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6 Solar+ESS Application Introduction

Experience Conclusion by Marwell Solar



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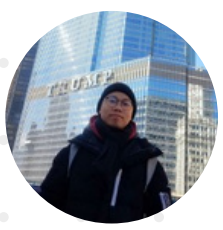
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1.Grid-Connected Storage (Commercial/Standalone)

Mega Storage Projects: Powering the Grid Revolution

Data:

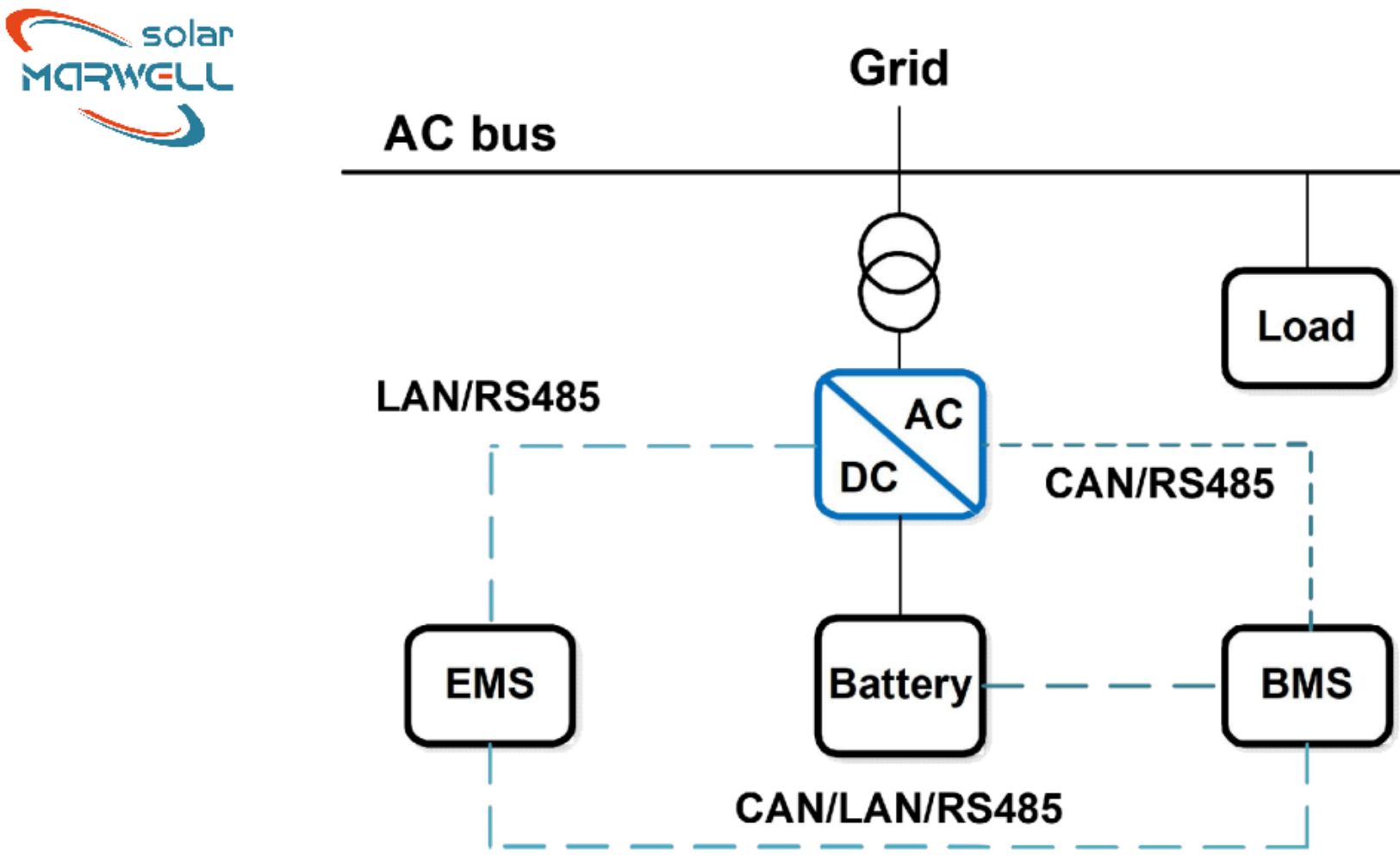
- Golmud, China: 50MW/100MWh project → 40% higher renewable integration
- Annual CO_2 reduction: 53,480 tons ≈ 297,000 trees planted



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Golmud, China: 50MW/100MWh project



Standard Wire Diagram

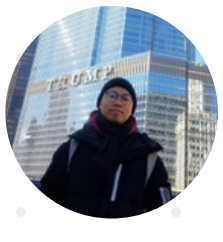
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2.AC Coupling (Existing Solar Expansion)

