



Draft PAEM Roadmap

PAEM Committees: Session 4

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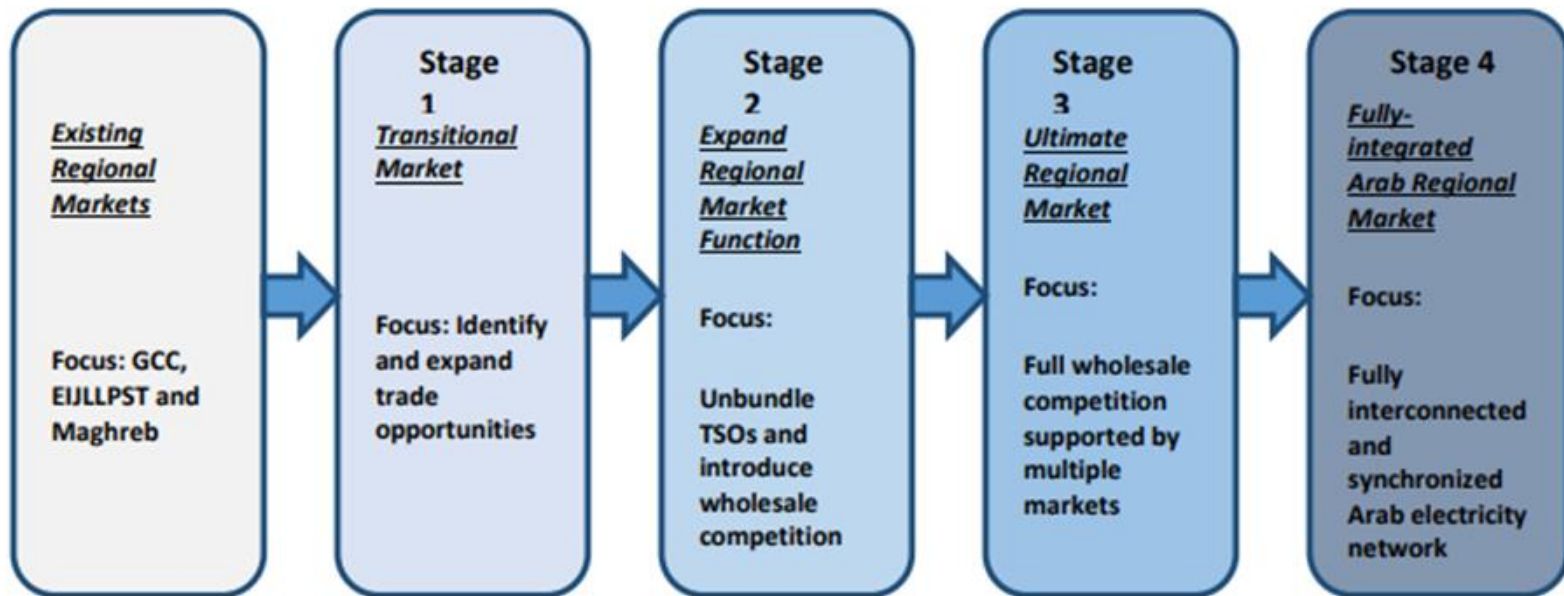


Context

- The PAEM Plan (or ‘Roadmap’) should guide the work needed, with an emphasis on the next couple of years
- Currently a draft, it needs to be considered and adopted by PAEM committees (ARC and TSO Committee) once formed. It then becomes their responsibility to deliver the Plan
- Proposed plan prepared by LAS External Expert together with the Steering Committee



PAEM development stages



Source: World Bank, *Operationalizing the ARC and TSO Committees*



Challenges facing the PAEM

- Physical network limitations
 - Strategic: Mashreq-GCC, Maghreb-Mashreq
 - National interconnections and internal networks
 - European interconnections
- Political challenges
 - Lack of strong legal/regulatory framework (cf Europe, USA)
 - Differing national priorities and situations
- Practical impediments
 - Motivation to trade
 - Contractual basis to trade
 - Access to non-bordering counterparts



