Sark Community Power update March ‘25

1. Bringing Sark’s electricity infrastructure into community ownership
   - States of Guernsey loan and affordability
   - Essential works for safety and security of supply

Q&A

2. Future system design phase update
   - Distribution system
   - Generation system

Q&A

3. Next steps

Speakers

Mike Locke	Future Energy Committee
Jake Burnyeat	CfR
James Lancaster	Alderney Electricity Ltd
Gill Jones	Infinite Renewables
John Guille	Policy and Finance

Sark's Energy Future

- From Sustainable and Reasonably Priced Electricity PDT in 2015
  - via Securing the Long-Term Resilience of Energy Generation and Supply in Sark in 2022
  - and Sark Replacement Power System Update in 2024
- to tonight

It's time to build on all the work that's gone before and take control of a safe and secure electricity system.

Securing Sark's Energy Future & Security for Sark,

for generations to come…

forever.

policy.finance@sarkgov.co.uk special.future.energy@sarkgov.co.uk

- Taking control of the island's energy future
  - *what does that mean?*
    - available
    - affordable
      - *equitable*
    - economics? environment?
      - *Aligned with island plan*
    - minimise risks
  - *fossil fuels?*
    - opinion divided
    - supply chain risk
    - price volatility
  - *renewables?*
    - *Contain cost and risk*

"This is a Journey…for everyone"

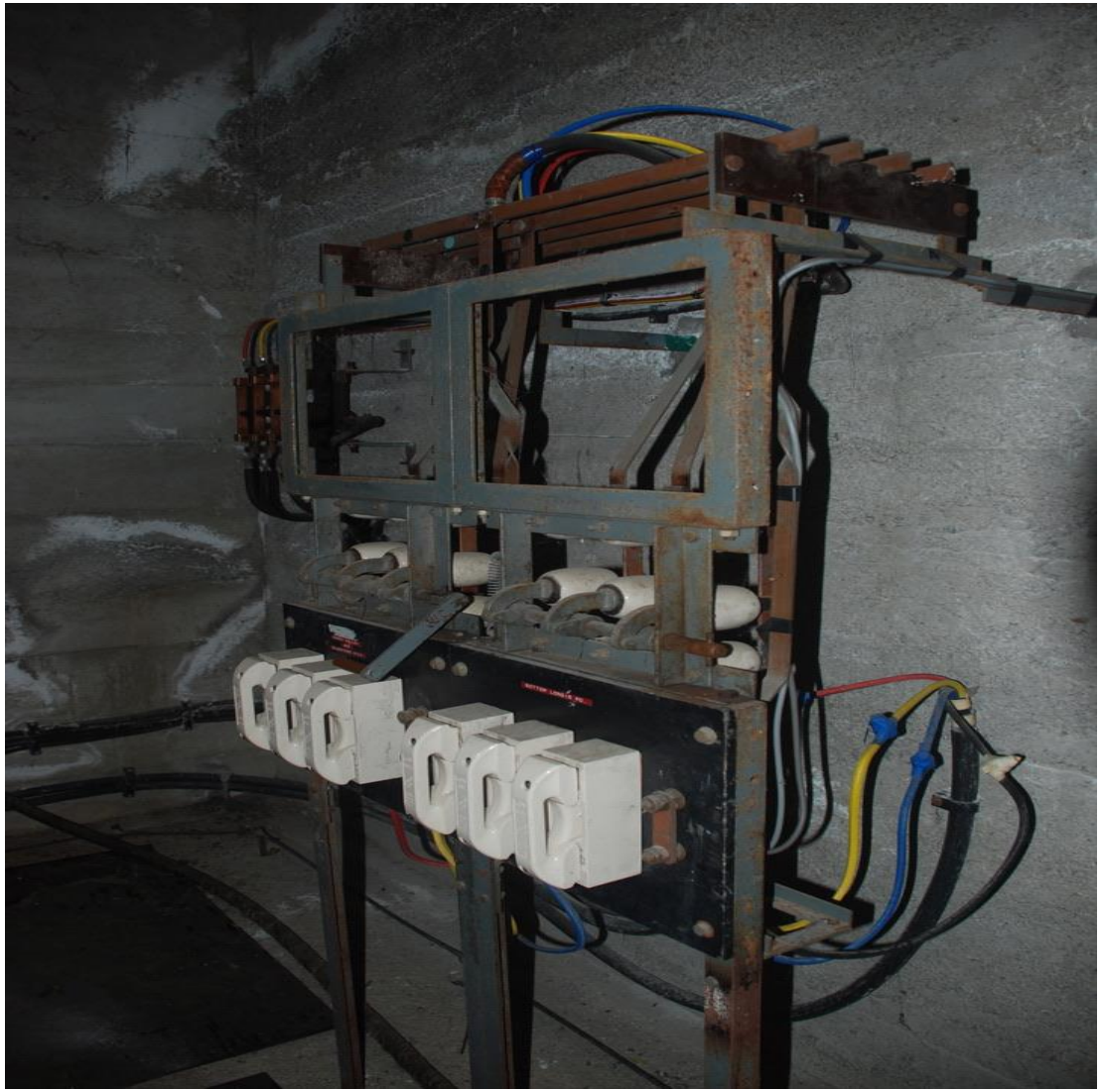
- 2008 – 10-year plan to upgrade grid infrastructure
- 2014 – 6 years in, 2 years of work complete
  - *quality of the infrastructure*
- *2015 – Accelerated network programme*
- *2016 – Station Upgrade Programme*
  - *both signed off in 2023*
  - *£6 million invested*
- Automation
  - *active network management*
- *Achieved without increasing the underlying cost of electricity*