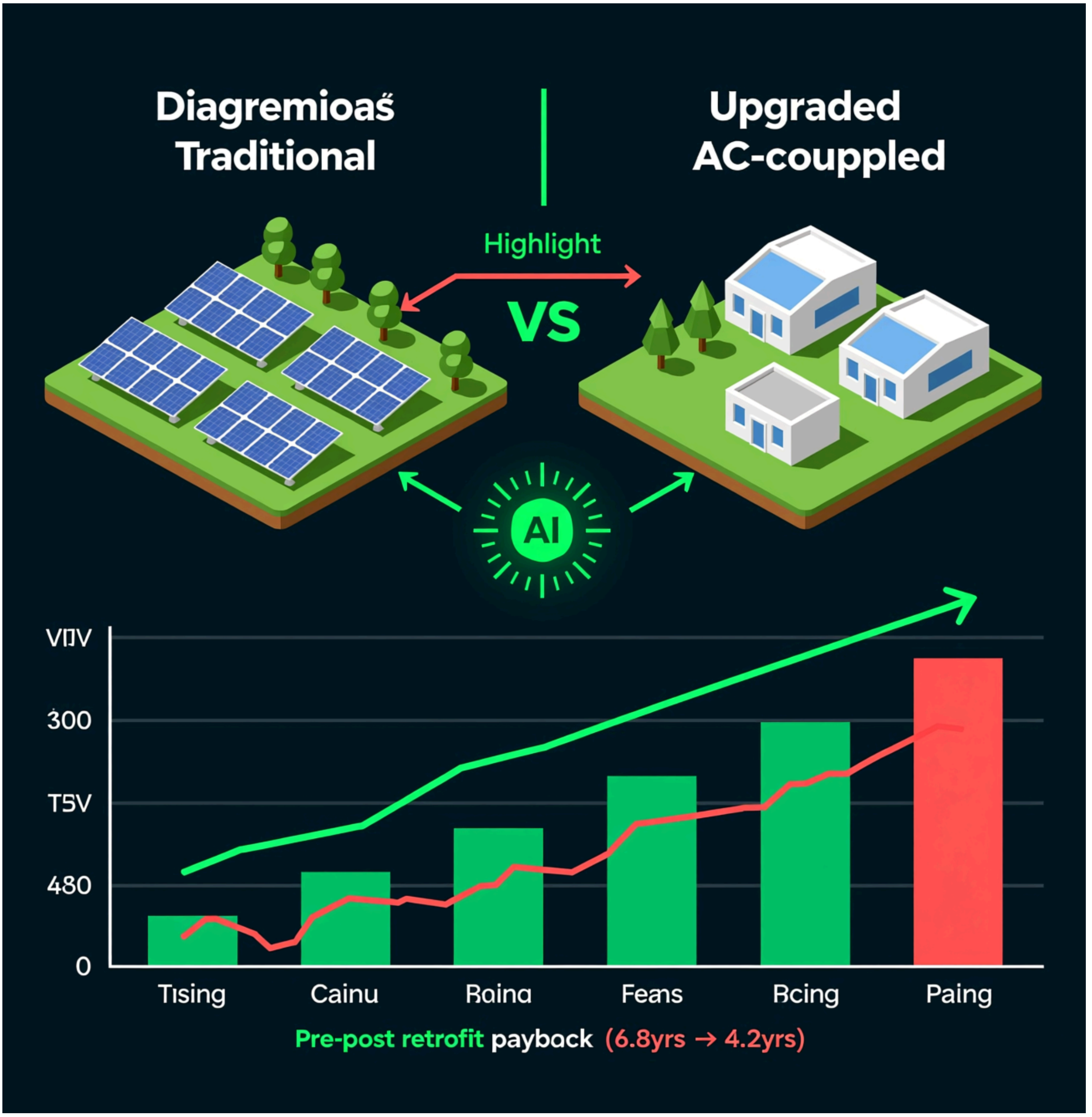
⚡ Give Old Solar Farms a New Lease on Life!

Data:

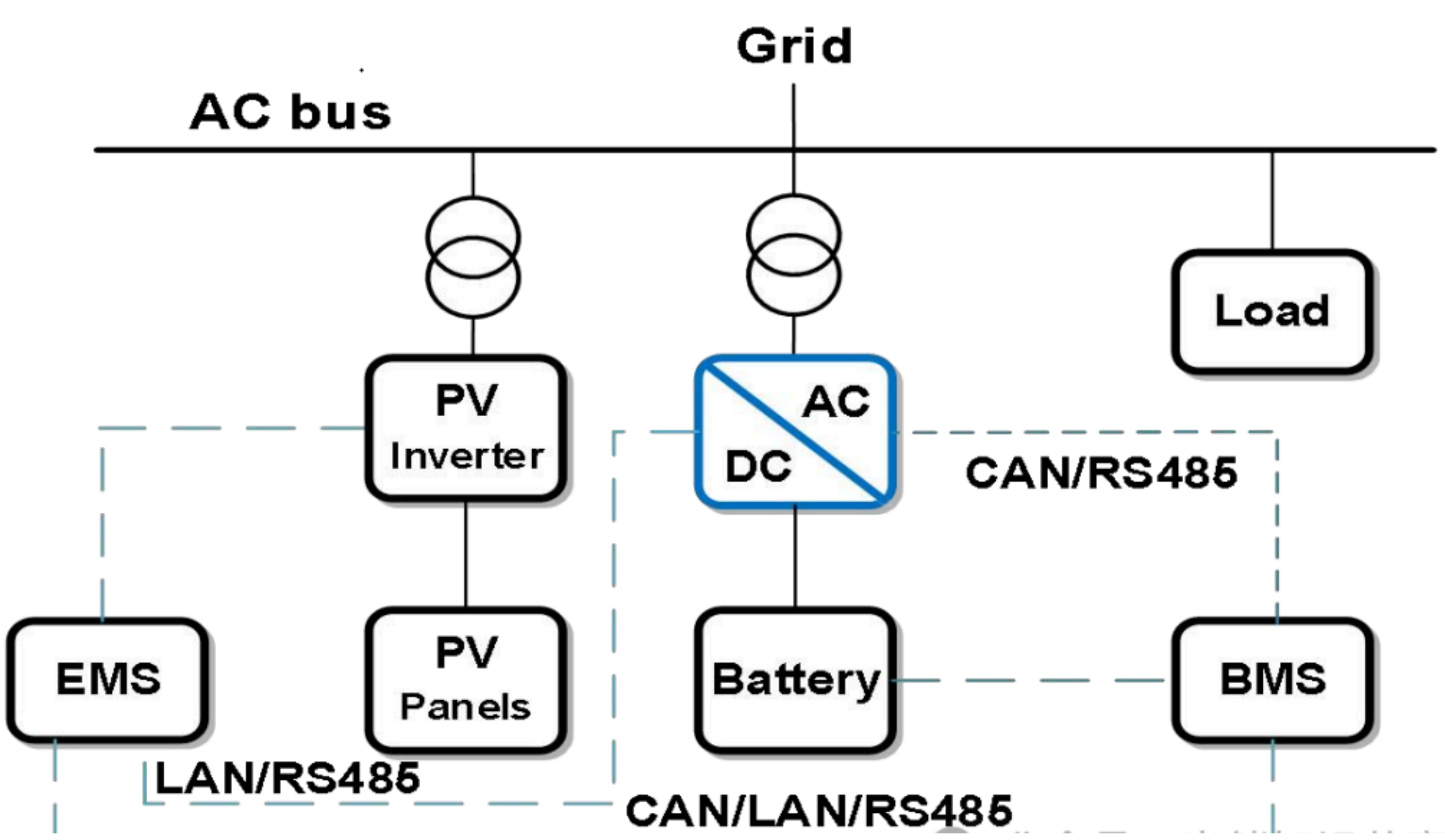
- Shenzhen Industrial Park: Solar curtailment ↓ from 25% to 5%
- Payback period: 4.2 yrs (vs. 6.8 yrs before)
- Capacity: The specific system involved 1MWp of rooftop PV capacity and a BESS with approximately 484 kWh (22 units of 215 kWh cabinets) of energy storage capacity.



