ETRM Service Catalogue

PwC service offering for Energy Trading
September 2019

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1

Overview:
Our service offering for Energy Trading

Reasons to involve PwC's project team

Advantages of involving PwC's ETRM delivery hub in future project endeavours

Project experience

The project team has **thorough experience** delivering ETRM projects with SME's supporting client's project team throughout the implementation.

Market knowledge/trends and strategy

The client can draw upon the knowledge of a **large pool of country and industry experts** and publications to help its business perform better and more effective.

Regulatory compliance

Ensuring the client's "**compliance readiness**" in an industry, which is subject to numerous existing and future regulations as MiFID II, MIFIR, MARM/MAD, REMIT & EMIR.

E2E service

The client receives **full service support** from strategic through implementation topics throughout the whole project lifecycle.

Competitive pricing

Due to an established project approach, the use of best practice models and benchmarks, PwC has provable conducted **faster and less costly** implementations.

IT & business knowledge

The client will work with trading and IT specialists to best use synergies during the implementation considering **PwC's ETRM benchmarks.**

Risk management

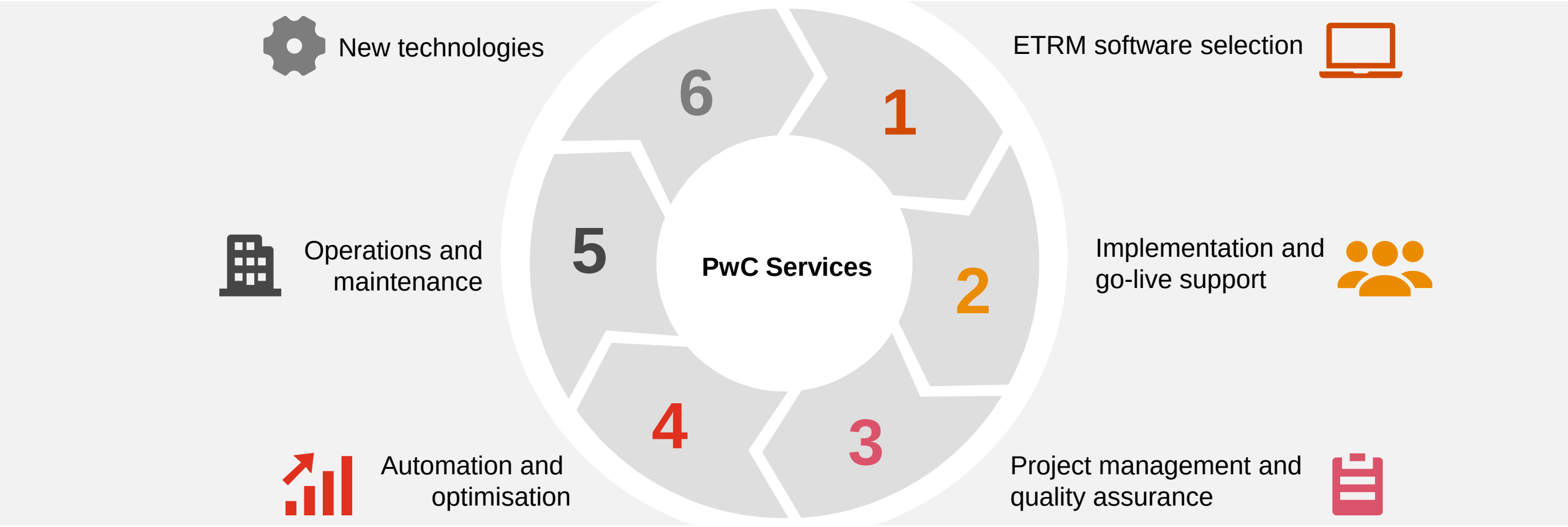
Managing risks is becoming more and more important in **volatile market environments.** PwC covers an E2E consulting approach for that purpose.

2

Our technology service offering for ETRM-related projects

PwC ETRM delivery hub: Service portfolio

Our European ETRM task force offers a variety of services supporting clients during their ETRM projects



2

Software selection

ETRM implementation and go-live support

ETRM project management & quality assurance

ETRM automation and optimisation

Operations & maintenance

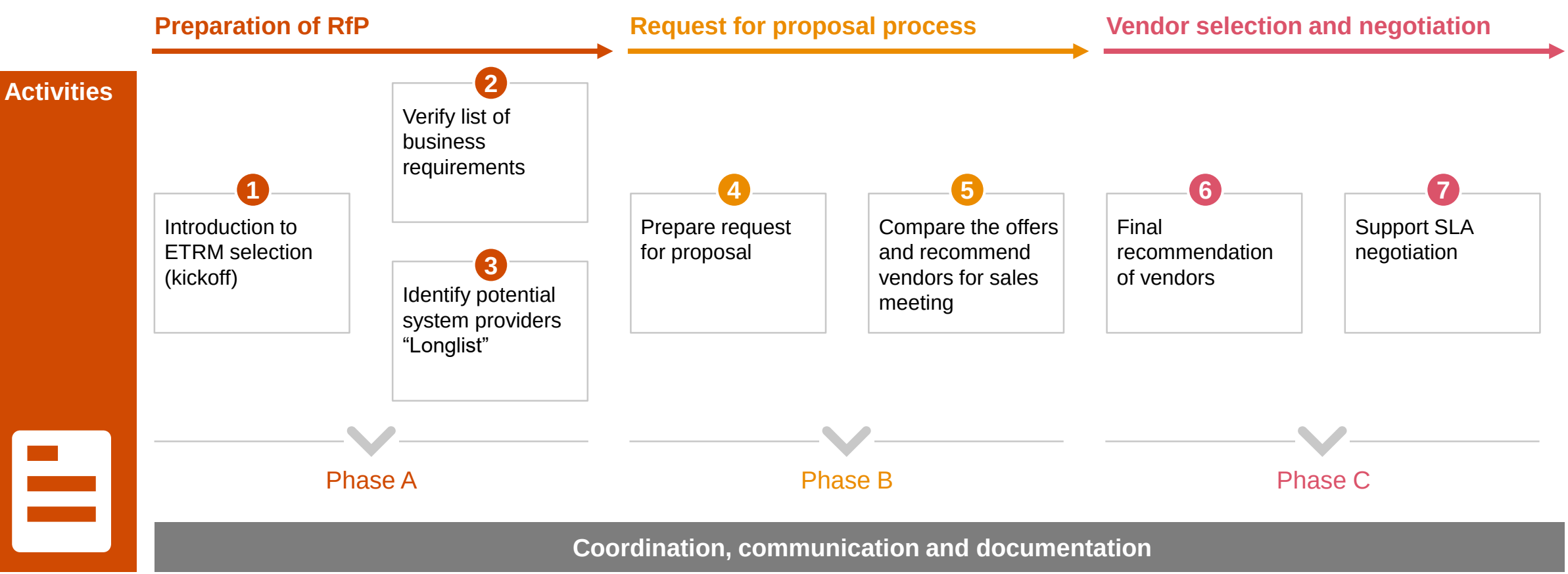
New technologies

Common pitfalls, recent project experiences & lessons learned

Proposed ETRM project structure

Extract of project references

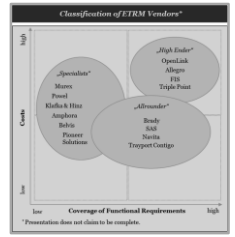
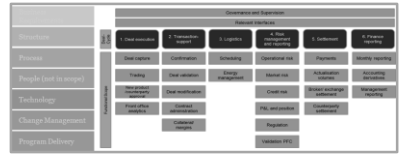
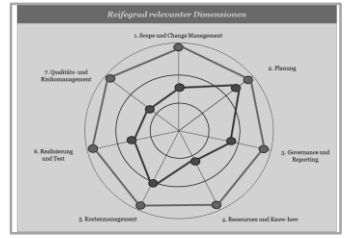
For the vendor selection, PwC follows a tried and tested approach adding lessons learned from previous projects



Phase A

Introduction to the project, definition of functional requirements and short list of potential vendors based on our experience

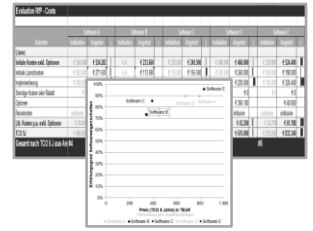
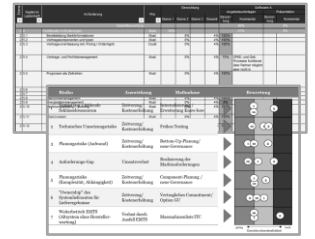
Phase A: Preparation

Products	Activities	Client examples
1 Introduction to ETRM selection (kickoff)	• Kickoff meeting with an introduction to new markets trends and best practices regarding ETRM system implementation projects • Overview of potential system providers relevant to the client • Discussion of lessons learned and case studies about recent implementation projects	
2 Verify list of business requirements	Work out list of requirements based on client's business processes, current and future market requirements and our experience from other projects	
3 Long list system providers	• Identify a list of potential vendors most suitable to the needs of the client to be included to the RfP process • Align list with client and decide on final vendors for the long list	

Phase B

Preparation of the request for proposal and comparison of the returned offers based on our best practice templates

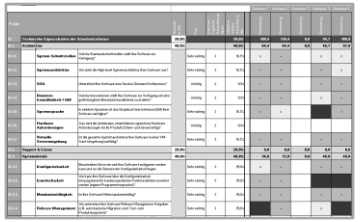
Phase B: Request for proposal

Products	Activities	Client examples
Prepare request for proposal 4	• Preparation of RfP document to be send out to the selected vendors • The document will include all relevant requirements as laid down in the vendor selection RfP send to us (e.g. list of functional and technical requirements, list of relevant interfaces, product descriptions, implementation schedule and price).	
Compare the offers and recommend vendors for sales meeting 5	• Comparison of the returned offers based on our best practice vendor selection template to objectively compare functionalities and price along a weighting scheme agreed • Focus on show-me meetings on critical functionality • Recommendation of vendors for a sales meeting • Preparation of questionnaire for meeting participants and list of questions to be asked	

Phase C

Final recommendation of vendors and support in negotiations of price, scope and services

Phase C: Finalisation

Products	Activities	Client examples
Final recommendation of vendors 6	• Based on the returned feedback from the vendors and the outcome from the sales demonstrations we will recommend 2 - 3 vendors to the client for final SLA and price negotiations. • Setup and organisation of reference visits (if required)	
Support SLA negotiation 7	• Supporting the client during SLA and price negotiations with the vendor in close alignment • Choosing the final vendor and discussing potential implementation project implications	

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Our value proposition

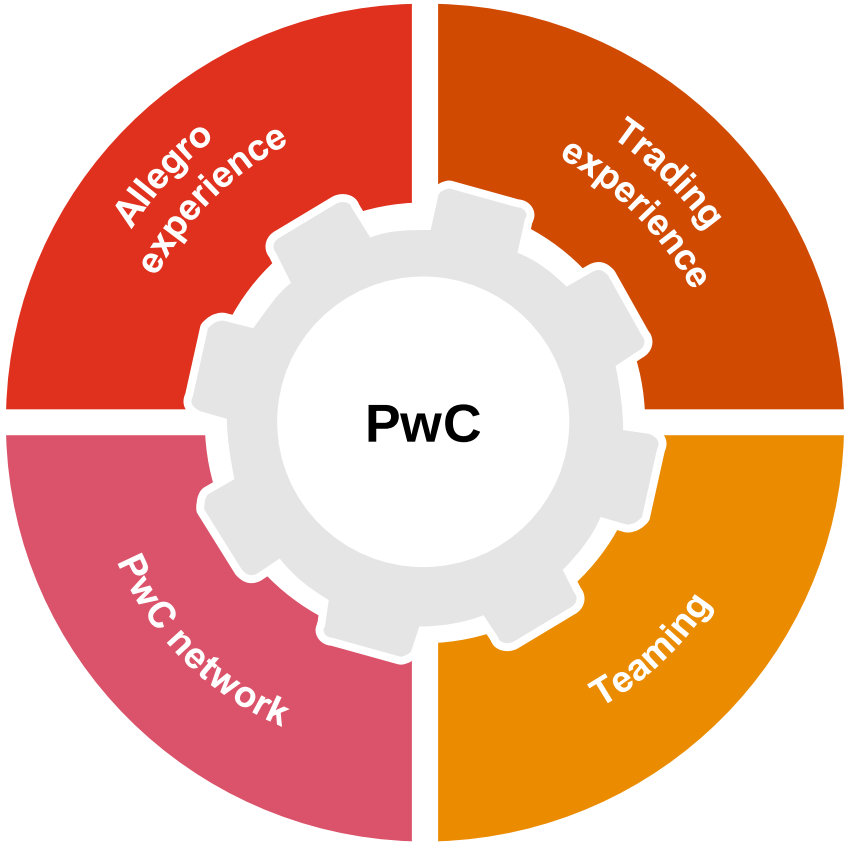
Being a trusted partner to support you in succeeding the Allegro implementation

Right skills and deep experience in Allegro implementation

The core team, which will be assembled for you, has the **best experience** and the right skills to both challenge **business** and **integrators**. We are convinced that our senior team will be able to present alternative views and challenging inputs.

