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Next Generation Power Systems for the New Digital Era

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Independent Power Corporation PLC

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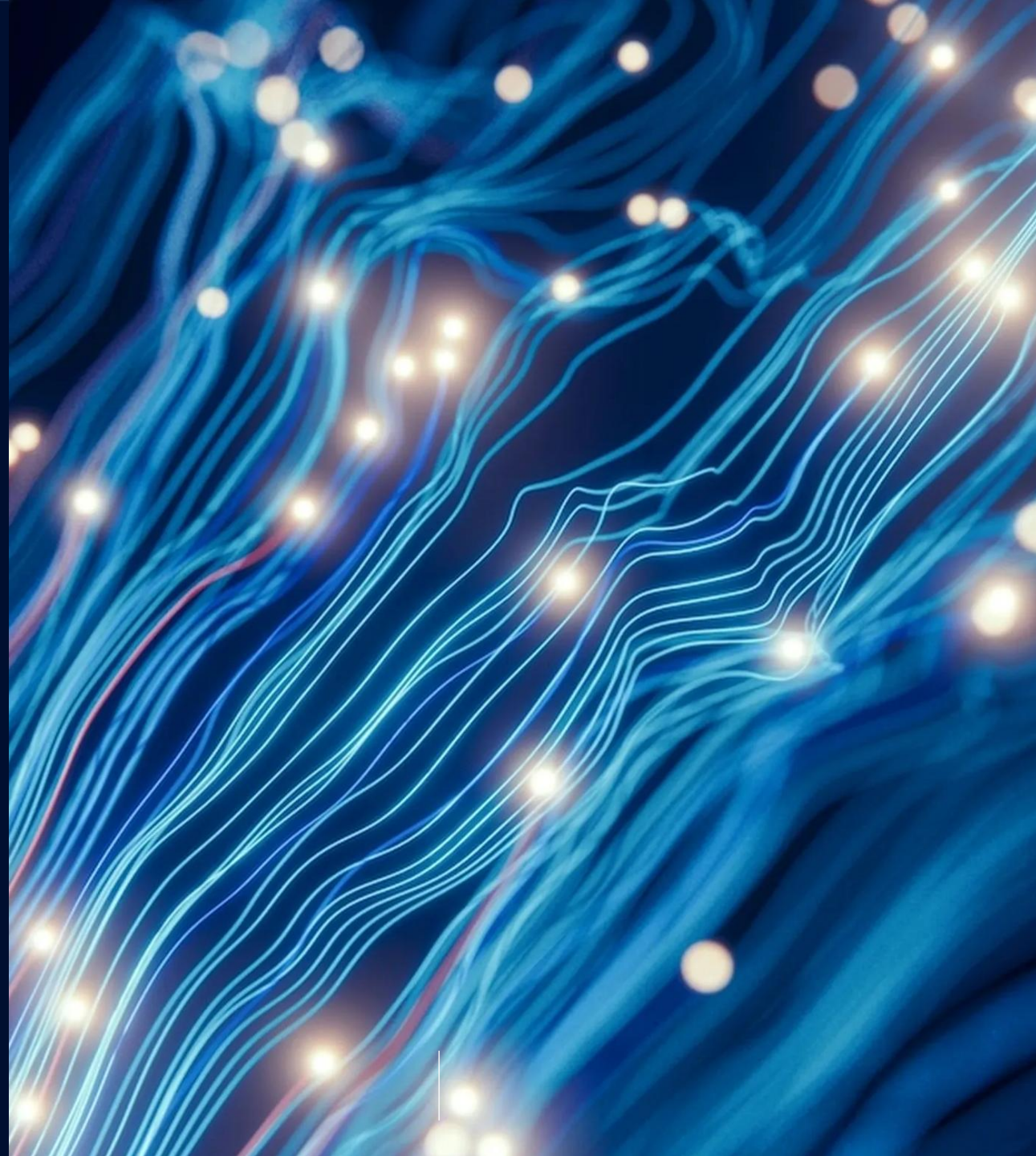

Independent Power Corporation PLC

- British Power Developer
- 30-Year Track Record
- Delivering Reliable, Conventional Power
- 10 GW of Ownership / Operatorship
- 7 GW New Projects

Karaganda GRES II

608 MW Coal

Second largest coal fired plant in Kazakhstan

Guaracachi

O&M > 500 MW of gas-fired capacity in Bolivia

Installation of new OCGT and CCGT capacity > 300 MW

Chaco

90 MW OCGT

BPs aeroderivative fleet for a gas field Bulo Bulo, Bolivia

Newcastle Cogeneration

18 MW CHP Syn Gas

First IPP in South Africa, KwaZulu Natal

Al Hamra I

45 MW OCGT

First aeroderivative GTs in Ras Al Khaimah, UAE, built on fast-track

Energia del Sur

134 MW CCGT

First CAF forward sale agreement for CERs in Argentina

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How AI is Reshaping Power Demand

IPC is reshaping its portfolio to deliver reliable, sustainable energy for a new generation of power users.

