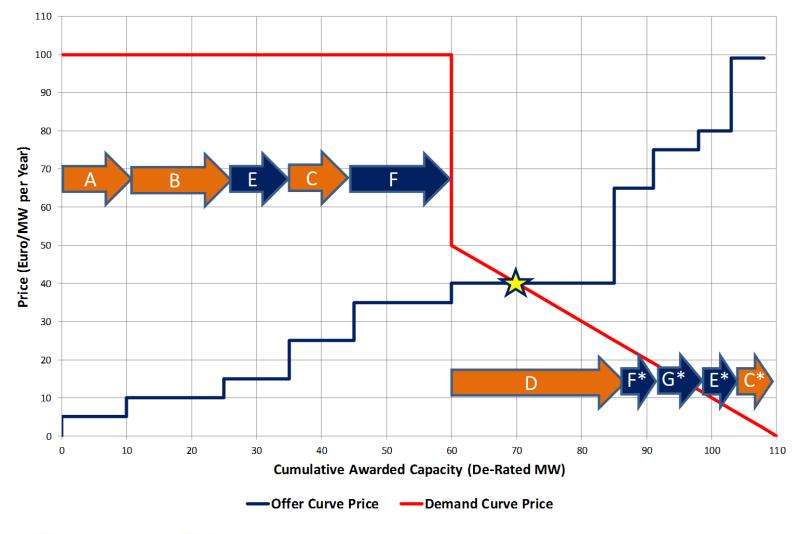# Chapter 3:
The Unconstrained Auction

Introduction

- We focus on the auction design to be used in the first Capacity Auctions:
  - This combines two steps which we call the "Unconstrained Auction" covered here, and the "Constrained Auction" covered later.

- The Unconstrained Auction takes the aggregate offer curve from all Capacity Market Units and compares it with the Demand Curve. Locational Capacity Constraints are not considered.

- For a given total quantity scheduled:
  - the area under the Demand Curve is the **Benefit** that the market receives from that capacity.
  - the area under the Offer Curve is the **Cost** of that capacity scheduled (based on their offers, not what the market actually pays).
  - the difference between these areas is **Net Social Welfare = Benefit – Cost**

- The aim is to find the solution that maximises Net Social Welfare.

- The Unconstrained Auction treats all offers as Flexible, which means in practice Net Social Welfare is maximised where the Demand Curve and the Offer Curve cross.

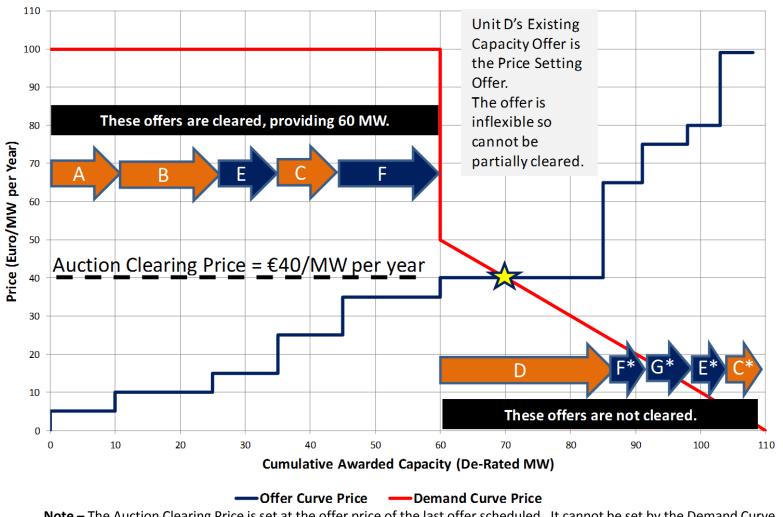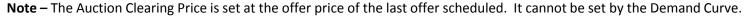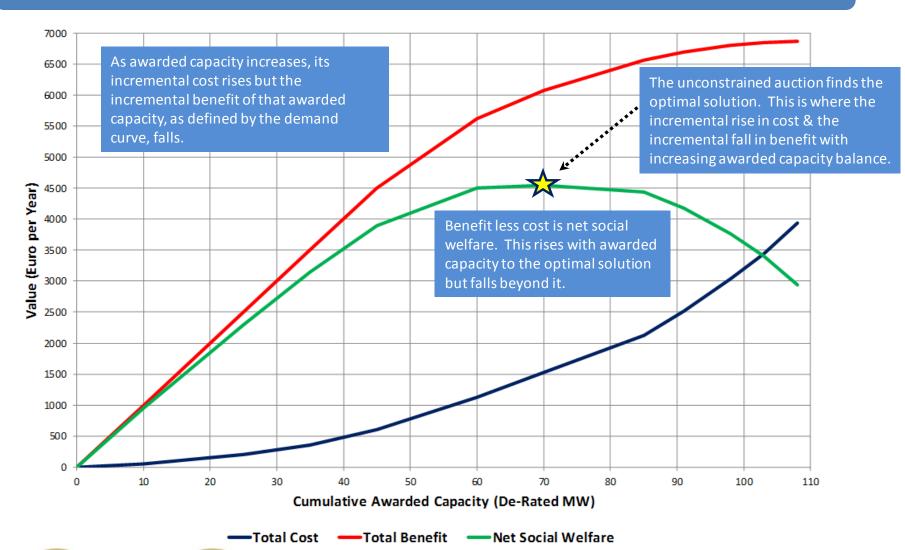# The Unconstrained Auction – (1/2)

The Unconstrained Auction – (2/2)

Offer Curve Price   **Demand Curve Price**

Note – The Auction Clearing Price is set at the offer price of the last offer scheduled. It cannot be set by the Demand Curve.

The Unconstrained Auction – Net Social Welfare

As awarded capacity increases, its incremental cost rises but the incremental benefit of that awarded capacity, as defined by the demand curve, falls.

The unconstrained auction finds the optimal solution. This is where the incremental rise in cost & the incremental fall in benefit with increasing awarded capacity balance.

Benefit less cost is net social welfare. This rises with awarded capacity to the optimal solution but falls beyond it.

Value (Euro per Year)

Cumulative Awarded Capacity (De-Rated MW)

—Total Cost —Total Benefit —Net Social Welfare

The Unconstrained Auction – Net Social Welfare

The benefit exceeds the cost of clearing these offers

A B E C F

Step D is inflexible and cannot be part scheduled.
It sets the price but is not cleared in the Unconstrained Auction

The costs exceed the benefit of clearing these offers

D F* G* E* C*

Value (Euro per Year)

Cumulative Awarded Capacity (De-Rated MW)

── Total Cost   ── Total Benefit   ── Net Social Welfare

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Single Electricity Market Operator

The Unconstrained Auction Solution

	A	B	E	C	F	D	F*	G*	E*	C*
Price (€/MW per Year)	€5	€10	€15	€25	€35	€40	€65	€75	€80	€99
Offer (MW)	10	15	10	10	15	25	6	7	5	5
Flexible?	Y	N	N	N	N	N	N	N	Y	N
Unconstrained Auction Cleared Quantities (MW)	10	15	10	10	15					
Settlement Price(€/MW per Year)	€40	€40	€40	€40	€40					
Capacity Duration	1	1	1	1	1	1	10	10	1	10

E*, C*, F*, G* indicate offers from New Capacity. All other offers are from Existing Capacity