Access to our global network to get relevant information

The access to our **global network** guarantees finding the right expertise and/or relevant use cases, which helps you to make the right decision. PwC's team has a founded experience in ETRM, is working together globally, and shares knowledge and experiences in an integrated way.



… with extensive knowledge in trading business

The team has the necessary **business background** to educate business owners when necessary and challenge business issues resolutions in Allegro. This should help you to increase business and integrator in gaining maturity in your ETRM project.

Successfully played role of Q&A partner to manage efficiently trade offs

We have **a proven track record** of working with Allegro delivering your implementation project in scope, budget, and time.

We consider PwC as the ideal partner for the delivery ETRM for multiple reasons

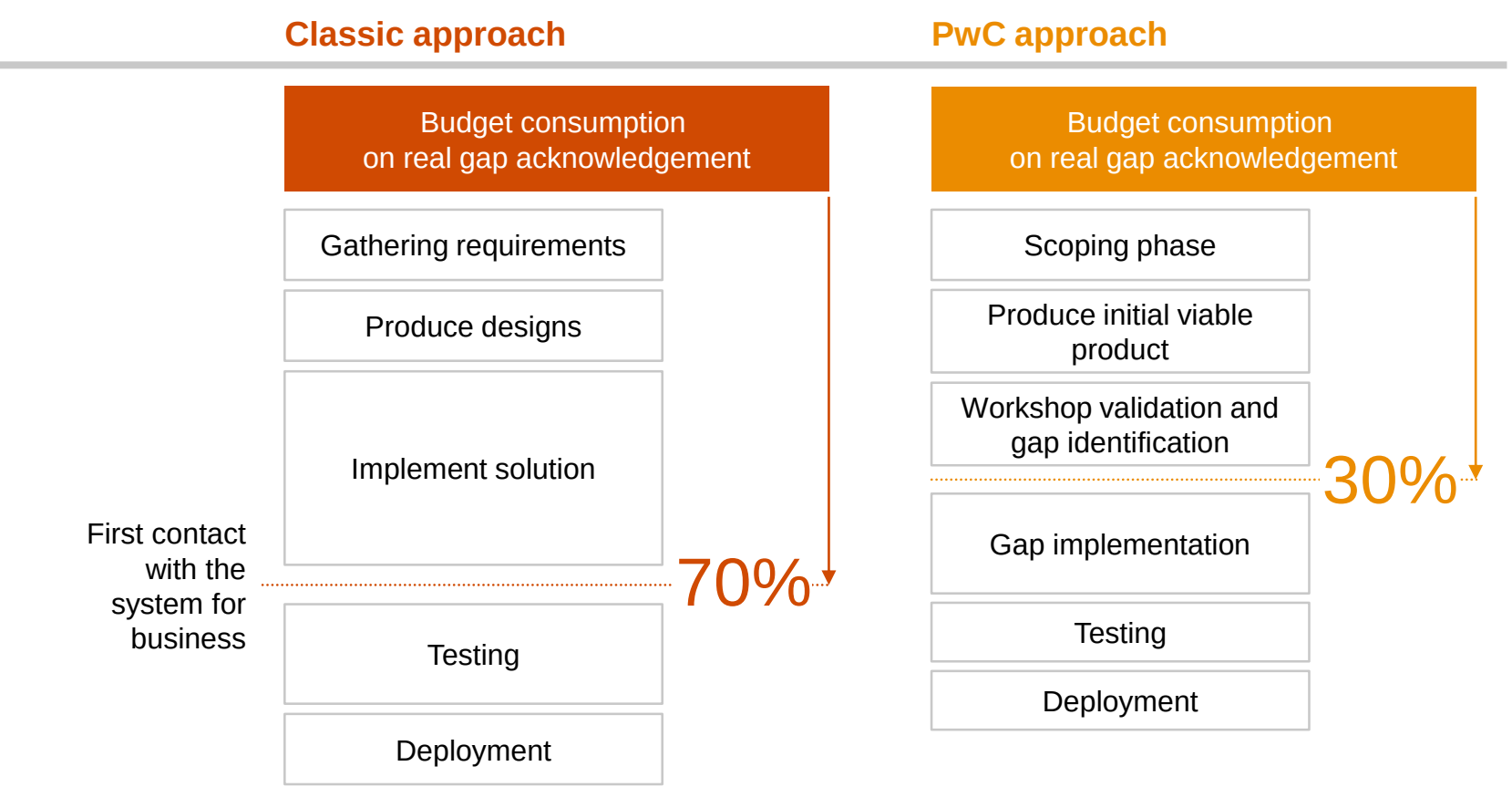
Reason	Description	Value for the client
Global cost	We propose to deliver the project using our Delivery Hub in Spain. That will help us to be **more economically efficient** for the **same value delivery**.	The overall cost of the project will be reduced due to lower rates of the consultants from Spain delivering the same scope and value.
Reduced cost risk	We are able to work on a **fixed-cost approach** for the project after confirming the scope through a scoping phase period (between 6/8 weeks). Based on our experience, our proposals **present a cap** of the global cost of the implementation.	Cap of the overall cost of the project and reducing risk for the client
Delivery approach	We propose a scoping phase to ensure a **realistic plan** for the implementation. Also, during the project, we expect to include resources allocated full time with different skills (BA, Allegro expert, developers) to optimise the project plan.	Client will be able to manage a realistic plan and also take advantage of the analysis during the scoping phase to facilitate the business' readiness.
Company risk	Our delivery hub is composed out of multiple resources and is replicated in the US **(+80 resources dedicated to ETRM practice)** ensuring the delivery and reducing the risk. PwC will always ensure to have available resources for the project.	No risk on the delivery due to rotation of the key consultants on the project. PwC has a large number of consultants with experience in delivering Allegro implementations.
Account-ability	We are able to deliver with our own resources, so we can sign a **single contract.** Therefore, the responsibility of the delivery lies with one single company and is not spread across multiple parties.	Simplify the governance model of the project and ensuring the management of risks in an effective manner
Time-to-Value	We propose an approach to **deliver in a fast and effectively using the accelerators we produced during the last years.** Doing so, we are reducing the time to value and the global cost of the project.	Reduced time of the implementation helping the client to take advantage of the system in a short period
Experience	We have **experience** implementing gas and power in Allegro for European markets with **accelerators** to reduce the time of the implementation.	Helping to understand requirements and understanding best-practices of the industry to improve the existing business process of the client

During these years we have implemented our own methodology to deliver ETRM systems

The key principles of this methodology are …

Key principle	PwC approach	Client benefits
Early adoption	We propose a methodology where we go-live with the **minimum viable product.** From that point on, we work with the client to add additional functionalities, which further increase the value of the system.	Following this approach, the risk of delays is effectively controlled while increasing the flexibility to adopt requirements, which are aligned with the business strategy.
Business process alignment	We propose an approach combining resources with **technical expertise** (i.e. ability to configure and extend ETRMs) and **functional expertise** in order to ensure a proper alignment between business processes and requirements.	• The client has the opportunity to review the business processes during the actual implementation to align both processes and requirements. • Further, this approach allow clients to review the existing processes and benchmark them against the best practices of the sector.
Maximise standard	• We propose a methodology where each extension should be based on a **business case** to ensure a return on investment for the client. • Over the last years, PwC has created a **catalogue of best practices** for the implementation of the business processes for the power and gas sector that allows to maximise the use of the standard and gain maximum value.	• Reduce the cost of the project due to a limitation of extensions, implementing only those that create added value to the system • Reduce the risk of future evolution of the system due to the misalignment between the roadmap of the software and the implementation performed
Knowledge transfer	We propose an approach, which ensures a transfer of knowledge of the system to the internal teams of the client to **empower the support teams** and reduce dependency on external resources after go-live.	• Reduce the dependency on external teams and reduce cost of the support of the system after go-live • Increase the perception of ownership of the system supporting the change management process

We propose a quick implementation based on agile methodology with the minimum viable product – Doing so, clients can benefit from our accelerators and pre-configurations that we have for gas & power markets



Approach analysis

The diagram shows the main differences between a classical approach and PwC's proposed approach. Main differences are

- The first contact with the system on the classic approach is during testing that implies the risk of a high consumption of the Budget and reduce flexibility to accommodate potential gaps identified.
- The PwC approach requires a shorter period because the business is earlier in contact with the system and, therefore, requiring less testing effort.
- The PwC approach reduces the risk of misalignment b/w requirements and implementation because the system is available to users at all times.
- PwC's approach uses tools as an accelerator and pre-configurations to ensure focus on the implementation rather than starting from scratch.

We consider an approach, which starts with an initial scoping phase to perform “deep dive” analysis followed by implementation phase with certainty about planning and scope

- We consider an approach based on two main phases – **“Scoping” and “Implementation**”
- The objective of this approach is to **de-risk the project** and facilitate the understanding of the capabilities of the system to the business. This approach will help to maximise the use of the **standard capabilities** and provide a **cost estimation for the implementation.**
- During the implementation phase, we include two main work streams, **configuration** to implement the requirements in the system and **integration** to develop the interphases within the 3rd party systems that converge to a single work stream for testing.

Scoping phase | **Implementation phase**

x weeks | x weeks

1

Scoping phase

The main goal of the scoping phase is deep dive into the requirements and readiness to mitigate risk on the project

How we expect to work

- Produce a list of workshops to obtain detail on the requirements
- Prepare a prototype to facilitate the understanding of the business about the capabilities of Allegro
- Design the extensions creating prototypes of them to ensure a common understanding

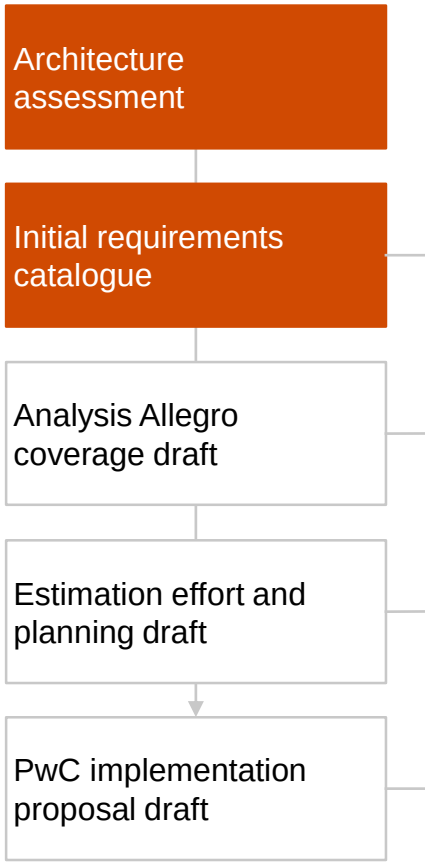
What we expect to deliver

- PwC will produce a prototype of the existing portfolio to validate the main functionalities and identify gaps.
- The functionalities to validate should cover the E2E process and the main position and risk reports using the standard capabilities and workarounds on the gaps that will be properly implemented in next phase.
- We expect to deliver a testing and migration strategy and also facilitate the inputs for defining a target operating model and a proper release strategy for the implementation.

What are the benefits of this approach

- Ensuring a real understanding of the capabilities and gaps
- De-risk the project ensuring a complete information for prioritise requirements
- Facilitate the common understanding of the requirements and the capabilities of the system and ensuring an alignment within the business processes

The objective of the scoping phase is to substantiate the previously performed analysis and to confirm the effort and cost planning



Scoping phase

Activity	Objective	Methodology	Deliverables
Confirm requirements and common understanding	Confirm common understanding of the requirements	Sessions for walkthrough requirements and data required	Requirements catalogue Specification document
Update and agree on Allegro coverage analysis	Review and the proposed resolution in the system for each requirement	Using a PoC review in different sessions the pro-posal for each requirement	Business scenarios
Update effort and project planning	Produce a final version of the planning and of the estimation effort in detail	Update using the outcome from the PoC as a base for the planning	• Detail planning until end of project • Update SoW for **cost** • Migration strategy
Update PwC implementation proposal (SoW)	Produce the SoW and update the estimation effort based on the cost planning	Update using the final planning as a base	

2

Implementation phase

With more certainty, we deliver an implementation phase within a clear strategy and scope based on a collaborative and transparent approach of show & tell

How we expect to work

- We expect to work in a combination of agile plus classic approach where we do continuous releases but ensuring a proper documentation of all steps and ensuring helping business to understand the capabilities of the system for reduce the dependency on the consultants.
- We will facilitate templates and accelerators to migrate and capture master data and also documentation to create knowledge in the client.

What we expect to deliver

- PwC will deliver the full set of requirements identified on the RFP validated after the scoping phase (the effort estimation is based on the current list of requirements).
- PwC will lead the delivery part of the project and will ensure creating knowledge in the business to use the system.

What are the benefits of this approach

- Our approach ensures an implementation based on the combination of agile and classic approach that will facilitate the control of the project, the costs limiting the scope based on the effort delivered in the scoping phase.
- Our approach is to work on a fix price, which limits the risks of the implementation and the controls, hence, ensuring the project's primary focus on prioritised needs of the business.

