

# Options for Electricity Supply in Malta: Financial Costs and Emissions Performance

This presentation contains excerpts from an economic assessment study being conducted in relation to the IPPC application for the proposed D4 facilities. Data and results presented are provisional.



## Questions

- What are the economic implications of a shift to Gas-fuelled electricity generation at the earliest possible opportunity?
- Is the proposed gas-fuelled electricity generation capacity (at D4 and D3) at the right level?

## Method

- Identify the best ways to satisfy electricity demand hour by hour throughout the years
  - **at the minimum possible cost**
  - **respecting technological constraints**

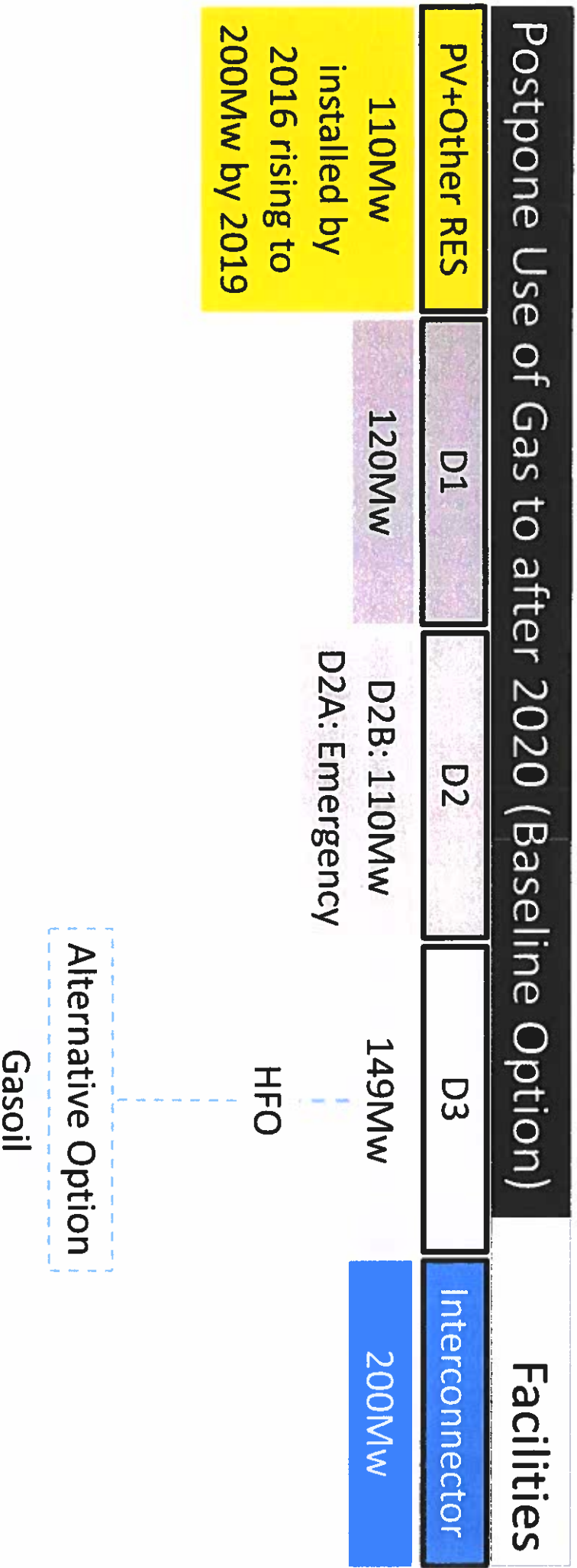
## Relevant Costs for Decision-making

- Financial costs that are affected by the decisions to be taken (sunk costs not considered)
- Costs of emissions from generation of electricity consumed

## Data and Models

- Supplied and/or endorsed by Enemalta, Ministry of Energy and Conservation of Water

# The Options for Electricity Production Post 2015



# The Options for Electricity Production Post 2015

## Utilise Gas Immediately Post 2015

## Facilities

PV+Other RES

D4

D3

Interconnector

110Mw installed by 2016 rising to 200Mw by 2019

Proposed Option: 215Mw (Gas)

149Mw

200Mw

Fuel Storage and Regasification Infrastructure

Gas

Minimum Option: 115Mw (Gas)

Just Meeting Demand without spare capacity

Maximum Option: 220Mw (Gas)

Avoid Excess Supply

Are there excessive redundancies in the system?