To Date?

HV switchgear pre-2015

HV switchgear pre-2015

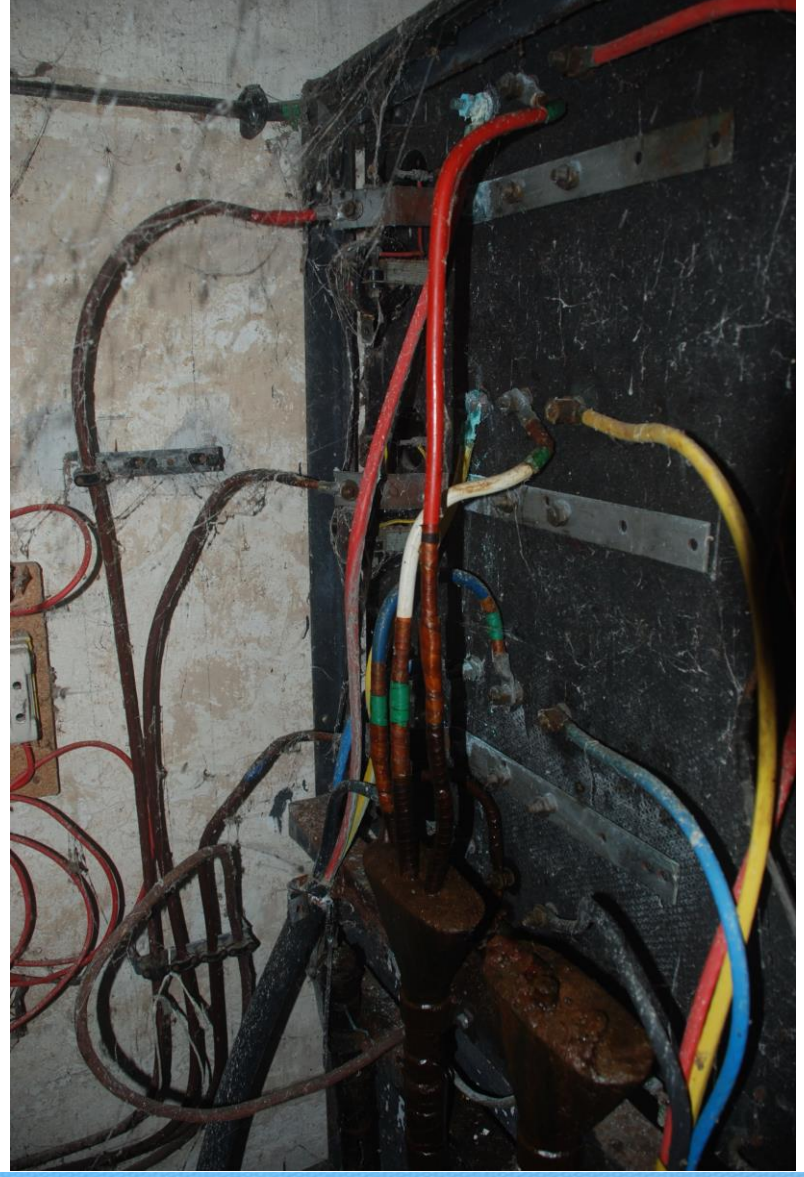
Modern HV Board?