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For the implementation, ensuring success on the delivery is a collaborative approach where client stakeholders and implementation team should be aligned

Risk factors

01 Lack of executive sponsorship

02 Not involving all stakeholders throughout the process

03 Not addressing change management up front and throughout

04 Business objectives not clearly articulated

05 Lack of detailed requirements

06 Poor or non-existent demo scripts

07 Insufficient business resources

08 Too much customisation

09 Poor project governance

Mitigation actions

01 Define a design authority board to align requirements and expectations

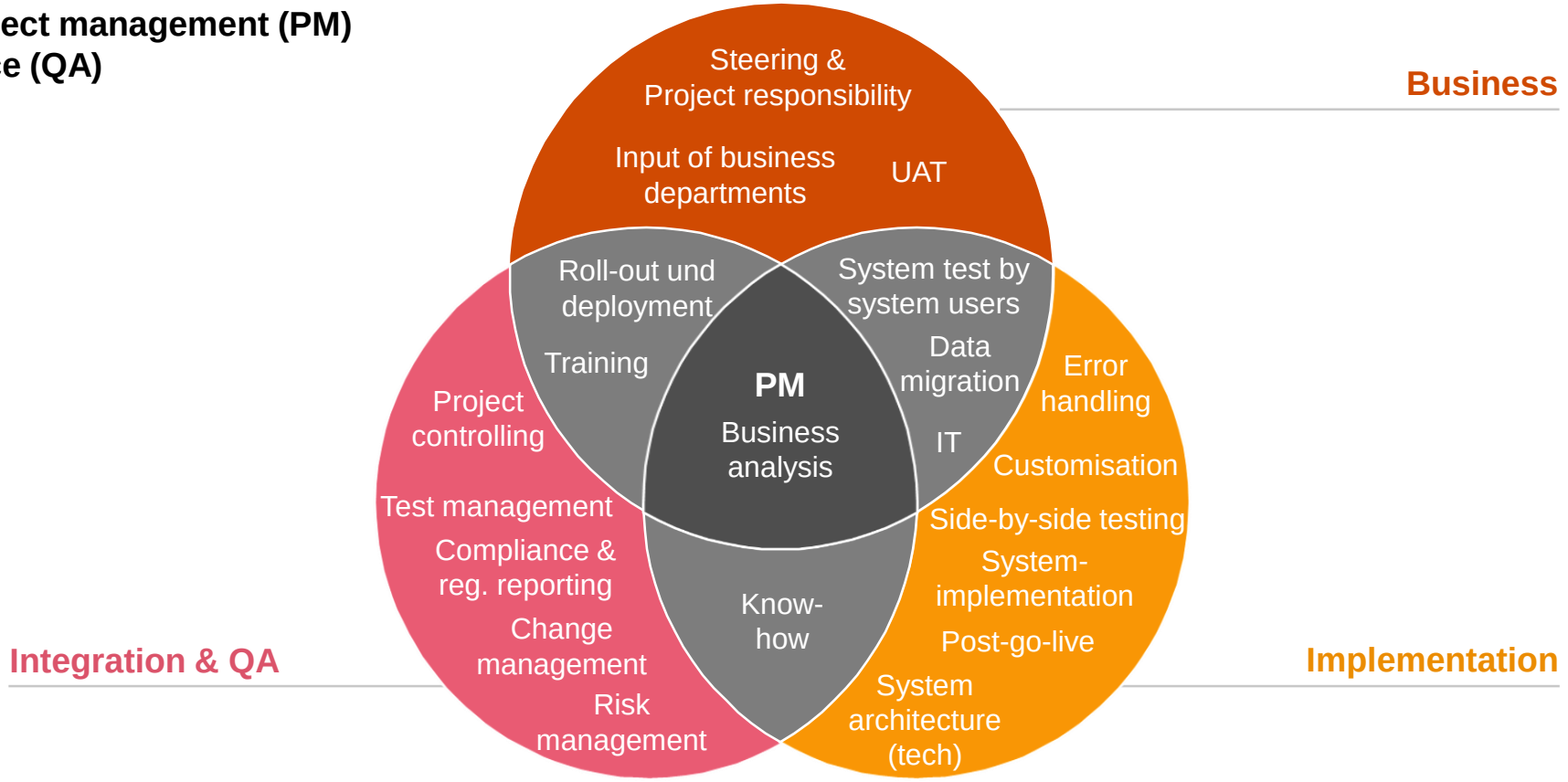
02 Ensure quality time from stakeholders for validating test cases and designs.

03 Prioritise according business as usual criteria.

04 Collaborate to adapt business processes to ensure maximise standard capabilities

Our PwC's project management ensures an ongoing alignment between business and the implementation team as well as a continuous quality assurance of deliveries

PwC – Overall project management (PM) & quality assurance (QA)



Risk factors, which we have identified in previously conducted ETRM projects and corresponding mitigation actions

Risk factors

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PwC's ETRM project management method combines an IT transformation approach with continuous risk management throughout all phases of the implementation project

What we do for you

- Support with the setup of a **project organisation and governance**
- Support with the definition of a **realistic**, **yet ambitious project plan**, which includes **relevant milestones and quality gates as well as managing dependencies!**
- Ongoing and proactive **risk management** in close collaboration with the business and definition of **mitigation actions**
- **Review of business requirements** and specifications as well as a corresponding **prioritisation** (i.e. challenging customisations vs. standard functionalities)
- **Interface management** between business departments and IT.
- **Defect management, rollout und release-management**
- High knowledge around test management in deployment processes, IT environment management and release management processes.
- Early involvement of business parties to show delivery transparency and build up understanding for the system implementation
- **Change management** and high level of project transparency

What you get

- High knowledge/experience of ETRM-implementations and connected **IT transformation challenges**
- Close collaboration and **communication between the project participants and stakeholders** (i.e. business & implementation team)
- Close **project monitoring** of mile stones, time lines and deliveries. Continuous **review of progress regarding system implementation.**
- An independent view on the prioritisation of needed requirements as well as a review on technical documentation and implementation (e.g. challenging too complex implementations that may cause delays)
- An **early knowledge transfer** to all involved business stakeholders
- **Post-go-live support**, ensuring that business is comfortable with usage of new system
- **A project, which is delivered in time, scope and budget**

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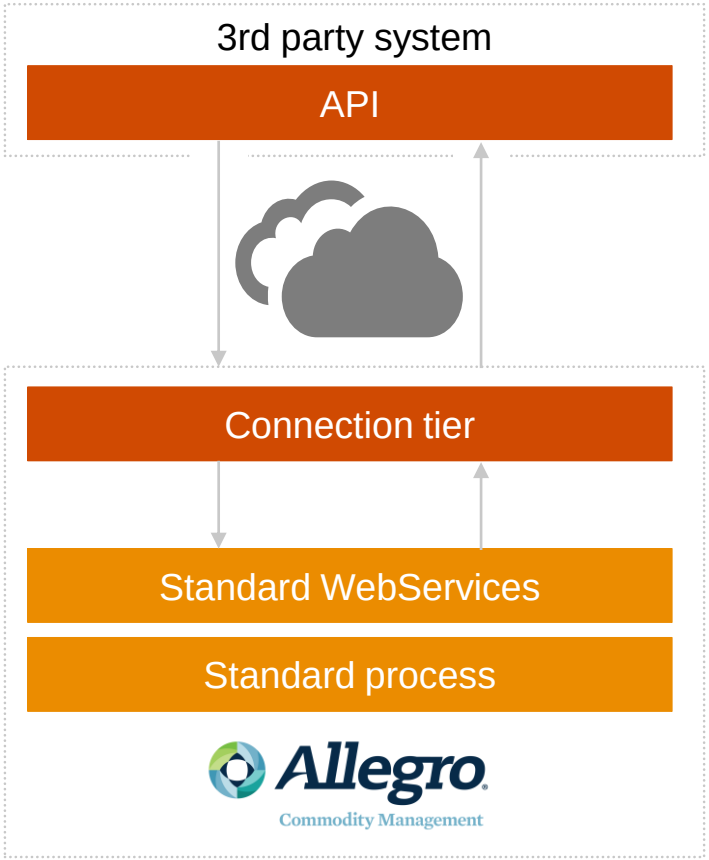
We are working to create extensions to integrate multiple tools within Allegro to maximise the standard capabilities and reducing the extensions for not core transactional processes



- We create connections based on existing APIs from the different solutions.
- The connection is through WebServices that are located inside Allegro (based on class events) to ensure fully compatibility with the system and the use of the standard capabilities for security and audit.
- This approach allows us to easily connect/disconnect from to any source and integrate Allegro with multiple tools to extend the capabilities.
- Using this approach of plug- and -play we mitigate the impact of create a non-maintainable system due the number and the complexity of the extensions.

To include new Allegro capabilities, we maintain the data model with functions included in Allegro

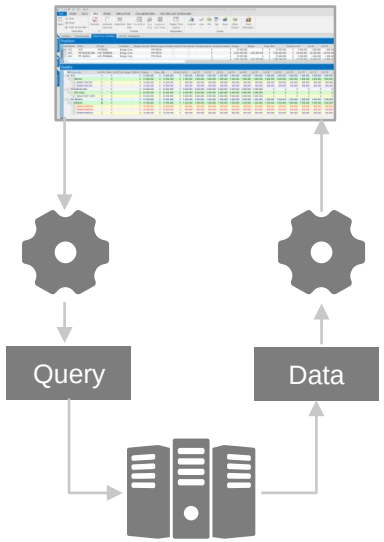
This approach ensures that the evolution of the product does not have a negative impact in the implementation, also improving both the user-experience and the capabilities.

Allegro is a 3-tier system with different functions: The logic and presentation tiers allow extending the system without extending the data model

Presentation tier
The upper level of the application is the User Interface. Allegro generates specific views based on translating the information from the database.

Logic tier
This layer coordinates the application, processes commands, makes logical decisions and performs calculations. It also moves and processes data between the two surrounding layers.

Data tier
Here the information is stored and retrieved from a database. The information is then passed back to the logic tier for processing.



Our approach is to extend Allegro's capabilities by using the standard functions of Allegro.

Presentation tier
We adapt the visual model by incorporating information from multiple tables to display it. The way that the information is stored in the database is not affected.

Logic tier
We use public methods to extend and automate the system. With this approach we ensure that the standard functions of Allegro manage the logic.

Data tier
We avoid extending the data model or reusing data columns with a different meaning.

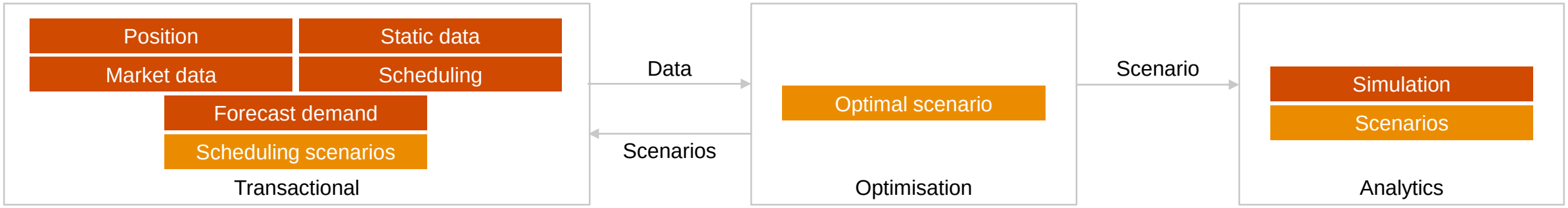
Our principles to extend the system

- ✓ UI class events for data validations
- ✓ Replacing queries to improve reporting
- ✗ Replacing update to change meaning of the columns
- ✓ Consuming standard public functions from Allegro
- ✗ Add new *.dlls* to replace capabilities in the system
- ✓ Add new tables for audit purposes
- ✗ Replace columns' meaning in the system
- ✗ Update directly into the database

Using this approach we ensure a comprehensive integration with Allegro along with no negative impact in the performance or evolution of the system.

Example 1

Connection within Matlab and Power BI to increase the Allegro capabilities for simulation



1

From Allegro, the relevant transactional data is sent to the optimisation system.

2

Optimisation receives the information and calculate the optimal scenario that is sent back to Allegro.