- AI drives innovation and optimisation
- AI is the fastest-growing electricity consumer
- Power intensity of AI doubles approximately every 18 months
- Challenges:
  - → Grid Infrastructure bottlenecks
  - → Power generation constraints
  - → Regulatory and Permitting delays





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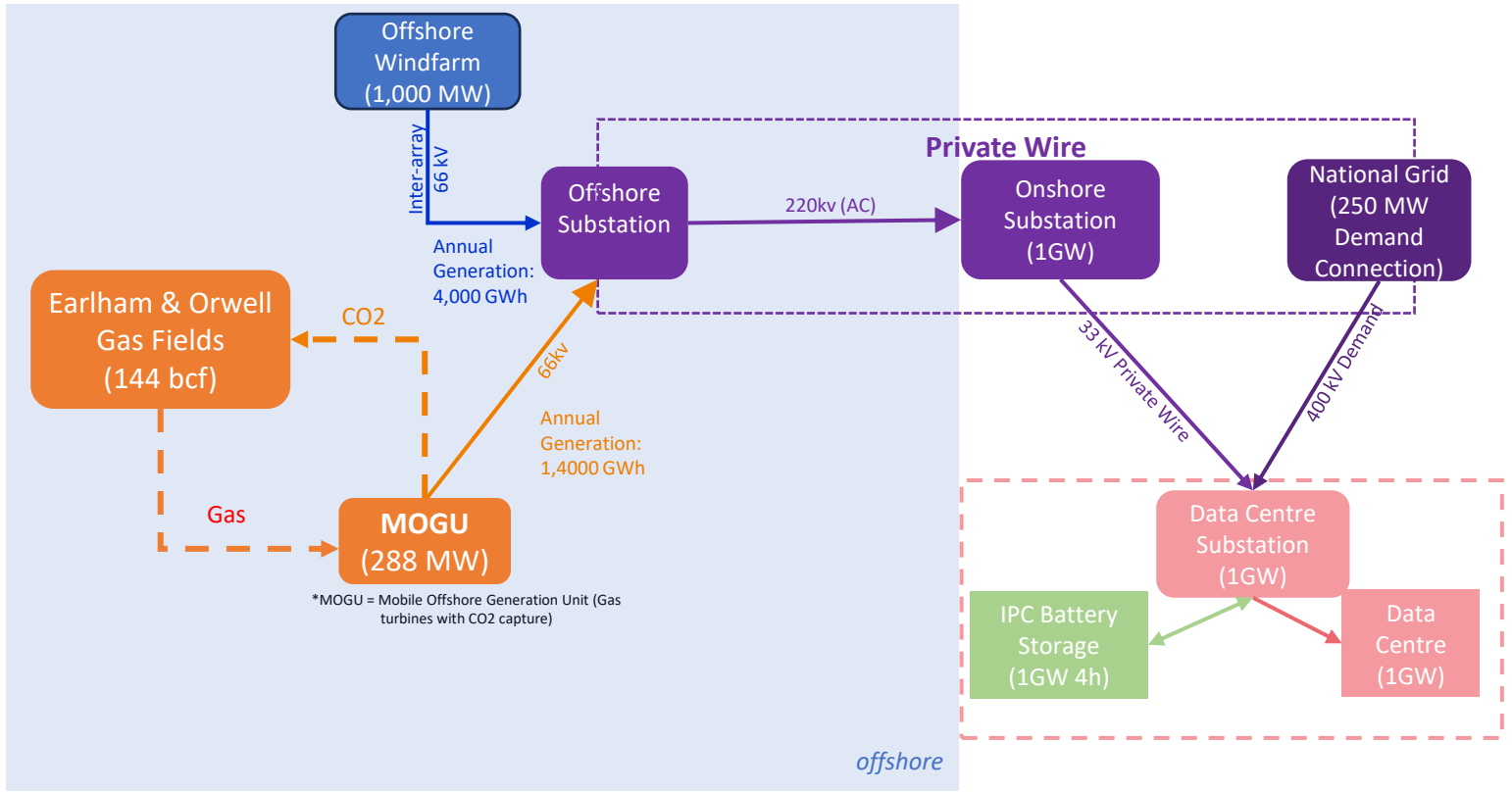
Our Vision: Behind the Meter Generation

- Behind the Meter Generation advantages:

  - Independent from grid stress
  - Control electricity costs
  - Added flexible
  - Holistic Design
  - Carbon-conscious strategy