LV switchgear pre-2015

LV Switchgear pre-2015

Compliant LV feeder board



LV Cabling pre-2015

HV Cable pre-2015

HV Cable pre-2015

Objectives

- Public Safety
  - Accessible infrastructure (cabling and transformers)
    - secure and intrinsically safe
      - enclosures and signage
    - domestic installations outside scope
  - Fault management systems reviewed and upgraded
    - Earthing and fusing
    - Fails to safe
  - La Coupée

- Employee Safety
  - Operations
    - Hardware Compliance
      - Switchgear
  - Maintenance programmes
    - Tools and equipment
  - Systems
    - Operating procedures
    - Risk assessment
  - Training

States of Guernsey Loan

Loan facility of up to £1,500,000, drawn down as needed to cover:

- £400-500k asset purchase at current asset valuation (subject to due diligence)
- £100k legal fees
- £300-500k remedial measures to make system safe and secure (estimate provided by firm with 20yrs experience of Sark's network)
- £400k headroom for remedial works

Total: £800k to £1.5m depending on actual state of network & assets

States of Guernsey Loan Conditions

Loan facility of up to £1,500,000 on draw down basis

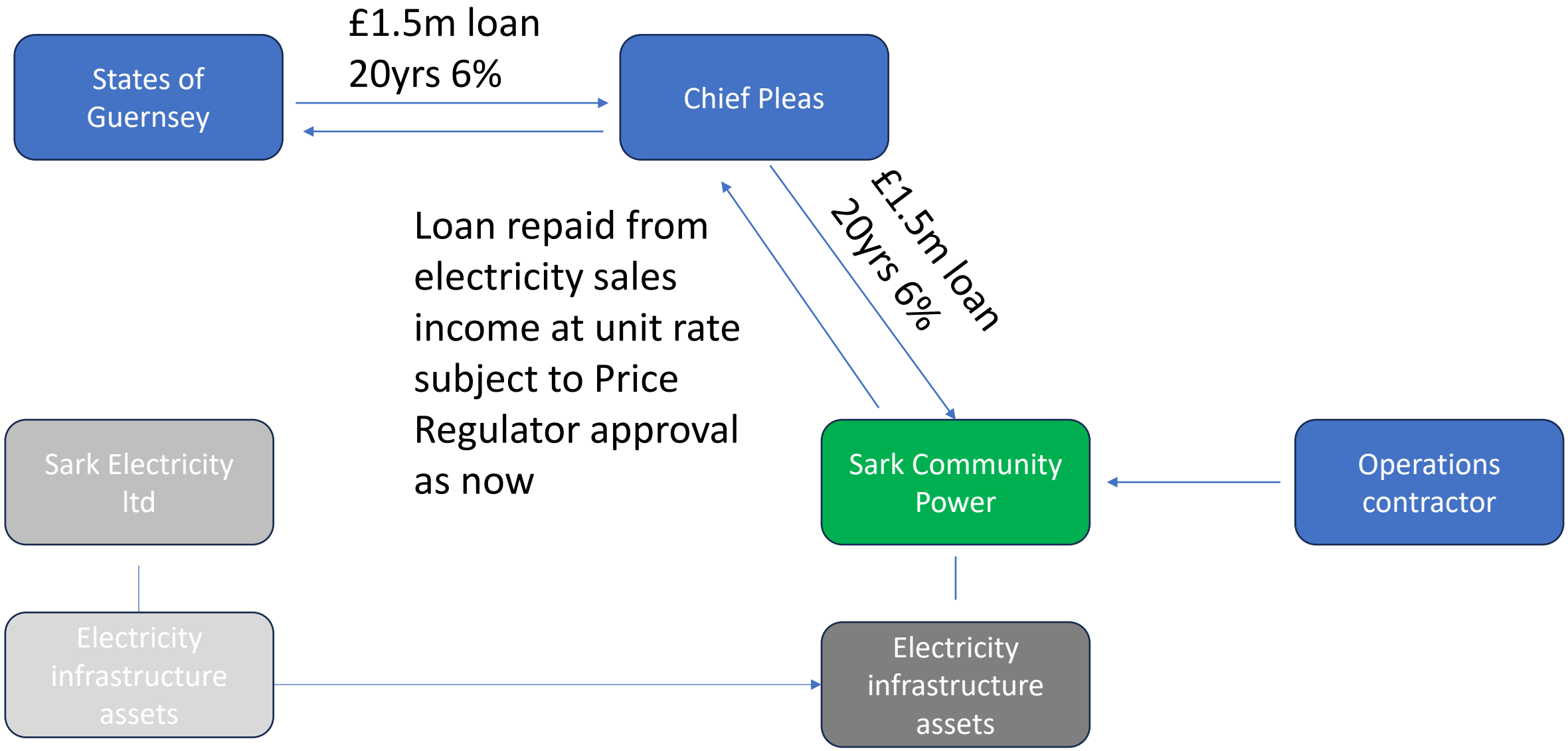
1. Participate in the proposed Bailiwick Commission
- Bailiwick Commission to engage with Conseillers and the public
- Public briefing on Bailiwick Commission to be provided in coming weeks