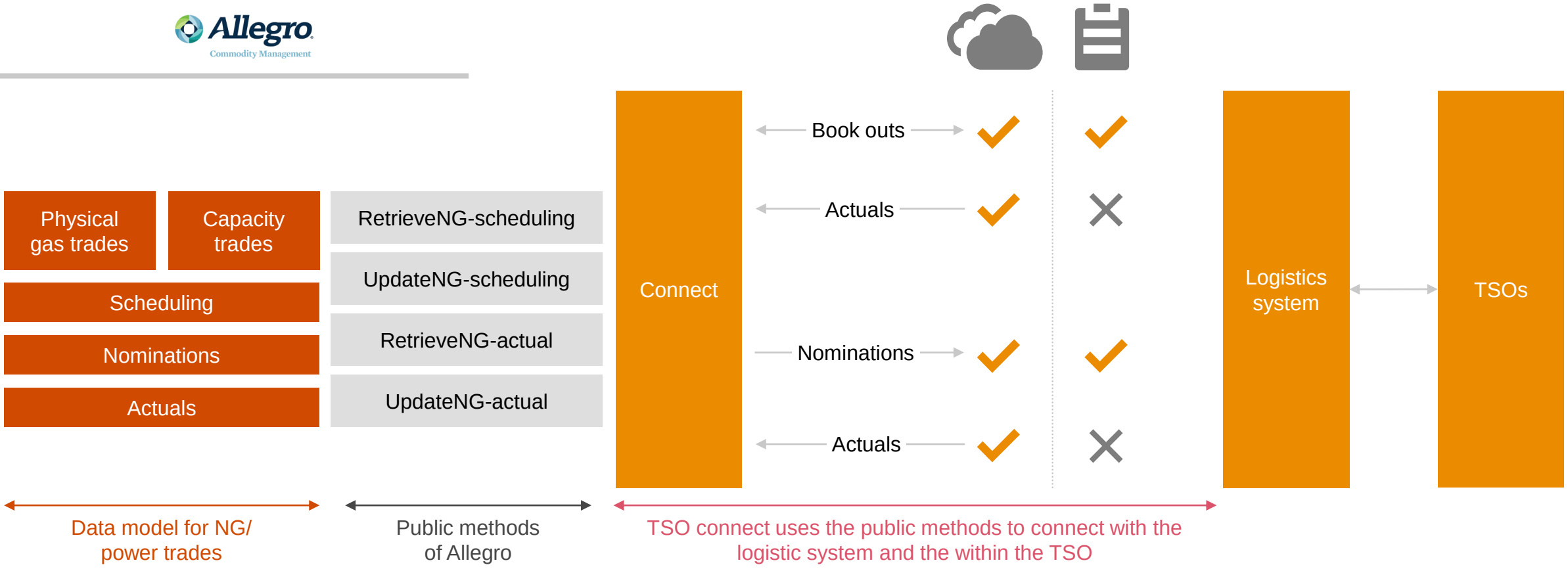
3

Through BI it is possible to analyse in mode detail the different alternatives.

Using this approach we are able to easily extend the capabilities of Allegro with no need of create and maintain many extensions that increase the risk and the effort to the project.

Example 2

Extension with a logistics system is shown in the next diagram



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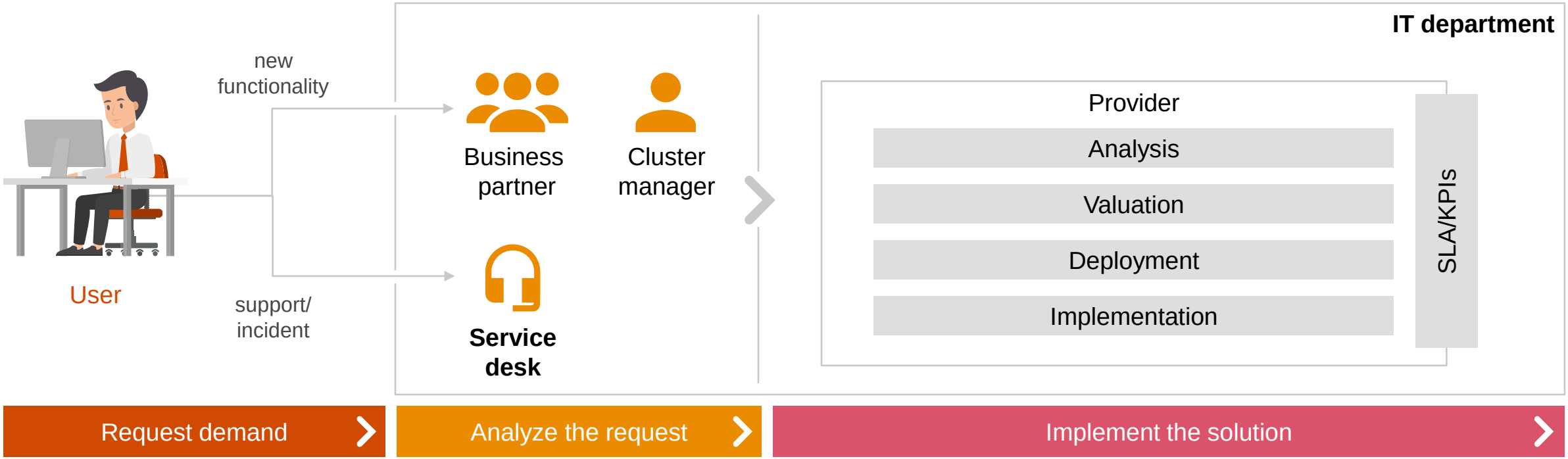
Supporting your daily business with an “application management service model” based on service level agreements

The development of an IT implementation project must follow certain steps and models for both the client and the provider to achieve successful results. The optimal model is known as the IT **application management** service model based on SLA (Services Level Agreement) which allows to

1	**Aligns IT services with business needs:** IT support effort and service delivery plans are focused and prioritised to best meet changing business needs and maintain agreed service levels.
2	**Improves service performance:** Delivers a quality service to the business by ensuring incidents affecting services are resolved as quickly as possible, reducing the number of unplanned IT outages/downtime, and following a consistent approach to the delivery of new services.
3	**Reduces operational risk:** Service management processes such as change and release management facilitate the identification and mitigation of risks in the IT operational environment that supports business processes.
4	**Demonstrates clear value of IT services to the business:** An IT service model provides a comprehensive view of the business service dependencies on the underlying IT services and infrastructure architecture. Through service reporting, provides clear evidence of the performance of the IT organisation in supporting the business.
5	**Improves understanding of IT costs:** The ability to define IT costs in terms of business services provides a powerful communication tool for the CIO and the business and helps in the identification of cost savings.
6	**Improves IT agility:** The ability to manage business aligned IT services allows the services to be improved, changed or cancelled in response to changing business needs.

The implementation model using KPIs/SLAs to ensure the best quality and service

- The next diagram represents the Implementation model when a new demand is aroused. Depending on the request, it is catalogued and referred to the correspondent provider who analyses, valuates, deploys and implements the solution.
- All the steps are measured using KPIs/SLAs in order to ensure the best quality in the service.



Elements of the IT service model

Activities	Depending on the user request type, demand management will be different and will therefore be necessary to define different types of activities. It will define a base service that includes a Service Desk to address and supports and corrective actions and baseline for improvements of a relatively small size. New functionalities will be managed independently.
Roles	The service is based on the coordinated action of different roles in order to plan and prioritise the actions to increase the quality of service. There will be roles that will manage the needs of users (Business Partner) and roles that will manage the relationship with the supplier (Cluster Management).
Workflow	The coordinated action of all roles will be defined based on a workflow where all steps are well defined and the respon-sibility of each role in each step. These workflows will be different depending on the type of service to be provided.
Valuation tables	Be used valuation tables differentiated by technology and approved with the provider to evaluate each of the evolutionary development.
SLA/KPIs	In order to analyze the quality of service metric used to analyze both the quality and execution times. These metrics are based on formulas that allow you to monitor service quality by comparing the values obtained with the benchmarks set out in the SLAs.
Reporting	The tracking service will be through reports and regular meetings between the various roles involved. These reports shall include the deviations in the metrics to analyze the weaknesses of the service.

Exemplary role model and responsibilities for support and error-handling

User

Service desk

Business partner

Cluster manager

Provider

Request demand

Valuate the request

Catalogued

Corrective

Specialised support

Analysis

Record support

Refer to supplier

Solve request

Implement solution

Analysis

Planning

Develop

Our service model includes an evaluation system based on maintenance and continuous improvement of service quality, productivity, cost effectiveness and satisfaction of users

- Our service model raises a number of indicators related to Service Level Agreements (SLA) with a metric for the analysis of the quality of service (KPIs).
- SLAs focus on three key areas aimed latest end-user satisfaction
  - Quality in deliverables and documentation of any kind or development
  - Product quality and service so that it tends to minimise the volume of failures in the production system in which users operate
  - Committed to meeting deadlines
  - Compliance with operating procedures (Completeness and accuracy of information reported by the supplier on their activity)
- The conditions of application of SLAs may have variations in the different stages of service and depending of the kind of service.

Depending of the stage, it will be defined SLAs/KPIs for

Input transition › Service provision › Output transition

Depending of kind of service, it will define SLAs/KPIs for

Support/corrective | New functionalities

2

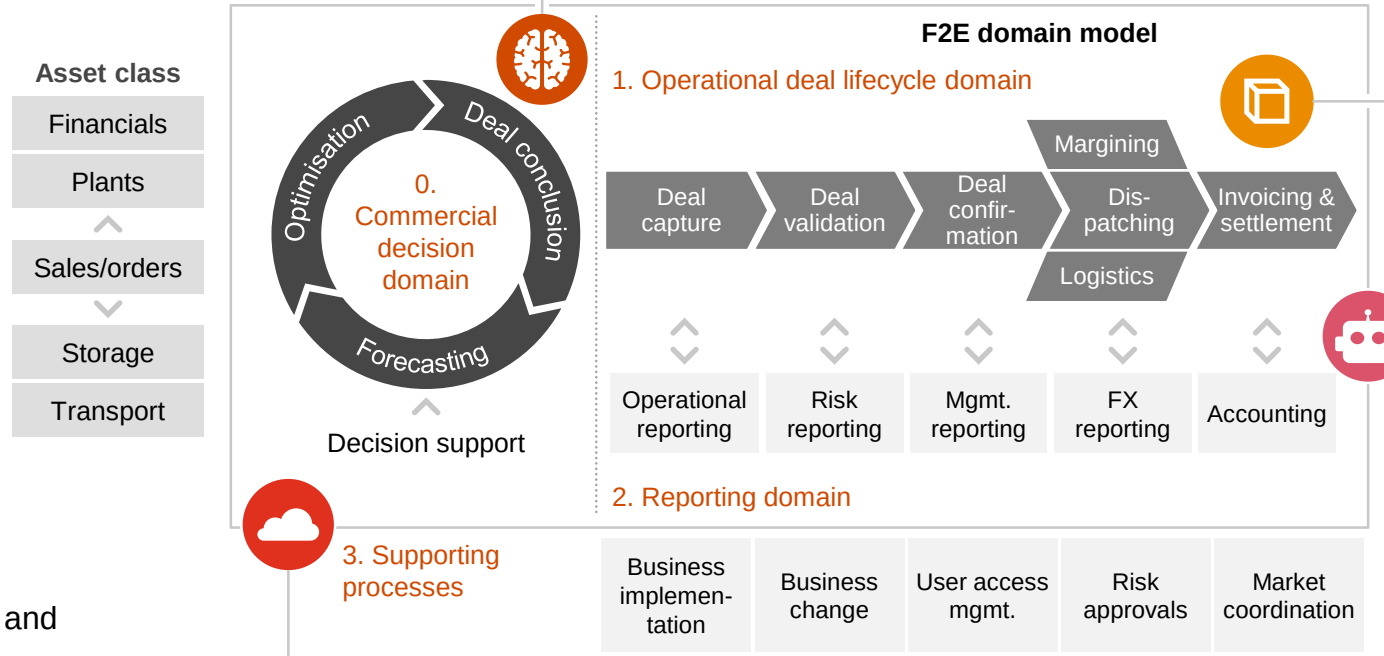
Software selection
ETRM implementation and go-live support
ETRM project management & quality assurance
ETRM automation and optimisation
Operations & maintenance
New technologies
Common pitfalls, recent project experiences & lessons learned
Proposed ETRM project structure
Extract of project references

New technologies and their implications on Energy Trading

New Technologies enable the adoption to changing market demands within the Energy Trading life cycle

Artificial intelligence (AI)

- Automated virtual assistants
- Machine learning
- Optimisation of trading portfolio
- Identification of transaction anomalies



Blockchain

- Provenance/traceability of trades
- Smart contracting
- Peer to peer transactions

Robotic Process Automation (RPA)

- Automation of predictable tasks
- Financial settlement
- Analytics and scheduling
- Risk management

Cloud solutions

- Software as a service (SaaS) and platform as a service (PaaS)
- Data storage
- Disaster recovery and backup

2

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Most common pitfalls throughout an implementation project

Common pitfalls need to be addressed and mitigated with appropriate project management mitigation actions

Known pitfalls

Project initiation	Requirements definition	Implementation	Test	(Post-)Go-live
Project planning & budgeting Unrealistic planning of project duration, internal/ external resources and missing dependencies.	**Requirements definition** Lengthy requirement definition causing originally defined documentation to be outdated.	**Business involvement** No or only partial involvement of business stakeholders throughout the project causing lack of user acceptance.	**Knowledge transfer** Insufficient knowledge transfer from external to internal resources causing unnecessary dependency on implementer.	**Go-live scenario** “Big-bang”-approach deploying enormous functionality causing functional problems and demotivated project team.

Mitigation actions

Project initiation	Requirements definition	Implementation	Test	(Post-)Go-live
“Plan precisely” Look closely at dependencies between internal and external project roles to avoid planning of inaccurate project durations and milestones.	**“Use standards”** Understand and use standard functionalities and, thus, the system’s strengths; adapt business processes to the system rather than adapting the system to your processes.	**“Identify key stakeholders”** Know your stakeholders within the business, create incentives and build a project organisation based on project functions with clear escalation path.	**“Seek knowledge”** Nominate internal SMEs and key users, who are strongly involved in the project to enforce “train-the-trainer” principle and enforce detailed training documentation.	**“Grow as you go”** Organise sequential go-lives taking individual functionalities into operation to allow user to work with new system and gradual testing of functionalities.

