ADB's Role in Market Development

- ADB's Energy Policy supports private sector participation through sector restructuring
- The efficiencies gained from the participation of the private sector is expected to be passed on to consumers as less expensive and more reliable electricity
- ADB loans since 1996 for restructuring $3.5 billion, over 40% of total loans.
- ADB does not directly participate in the restructuring process: Each country hires its own specialists and is encouraged to find its own solutions

ADB

Fundamental Changes In Moving To Any Market Structure

- Risks are transferred away from consumer to decision makers
- First changes include increased accountability and transparency in all functions
- Perspective in the electricity industry slowly shifts from a technical, largely engineering focus to a financial, risk management focus which is driven by customer expectations.

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Market Structure Process

Liberalization is a process **not an single event**

Political negotiations between interest groups precede process

Legislation, regulation, and codes established

Unbundling is first "physical step" to level playing field. Creates corporations which have commercial structures and obligations

Open access for competition

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Comparisons of Market and Monopoly Structures

Monopoly

- Risks passed to consumer, little transparency
- Costs passed to consumer
- Supply more assured (central planning)
- Subject to political intervention, little regulation
- Closed access

Market

- Decision Marker bears risks, each area is transparent
- Competition reduces costs
- Supply failures may occur
- Reduced political intervention, regulated
- Open Access

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Changes to Facilitate Trading

Unbundling

Open Access

Regulation

Independent System Operations

Exchange Market (s)

- Contracts
- Prudential requirements
- Market Monitoring
- Metering

Competition Law

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Types of Energy Trading Structures

- Barter (Singapore and Malaysia)
- Top Up and Spill (Ireland)
- Power Purchasing Agreements - PPAs (Lao PDR and Thailand, PRC, Vietnam etc)
- Bilateral Trading through open access transmission (BETTA, India) with balancing market
- Bilateral trading and transmission trading (FTRs)
- Full (compulsory) Market (Australia, Singapore)