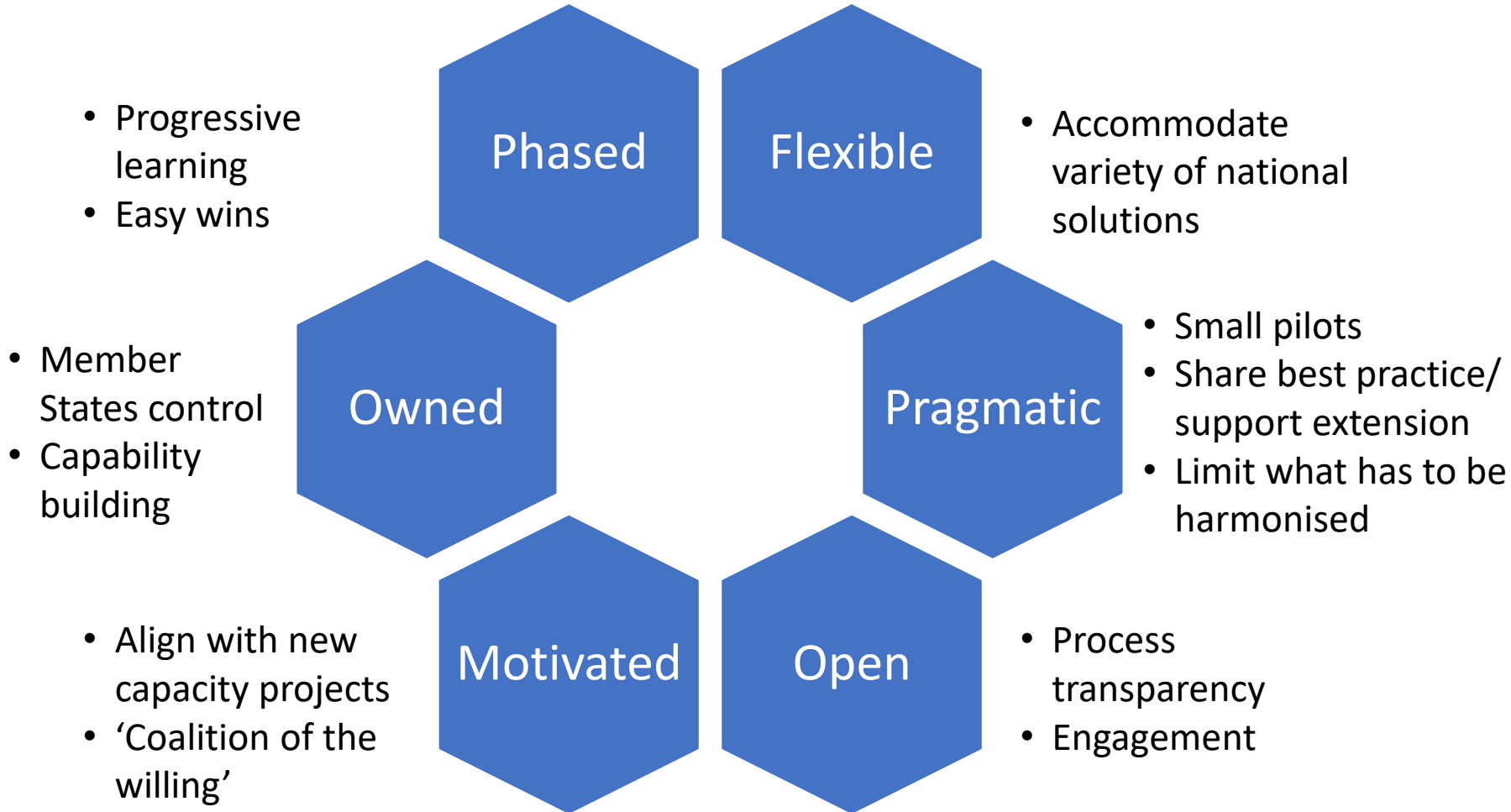
Challenges facing the PAEM

Subsidies

- Examples:
 - Fuel subsidy: gas or oil for generation provided at below market price
 - Subsidised consumer tariffs
- European experience
 - Moving towards increased intervention in the market, driven by sustainability goals (increased RES)
 - Poorly designed subsidies distort markets
- A national responsibility to manage subsidies
 - Achieve goals while minimising market distortion



Project design principles





Stage 1: Multilateral trading – Market model

Ability to trade with anyone in the connected region, not just with bordering countries