Will D4 be utilised?

Will it render D3 and the interconnector redundant?

Proportion of total demand serviced by each facility

The proportion of capacity used of each facility

The use of each facility in peak demand conditions

## Postpone Use of Gas to after 2020

## Utilisation to Minimise Cost

PV+Other RES:

11%

D1

D2

D3

Interconnector

120Mw

110Mw

149Mw

200Mw

% of Demand

7%

13%

25%

44%

Hours Used

3,000

5,000

8,200

8,200

% of Capacity at Peak Demand

26%

55%

62%

82%

## Utilise Gas Immediately Post 2015

## Utilisation to Minimise Cost

D4

D3

Interconnector

Proposed Option: 215Mw

149Mw

200Mw

% of Demand

63%

12%

15%

Hours Used

8,700

3,700

5,600

% of Capacity at Peak Demand

90%

33%

52%

## Utilise Gas Immediately Post 2015

## Utilisation to Minimise Cost

D4

D3

Interconnector

Proposed Option: 215Mw

149Mw

200Mw

% of Demand

63%

12%

15%

## Utilise Gas Immediately Post 2015

## Utilisation to Minimise Cost

D4

D3

Interconnector

Minimum Option: 115Mw

149Mw

200Mw

% of Capacity at Peak Demand

% of Demand

30%

19%

40%

Hours Used

8,700

6,100

8,400

% of Capacity at Peak Demand

90%

55%

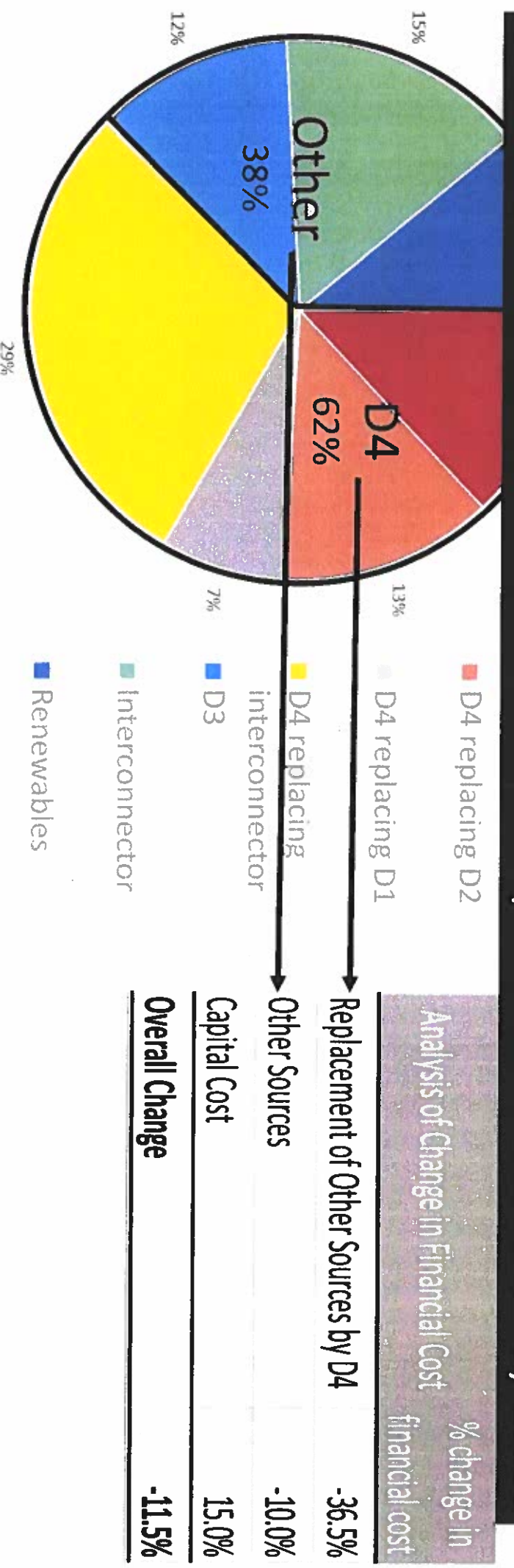
80%

Which option minimises **Financial** Costs of electricity consumed?