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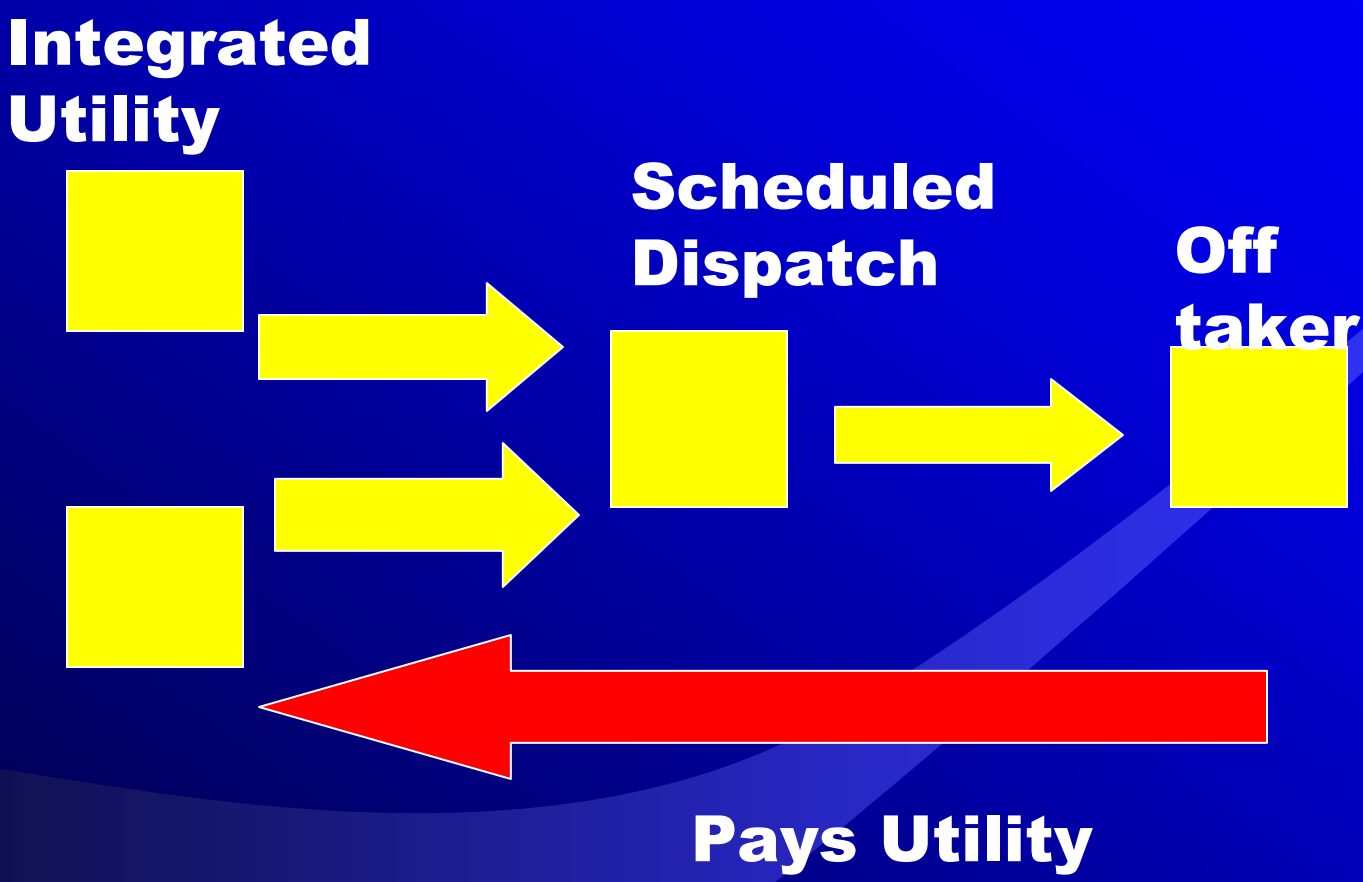
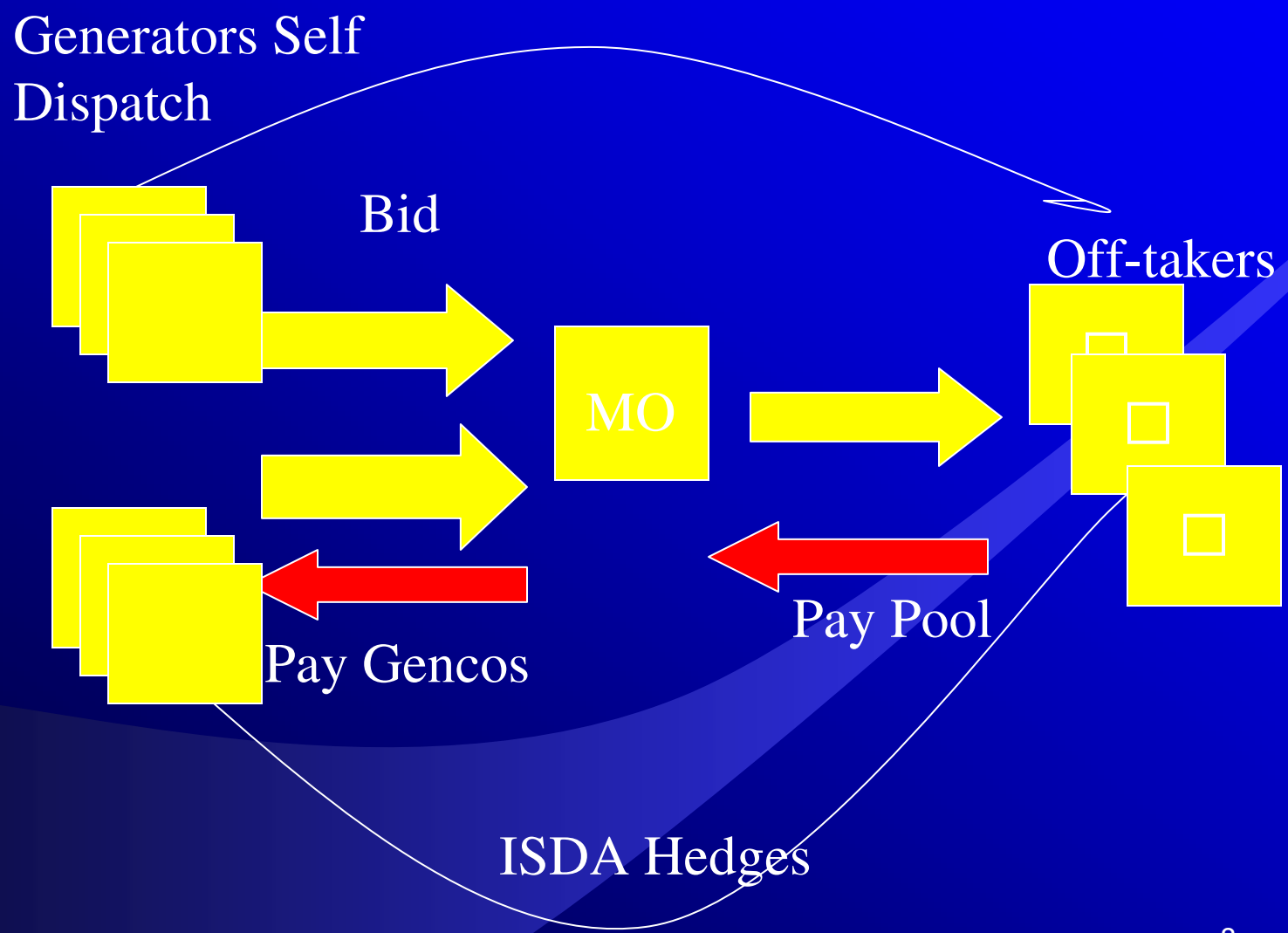
Before Market