Project example 1

Implementation of an ETRM system in Switzerland

The PwC project team took over a delayed implementation project for power, gas and CO_2 and ensured delivery within time, scope and budget.

A Swiss utility had to set up a new trading entity for market access and asset optimisation.

Business challenge

The client sought PwC's expertise in CTRM to design, set up and implement a new IT Target landscape based on the new market challenges.

Project impact and outcomes

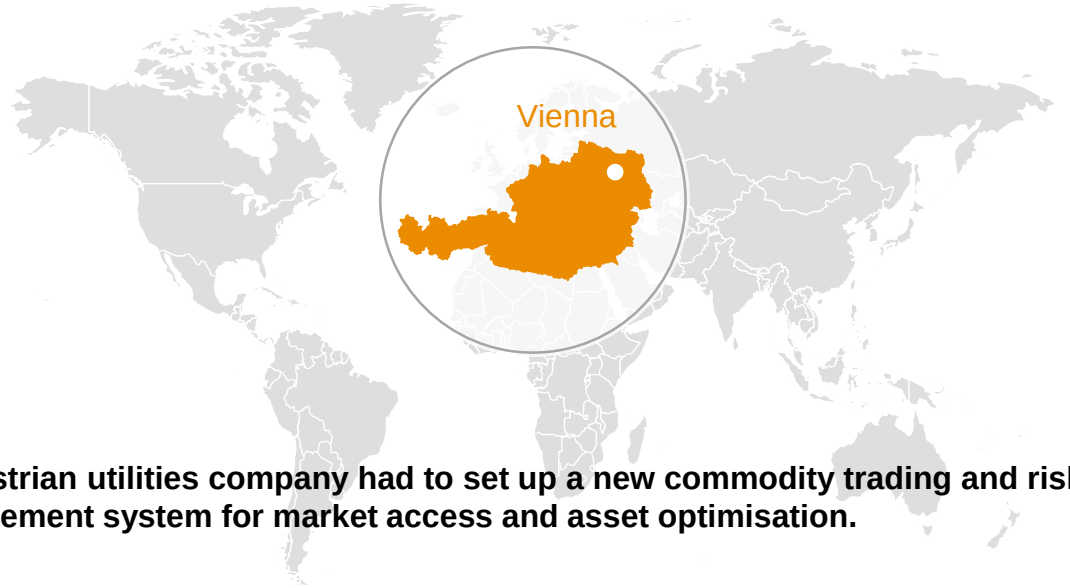
- Development of a new target operating model and based on the new trends and challenges
- New target system architecture reflecting the new requirements
- Implementation of the new target landscape
- Business will run in new instance for power and gas.
- Centralised reporting for multi-commodity
- Cost reduction in maintenance and support of trading systems
- Reused the out-box functionality and have a more flexible solution to proactively react to market challenges and new products for customers

PwC team assisted to design, build and test a robust interface platform for interfacing with different SAP, trading, pricing and risk systems.

Project example 2

Implementation of an ETRM system in Austria

Project management for the implementation of an ETRM system for power, gas, and oil trading, which was intended to replace several legacy systems.



An Austrian utilities company had to set up a new commodity trading and risk management system for market access and asset optimisation.

Business challenge

Different legacy systems had to be replaced in order to process all trading activities for different commodities in the CTRM system.

Project impact and outcomes

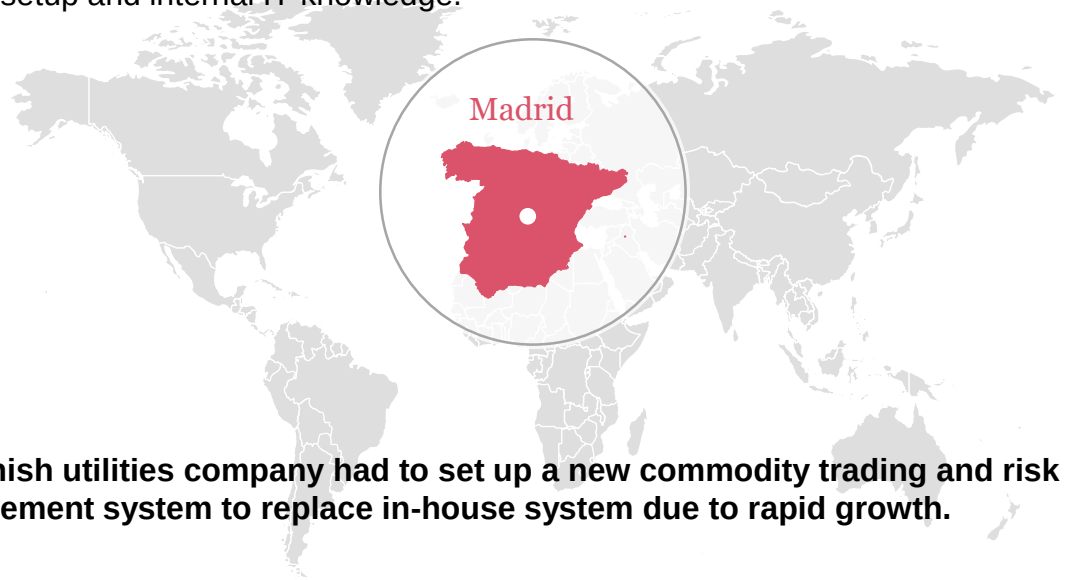
- Assessment of existing IT architecture and development of a new target system architecture reflecting the new requirements
- Definition of requirements as part of the specifications documentation for front office, middle office, and back office
- System customisation of specific business requirements
- Management of technical as well as business teams
- Cost reduction in maintenance and support of trading systems
- Development of test concept, training concept, roll-out plan, go-live concept as well as a concept for conducting the parallel run

PwC project member led the implementation team from a business and IT perspective to ensure a delivery on time, on scope, and budget.

Project example 3

Project assessment of ETRM implementation

PwC project team was asked to conduct a quality assurance of the ongoing implementation project for power and oil, which was off-track due to incomplete project setup and internal IT knowledge.



A Spanish utilities company had to set up a new commodity trading and risk management system to replace in-house system due to rapid growth.

Business challenge

Identifying functional and non-functional pitfalls in an ongoing and established implementation program with a heterogeneous team consisting of numerous external consultants and internal project roles

Project impact and outcomes

- Assessment of existing project governance (e.g. project plan, project organisation, etc.) through interviews/workshops with departments/ project teams to align on the project status
- Review of defined requirements definition and comparison to business model and target IT architecture
- Verification of business requirements towards the ETRM system implementation approach
- Review of technical implementation approach and project maturity under consideration of use cases and time required (roadmap).
- Outcome of quality assurance was a report with all findings and recommendations based on PwC's best practices for ETRM projects

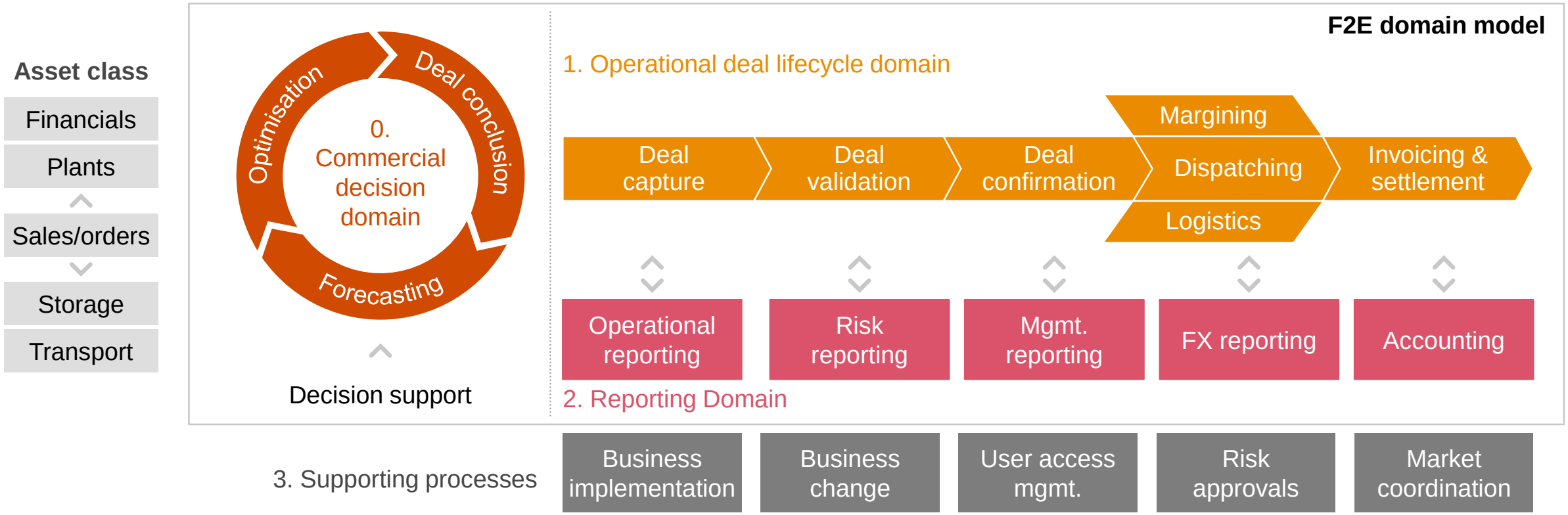
PwC project team conducted quality assurance/project review identifying pitfalls and provided containment actions and long-term roadmap.

Project example 4

Software selection German gas & power trader

Lessons learned (1/4)

All functional requirements of the trade life cycle need to be covered, considering different domains, supporting processes and asset classes.



Lessons learned (2/4)
Consideration of future developments

The design of the IT architecture should reflect future trends to allow a sustainable and flexible setup and be prepared for upcoming developments.

Future trends …

- Further unbundling of functionalities like
  - Grid operations
  - Sales (retail)
  - Sales (wholesale)
  - Trading (energy and fuels)
  - New asset development (renewables)
- Evolving markets towards renewable energies

… lead to new requirements …

- Evolving market to renewables change the energy and fuels trading (higher volatility, less fuel, more short term trading, x-commodity hedging).
- New market trends evolve quickly and need to be reflected (e.g. prosumer).
- Further unbundling needs to be reflected to be able to separate functionalities without too much efforts.

… for a flexible architecture

- The IT architecture needs to reflect the evolving future requirements.
- This will require a flexible and modular landscape/target operation model in terms of
  - Time-to-market optimisation
  - Handling and provision of real time & big data
  - Leveraging economies of scale by template usage & process standardisation
  - Maintaining data quality & IT security
- Integration and platform strategy becomes a game changer.

Lessons learned (3/4)
Consideration of future developments

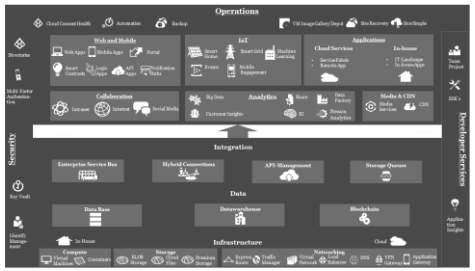
Definition of requirements needs to reflect both: Changes and trends in IT architecture due to new technologies and potential future business developments.

Former "classical" requirements

- Optimisation of production assets via hedging activities in forward markets
- Acting as a central decision-taker, service function and data provider in the center of the energy value chain
- Generation of additional revenue while staying within defined position and VaR-limits
- Segregation of proprietary trading and hedging activities
- Providing individual structured product pricing to origination and sales units
- Maintaining central data repositories for commodity & logistics transactions as well as for market prices in all commodities
- Ability to timely process all transactions in back-office and invoicing

"New" requirements

- Delivering security of supply and guaranteeing balance for production and sales with deliberate use of regulation energy
- Design and implementation of decision-support modelling tools for short-term trading and regulating markets
- Specification of real-time data requirements from various source systems outside trading
- Reassessment of the ability of existing systems used in trading for accommodating changed data and functionality (ETRM-, EDM/PFM, …)
- Reduction of forecasting errors and costs for regulating energy
- Monitoring implementation effort and cost per transaction, specifically for "Structured Products"



Lessons learned (4/4)

Best practices and summary of lessons-learned

Named below is a summary of best practices, which should be considered before and during implementation projects to ensure a successful execution on time, budget, and scope.