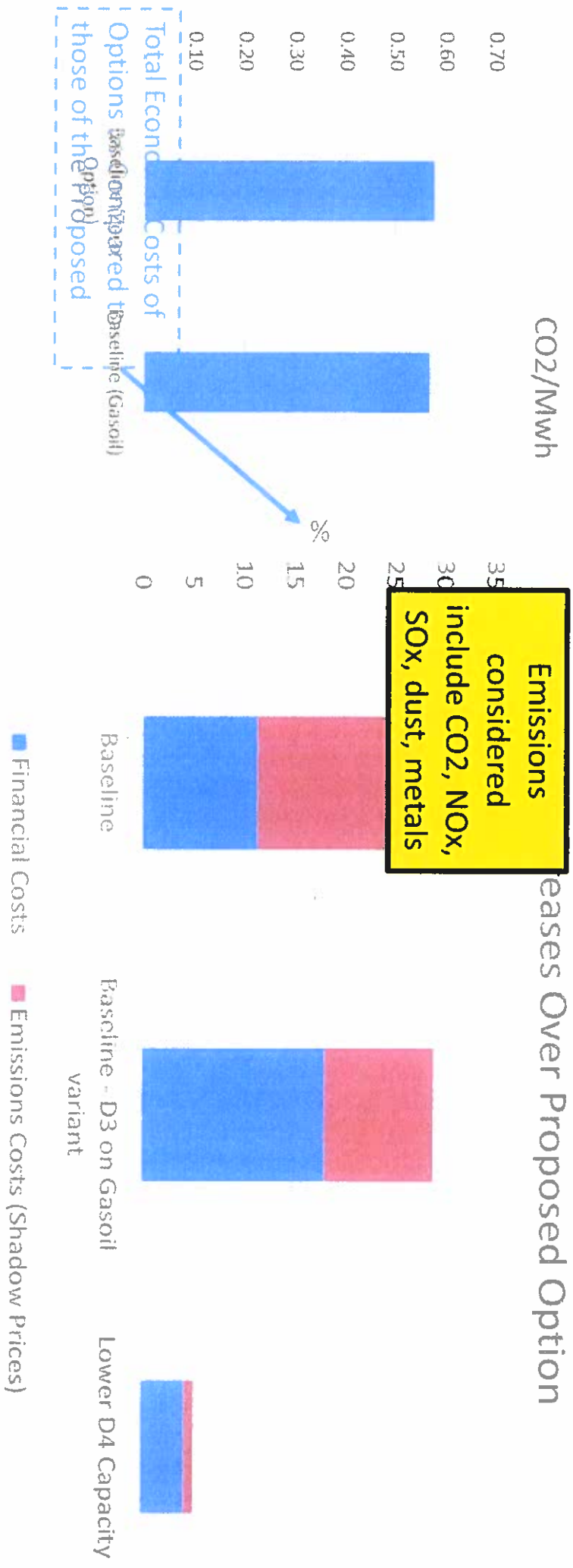
The Proposed Option **reduces financial costs by 11.5%** (on Zero Option)

The Smaller D4 Option reduces financial costs by (on Zero Option)

The Use of Gasoil in D3 **increases** Zero Option financial costs by 6.8%



# Which option minimises Financial and Emissions costs of electricity consumed?



- Proposed option remains preferred in the case of shocks such as:
- Emissions on interconnector electricity are assigned zero cost
  - Reductions in demand up to 70%
  - Prices of HFO, Gasoil, and interconnector electricity fall by 35%