2. Share results of Sark Taxation Review

3. Impôt collection as a backstop instead of security against the assets. Protection for both sides against default

Result? Government-to-government loan rate

States of Guernsey Loan Structure



Loan is affordable from current electricity revenues

Forecast Profit and Loss

Revenue	
Sark Electricity Consumption 2024 (kWh)	1,523,261
Unit price (£/kWh)	£0.54
Unit rate income (consumption x unit price)	£822,561
Standing charge income (538 customers x £10/month)	£64,560
Total revenue	**£887,121**
Operating costs	
Diesel @ 25p/kWh	-£380,815
Engineering team, admin and maintenace	-£337,791
Surplus	**£168,514**

Finance costs		
SOG loan (if full amount borrowed)	£1,500,000	
Annual interest (worst case)	6%	-£90,000
Annual capital		-£40,777
Total		**-£130,777**
Surplus after finance costs		**£37,738**
% of Revenue		4.3%

- **Diesel cost is main driver of electricity price variations so diesel cost reductions help compensate for revenue reduction at lower electricity unit price**
- **Up to £1.5million at 6% over 20 years affordable at current electricity prices of 49p – 54p/kWh**
- **Inflation and higher consumption will increase surplus available to pay loan costs**

Governance and operations

- Costs assume maintenance and management contract with experienced company to manage the system on behalf of Sark Community Power
- Island engineers and admin staff retained
- Once owned by Sark Community Power, community will determine how things progress

Q&A

Please send any further questions to Policy and Finance and Future Energy Committees

policy.finance@sarkgov.co.uk special.future.energy@sarkgov.co.uk

Design phase work completed over last 12 months

- Distribution system design lead by Sancus working with power systems design specialists Aurora Power
- Generation system design lead by Infinite Renewables
- Design approach provides basis of staged, partial or complete replacement systems
- Both designs independently reviewed by TSL engineers who have experience working on Alderney's power system
- Work completed within £175k budget approved in Jan '24
- Main design reports published on website

www.sarkcommunitypower.com

www.sancus-utilities.co.uk

www.aurora-power.co.uk

www.infiniterenewables.com

www. tslworld.co.uk

Distribution system

Distribution system specification

- Designed to meet demand range from current demand of 90 – 400kVA to max demand of 2,500kVA (with ability to scale above that if and when needed).
- Able to manage diesel and/or renewables-based generation.
- Will run at 6.6kV with cables able to run at 11kV if required in future.
- Designed as a complete replacement system or basis of staged upgrade.

Design phase work by Aurora and Sancus included

- Worked with CfR and Chief Pleas to develop model of current demand (based on the Cadastre database and assumptions for each type of property) and future load scenarios including Sark shifting to electricity for cooking, heating and transport. This confirmed 2,500kVA provides sufficient headroom for demand rebound, shift to elec cooking and some electric heating.
- Explored 4 design concepts for the HV system and outline design for the LV system (including 3-phase to all properties).
- Protection and earthing system design.
- Power system modelling and stress testing to validate the recommended design concept is viable.
- System spec and costing.