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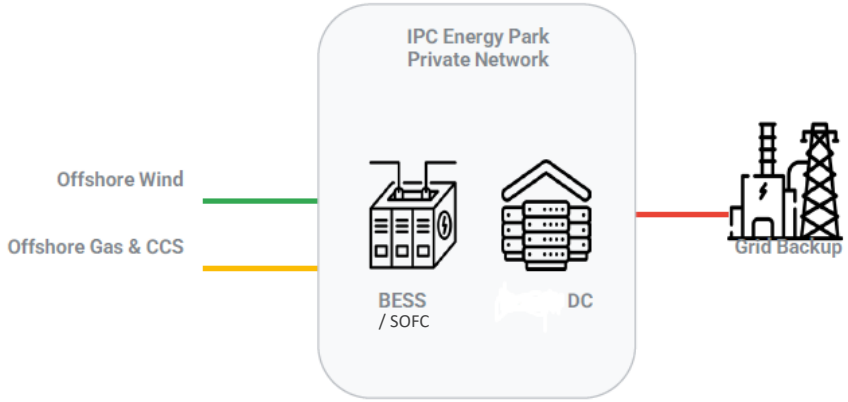
Integrated Hybrid Systems

Optimised Hybrid Energy Mix

- ~70% Renewable (Offshore wind)
- ~30% Dispatchable (Gas turbines peaking + Fuel cells base)
- Battery storage for second-by-second balancing
- + Smarter Load Shifting (AI helping AI)



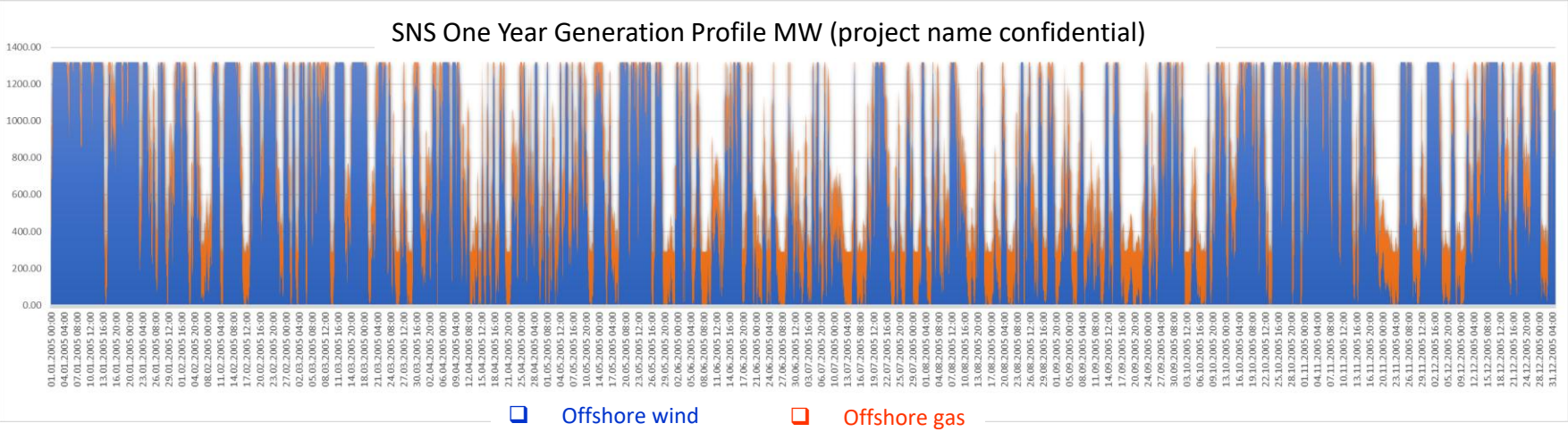
- Hybrid generation strategy:
  - At IPC, we take integration to the next level. Our vision combines multiple technologies into a single, optimised system:
  - Together, these layers create resilient, low-carbon, and commercially viable systems capable of powering demanding applications like large-scale data centres.
  - Essentially, hybrid systems make energy delivery faster, more cost-effective, smarter, and more dependable.
  - Power Management & Control is essential for implementing hybrid systems as performance depends heavily on power-sharing strategies.

Example of Offshore Gas & Wind Integration

- Hybrid & Co-Location Concept:
  - Shared grid connection and substation
  - Optimised capex & opex
  - Higher transmission asset utilisation: from ~45% to up to 75%

- Flagship hybrid project in Southern North Sea

	MW	GWh	Grid Export Capacity
Grid Export Limit (A)	1320	11,563	100%
Offshore Wind Generation (B)	1380	5,762	49.8%
"Spare capacity" in grid connection (A-B)		5,801	
Offshore Gas Max generation (C)	288	1,590	13.8%
Offshore Wind + Gas Generation (B+C)		7,352	63.6%



