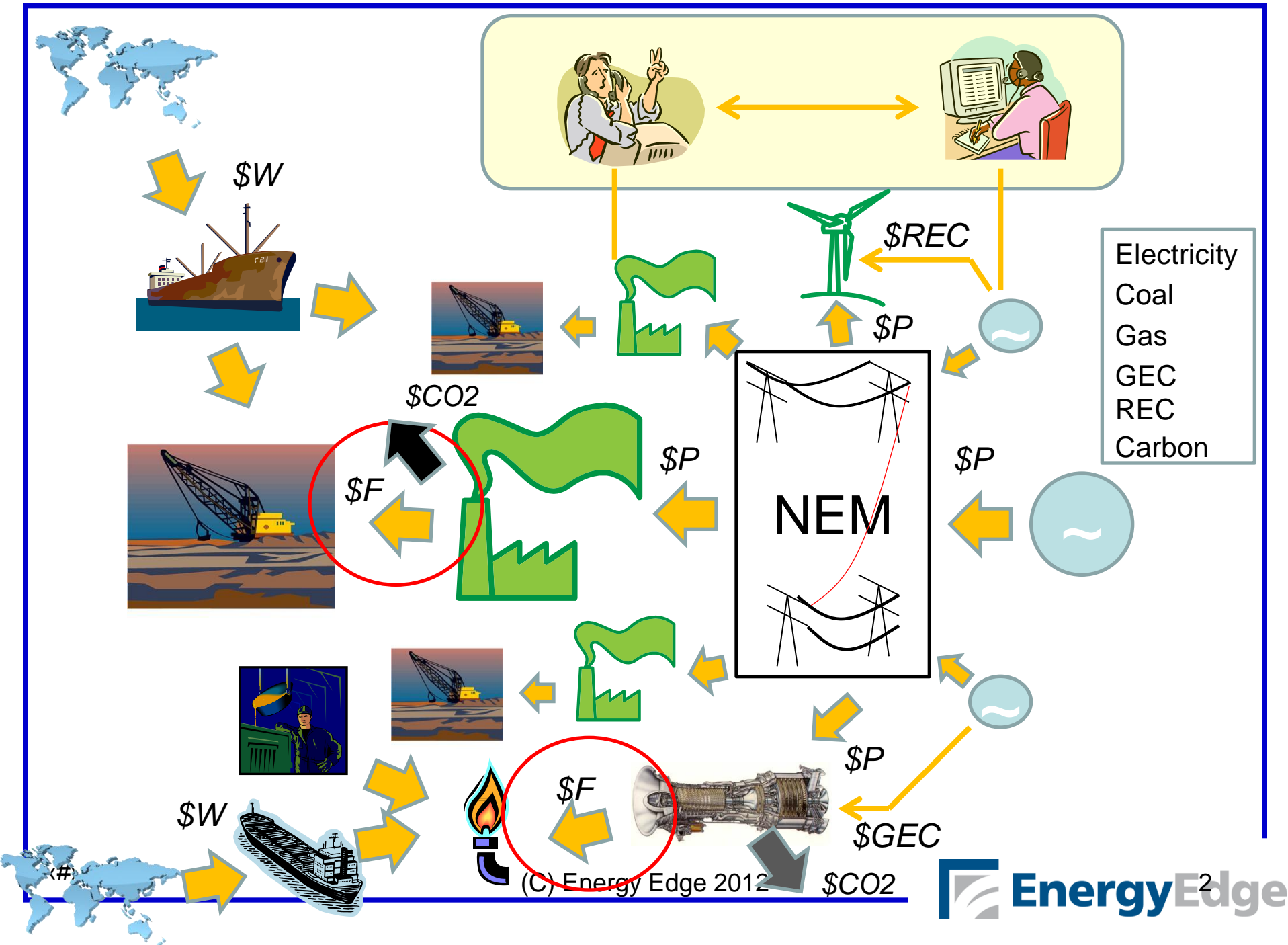


Challenges of operating in an integrated market environment

Elliot Tonkes
February 2012

*Presentation at the International
Energy Centre, UQ 2012*