Existing and Replacement distribution system

- 6.6KV
- 3 legged ring + Little Sark
- 26 step down transformers

Figure 3-3: Existing Network

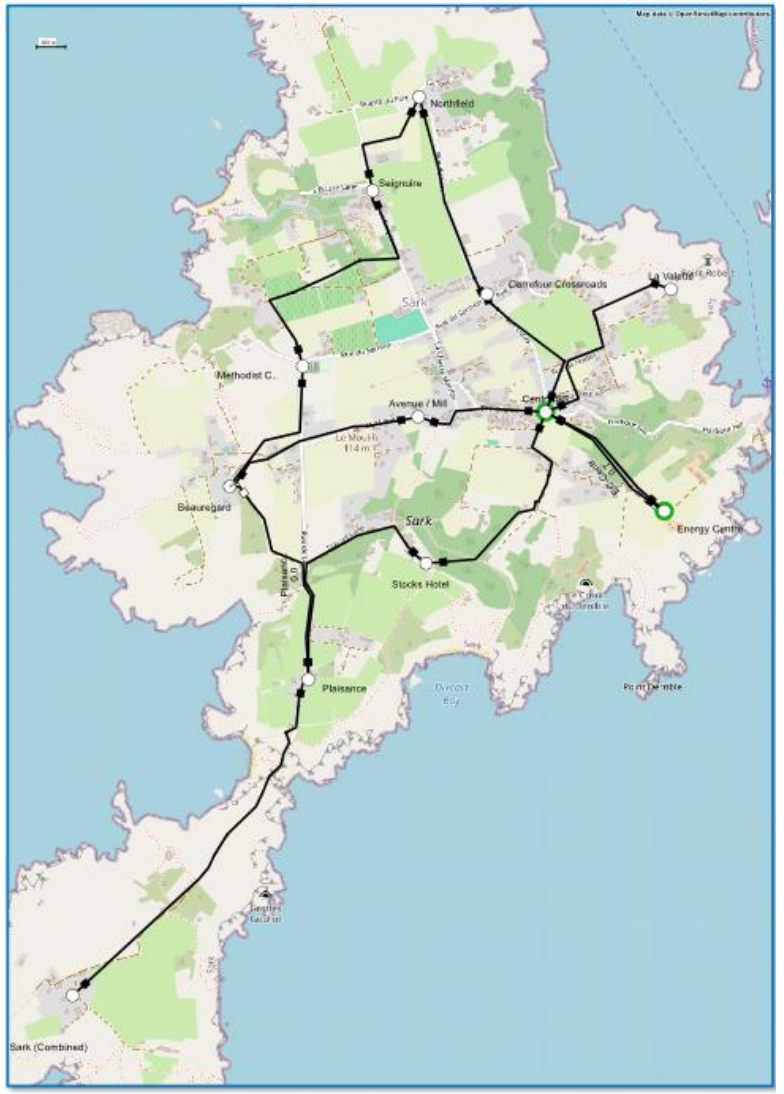


Figure 5-4: Hybrid Design with Central Substation

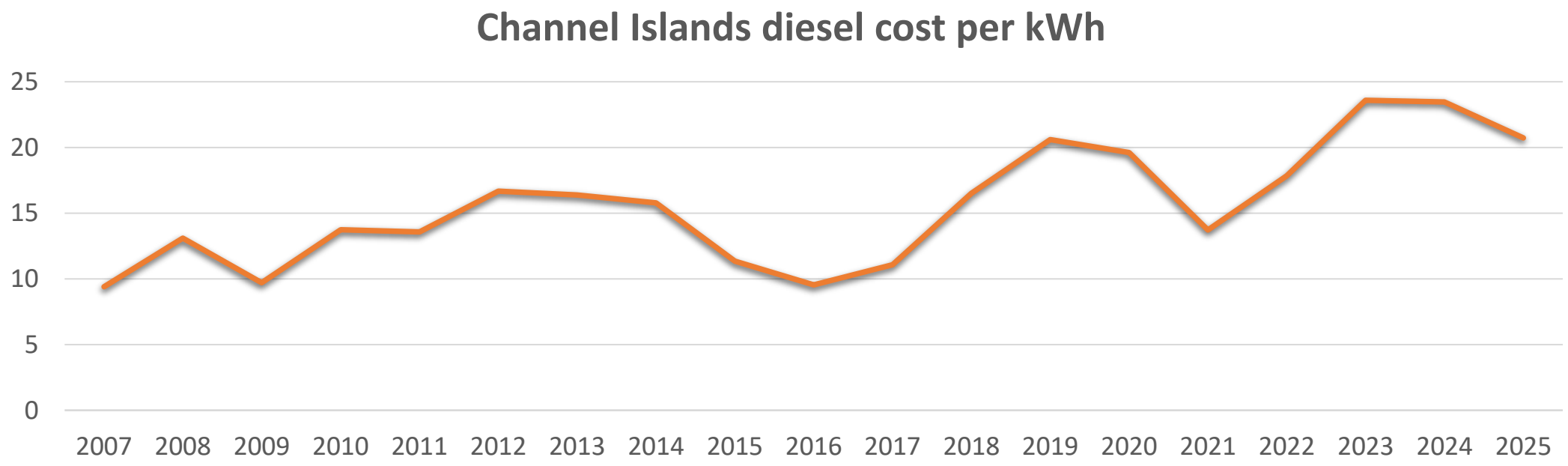
- 6.6KV
- 3 legged ring + Little Sark
- New main sub-stations at top Harbour Hill and Beauregard
- 12 step down transformers
- Cable route and sub-station locations similar to current