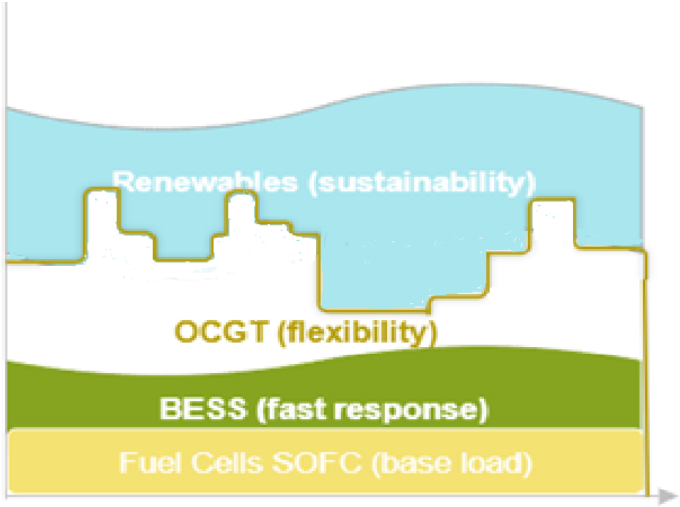
Example of Integrated Hybrid System

No Reserve

Parameter	Value	Comment
Peak Load	650 MW	Data centre peak
Offshore Wind Capacity	0.70 x 650 = 455 MW	Primary energy source
Fuel Cell Capacity	0.10 x 650 = 65 MW	Must run ≥ 30% of 65 MW → 19.5 MW minimum
Gas-Fired Capacity	0.20 x 650 = 130 MW	Flexible dispatch
BESS	650 MW x 2 h = 1,300 MWh	High-power battery, energy-shifting
Dispatch Priority	1. Wind → 2. BESS → 3. Fuel cells → 4. Gas	Maximize renewables, then battery, then fuel cells, lastly gas

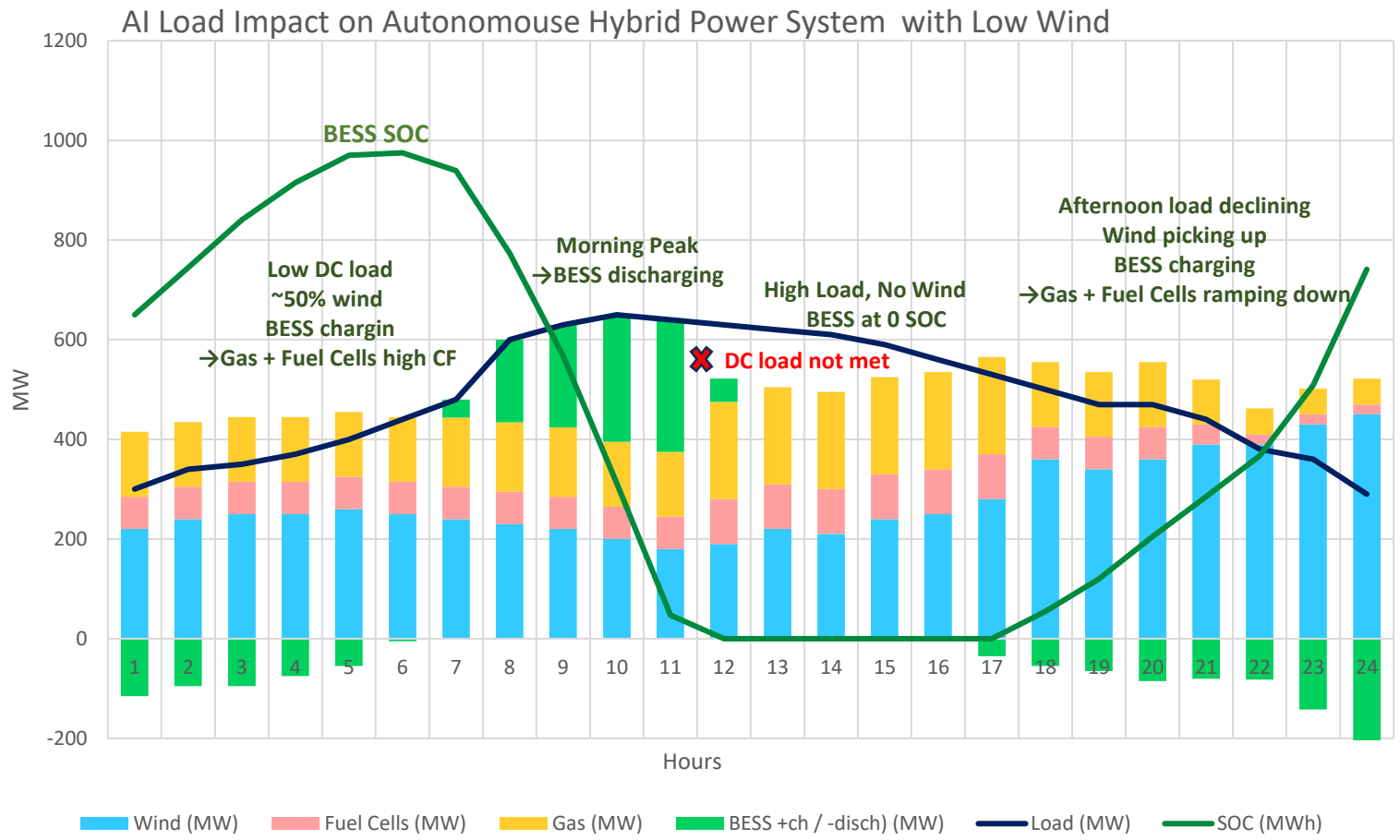
Dispatch logic:

1. Wind always used first; any shortfall met by BESS (if SOC > 0) →
2. → Fuel cells run at least at minimum 30% load (19.5 MW), can ramp up if needed →
3. → Gas fills any remaining gap (with minimum load of 40%) →
4. → BESS charges only from surplus wind (if load < wind + min fuel cells).



Integrated Hybrid System - No Reserve

24-Hour Dispatch Profile



Conclusion:
Not enough redundancy designed for extended wind calm periods.

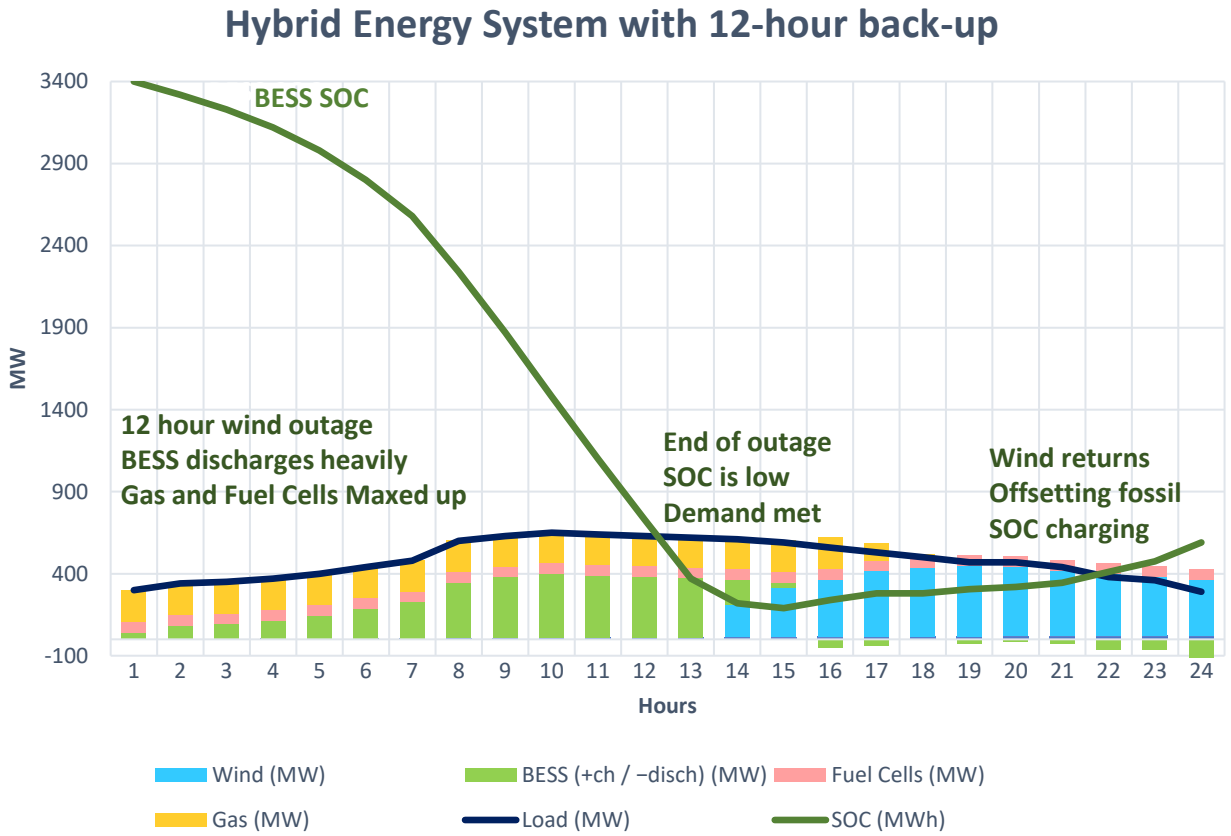
Integrated Hybrid System - 12-hour back-up