- Electricity
- Coal
- Gas
- GEC
- REC
- Carbon

(C) Energy Edge 2012

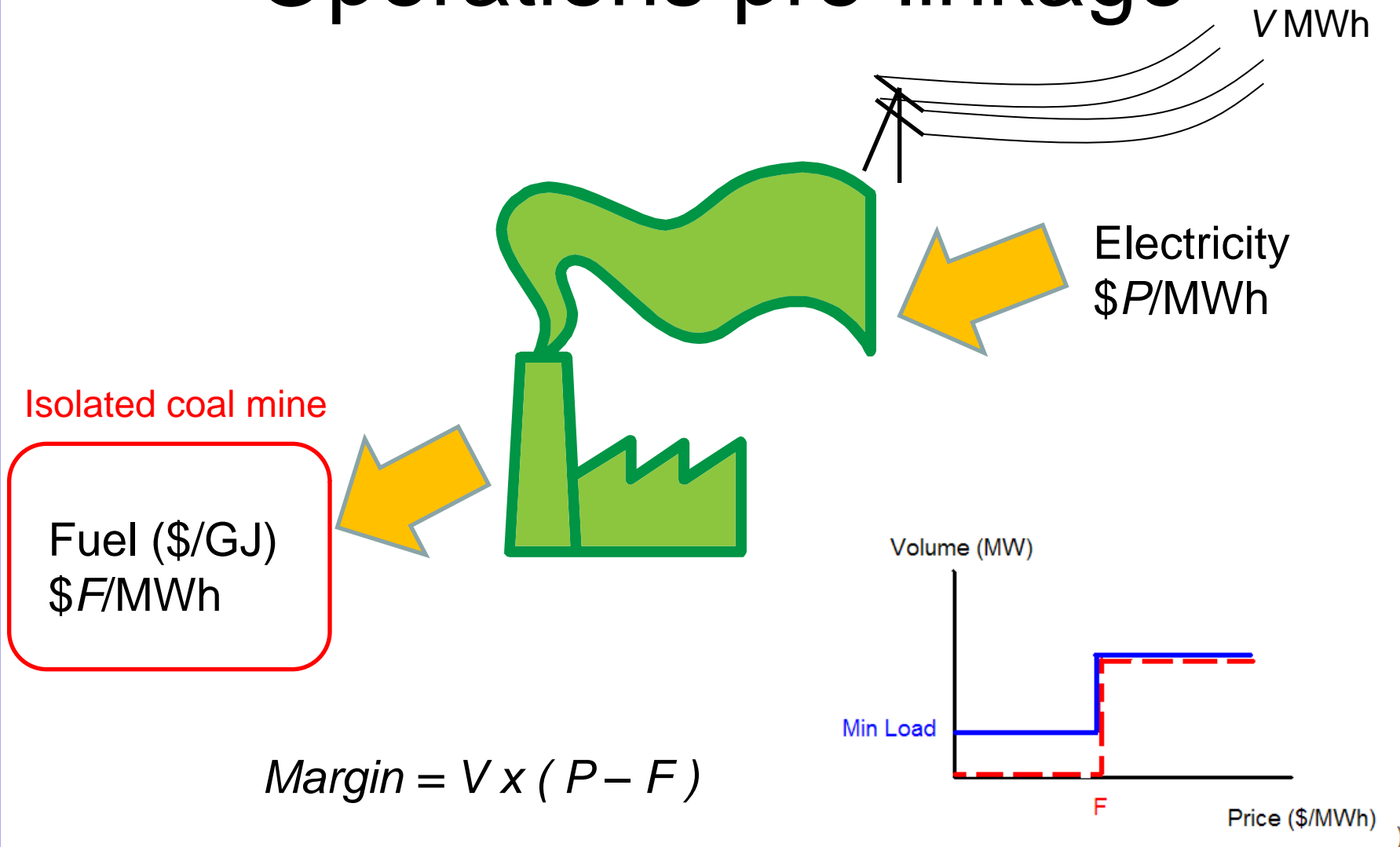
Market Linkages

- Commodity market prices flow through the energy supply chain

But ...