Best practices

- **Target landscape** emphasises the strength of the single software solution from an front-to-end perspective (don't overload the ETRM core with further processes)
- Focus was on critical path and "must-haves" regarding **scope** to realise components step-wise instead of big-bang approaches
- Involvement of ISV for **design-/roadmap** decisions & contractual binding as much as possible
- Prioritisation of importance of **governance** regarding scope, requirement & change management
  → Implement corresponding processes and boards to handle upcoming requests/changes in an appropriate way ("e. g. Design Authority")
- Guarantee of **business involvement** during the whole lifecycle of a requirement
- Guarantee of Ensure appropriate **ETRM know-how** on business & IT site for specification, testing, implementation and support (e.g. "Key-user"); reduction of dependency on external resources
- Functional **testing** as a source for regression modes (front-to-end), non-functional requirements have been considered as well
- **Support & maintenance** design was part of the overall to-be design (holistic approach)

Lessons learned summarised

1. Design the **target landscape** using defined and agreed architecture principles
2. Requirements based on **end-to-end processes** have to consider an end-to-end architecture blueprint
3. Setup of **governance** with regards to scope, requirements and change management
4. Definition of **critical path** and "must-have" functionalities

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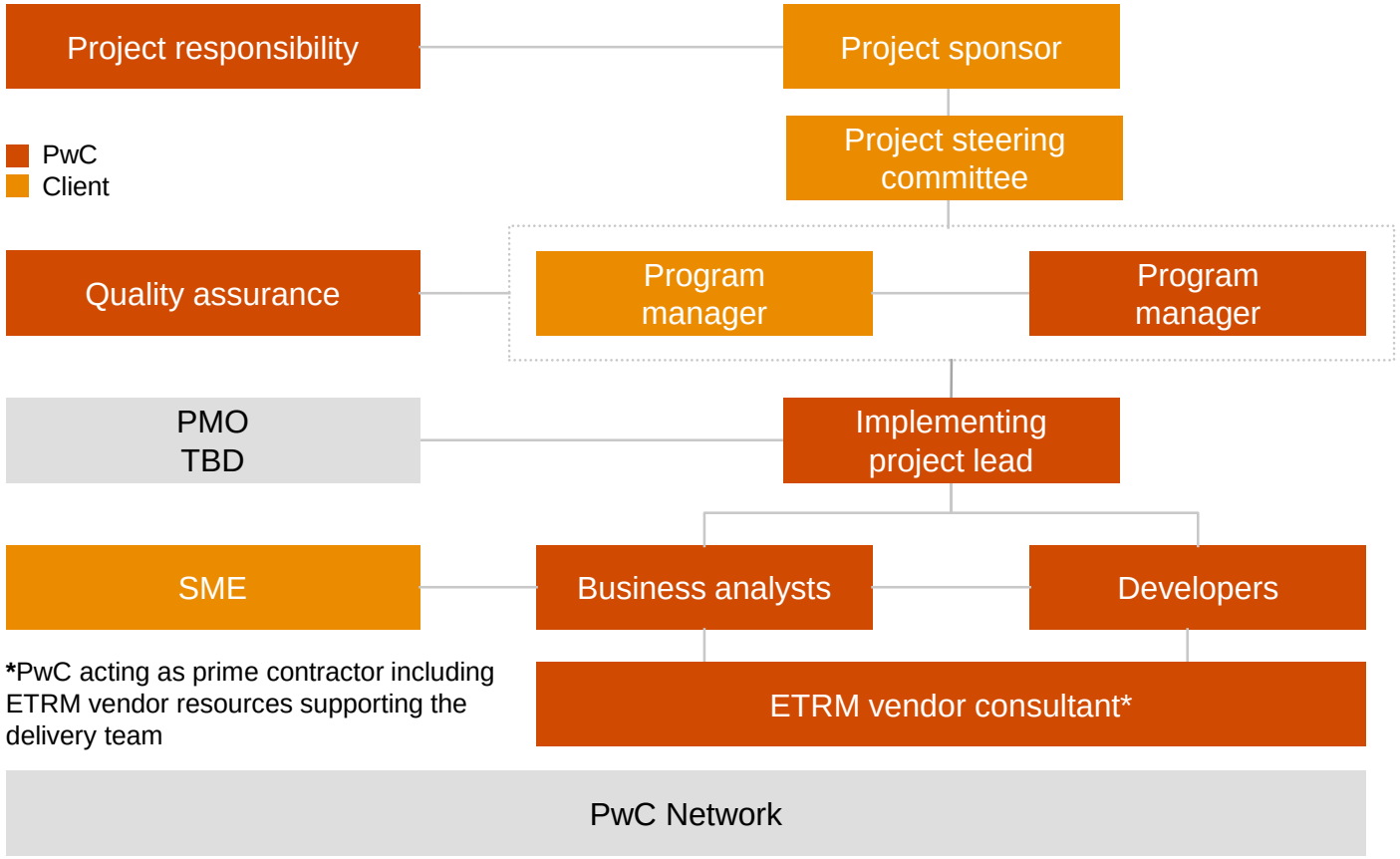
We propose a team with deep ETRM implementation experience and solid client base in Europe



*PwC acting as prime contractor including ETRM vendor resources supporting the delivery team

Team structure

- We propose a delivery team composed by business analysists and developers lead by a PwC implementing project lead.
- The delivery team is composed by senior consultants that will combine onsite/offsite work and developers that will work on the extensions and interfaces.
- The team will be supported by SMEs with experience in business processes to ensure a proper alignment between process and standard capabilities and facilitate the full coverage of the processes (not just requirements) in the solution. Also, the vendor will be part of the project supporting the team when required.
- We also recommend to include a design authority role to manage the transformation program and ensure coherence in the E2E process.

2

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Extract (1/4)
References for software selections and implementations

The references below briefly outline a number of PwC's projects, which dealt with the selection of an ETRM or ETRM-related software. Further references will be provided upon request.

	Project description	Approach	Result
E.ON Germany PFM software selection	• Vendor selection, concept development, realisation, test, as well as implementation of a portfolio management solution for power products and emissions • Legacy system replacement throughout affiliated group, conception and design of original system functionalities and to-be processes, particularly forecast, procurement, accounting, portfolio analysis and governance	• Target-oriented project management based on company standard • Process model including requirements management, conception, realisation, and implementation • Heterogeneous project team comprising clients, consultants, and staff members from various IT service organisations	• System implementation on schedule and in line with budget • Reorganisation/standardisation of process landscape and portfolio structure for one of the leading German energy providers
BayWa r.e. ETRM software selection & implementation	• A changing market environment as well as increasing marginal pressure urged customers to set up their own trading unit, which, in addition to portfolio management for end customers, also needed market access to optimise its renewable energies within the group. • In addition to the creation of a business case for the development of a trading unit and the definition of target processes, a supplier selection, SLA negotiation, implementation support and test management were commissioned.	• Setup of the business case and the definition of go/no-go decision • Definition of to-be bus. processes • Prep. of risk and mgmt. manual • Creation of role profiles • Definition of functional and non-functional requirements for an ETRM including RfI and RfP • Showcases and recommendation • SLA negotiations with two vendors (5 years TCO) • Project management and quality assurance Test management and UAT	• Clear communication with all stakeholders • Obtain non ETRM-deliverables in time and budget • Selection of suitable tools for complex requirements (weather optimisation) and development of workaround solutions (cost-benefit analyses) • System implementation on schedule and in line with budget

Extract (2/4)
References for software selections and implementations

The references below briefly outline a number of PwC's projects, which dealt with the selection of an ETRM or ETRM-related software. Further references will be provided upon request.

	Project description	Approach	Result
E.ON Germany Regulatory reporting software selection (REMIT)	• With the EU's adoption of the Regulation on Wholesale Energy Market Integrity and Transparency (REMIT), the energy market faced new obligations. Besides the prohibition of insider trading and registration with the national regulation authority, participants have to report wholesale energy transaction data. • A new reporting system had to be chosen and implemented, considering the existing IT architecture and compatibility with current ETRM system.	• Market screening of solutions • Definition of requirements and supplement of client specific requirements catalogue with defined ko.-criteria and weighting of criteria • Preselection (long list) • Detailed assessment of system functionalities based on the client's requirements (short list) • System presentation by the vendor • Final assessment and SLA support	• Agreed and communicated objectives • Definition of possible IT architecture scenarios and recommendation • Project implementation planning for realisation, duration, budget • Project management for implementation and go-live • Delivery of implementation on time, budget, and scope
Repsol Software Selection for ETRM and natural gas balance solution	• Repsol were looking to grow up on the gas and power market to become a multi-energy company • For supporting the new business units for gas and power they were looking for define the IT architecture for supporting the business processes for gas and power operations in Europe and select an ETRM solution and an scheduling solution for gas for Europe	• Definition of the business objective and the business strategy • Analysis of the existing business processes and the technical requirements based on them • Process for selecting the best IT architecture and software to support it based on standard packages in the markets • Produce a roadmap of the implementation of the architecture	• IT architecture defined and aligned within the business strategy • Recommendations on the systems to implement, defining the main gaps and proposing solutions for fill it • Produce a director plan and the budget to move forward to the implementation phase

Extract (3/4)
References for software selections and implementations

The references below briefly outline a number of PwC's projects, which dealt with the selection of an ETRM or ETRM-related software. Further references will be provided upon request.

	Project description	Approach	Result
gas Natural Software selection for scheduling solution	• gasNatural were looking for a new scheduling solution to manage the gas portfolio in Spain, France and Portugal. • The main objective was to find a solution with market communication capabilities and flexible to be quickly adapted to changes on regulation and a new business strategy more focus on the optimisation of the portfolio based on the new gas exchange in Spain (MIBGas).	• PwC deliver this project conducting workshops with the client to ensure an understanding of the business processes and the capabilities of standard packages. • PwC also prepared different scenarios for supporting demo from the different vendors to ensure an alignment on the real capabilities of the system and the requirements from gasNatural. • PwC ended with a recommendation and the preparation of a director plan for implement the IT architecture.	• As a result of the project gasNatural benefits from the experience of PwC to conduct this kind of project and a new architecture were selected to support the business processes. • Due the experience of PwC some of the business processes were optimised to reduce the effort of the business as a quick win.
Trafigura ETRM implementation	• Trafigura was looking to implement a new ETRM solution to support the E2E of gas and LNG activities, including trade capture, risk analysis, credit risk analysis, settlement and accounting. • The implementation was based on replacing an existing in-house solution and help to take advance on the best practices of the sector especially for MO and BO operations.	• PwC delivered the project E2E, starting with a scoping phase of two weeks to review the requirements and the main gaps • After the scoping phase, the PwC team delivered the implementation in seven months for the whole set of requirements, including training of the internal teams to continue with the support of the system.	• As a result of the project, Trafigura started the operations in the system and was able to implement by themselves new hubs in the system in a quick time based on the documents produced by PwC. • The team helped to adopt IFRS 9 to the accounting teams in Trafigura with an alignment between requirements and systems.

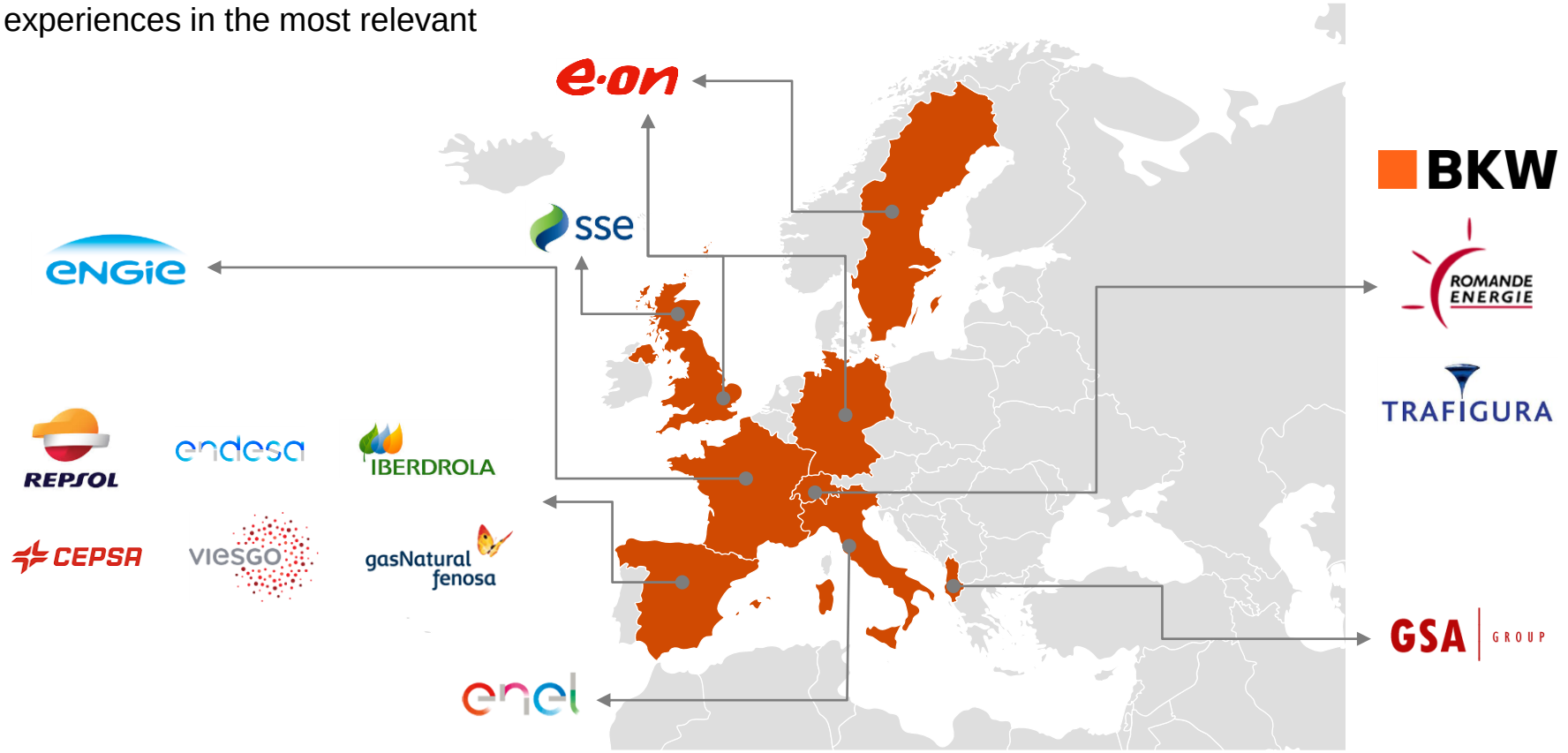
Extract (4/4)
References for software selections and implementations

The references below briefly outline a number of PwC's projects, which dealt with the selection of an ETRM or ETRM-related software. Further references will be provided upon request.