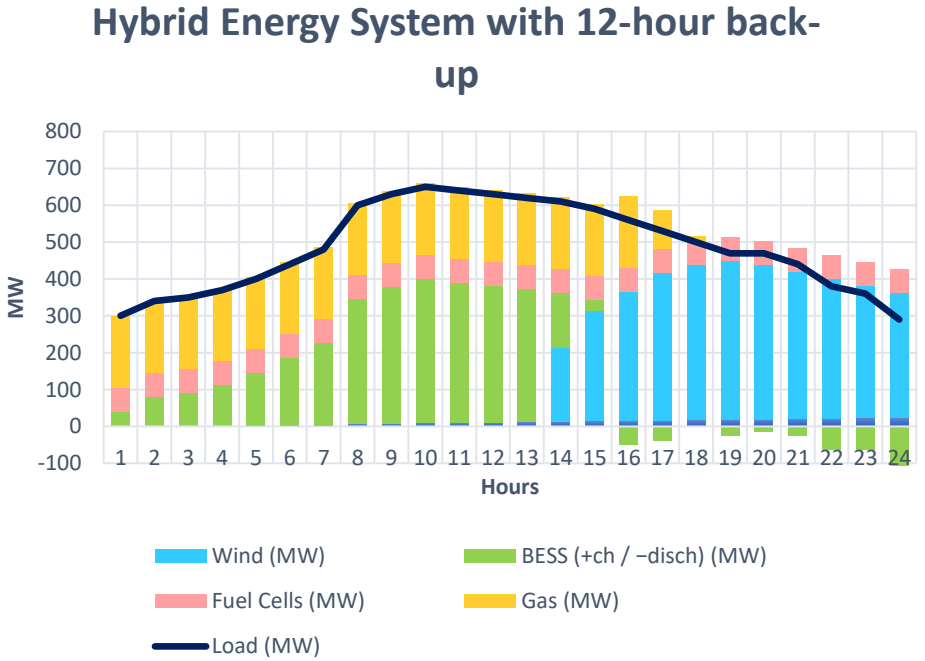
To achieve 12 hour back-uupin low-carbon design we implement hybrid approach combining additional redundancy with fuel cells, gas and BESS, and operational strategies like load shifting or partial curtailment for non-critical loads.

Pros	✓ Balances reliability especially for grid isolated data centres ✓ Mixture of low carbon ✓ Bridges calm periods > 4 h
Cons	✓ High CAPEX ✓ Added OPEX

Parameter	Value	Notes
Peak load	650 MW	Data centre
Offshore wind capacity	455 MW nominal	Can drop to 0 MW for worst-case scenario
Fuel cells capacity	65 MW	Must-run ≥ 30% (19.5 MW)
Gas-fired capacity	195 MW	Increased to ensure 12 h backup with BESS
BESS	650 MW x 7 h duration = 4,550 MWh	Sized to cover wind outage
Dispatch priority	1. Wind → 2. BESS → 3. Fuel cells → 4. Gas	Minimize carbon

Integrated Hybrid System - 12-hour back-up





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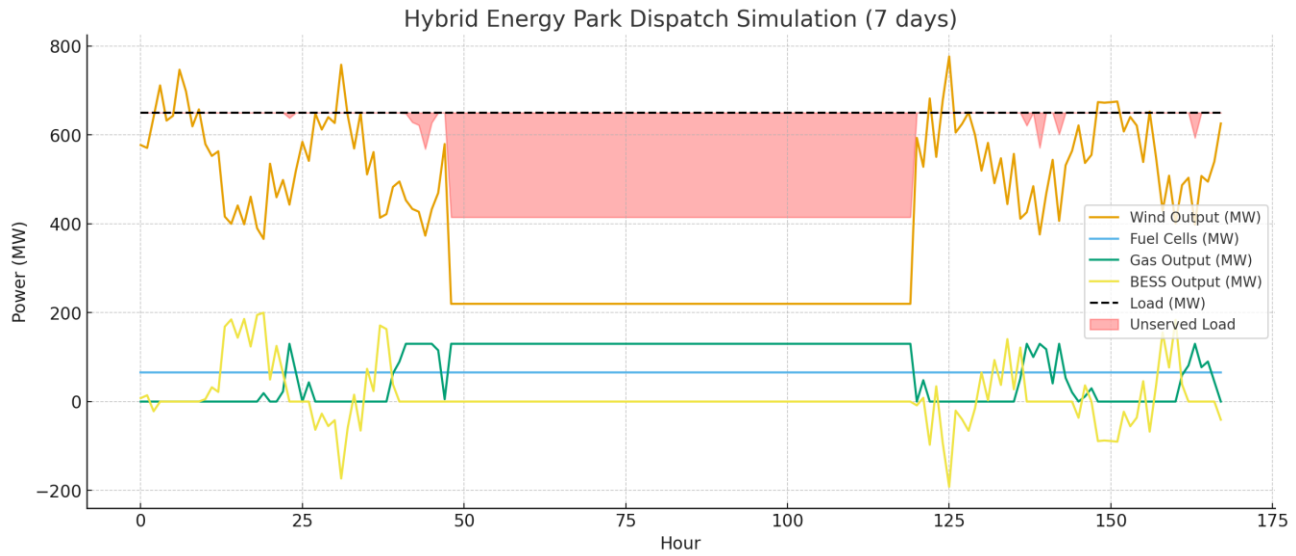
Tier 3 & Tier 4 Redundancy Requirements