- Aurora Power Consulting
  - TSL and AEL – Technical Appraisal
    - (not Energy Centre)
  - Network Design
    - Provides options
  - Pre-condition
    - No access to existing infrastructure
    - “What would we do if we were asked to start again?”
  - Minimise infrastructure

Technical Appraisal - Network Upgrade

- Conclusions
  - Allows for increased demand
    - “All electric Sark”
    - New larger cables and modern systems
    - Reduced network losses
      - lower cost electricity/affordability
        - Fixed vs variable costs
  - Compatible
    - Rational model for network upgrade

Diesel price exposure



The benefit of shifting to renewables

Diesel price	**22.4p/kWh**	**25p/kWh**
Diesel cost for 100% diesel system at 22.4p – 25p/kWh	£340,000	£380,000
Diesel cost for hybrid system (wind+solar+battery+diesel)	£60,000	£66,000
Renewable system additional maintenance costs	£40,000	£40,000
Saving	£240,000	£274,000

Annual interest and capital payments for 20 year loan at 6% = £87,000 per £1million

Borrowing potential from savings vs diesel	£2.8 million	£3.2 million

Borrowing potential increased by:

- **Lower interest rate or longer term**
- **Inflation -** Actual borrowing potential is higher as loan repayments do not increase with inflation. Operating surpluses from a renewables-based system do increase with inflation as revenue is high relative to operating costs
- **Increase in consumption** – finance costs are fixed so more units sold means less cost per unit
- **Diesel cost increase** – increases saving of renewables vs diesel

Costing

	Cost	Business case
Acquisition, make safe and secure supply (SOG loan)	£1,500,000	Finance costs covered by unit rate
Generation system CAPEX	£3,200,000 (£650k for diesel only)	Finance costs covered by diesel cost savings if renewables hybrid system
Distribution system CAPEX **IF FULL REPLACEMENT**	£6,800,000	Cost depend on how much of the existing infrastructure can be retained May need grant or low cost loan OR may be done in stages over time