	Project description	Approach	Result
Engie ETRM implementation	• Engie was looking to replace the existing in-house ETRM solution for supporting LNG portfolio activities. • The objective of the project was also to review the business processes and to align them with best-practices and standards of the sector.	• PwC delivered the project E2E, helping Engie as technical experts on the review of the existing business processes and proposing changes to be adapted to the standard capabilities of the system. • PwC worked as part of the implementation team in Agile methodology configuring and extending the system • During the project, the PwC team worked on the knowledge transfer to internal teams for after go-live support activities.	• As a result of the project, the system was delivered on time according to the initial plan. • The budget was kept under control and PwC helped adding flexibility to the resources' workload to ensure a proper alignment of project requirements and the resources workload.
BKW Quality assessment & project management	• The objective of the project was to replace the existing legacy system, which was running out of support. • Scope of the project were several commodities – CO_2, gas, and power. • The project was delayed due to the massive amount of BKW-specific requirements.	• PwC conducted a quality assessment/review of the ongoing project, reviewing project governance as well technical and business specifications. • The team proposed an alternative project approaches with new timelines, quality gates, project structure, governance and risk measures to ensure a delivery on time and budget.	• PwC recommended a favorable approach PwC was put in charge of project management activities and the quality and risk management. • PwC supported the implementation with several SMEs. • The project was delivered on time, budget, and scope.

Additional engagements

Additionally the team has previous experiences in the most relevant implementations across Europe.



3

Our service offering for organisational design and business transformation

3

Building a new trading organisation

Transforming an existing trading organisation

Overview of PwC’s due diligence services

Extract of project references

As a subject matter expert of strategic commodity trading issues, PwC provides a full stack of strategy related services in order to adjust client's needs to changing market requirements

Strategy execution

- Support clients to transform their **business models** and implement the required changes in their organisation, steering approaches and business processes in order to take advantage of changes in their market environments (e.g. "Energiewende", move towards more short-term trading, regulation).
- This adjustment often require them to exploit the possibilities created by **"digitalisation"** (e.g. building of virtual power plants, algorithmic trading).

Quantitative modelling support

- Develop and review **quantitative steering & valuation models** that improve the ability of client's commercial teams to steer trading activities and the client's risk teams to monitor associated exposures and attribute PnL movements to their root causes.
- Examples are development of hedging/risk steering models, contract design as hedging to lock-in originated value or transfer price models.

Digitalise commodity trading business

- We support clients to **digitalise** risk measurement, risk reporting and valuation processes as leveraging capabilities of new IT solutions (BI, S4 Hana) to set-up new steering models.
- Realise efficiency gains inherent in semi-automatic risk and (hedge) accounting processes

Due diligence support

- Data-based portfolio analytics supporting financial due diligence teams to identify trade patterns, concentrations of risks exposures, inconsistencies between unrealised PnL, realised PnL and risk exposures
- Power purchase agreements: Support regarding the valuation of storages, physical assets and long-term contracts

Our “blueprint” approach for building a new trading organisation

Target state definition

- Derive structure of target portfolio from business plan
- Modelling of drivers of risk & value
- Assessment of capital & liquidity needs

- Description of the target portfolio and the trading approach
- Identification of gaps vis-à-vis as-is portfolio (if applicable)

Structuring of portfolio & definition of steering model

- Delineate value drivers & define book structure
- Define KPI per type of book
- Set-up incentive-compatible steering mechanisms
- Translate capital & liquidity available into limits per book

Definition of the commercial aspects of the steering model including book structure, KPI per book type, position hand-over mechanisms and limits

Building of organisation and business processes

See section 3.2

- Business plan for current set-up
- Mid-term potentials from improvements

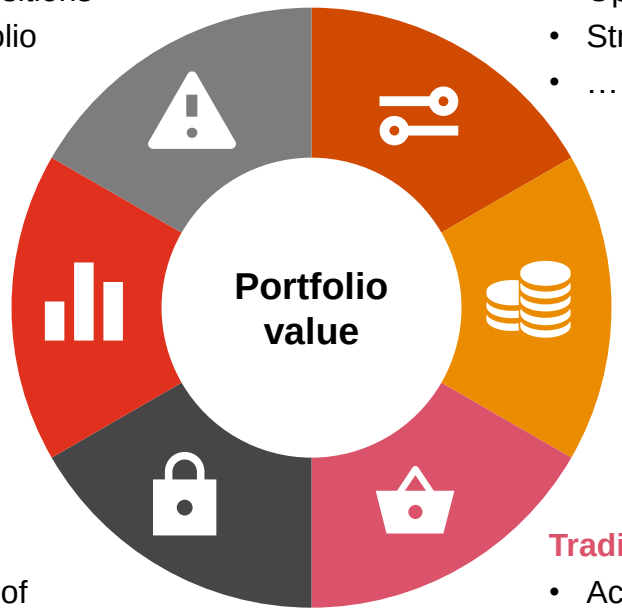
Best-in-class and scalable trading unit

We review the business plan and work out possible approaches for structuring the target portfolio and defining the pursued trading approach …

Key issues that need to be considered …

Market risk
- Hedging of open positions
- Structuring of portfolio
- …

Portfolio optimisation
- Optimisation storage & location
- Structuring & origination flexibilities
- …



Liquidity risk
- Optimisation of the cash commitments from margins
- …

Credit risk
- Diversification of exposures
- Framework contracts
- …

“Security of Supply”
- Physical protection of distribution obligation
- …

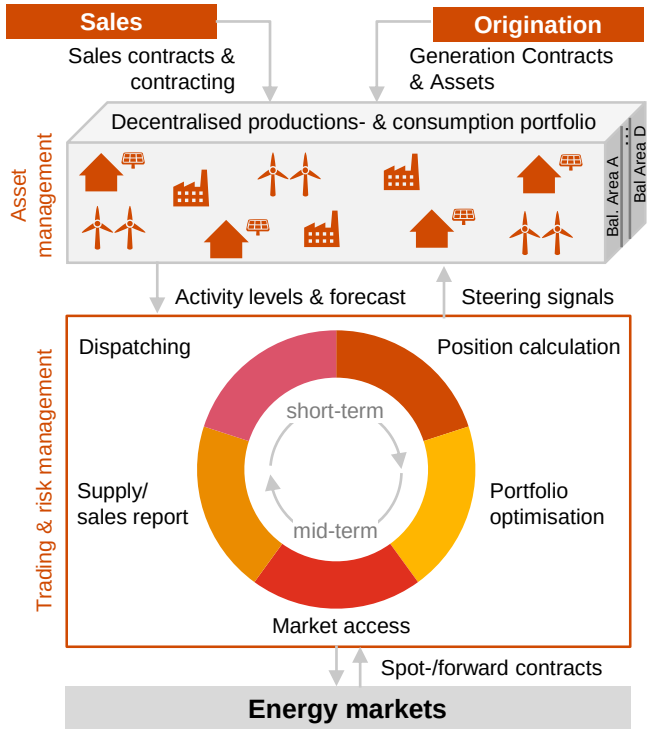
Trading & origination
- Acquisition of undervalued assets
- Arbitrage trading
- …

… definition of the structure of the target portfolio & trading approach

Key elements include
- Composition of the portfolio (markets, commodities, product types, …)
- Analysis of the key sources of risk & return
- Feasible hedging strategies
- Assessment of the critical success factors, e.g.
  - Required scope of physical asset base,
  - “platform” contracts required for building the portfolio,
  - It (e.g. support of trading algorithms),
  - …
- Identification of gaps vis-à-vis as-is portfolio

… and model the key drivers of risk and value enabling us to assess the amounts of capital and liquidity required for executing the trading strategy

Holistic view on physical assets and trading portfolio is the basis for …



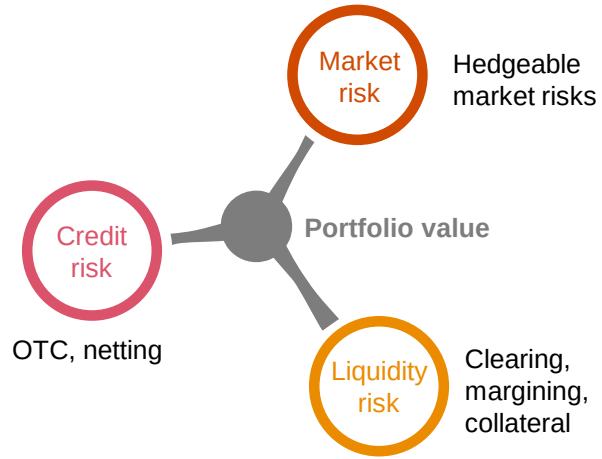
… modelling the key drivers of risk and value …

Category	P&L component
«Financial overlay»	Asset-backed trading P&L
	Hedging P&L
"Physical execution"	Spot margin
	Balancing energy (pro-rata)
	Intraday trades
Flexibility services	Capacity price
	Reserve contracts
Other	Other charges (incl. risk capital)

Trading | Asset owner | Transfer

… and assessing the amounts of capital and liquidity required

Trade-offs between liquid/hedgeable risk exposures



Illiquid/non-hedgeable risk exposures

- Calculation of valuation reserves for illiquid/non-hedgeable risks
- Adapt alternative risk frameworks (e.g. from insurance industry) for dealing with longer-term risks (e.g. "risk of ruin" framework)

We help to delineate key drivers of risk/value and translate them into a book structure that enables organisation to mone-tise the portfolio value in day-to-day trading operations, …

Clear definition of responsibility per value lever

Illustrative example

Sales trading		Origination		Physical asset management	
Internal sales interface	Direct market access & electronic platforms	Structured contracts (retail B2B)	Structured contracts (wholesale)	Asset optimisation (Internal)	Asset optimisation (3rd party)
Portfolio management clients	…	Prosumer solutions	…	Tolling & VPPs	Renewable PPAs
Risk transfer ↓ / Internal liquidity provision ↑		Risk transfer ↓ / Internal liquidity provision ↑		Risk transfer ↓ / Internal liquidity provision ↑	

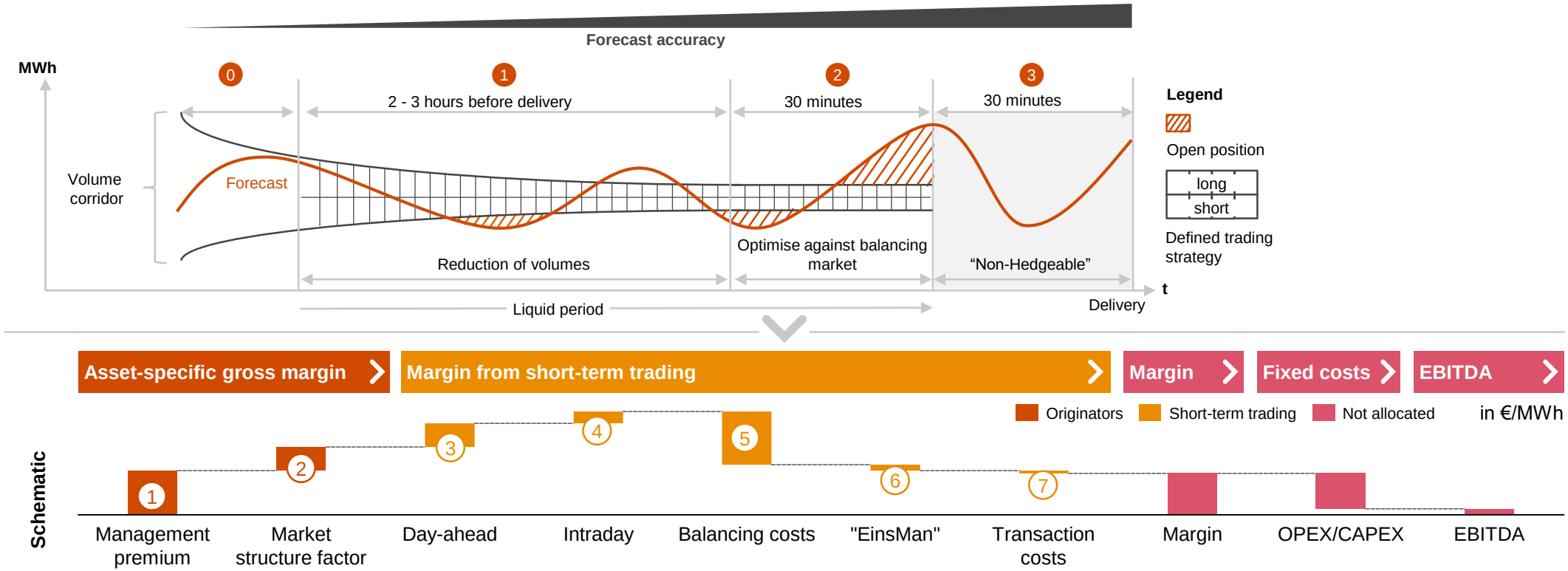
Merchant trading & market access – Risk taking against risk capital