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Diagremioaš
Traditional
Upgraded
AC-couppled
Highlight
VS
AI
VIV
300
T5V
480
0
Tising
Cainu
Raina
Feans
Bcing
Paing
Pre-post retrofit payback (6.8yrs → 4.2yrs)

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Standard Wire Diagram

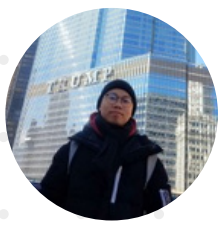
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3: DC Coupling (High-Curtailment Sites)

💡 Stop Wasting Sunlight: The DC Coupling Fix

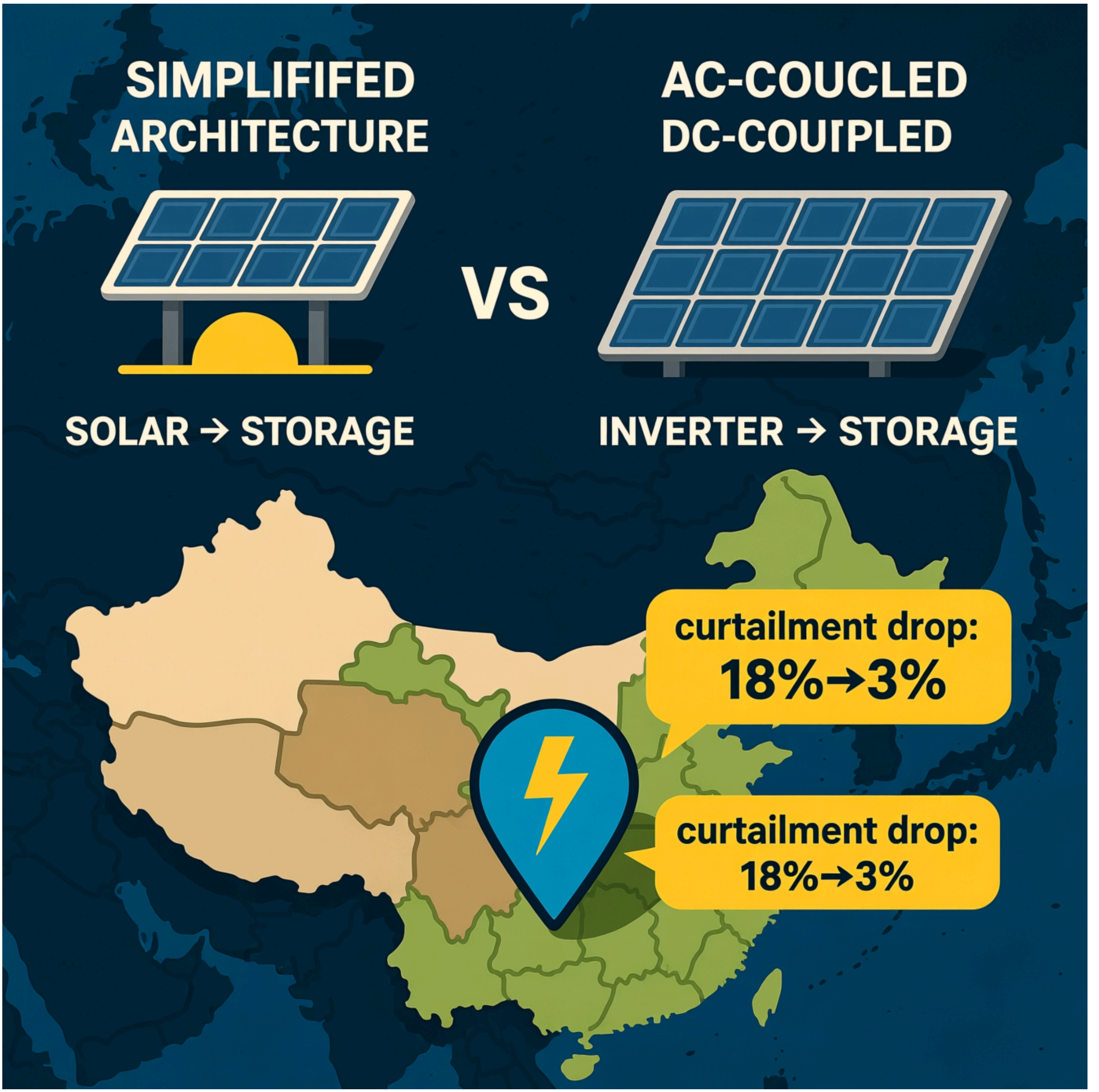
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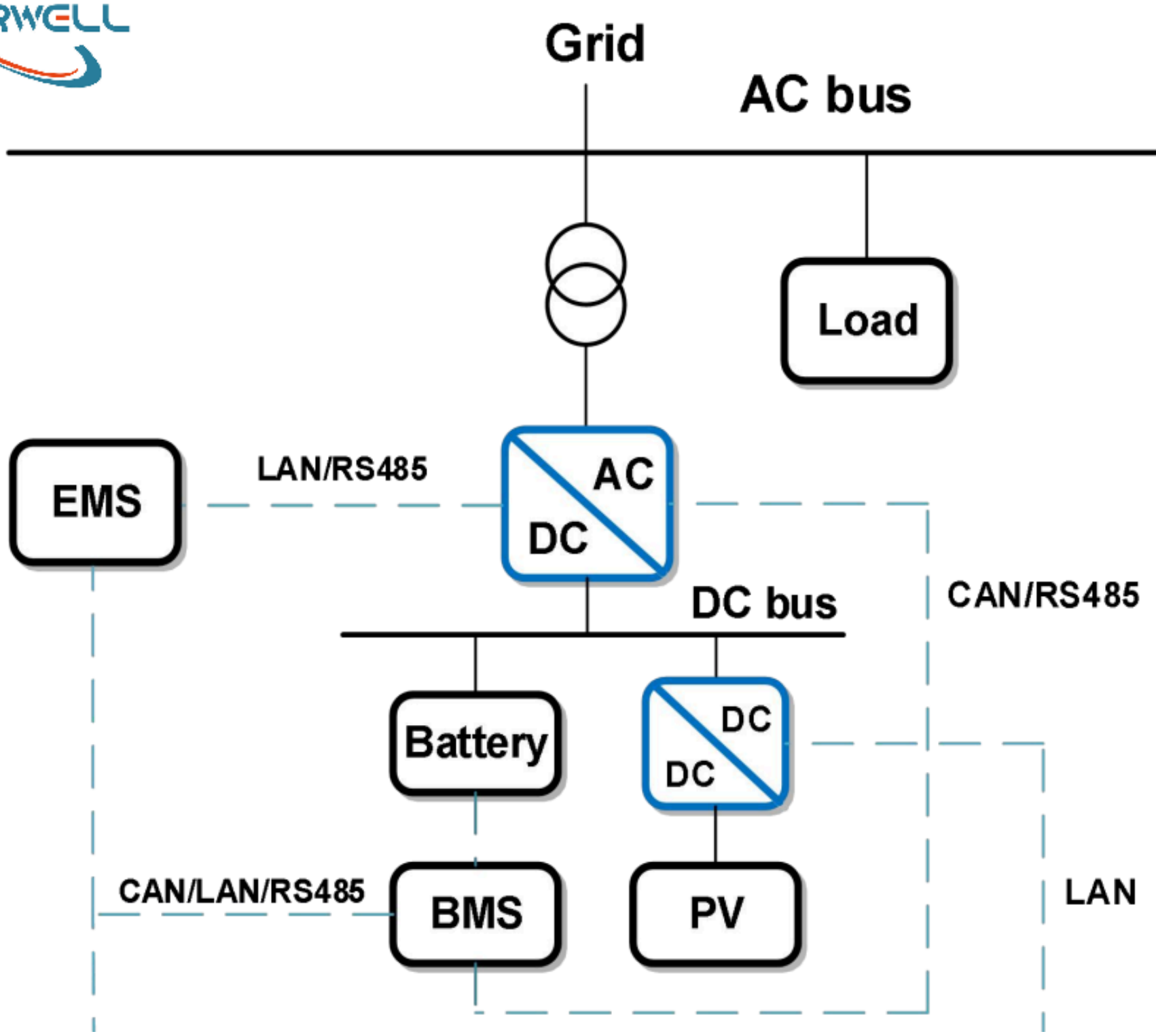
- Northwest China plant: Curtailment ↓ 18%→3% (DC efficiency ↑12%)
- LCOE reduced by $0.02/kWh
- Why It Works:
- Fewer conversion losses – ideal for large, orderly arrays



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Standard Wire Diagram

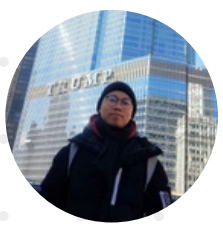
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4: Microgrid AC (Remote Areas)

🌵 How Off-Grid Villages Get 24/7 Power

Data:

- China Tibet village: Reliability ↑ 65%→99.2%
- Diesel use ↓ 80%
- Real Impact:
- 72+ hours backup for clinics/schools during outages