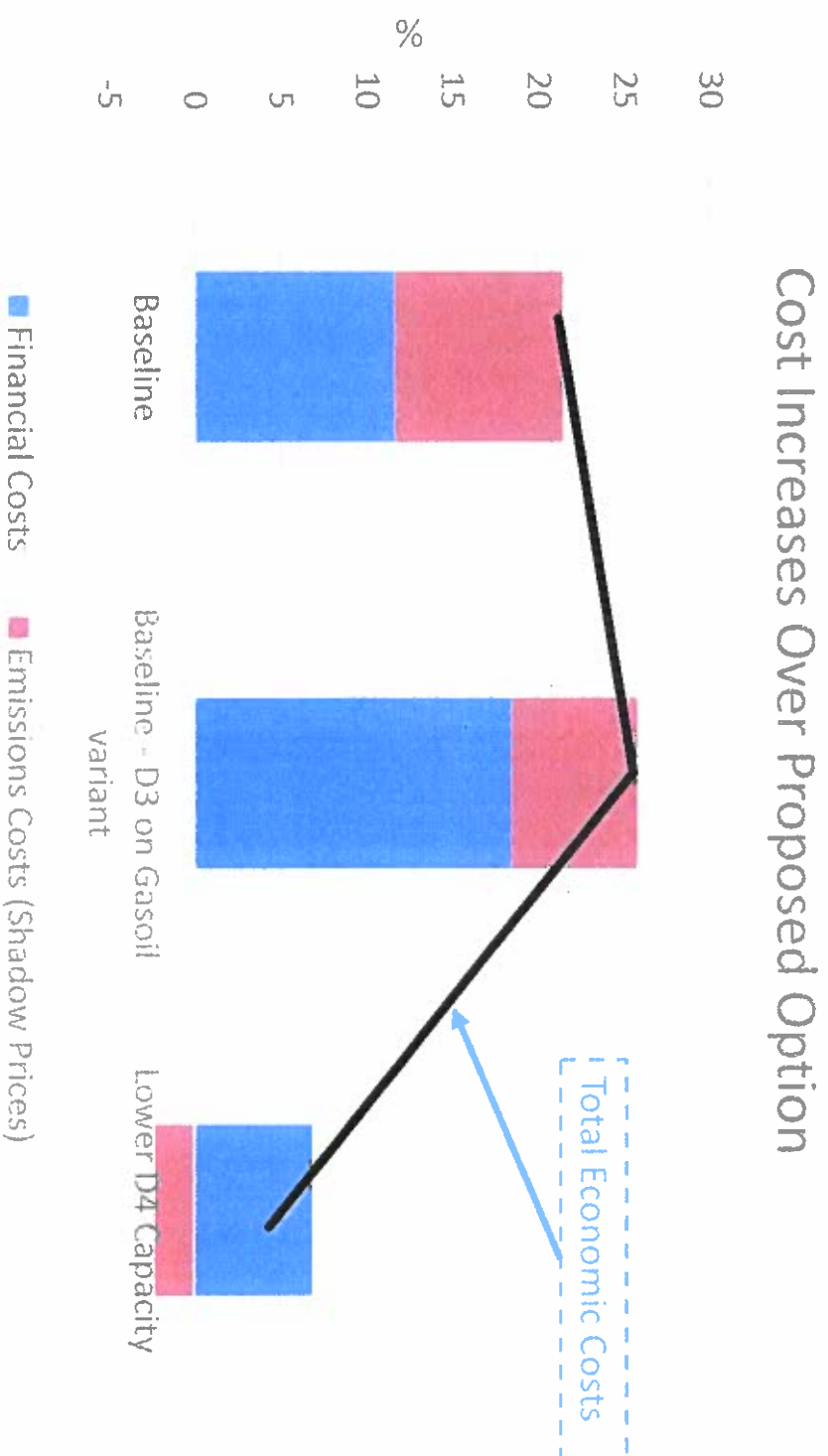
**Thank you**



**Cubed Consultants Ltd**

[info@ecubed-consultants.com](mailto:info@ecubed-consultants.com)

# Assigning Zero Cost to Interconnector Electricity Emissions



Emissions costs of Lower D4 Capacity Option are marginally lower than those of proposed option  
Total Economic costs of Lower D4 Capacity Option are 4.5% higher than those of proposed option

## Conclusions of Report Submitted by Enemalta Corporation in the Context of the Application for IPPC Operating Permit for the Delimara Power Station Extension (May 2011)

“The marginal economic advantage of HFO relative to Gas may be eroded by any one of the following conditions (everything else remaining the same):

- a 1% per annum increase in electricity demand;
- a 64% annual increase in crude oil prices;
- the relative price of gas to HFO declining from 110% to 92%;
- the investment in gas infrastructure being cheaper by 25%;
- a 41% increase in the shadow price of emissions.”

**“The conclusion... indicates that a policy of flexibility in terms of the ability to use different types of fuel continues to be advised...In the short term, at least until 2015, the DPS extension cannot be run on gas due to the infrastructural adjustments required to operate the Plant. As a result during the time frame of the IPPC permit the extension can be run on HFO or Gasoil or varying proportions of the fuels.”**