After Market



What is Traded

Physical electricity

Bilateral contracts for fixed delivery

Hedging contracts (CFD), between retailers and generators, (also generators)

Options for high priced, less seldom events (eg Voll)

Ancillary services (contract or market)

- Reserves
- Voltage support
- Black start

Financial Transmission Rights (FTRs), or congestion charges

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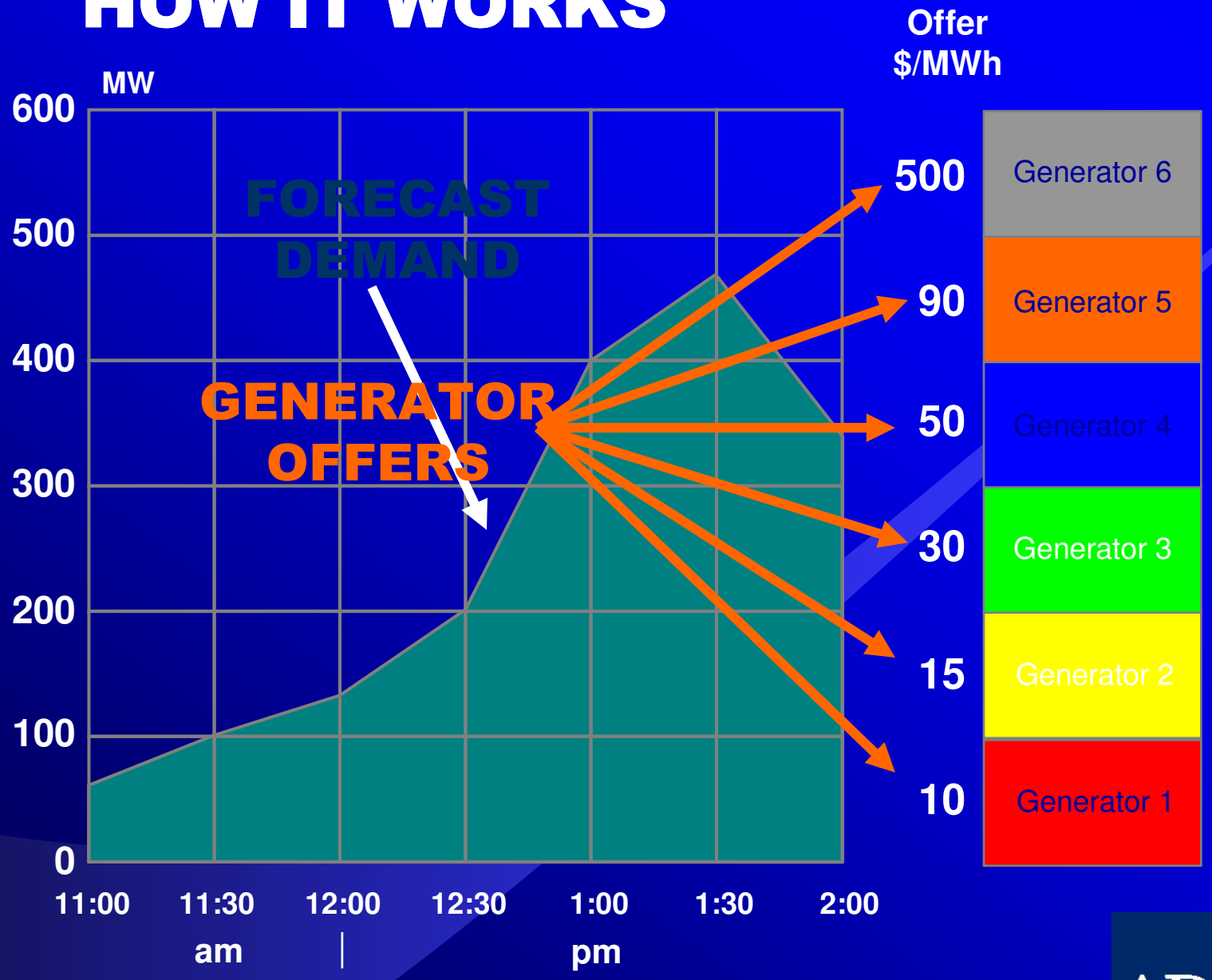
HOW IT WORKS