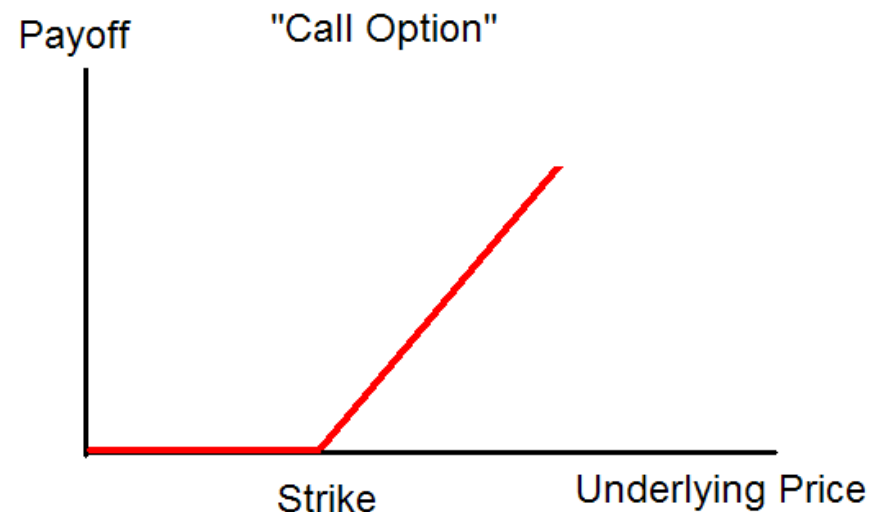
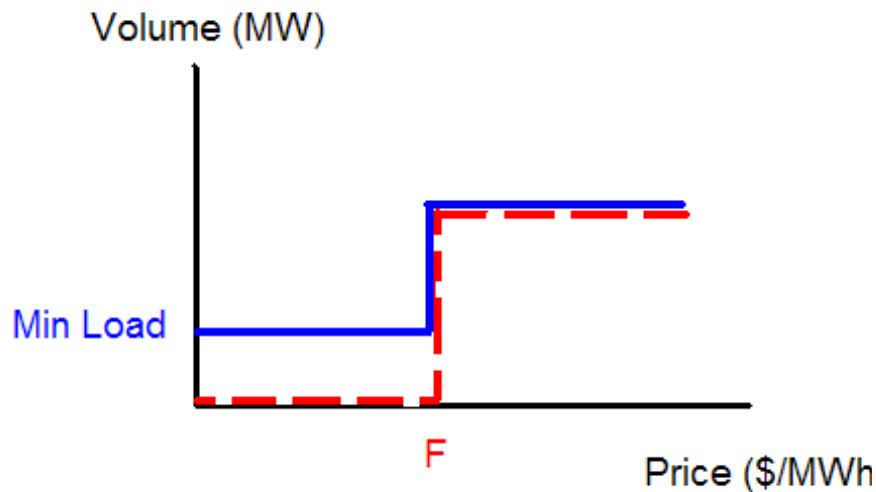
- Subject to constraints
 - Constraints on infrastructure
 - Commercial and technology constraints