Typical features:

- Price-based trading/competitive price discovery (trading-in-kind also supported)
- Bilaterally negotiated trading agreements (terms, price, etc)
- Variety of products traded: long-term or spot; base or shape
- Wheeling pre-arranged (obligation to offer; compensation for transit countries for infrastructure cost and losses)
- Obligations and penalties for unscheduled deviations
- Open, non-discriminatory access to cross-border capacity
- Open to any qualified market party – potentially independent parties, not just national entities

Will be a core element of any future PAEM model



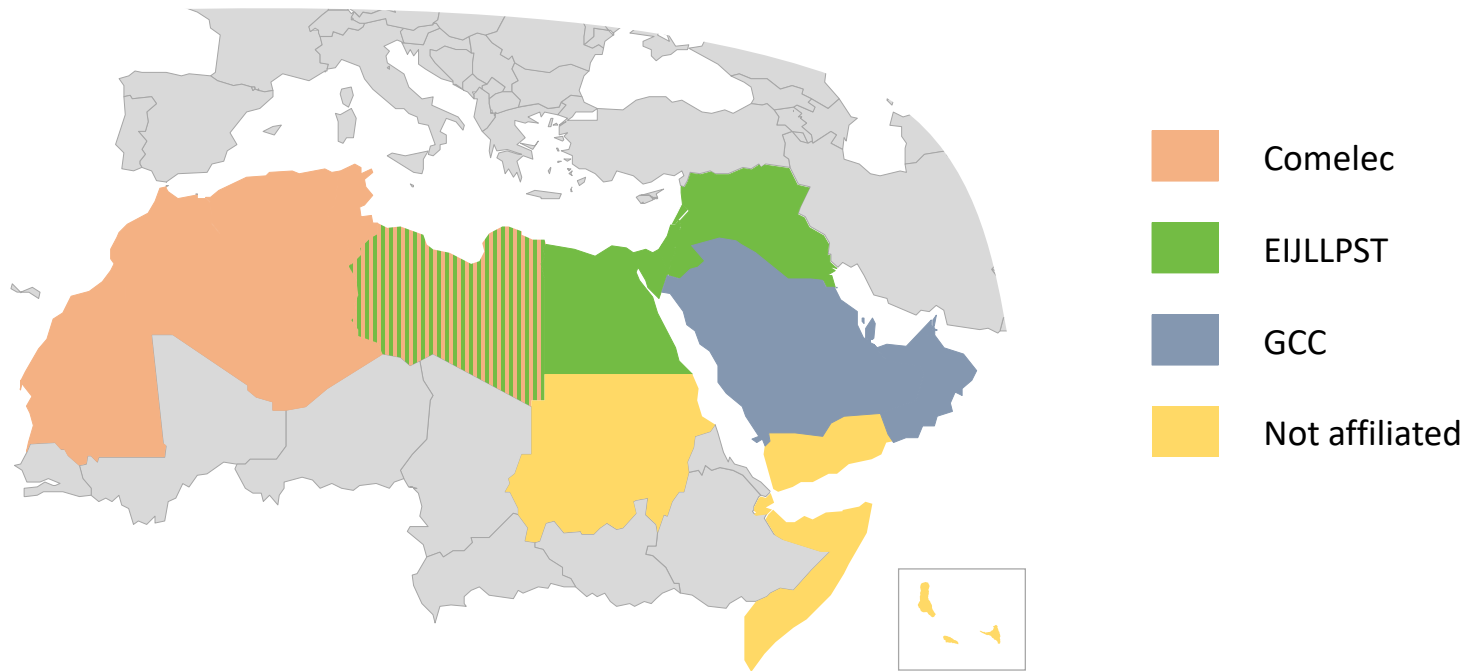
Geographic development

1. **Strategic regional developments** that determine the geographic scope of the connected PAEM region.
 - KSA-Egypt (3000MW, 2025) and GCCIA-Jordan-Egypt (500MW, 2025-6). Links GCC and Mashreq sub regions
 - Libya internal reinforcement/HVDC link (date TBD). Links Comelec and Mashreq/GCC
2. **National connections/enhancements** enabling countries to connect to the existing sub regional or regional solutions – e.g.:
 - Iraq-Jordan, Iraq-KSA, Iraq-Kuwait (500-1000MW, 2025-7)
 - Yemen-KSA (500MW, 2025)
3. **International connections** in particular capacity to Europe:
 - Morocco-Spain (additional 700MW, 2026)
 - Egypt-Greece (3GW, 2025+)
 - Tunisia-Italy (600MW)