Investment will go ahead in stages and only if affordable

How we Design an Energy Centre

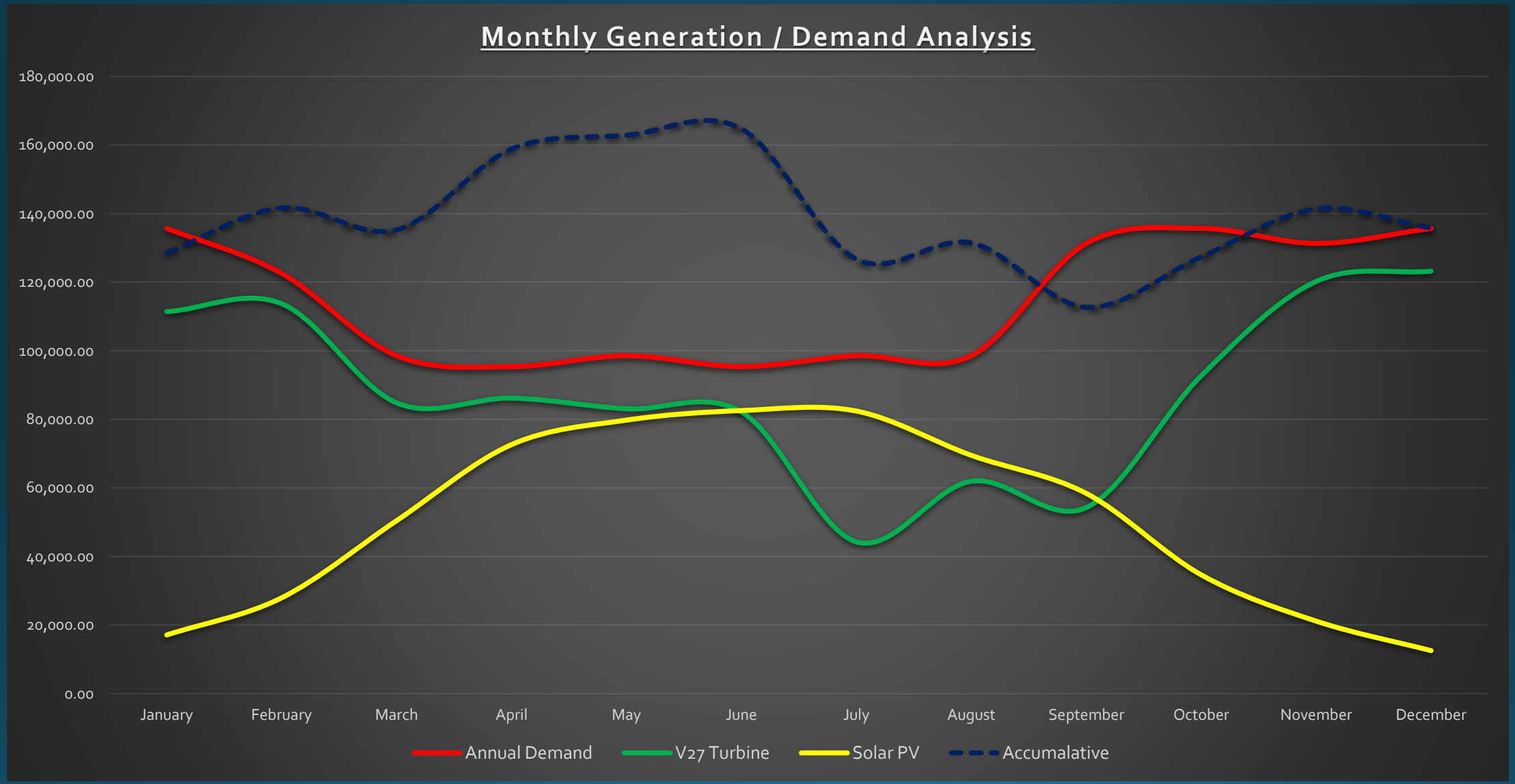
01 Continuity of Supply

02 Technical Studies to assess impact on infrastructure and amenity

03 Transportation and installation of renewables

04 Cost effective system to build, operate and maintain


T1 - 27m Ø
BESS
LV Cable
T2 - 27m Ø


Monthly Generation / Demand Analysis
180,000.00
160,000.00
140,000.00
120,000.00
100,000.00
80,000.00
60,000.00
40,000.00
20,000.00
0.00
January
February
March
April
May
June
July
August
September
October
November
December
Annual Demand
V27 Turbine
Solar PV
Accumalative

A Cost Effective System to Build, Operate and Maintain

- Capital costs value engineered to minimise outlay

Staged approach		
New Energy Centre with Diesel	£	650,000
Solar and Battery	£	1,300,000
Wind turbines	£	1,250,000
Total	£	3,200,000

- Operational costs reduce the more renewables are integrated to the grid

- 25 year Maintenance contract for the Wind Turbines ensures the assets are looked after and continue to produce clean power

Q&A

Please send any further questions to Policy and Finance and Future Energy Committees

policy.finance@sarkgov.co.uk special.future.energy@sarkgov.co.uk

Next steps

The only decision we are making at this stage is to progress SOG loan of up to £1.5million to:

- Bring Sark electricity infrastructure into island ownership
- Make current system safe and secure
- Establish viability, cost and plan for staged upgrade based on the design

Business case and financing strategy for further system upgrade and new generation system will follow once we are able to acquire the assets and conduct a full condition survey.

Investment will progress in stages and only if affordable.

Something has to be done and this is a generational project for Sark.