- 7-day simulation for proposed mix (70 % offshore wind, 10 % fuel cells, 20 % gas, plus 200 MW BESS) assuming:

Wind output:	Highly variable, with a 3-day calm period dropping to ~20 % of installed capacity.
Fuel cells:	Constant 65 MW.
Gas Turbines:	195 MW, dispatched fully during wind shortfall.
BESS:	650 MW x 7 h duration = 4,550 MWh used to smooth ramps and short-term deficits.



→ Unserved load: Peaks at 235 MW during the calm period; total unserved energy over 7 days is ~17,300 MWh.

Conclusion: Even with gas and BESS, multi-day calm events cannot be fully covered. The system relies on partial curtailment unless more firm capacity is added.

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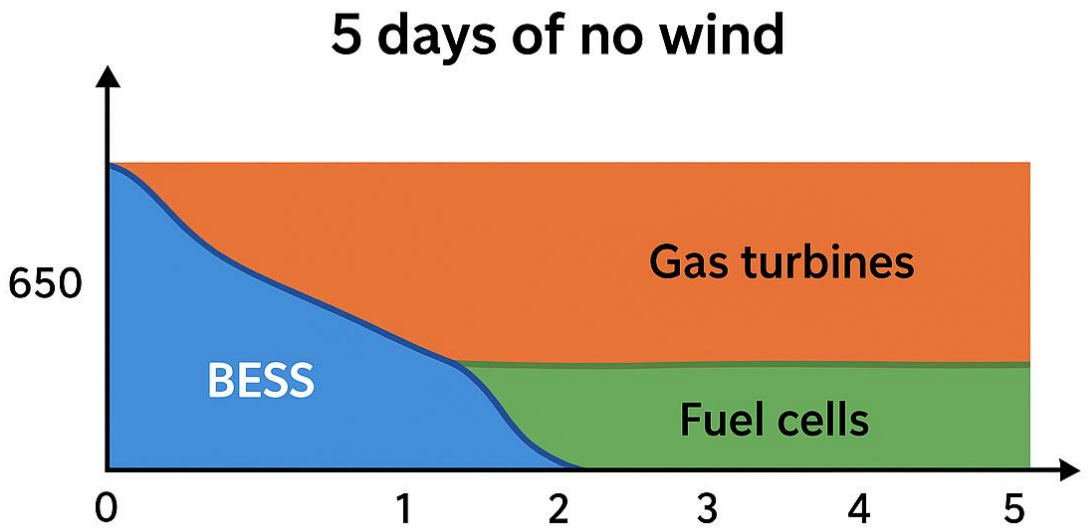
Tier 3 & Tier 4 Redundancy Requirements Served



Solution:

1. Additional gas/fuel cell capacity to cover ~ 80% of peak load
2. Longer duration BESS with spare capacity
3. Load shifting to smoothen out load and make use of available power sources

Component	Unit Capacity	Units (N+1)	Total Power
Fuel Cells	65 MW	2	130 MW
Gas Turbines	195 MW	2	390 MW
BESS	650 MW (>4 hr)	10%	715 MW

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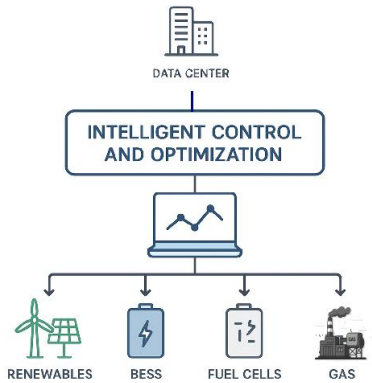
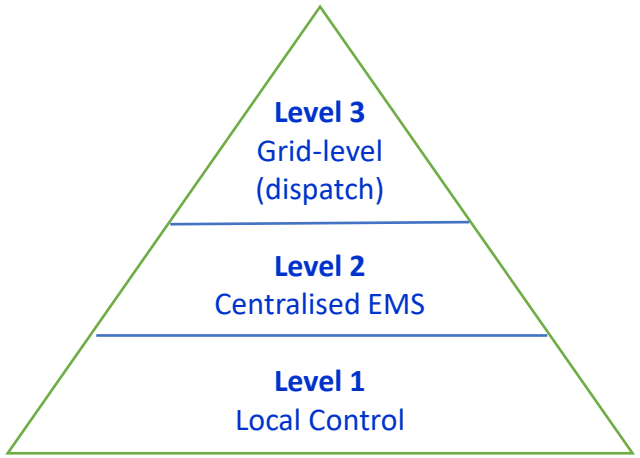
Intelligent Control and Optimisation

- Managing these hybrid systems requires advanced controls. That's where the AI-driven centralised dispatch system comes in.
- It monitors generation, load, and maintenance in real-time, optimising efficiency, extending asset life, and reducing stress on equipment.
- Essentially, it operates as an autonomous, islanded power system → smart, reliable, and fully integrated.