Multilateral trading – implementation strategy

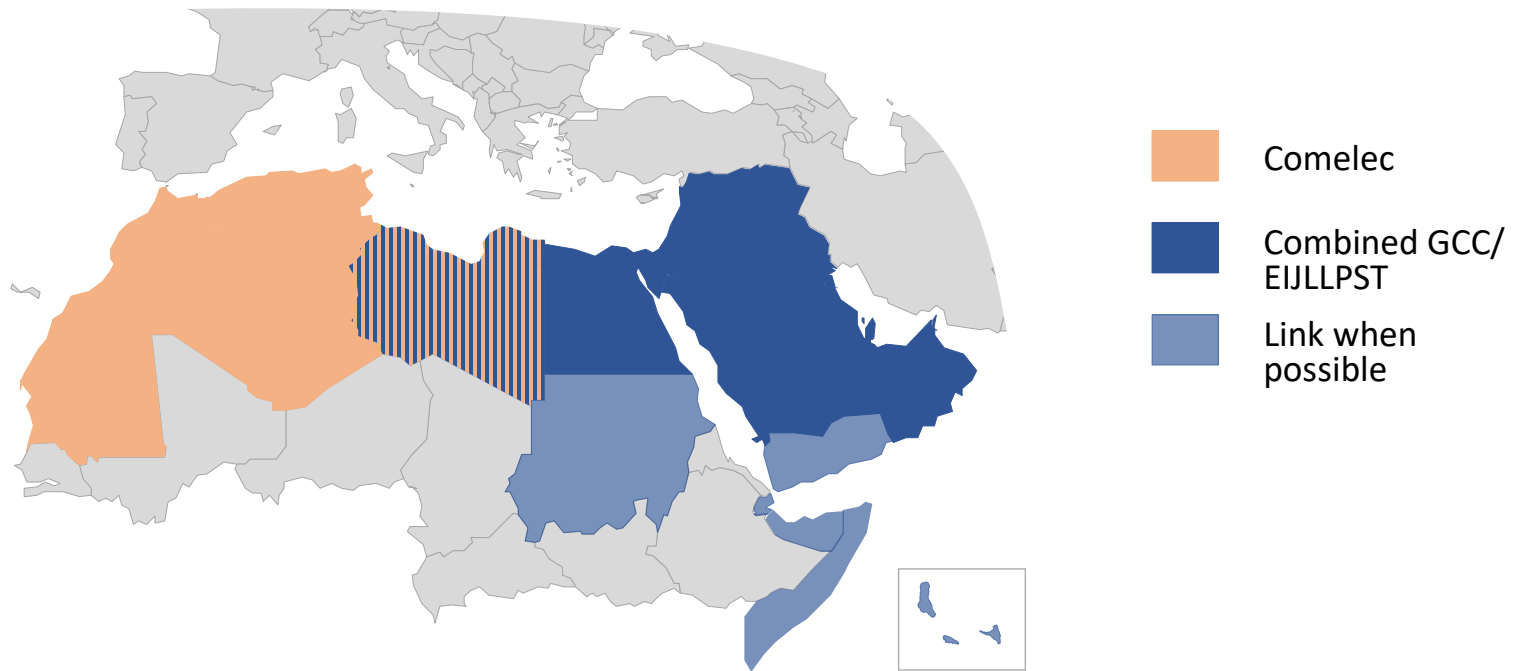
Current situation





Multilateral trading – implementation strategy

Step 1: GCC-Mashreq



Trigger: KSA-Egypt interconnector, 2025



Multilateral trading – implementation strategy

Step 2: GCC/Mashreq-Maghreb



Trigger: Libya internal system reinforcement



Critical market arrangements

Arrangements required to support multilateral trading

- Cross-border capacity calculation
- Capacity allocation/ congestion management
- Transmission services/wheeling
- Unscheduled deviations
- Market facilitation services
- Data transparency
- Market participation