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Microgrid AC / Remote Areas

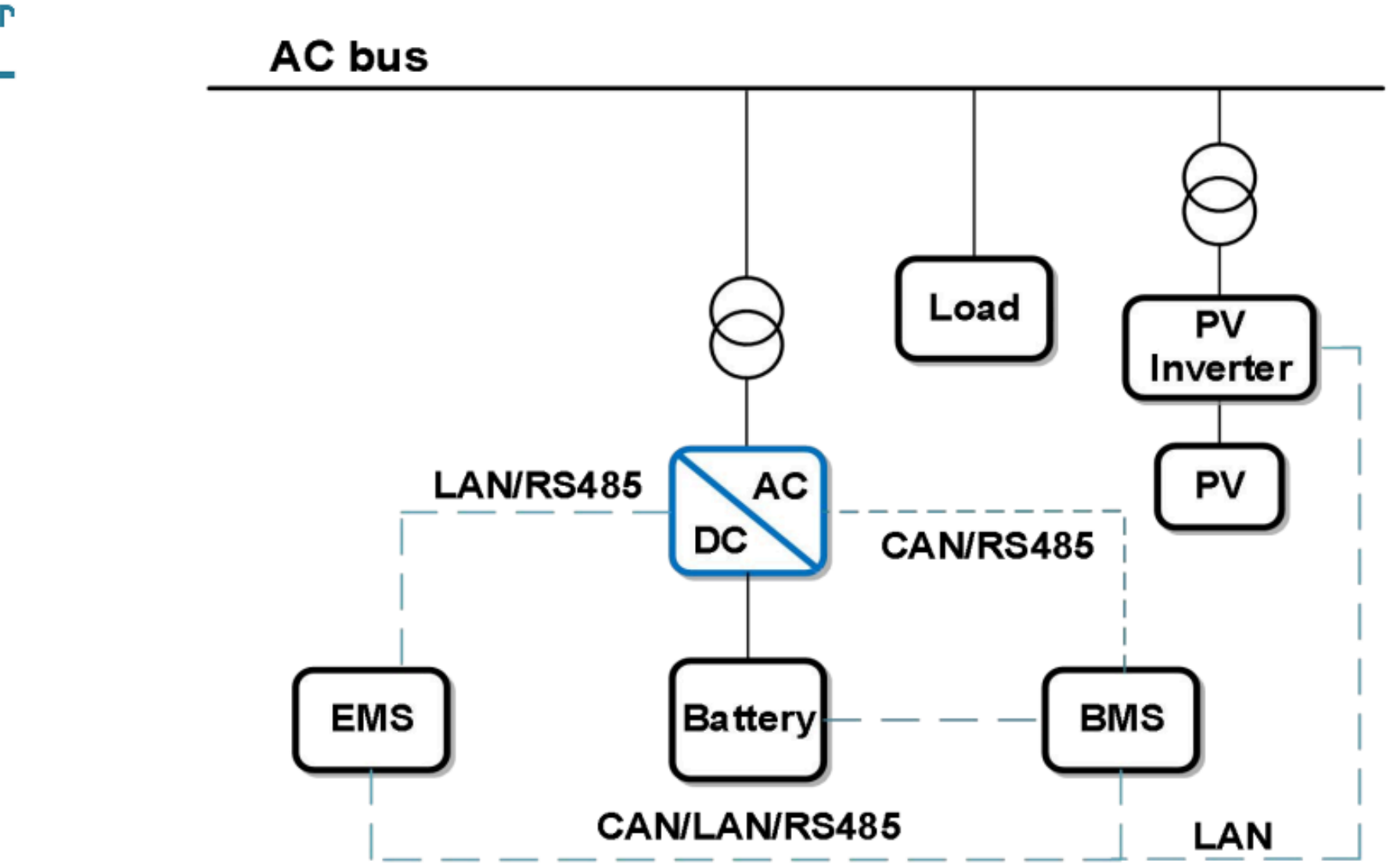
Visual Before/After:

99.2% reliability

Real-Impact Photo

72+ hours backup

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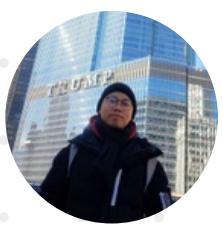

AC bus
Load
PV Inverter
PV
LAN/RS485
AC
DC
CAN/RS485
EMS
Battery
BMS
CAN/LAN/RS485
LAN

5: DC Microgrid + Genset (No-Grid Backup)

🏝️ Island Power: Simpler = Cheaper?

Data:

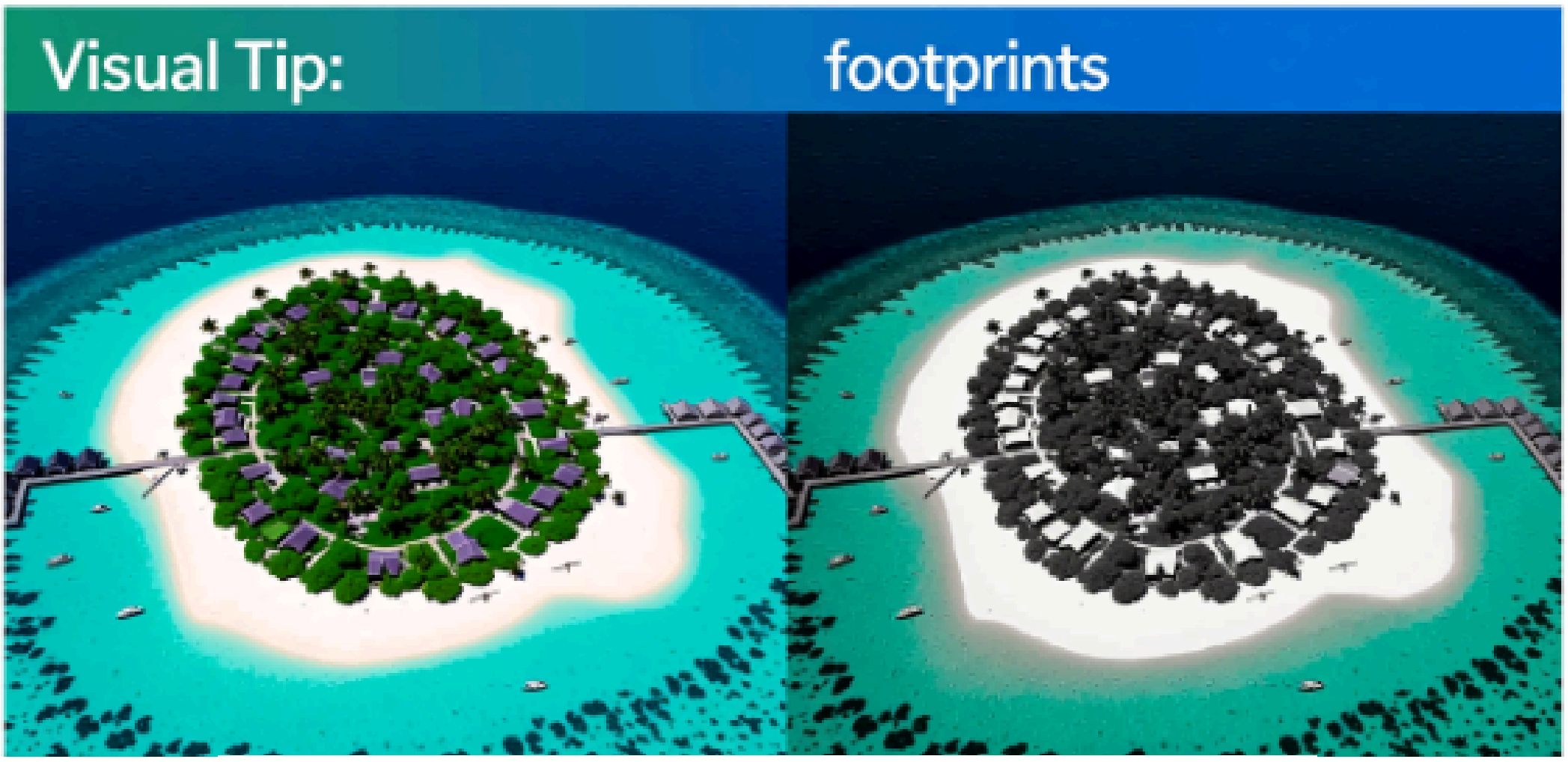
- Maldives resort: O&M costs ↓ 40%
- EMS response: 0.3 sec faster than AC systems
- Limitation Alert:
- Best for <5MW projects; larger islands need hybrid setups