Operations pre-linkage

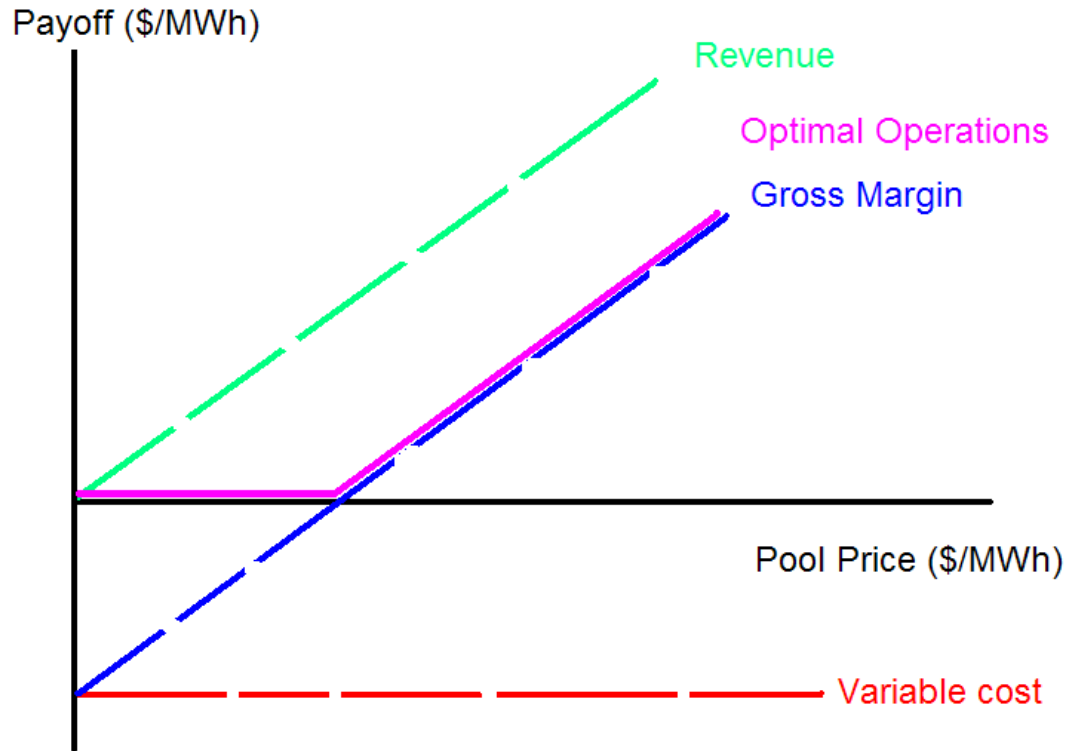


Real optionality

- Represents flexibility in operations, which has significant value

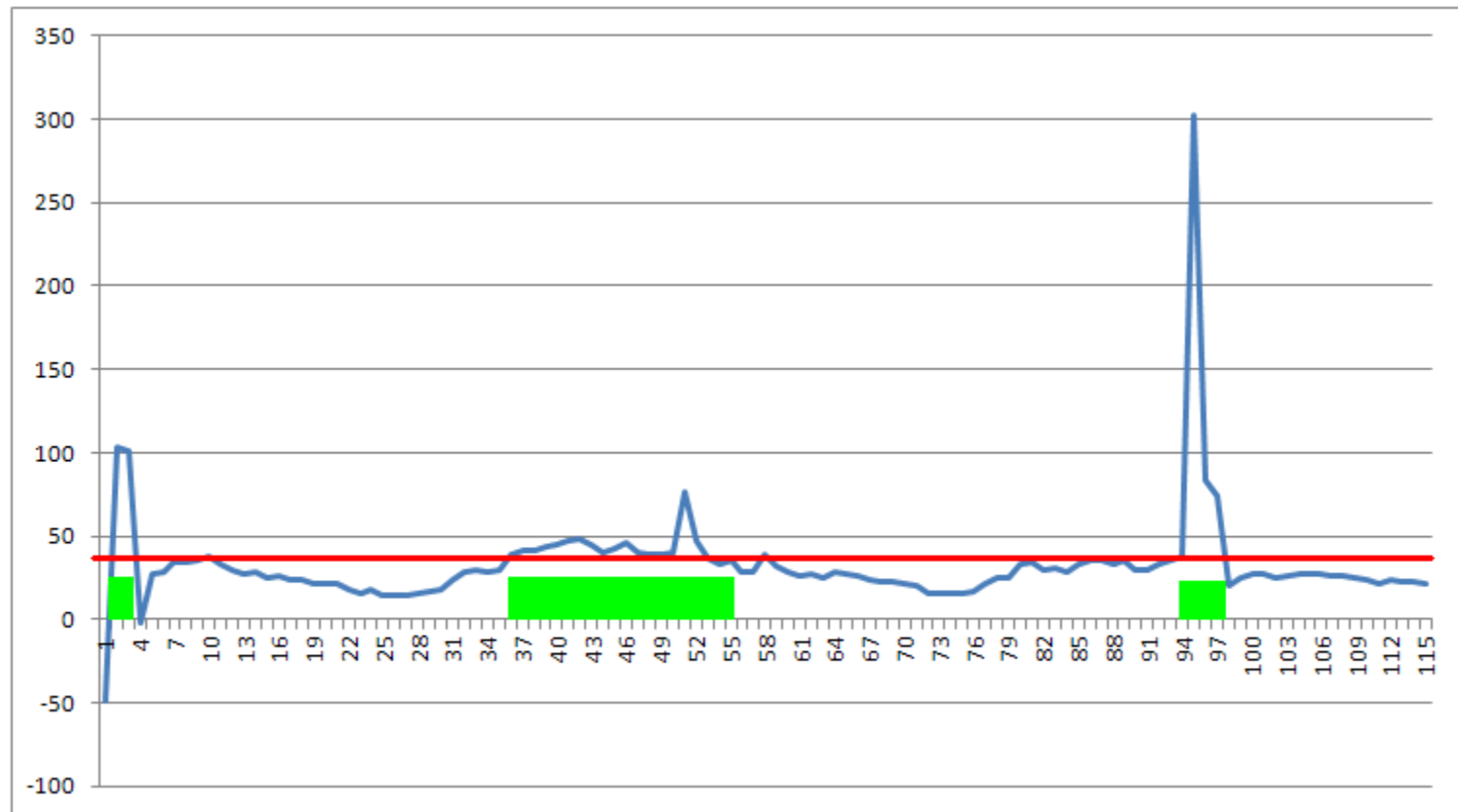