MW
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Generator 6
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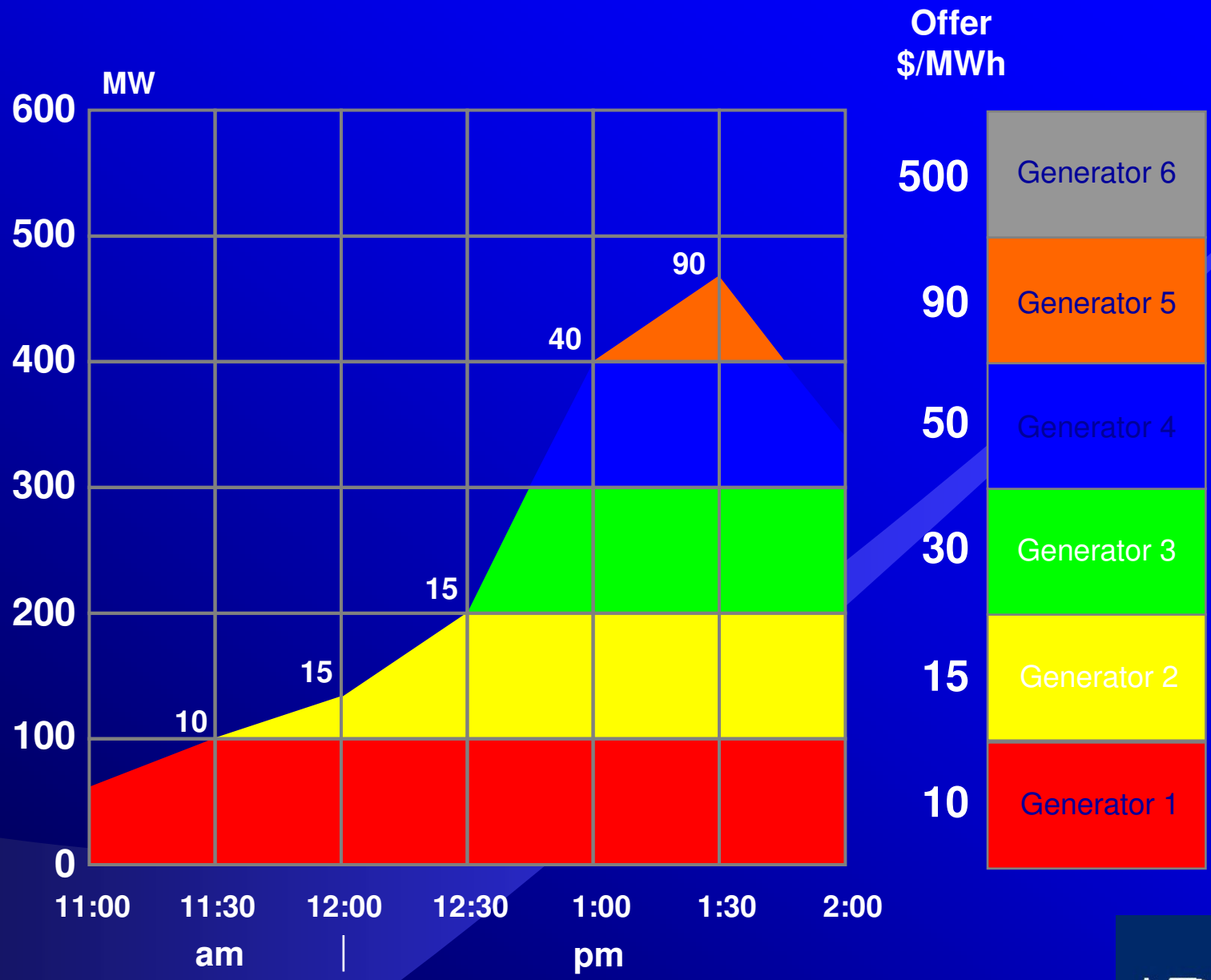
Generator 4
Generator 3
Generator 2
Generator 1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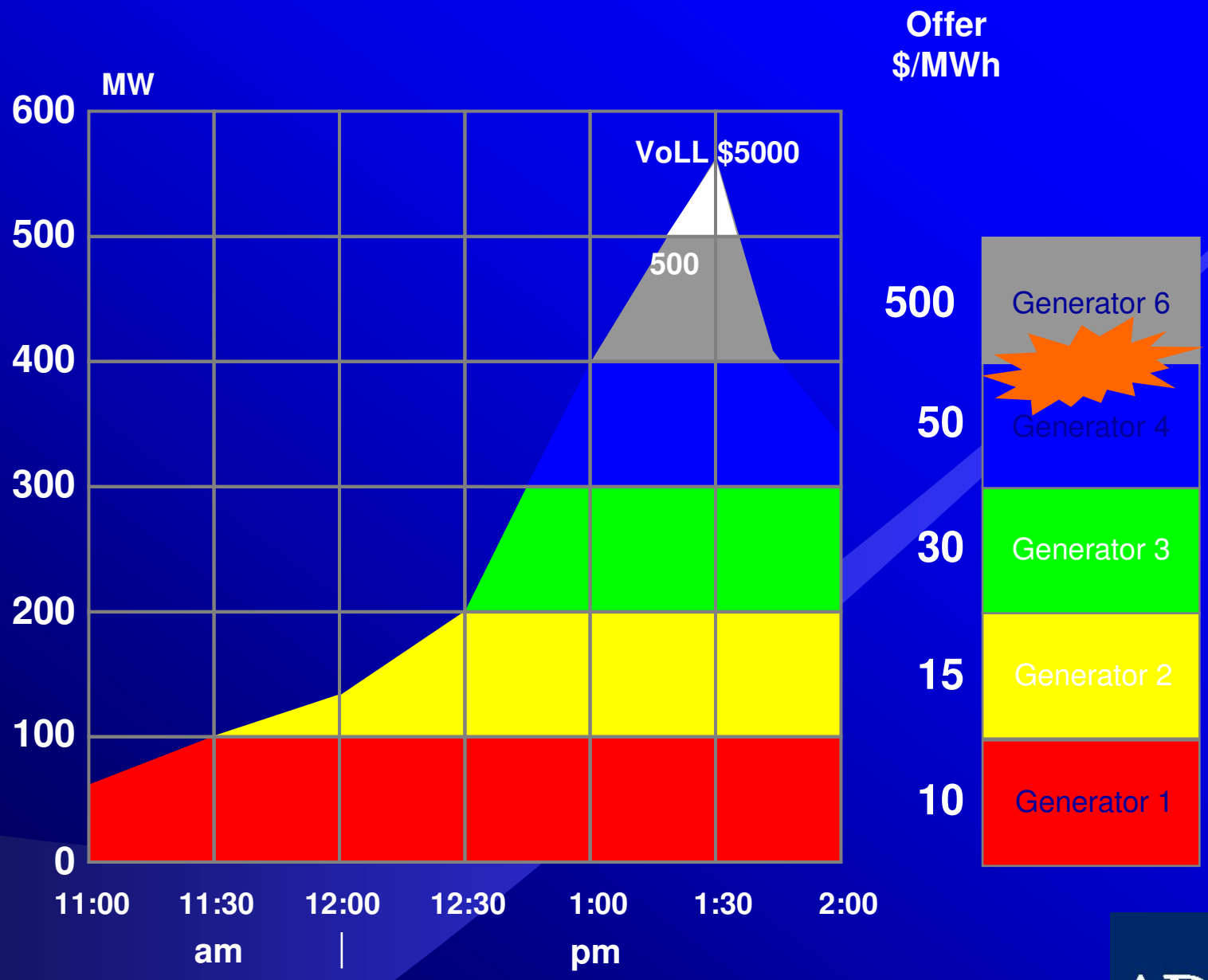