PAEM Rules

- Policies, rules, standards to be applied across region
- As needed to ensure fair, efficient and operable market
- Aligned national regulation/laws

Market Enablers

- Market rules and participation terms
- Supporting systems, procedures
- Procurement of service providers
- Governance structure for multiparty cooperations

Geographic scope

- Physically connected grid
- PAEM required minimum scope (sub-region, region)
- Option for TSOs to cooperate more widely (e.g., clusters, sub-regions, region)



Multilateral trading – critical elements

Cross-border capacity calculation	<ul style="list-style-type: none">• Fair and reasonable method of calculation• Treatment of pre-existing rights
Cross-border capacity allocation/congestion management	<ul style="list-style-type: none">• Open, non-discriminatory access for any qualified party• Clear terms and conditions (e.g., firmness, rights, nomination)• Method to handle congestion (demand exceeding availability): pro rata; explicit auctions (single or multi-border)
Transmission services (wheeling)	<ul style="list-style-type: none">• Reasonable cost recovery for transit networks (infrastructure costs, losses); fair basis for allocating costs to users• Regulated charges, no trade-specific negotiation



Multilateral trading – critical elements

Unscheduled deviations	<ul style="list-style-type: none">• Incentives on all countries to flow as scheduled• Fair compensation for costs imposed on others due to deviations
Market facilitation	<ul style="list-style-type: none">• Identify most relevant services (voice broking, online platform, price reporting, price model)• Appointment/supervision of market facilitator; building necessary competences and trust
Data transparency	<ul style="list-style-type: none">• Identifying the need for transparency: who needs what to be able to make rationale, efficient decisions• Establishing accessible transparency platforms: national, regional