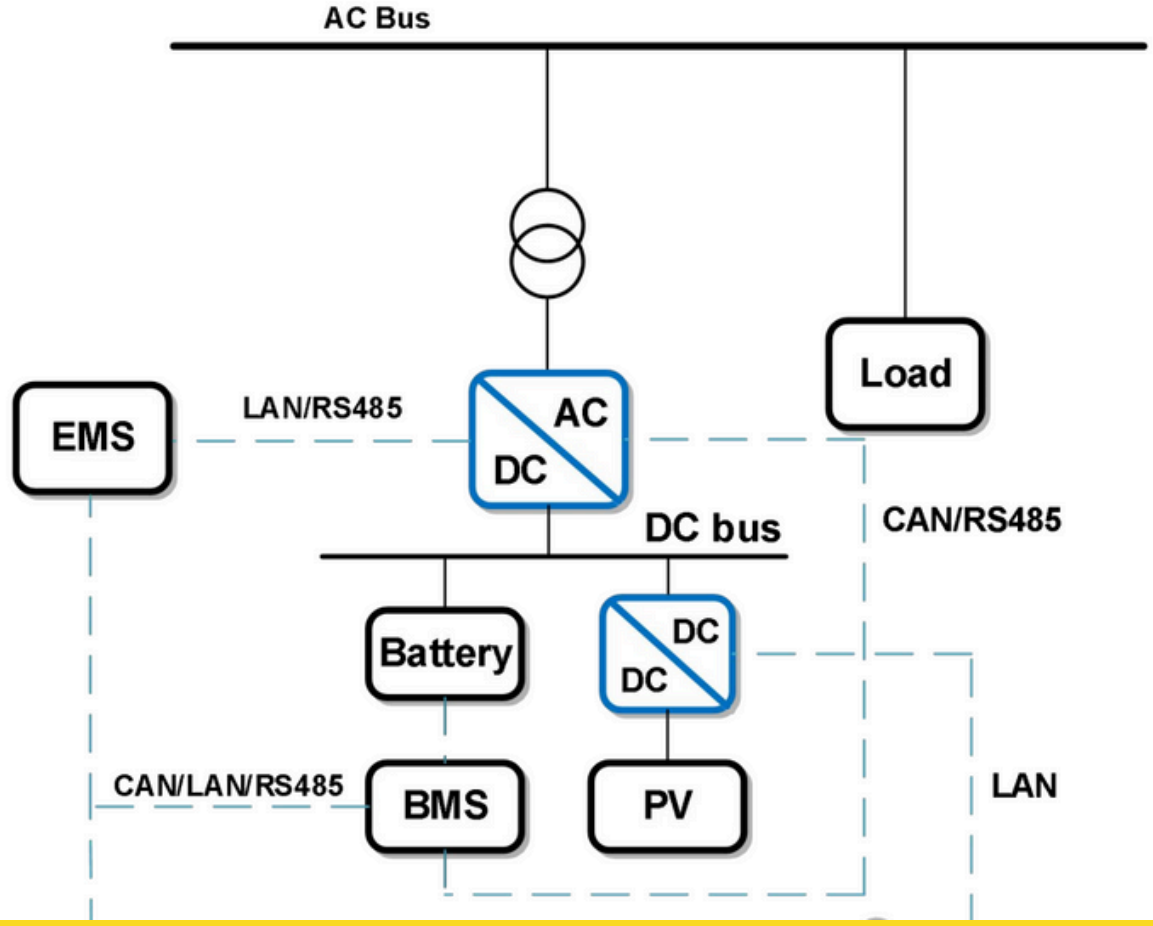


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Limitation Alert:

Best for <5MW projects; larger islands need hybrid setups





Standard Wire Diagram

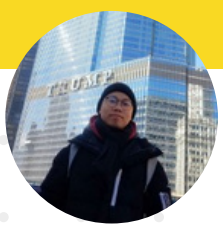
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6: Hybrid Microgrid (Unstable Grid Switching)