Power Station Payoff

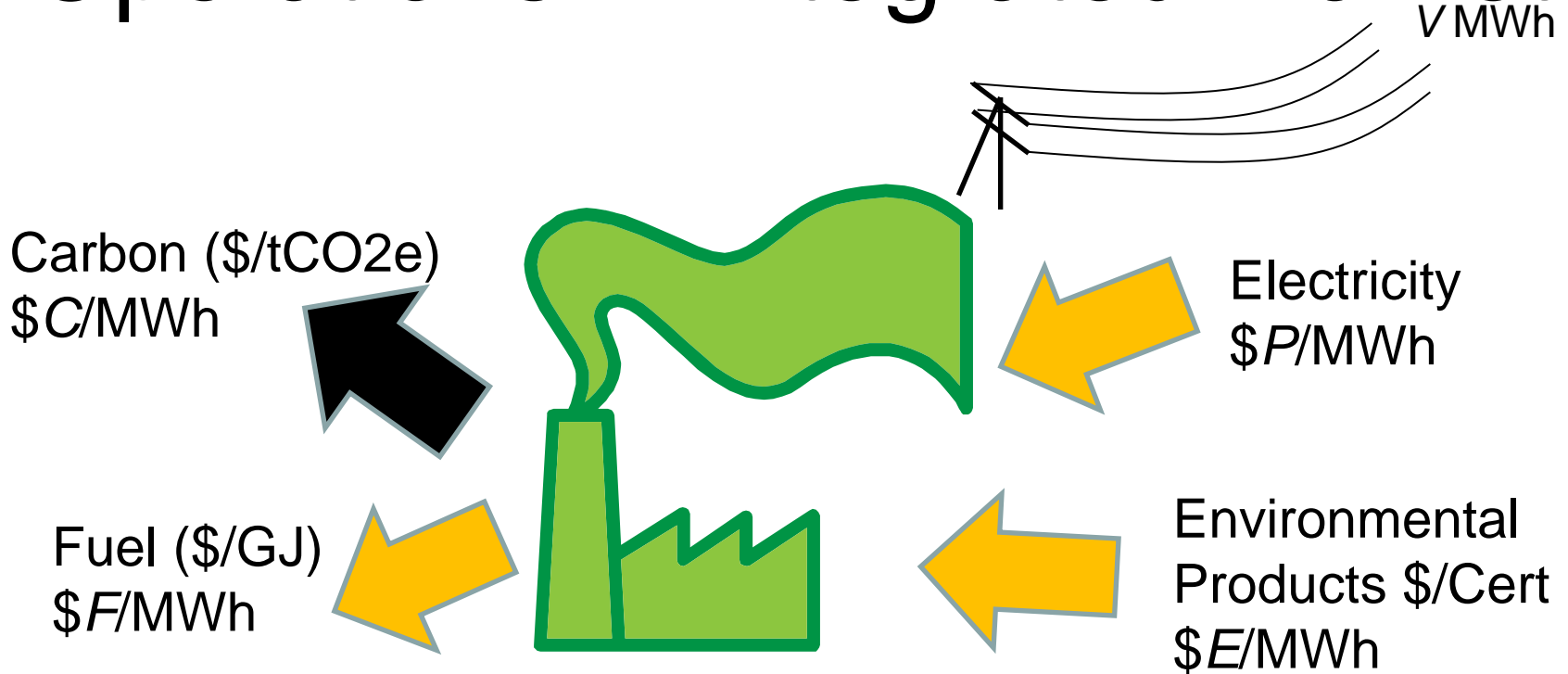


– There is actually more complexity in offers

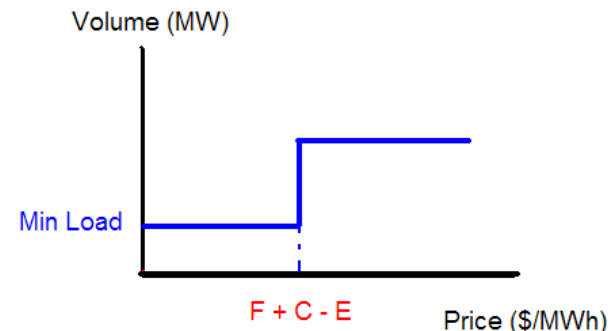
Generation in economic periods



