	SEL_24DI_1_ECAT.LIVE_BUS_RA2	RA2 - Live Bus off
2021-10-03 11:27:07.676	SEL_24DI_1_ECAT.STATUS_RA1	RA1 - Closed on
2021-10-03 11:27:07.735	SEL_24DI_1_ECAT.TRIP_LS_RA1	RA1 - Trip Loop Scheme off
2021-10-03 11:27:15.899	SEL_24DI_1_ECAT.STATUS_RA2	RA2 - Closed on
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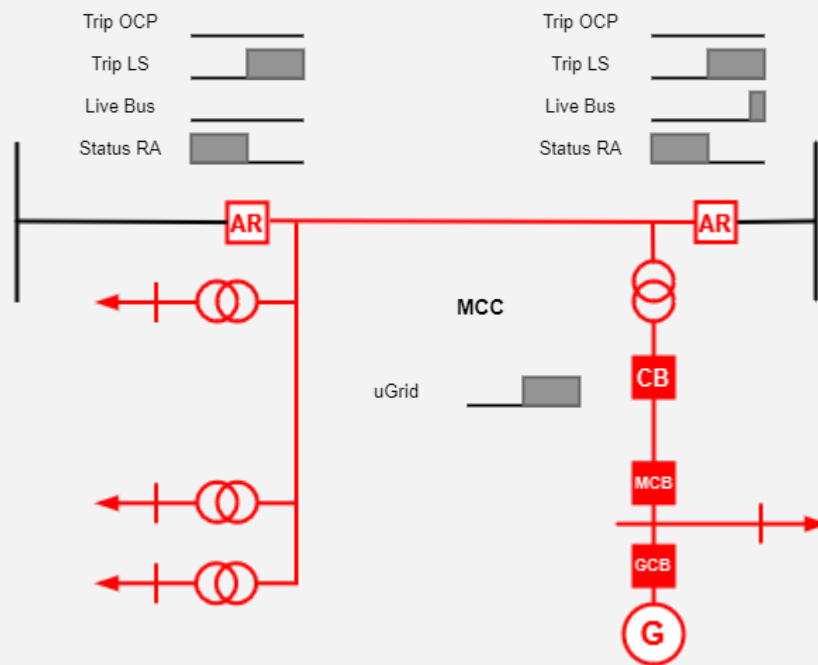
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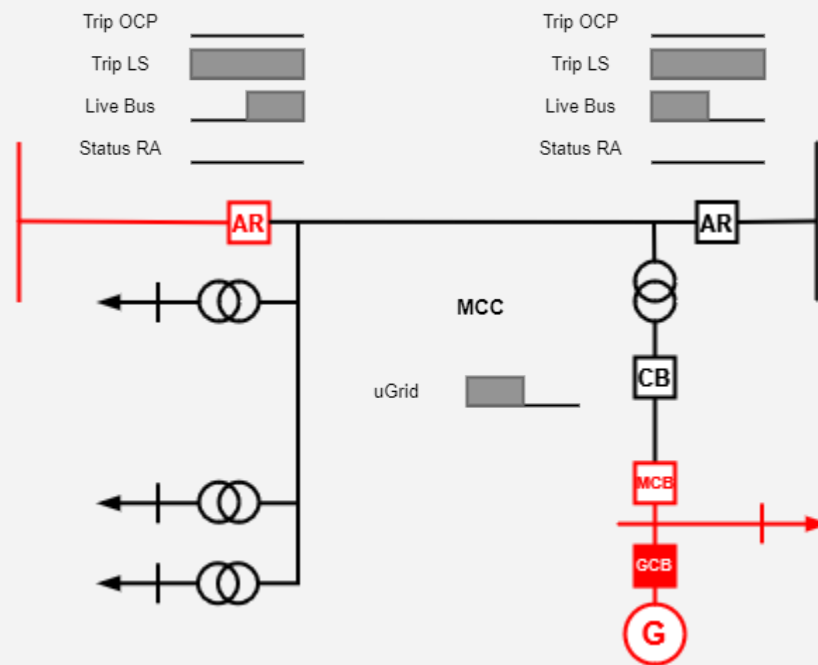
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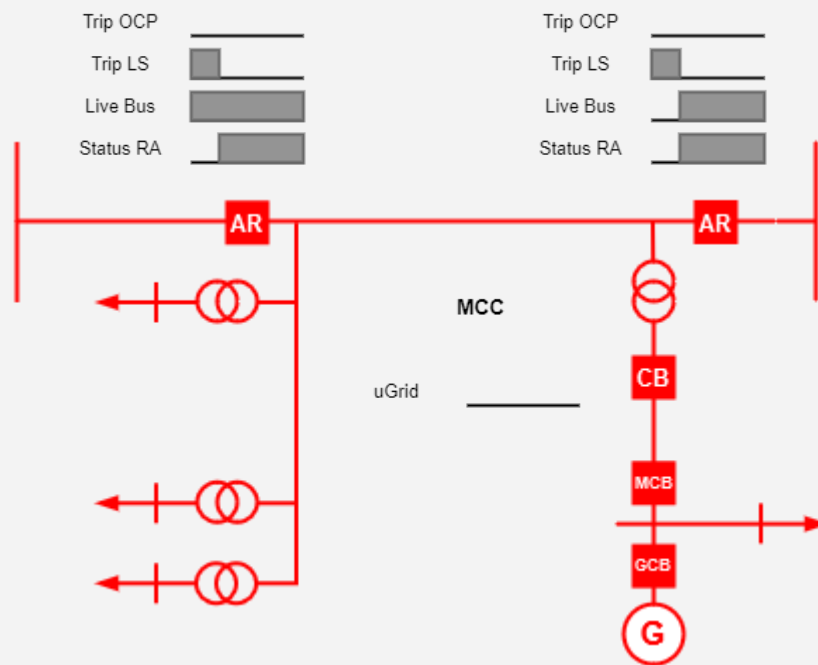
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FIELD TESTS

Scheduled Islanding

Teste	Begin	End	Energy (kWh)
#1	10/08/2021 11:31:51	10/08/2021 12:04:13	9,69
#2	10/08/2021 15:03:39	10/08/2021 16:00:47	35,79
#3	11/08/2021 10:33:54	11/08/2021 11:46:07	44,43
#4	11/08/2021 14:16:59	11/08/2021 16:49:44	106,83
#5	12/08/2021 10:27:13	12/08/2021 11:56:22	49,54
	Total:	~7h Operation time	246,28

Monitored period

- Three times microgrid operation – 35h
- Supplied energy – 400 kWh

CONCLUSION

- Safe environment tests
- Microgrid operation reliability

Thank you for your attention

Contact:

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