Generator 6
Generator 5
Generator 4
Generator 3
Generator 2
Generator 1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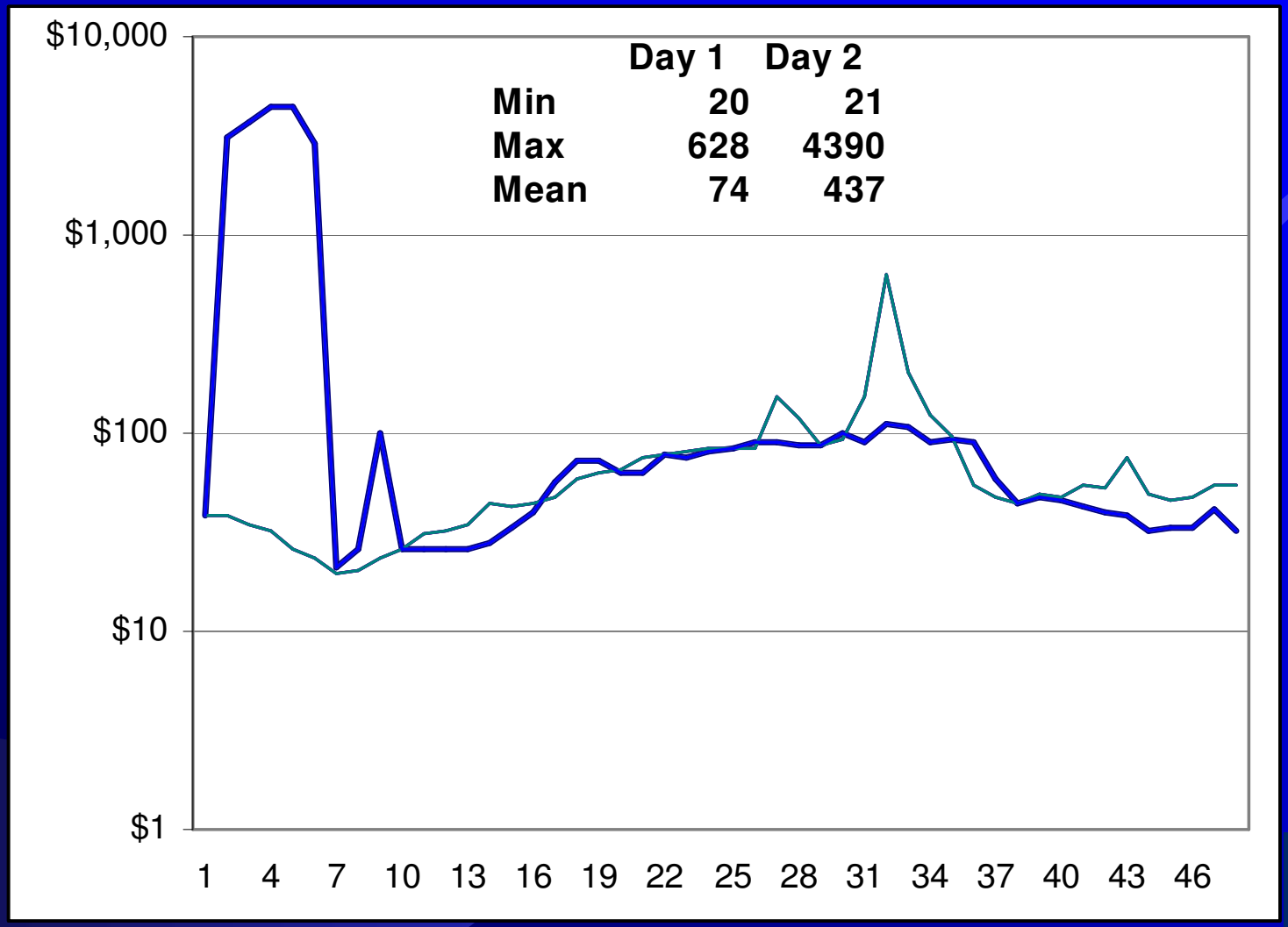
Generator 6
Generator 4
Generator 3
Generator 2
Generator 1