Operations in integrated market



$$\text{Margin} = V \times (P + E - F - C)$$

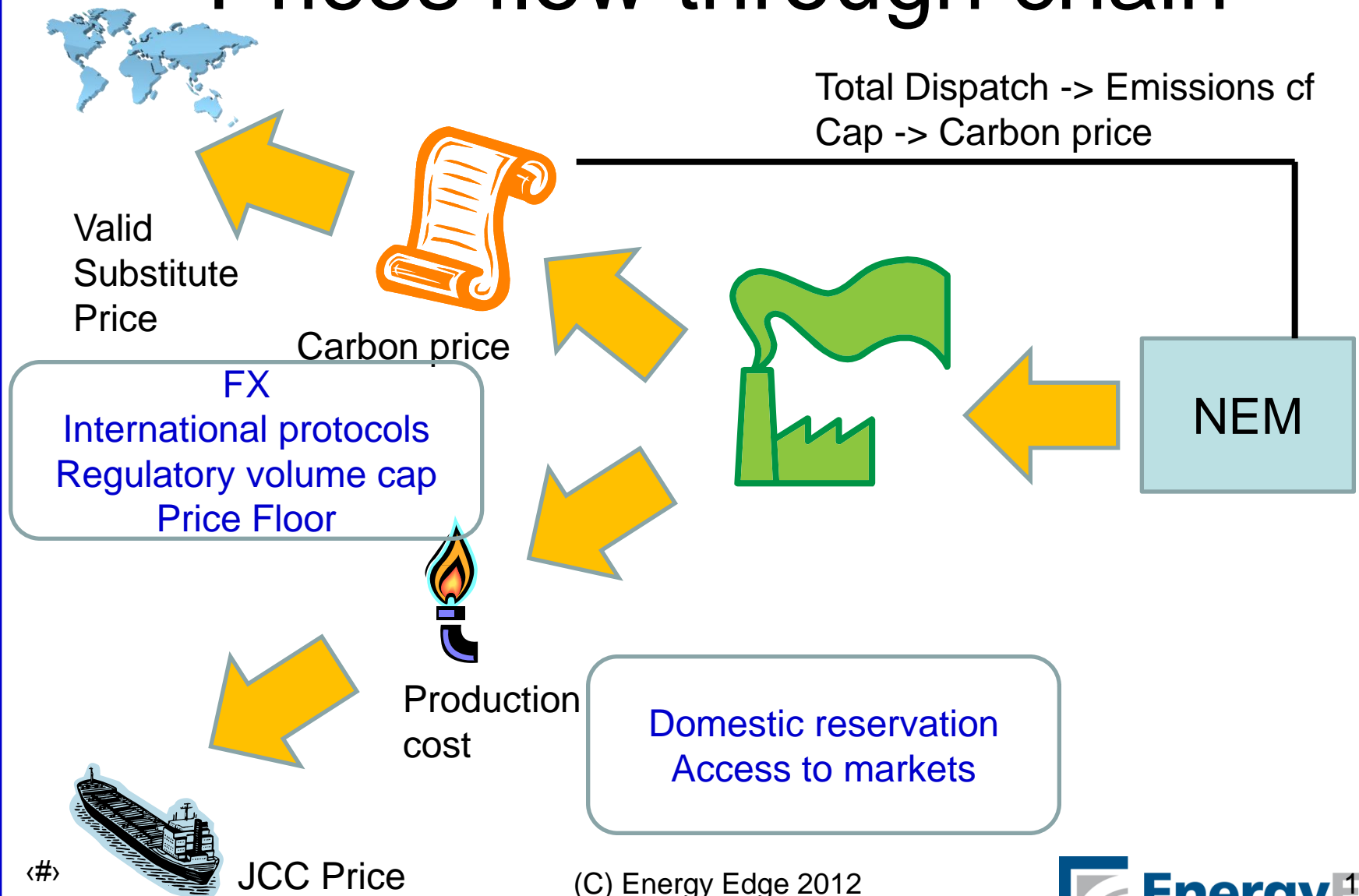


Fundamental change

- Market participants will manage:
 - Floating revenue
 - (electricity spot prices)
 - Floating costs
 - (fuel prices)
 - (carbon prices)
- Real optionality now extends to:
 - Offers to sell
 - Bids to buy