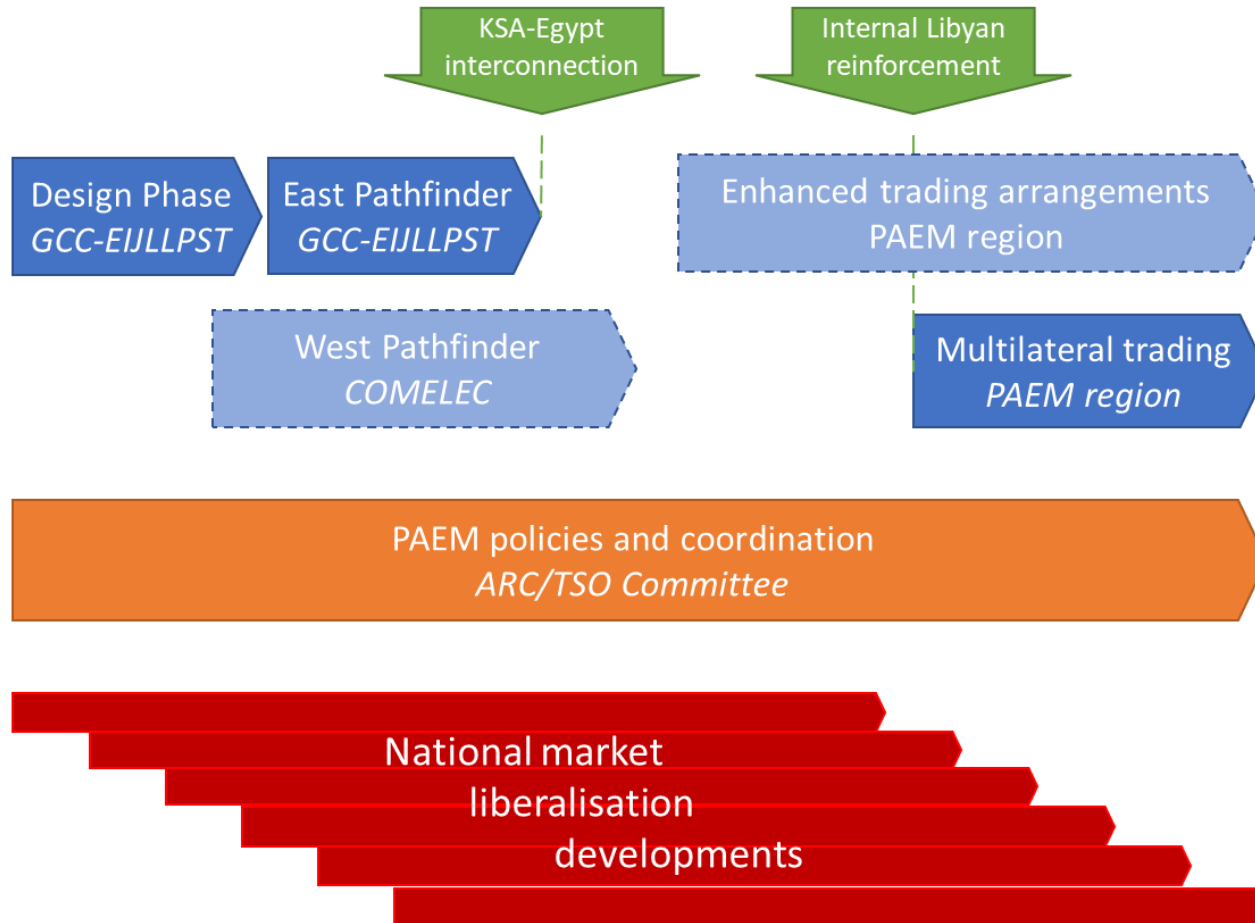


Multilateral trading – critical elements

Market participation: Qualified counterparts	<ul style="list-style-type: none">• Ability to trade with as many potential counterparties as possible• Establish master bilateral agreements setting out key terms - e.g., invoicing and payment, guarantees, performance assurance, etc.
Market participation: Trading competencies	<ul style="list-style-type: none">• Capable traders maximizing economic gain for both generation and supply: need to separate generation from supply?• Adequate authority, resources (legal, financial, systems), focus, and motivation• Detailed understanding of own marginal costs
Market participation: New market parties	<ul style="list-style-type: none">• Recognizing benefits of widening market access• Associated changes needed to support independent parties: domestic and cross-border



High Level Plan (Stage 1)





High Level Plan (Stage 1)

- **Pathfinders project(s)** to develop multilateral trading:
 - East Pathfinder: KSA-Egypt-Jordan to enable trade across EIJLLPST and GCC once KSA-Egypt interconnector operational (2024/5), followed by Jordan-KSA and Iraq-GCC
 - Potential West Pathfinder in Comelec; Libya internal reinforcement would enable linking of PAEM
- Ensure alignment between the Pathfinders and consistency with the emerging PAEM rules (TSO Committee/ARC)
- Further enhancements to the trading arrangements to be added over time
- Development of national markets not a PAEM obligation; PAEM market design should support a range of national market forms



Stage 2: Liberalised national markets

- Typical elements:
 - Unbundle TSO, independent regulation
 - Enable generation competition – e.g.: IPPs (with and without PPA), private RES, separate national utility supply and generation, breakup generation, demand side participation
 - Consumer choice of supplier: large users; small/domestic
 - Access to cross-border market for independent participants
- Different ways to develop national markets
 - Isolated development (adequate scale?)
 - Cluster of coupled markets
 - Link to adjacent developed market
- Approach and timing will vary between countries
- PAEM does not impose any obligation to liberalise



Stages 3/4: Fully liberalised, integrated markets

- Likely to be based broadly on European model
- Focus on spot markets (day ahead, intraday)
 - Coupled: cross-border capacity allocated automatically
 - Cleared: trading against a central counterparty
- Principal spot market designs:
 - Continuous markets
 - Bid-offer online negotiation/matching
 - Able to run close to delivery
 - Potential early enhancement to Stage 1
 - Potential to link to European market (single intraday coupling)
 - Auction-based markets
 - Periodic market
 - Single clearing price in each period
 - Liquidity critical to getting trusted price formation



Roadmap main objectives

1. Establish and build capacity of the TSO and ARC committees; set out a plan for the target organisation and resourcing of the PAEM, including committee structure and support functions, and have initiated a transition to this structure
2. Establish the necessary PAEM rules that should apply across the region, within which sub-regions can have some flexibility in their approach where appropriate
3. Design, implement and test the necessary market enablers to support multilateral trading in at least one pathfinder area. Set out a plan for the further development and phased geographic rollout of the arrangements
4. Provide support to the development of trade and market liberalisation in individual member states