Actual Prices, 2 Consecutive Days



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Generator's Price Risk

Generator sells into the Pool

Generator needs to manage cash flows to meet financial obligations

- Fuel
- Operations & Maintenance
- Financial Charges (debt & equity)

Risk for generator is periods of low pool prices

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Distribution/Supply Co's's Price Risk

Supply Co's **buy** from the Pool

Need to manage cash flows of gross margin, which is the difference between:

- buying from the Pool at uncertain and volatile price and
- selling to end-use retail customers at fixed rates

Risk is periods of **high** pool prices

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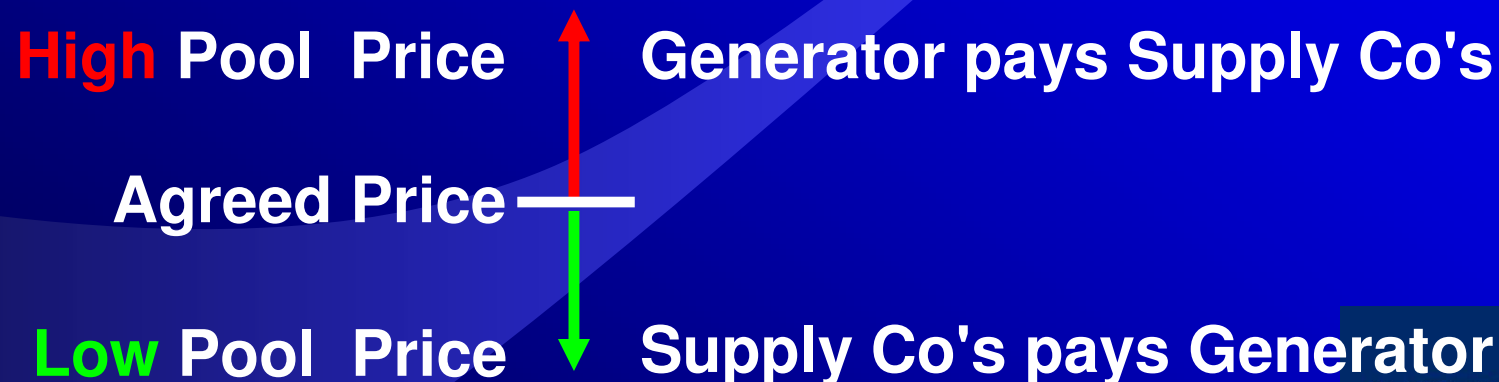
Hedge Contracts