} *To coordinate a positive gross margin*

Prices flow through chain

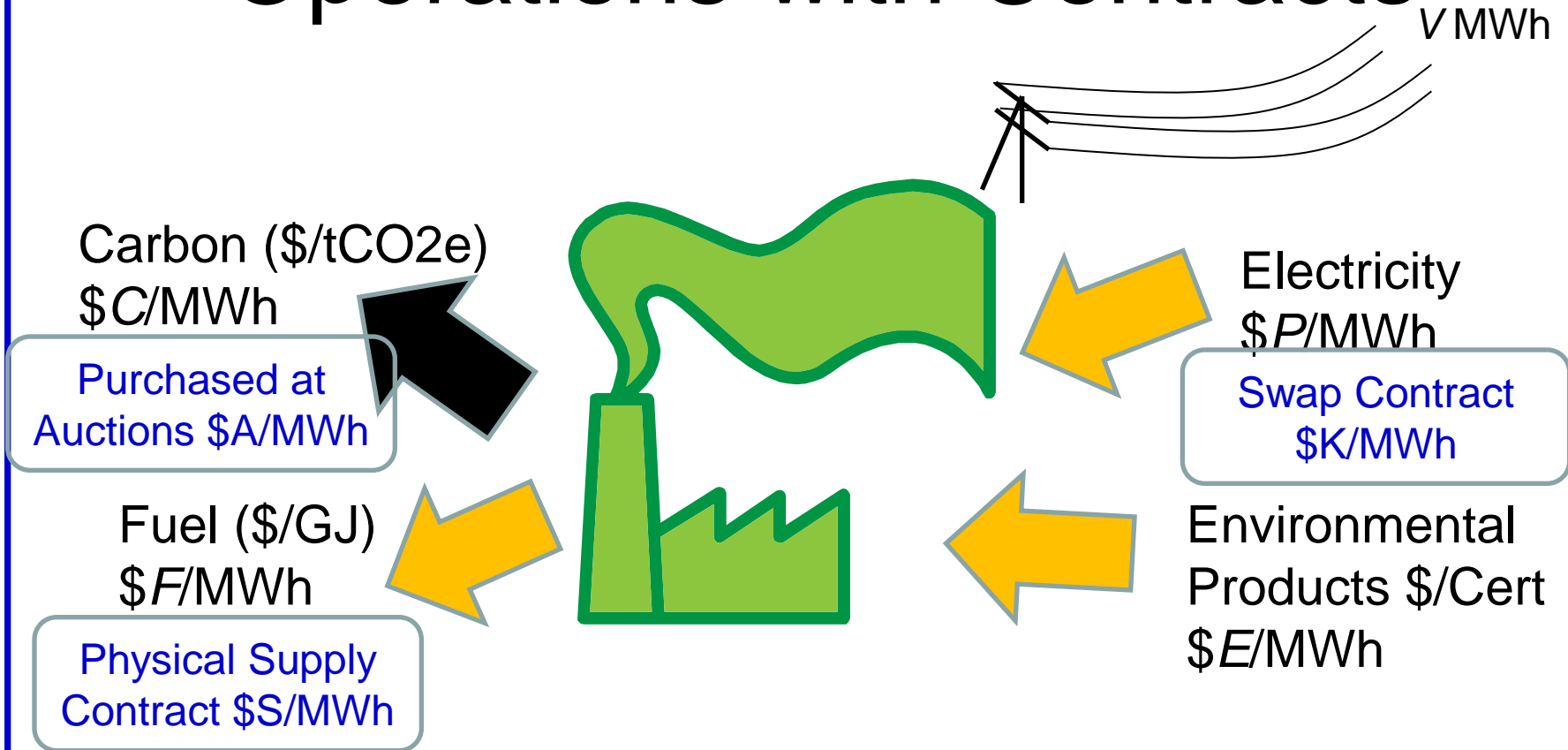


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Contracting

- Spot exposure AND contracts
 - Physical supply contracts
 - Financial derivatives
- What is the optimal operating strategy within contract framework?

Operations with Contracts



~~$$\text{Margin} = V \times (P + E - F - C)$$~~

$$\text{Margin} = V \times (K + E - S - A)$$

<#>

Operations with contracts

- V = notional generation amount
- G = actual generation amount

$$\begin{aligned} \text{Margin} &= G \times P + V \times (K - P) \\ &+ G \times E \\ &- VA + (V - G) C \\ &- VS + (V - G) F \\ &= G(P + E - C - S) + \dots f(V) \dots \end{aligned}$$

“Operate on the basis of spot prices with coordinated operational strategy”

Linkages

- Flexible operations depends on having a spot market to shift the commodities
- Constraints lead to limited market linkages
 - Transmission constraints
 - Pipeline constraints
 - Shipping constraints
 - Commercial constraints (eg take or pay)

Risk Management strategies

- Prices in the supply chain becomes more or less correlated
- Danger of one-side hedging
 - Sell electricity contracts
 - Leave carbon unhedged

$$\begin{aligned} \text{Margin} \\ = V \times (P + E - F - C) \end{aligned}$$

- Merchant with Hedging
- Pass-through contracts
- Tolling
- VI: upstream fuel supply, downstream customers

Timelines of decisions

- Dispatch decision
- Commitment decision
- Mothball decision
- Decommission decision
- New investment decision