Closing: From Vision to Implementation

- What's exciting is that all this technology exists today.
- The challenge isn't technical feasibility. It's bringing the right mindset, partnerships, and forward-thinking customers together to implement it.
- Data centres, for example, are already embracing decentralised, hybrid power systems, combining reliability, flexibility, and sustainability in ways traditional grids can't match.
- At IPC, we're bridging proven power generation expertise with cutting-edge, hybrid technologies to deliver resilient, low-carbon systems at scale.
- We're eager to collaborate with partners who share this vision and want to make next-generation power a reality.

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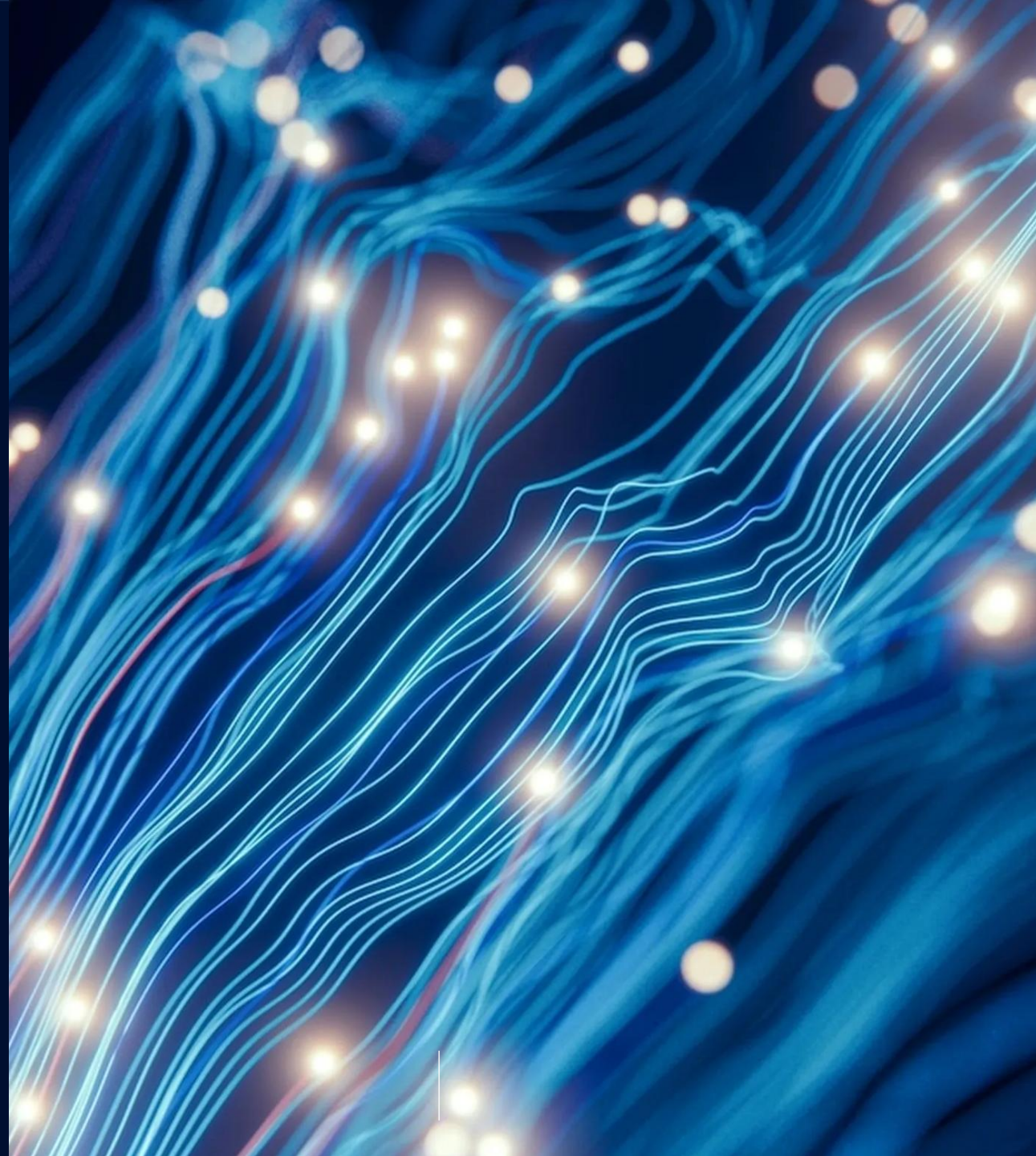
THANK YOU



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