- Derivative instruments (or hedge contracts/ Contracts for Differences) are used to reduce risk of unfavourable price movements in the Pool
- Generators and Distribution/Supply Co's enter into commodity contracts to swap cash flows



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CFD Structures Hedging Risks

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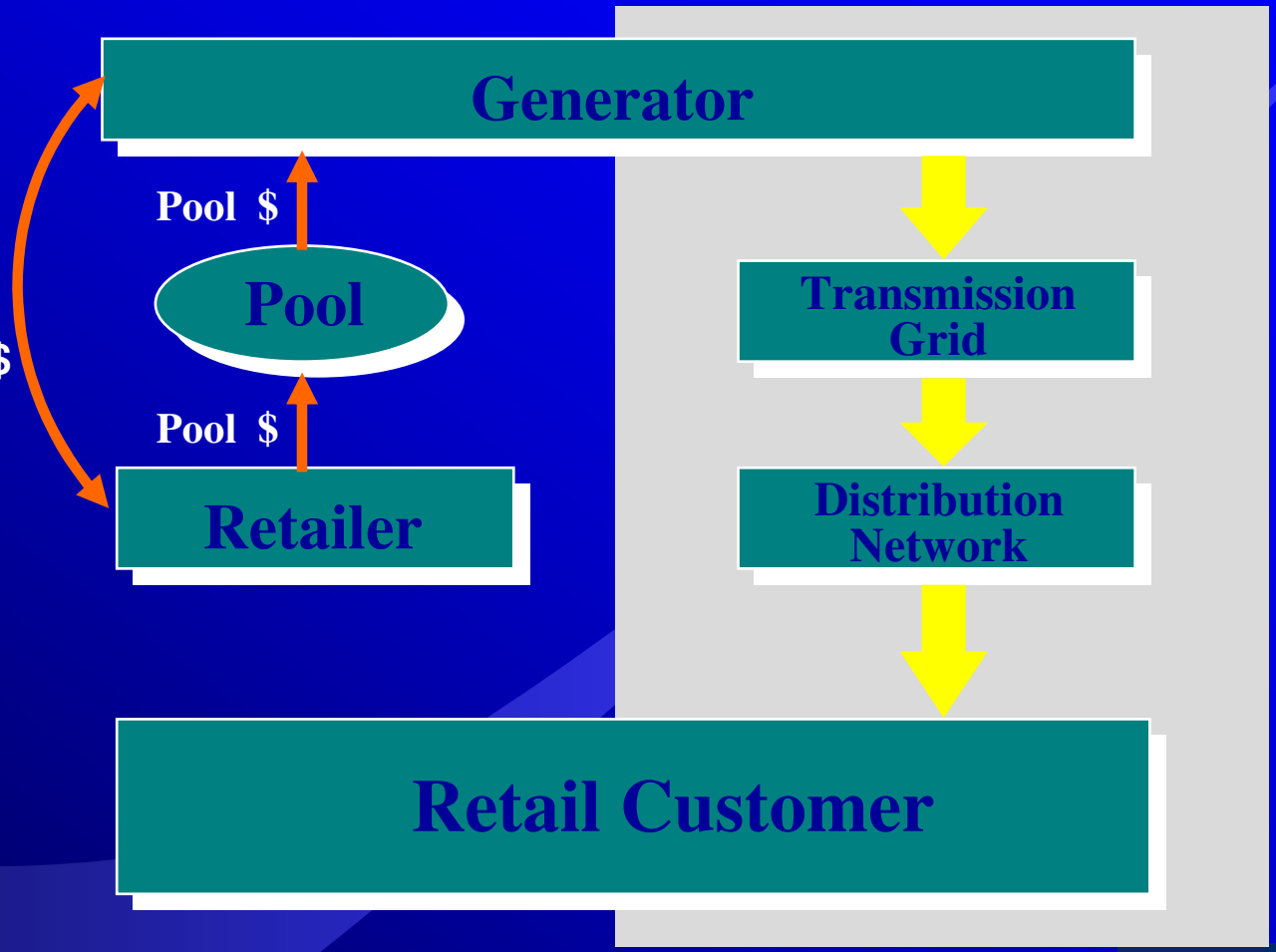
Financial Hedging & the Physical Market

Hedge Contracts

Hedge $

They are financial instruments - not electricity supply contracts



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Vesting Contracts/Competition

- Initially most energy is contracted
- Imposed on buyers and sellers **BEFORE** market starts
- Competition schedule is set out in advance; e.g, >10 MW, >1 MW, >750 kWh
- Contract volumes matched to levels of competition, including reductions of competitive load
- Protects market from initial shocks
- If privatization considered, sets values for plant

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Associated Benefits of Trading Through Market

Credit risks are largely managed by prudential requirements.