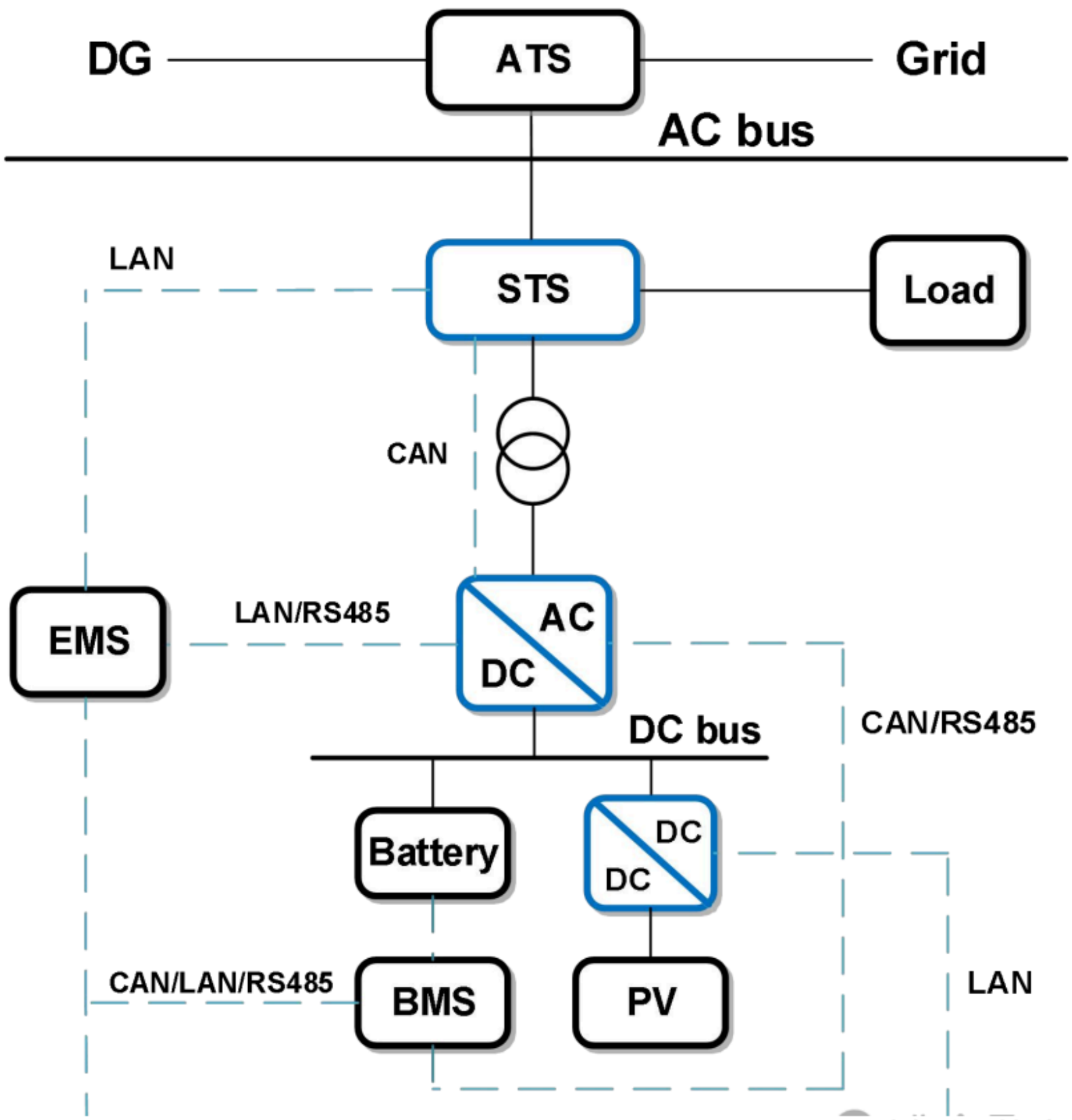
🌪️ When the Grid Crashes: This Mine Stays Online

Data:

- South Africa mine: Grid-to-island switch <20ms
- Annual loss prevention: $3.8M USD
- Secret Tech:
- Triple redundancy: Storage primary → Genset backup → Grid fallback
-