Liquidity & transparency: Price discovery of contracts and spot

Easy to trade in and out of contracts, too much of any kind of contract can be backed out.

PPAs, bilateral trades very difficult to unwind into a market structure

Common contracts ISDA is standard, one agreement many schedules

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Regulation of Monopoly Structures

Regulation should be predictable, little discretion should be allowed

Self funded from industry

Advantage of performance based regulation

- Cost plus no incentives to reduce costs, quality is an issue
- Issue for regulator to understand and approve least cost expansion options, particularly in transmission
- Transmission outages also have value, hence availability needs careful consideration

Regulator should be party to setting rules

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Initial Market Conditions

3 Scenarios – (1) under- (2) over- or (3) balanced supply.

Results in an (1) uncontrolled market of low (unsustainable), (2) very high (invites intervention) or (3) realistic prices

Note: lower prices not always the result

- Prices may increase with the removal of subsidies

Include measures which mitigate market power

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Market Power

Concentration (portfolio size)

Participation in several sectors may initially be prohibited, particularly for transmission operator

Technical Power

- High ramp rates (hydro) can be used to influence prices, or alternatively reducing availability very rapidly

Congestion effects (only plant to service load)

Predatory pricing

Withdrawal of plant with low reserves

High prices with unforeseen growth of demand

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Market Power Mitigation

Competition Law is the first step, combined with an effective regulator to enforce the law

- maximum size of portfolios
- Bidding behaviour (collusion, predatory pricing)

Contracts mitigate many of the effects of under/oversupply

Nodal/zonal pricing to overcome congestion

Independent Market Operator and metering

Clear sets of rules regarding operation of grid, with regulatory oversight.

Market operator should give clear advance indications of new capacity requirements

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Market Power Mitigation

VoLL (value of lost load), absolute cap on bids/offers. ($10,000 Australia)

- Empirical basis is best
- Can be for any type of service (energy/ancillary)

Administered prices (lower cap)

- Takes into account long periods of market failure, e.g. after extensive weather related outages

California got this wrong and generators refused to bid, abused ancillary caps

Lessons here is to adjust to market conditions quickly

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Residual Issues

Take or pay contracts for energy or fuel

- are these fixed or variable costs?
- how will these be bid into a market?

Stranded costs of redundant plant

- who pays?

Seasonality of plant

- drought years and low supply for exports (who takes the pain?)

Restructuring Costs

- unfunded pensions
- receivables more than 6 months old
- debt without owners

Very small systems - unbudle or join a bigger system

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Emerging Markets -Financing Power Projects

Need Cheap Power, not world class power

Tariffs which closely match the cost of supply

Contracts underpin projects - **BUT MARKETS UNDERPIN CONTRACTS**

- Clear regulatory guidelines
- Well defined market with depth and liquidity

Plant which matches loads

Transmission bottlenecks removed

Market provides these signals

(Source ANZ Banking)

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Some Success Stories

Australian States

- Implementation was from a very simple week ahead to a complex market. Interconnection between states only as they were ready. Single market operator, very strong regulation for market (ACCC) and state regulators for distribution/transmission.
- Unbundling and ownership suited to each state. Corporatization prior to start owned by government
- Vesting contracts and retail competition schedule before market
- Zonal Pricing to avoid congestion effects

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Some Success Stories

Singapore

- Similar to Australia, slow and steady
- Government unbundled into corporations
- Vesting contracts and competition schedule before market
- Capacity tickets innovation to ensure future supplies

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Not so successful

Korea

- Unbundling completed
- Stalled due to union pressure
- Market is cost based bids, open access

Sri Lanka

- Unbundling effected
- political interference
- stalled process

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Not so successful

Philippines

- Contracts have been a large problem (DUs,Co-operatives and a monopoly retailer) – risk management negligible
- Did not follow corporate structure
- Overly complex market model, lacks transparency
- Law prohibited new generation capacity contracts for NPC
- Imposed system

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Not So Successful

Singapore

- Software failure ($80 million), too complex market model
- Imposed system

Indonesia -

- constitutional challenge to ownership

California

- No retail contracts, poorly designed market caps

Australia NSW

- Corporate rewards based on market share - prices plunged, and contract overhang cost traders $1 billion plus

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Lessons from Markets

- Slow and steady, continuing process - too many overoptimistic expectations
- Adapted to each unique set of starting systems
- Privatization is NOT the only way forward, government owned corporations (India, NSW Australia) can compete and bring large efficiency gains
- Too little regulation (New Zealand, UK) is not conductive
- Contracts in place before markets
- Distribution efficiencies can be very large (India)

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Capacity Building

Imposed Systems Do Not Work!

Consultants do not always know best

Home grown systems, which adapt from others' experience are best

E.G. regulators forums are fertile learning events, knowledge is shared and new methods are developed

This is applicable across the sector

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