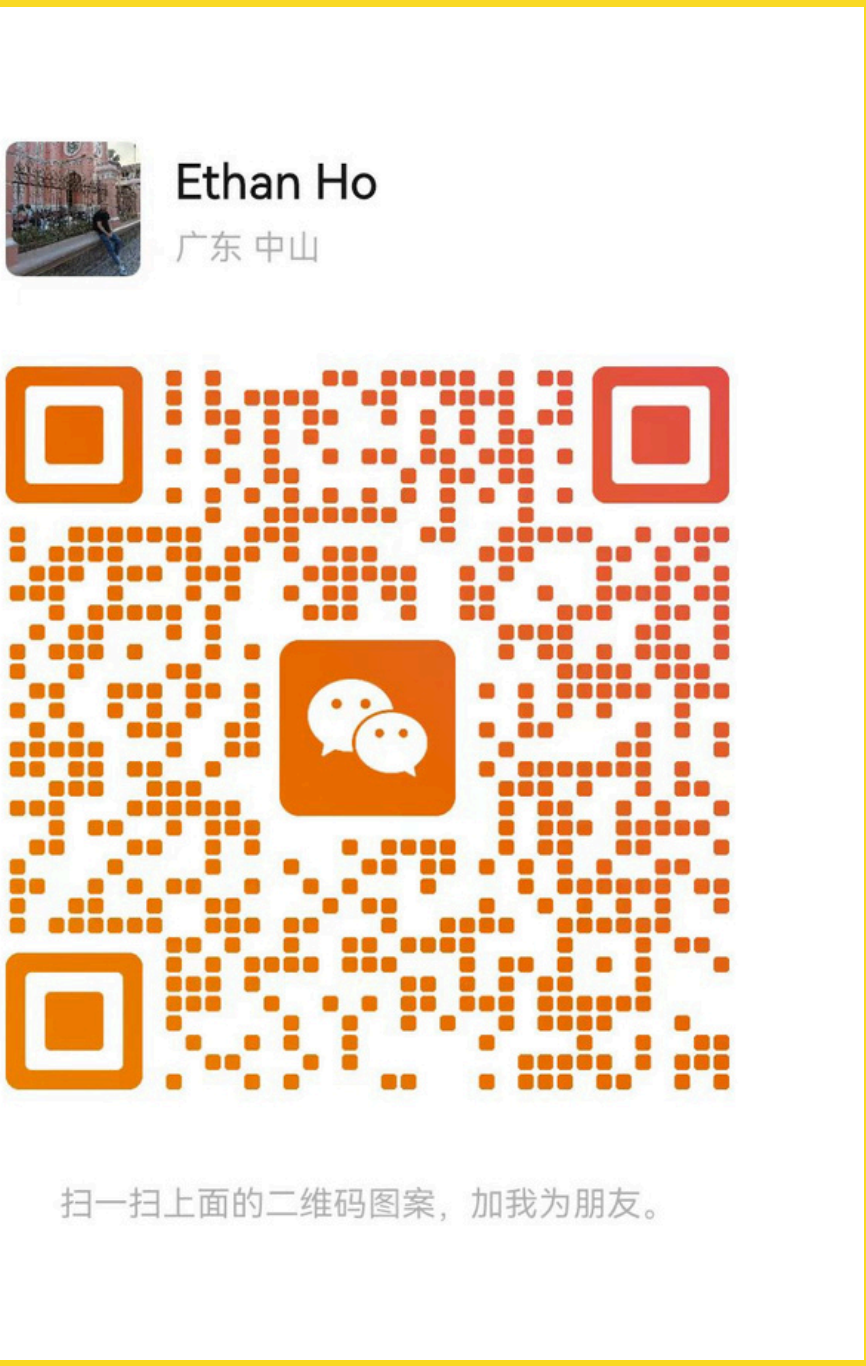
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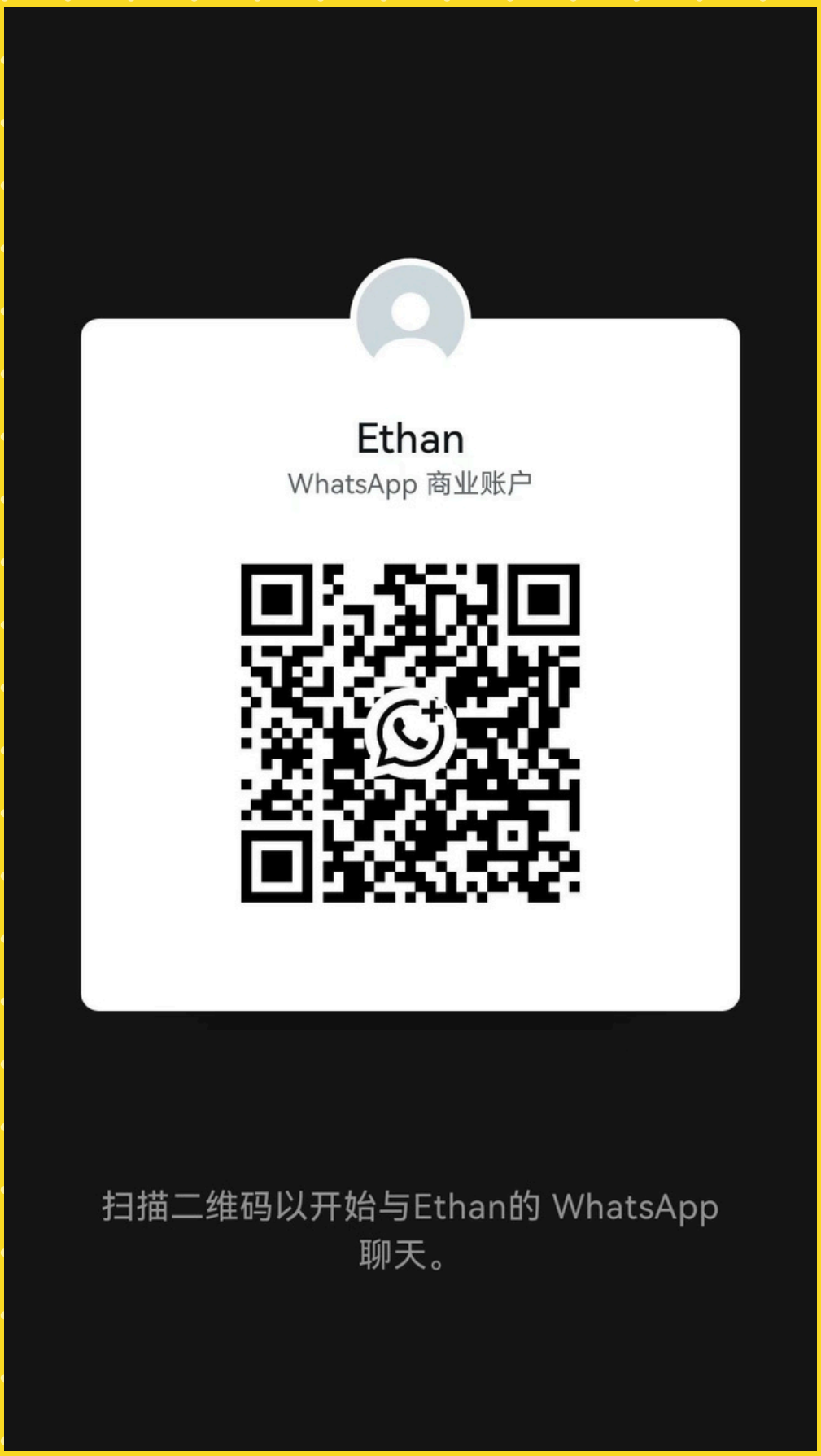


Standard Wire Diagram

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