Outright (Delta-1 position) trading	Market making	Options & structured products	Spread trading (cross-commodity & cross-country)	Short-term (day-ahead & intraday)	Proprietary trading

…, define sets of KPI that allocate responsibility for the clearly defined PnL components to book owners/organisational units, …

Set of KPI tailored towards risk exposures by book

Illustrative example



… and help to design the steering mechanisms and transfer price mechanisms required to align the incentives of the various book owners/business units with overall targets

Efficient hand-over of positions ensured

Designing incentive-compatible steering mechanisms

1 Define value amounts including risks, costs and other items that need to be allocated to book owners/business units

Transfer Price = Intrinsic Value + Extrinsic Value – Risk Premia – Costs

- Forward power and fuel prices
- Valuation reserves
- Efficiency of assets

- Moneyness/time to delivery of optionality
- Flexibility of assets
- Power- and fuel-volatility/correlations

- Non-hedgeable market price risks
- Volume and balancing risks
- Credit risks
- Operational risks

- Transaction costs
- Hedging costs (e.g. Market risk capital for open position, liquidity costs, credit reserves)

2 Define mechanism for allocation of value between book owners/business units

Transfer pricing (fixed)

Charging of a fixed amount per MWh (volumetric charge)

Transfer pricing (variable)

- Charging of a fixed amount per MWh at deal inception (volumetric charge)
- Periodic “ex-post” adjustment to make-up for realised costs/value

Fees (e.g. service fee)

Periodic charging of a fixed amount or variable amount in € based on actual costs

3

Building a new trading organisation

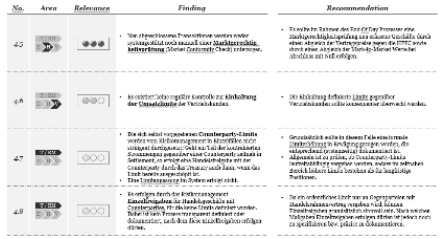
Transforming an existing trading organisation

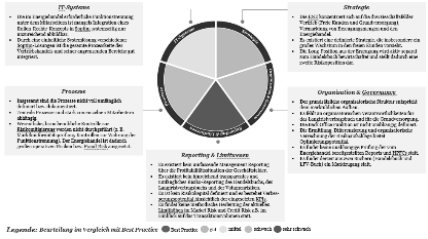
Overview of PwC's due diligence services

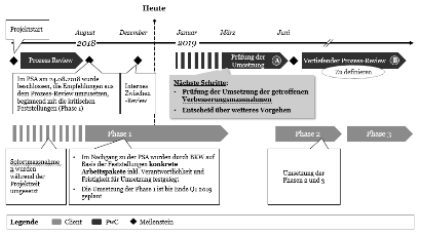
Extract of project references

PwC's benchmarking and transformation approach for trading and risk management services covers all relevant dimensions and is based on best practice principles

	1 Outside-in-view	2 Gap analysis	3 Measures & implementation
Governance Organisation Processes Risk capital & limit structure Reporting	• Performing an analysis across all dimensions of the trading unit incl. risk management based on inter-views, deep dives and documentation • Determining the consistency and state of maturity of all dimensions compared to industry best practices and peers using qualitative information and quantitative data from PwC peer database	• Determining target state of maturity for each dimension of the trading unit • Performing a gap analysis by comparing actual with target state of maturity • Identification of clear action points for each dimension based on detailed findings	• Develop recommendations for each finding and clustering to work several packages • Build a road map based on criticality, feasibility and cost • Develop appropriate measures to address the weaknesses and improve the trading unit • Implementation of the developed actions

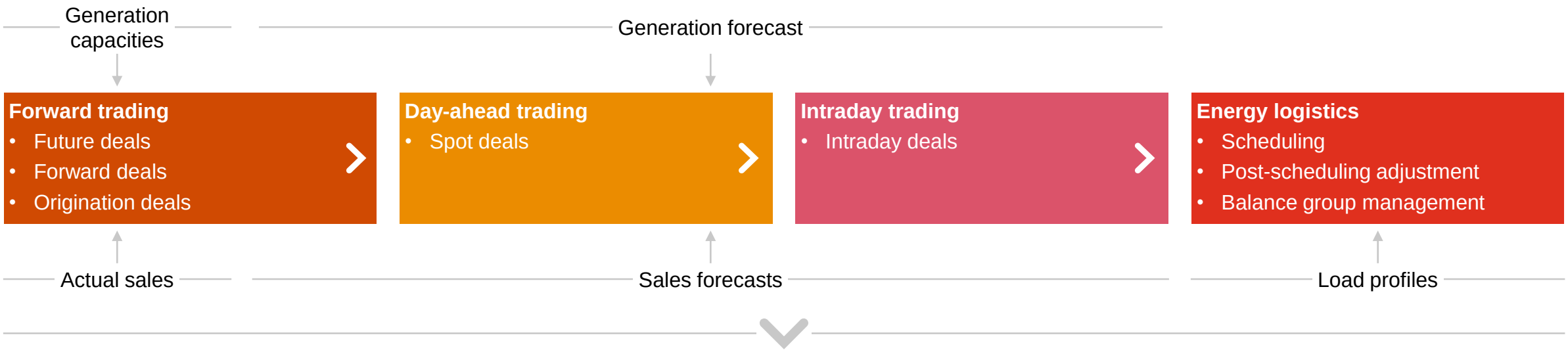






Governance

The value chain of the Energy Trading unit defines the relevant aspects for the right governance

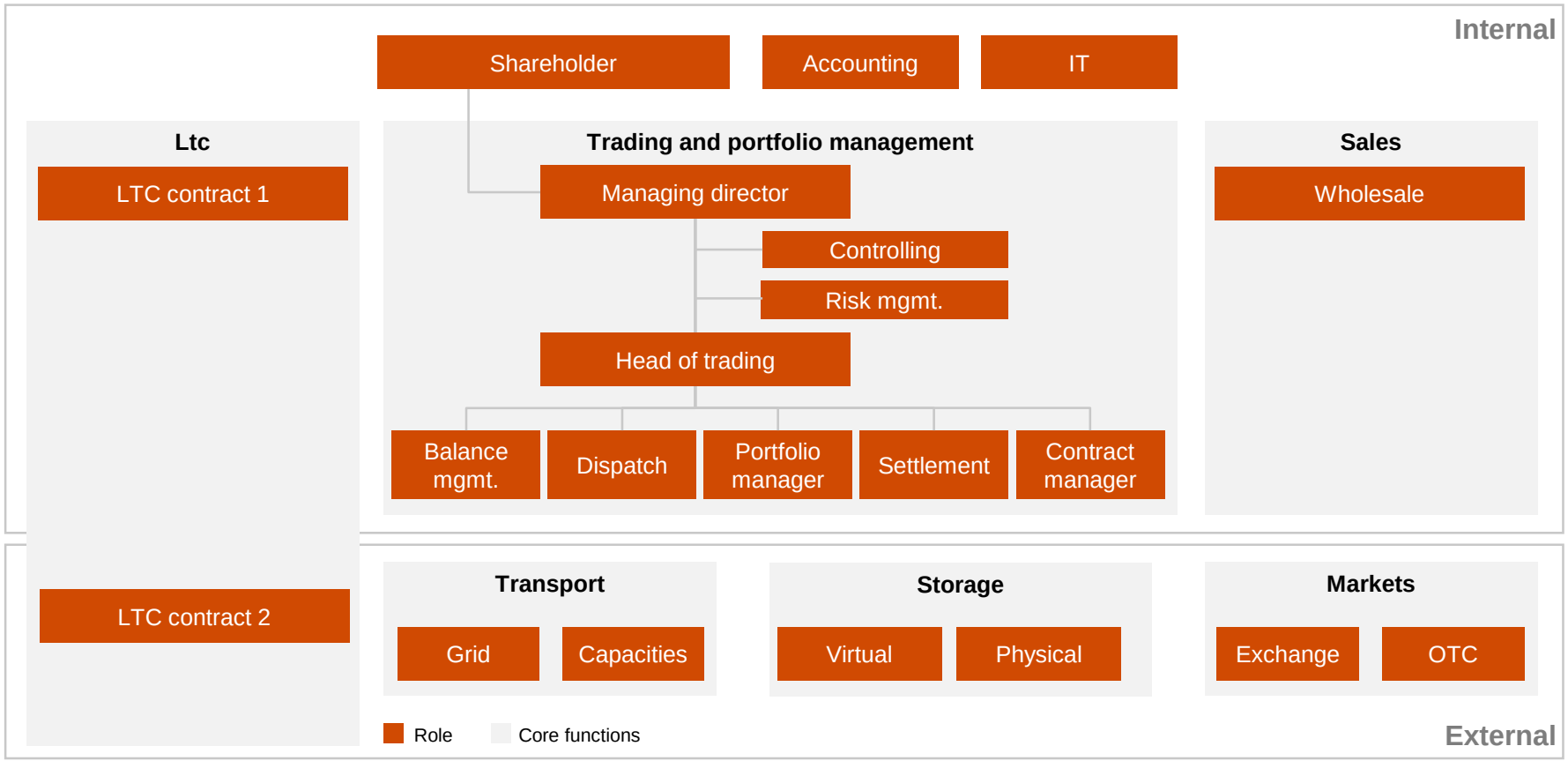


Relevant governance items

Group strategy	Internal transfer price agreements	Trading mandates	Risk management policy	Credit risk policy
Trading strategy	Hedging strategies	Book structure	Commodity price risk policy	FX risk policy

Organisation

Organisational structure of a trading company

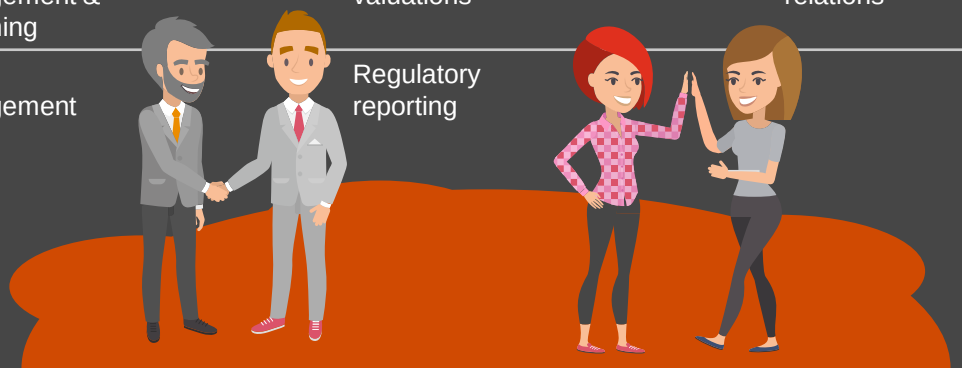


- We develop a blueprint of roles needed in order to operationally manage the desired trading and portfolio management activities.
- From the strategy and the level 0 and 1 processes headcount, job roles and their competencies are assessed following a lean approach.
- Having that, job descriptions can be reviewed in order to compare them against best practice responsibilities (see next slide).

Organisation

Key responsibilities of front/middle/back office and risk management

Front office			Middle office		Back office			Risk management		
Client management	Product management	Portfolio management & trading	Investment support	Transaction processing	Controlling & reporting	Portfolio & fund services		Risk framework	Risk monitoring	
Marketing	Product development	Investment strategy & research	Information exchange external PM	Trade matching	Post-trade compliance	Position keeping	Portfolio valuation	Risk policies and guidelines	End-of-day process	Approval of valuation models/tools
Sales	Product maintenance	Portfolio modelling & construction	Allocations & bookings	Clearing	Risk controlling	Fund accounting	Portfolio valuation	Alignment of risk capital with management	Special transactions approval	Coordination of risk Gremium and execution of its decisions
Client onboarding	Product reporting	Order generation	Counterparty management	Settlement	Performance measurement & attribution	Corporate actions & proxy voting	Tax	Definition of total limits based on risk capital	New market/ product/book/ trader/counter-party approval	Construction of price forward curve for valuation
Client relationship management	New product process	Pre-trade compliance	Collateral management & margining		Pricing and valuations	Reconciliation	Custody relations	Approval of hedging strategies	Market conformity check	Risk reporting
Client reporting	Commission management	Trade execution	Data management		Regulatory reporting			Risk valuation methods	Ensuring compliance with risk guidelines	Monitoring limit utilisation



Processes

A structured process review & definition follows the deal life cycle along the value chain of the trading unit

Governance and supervision

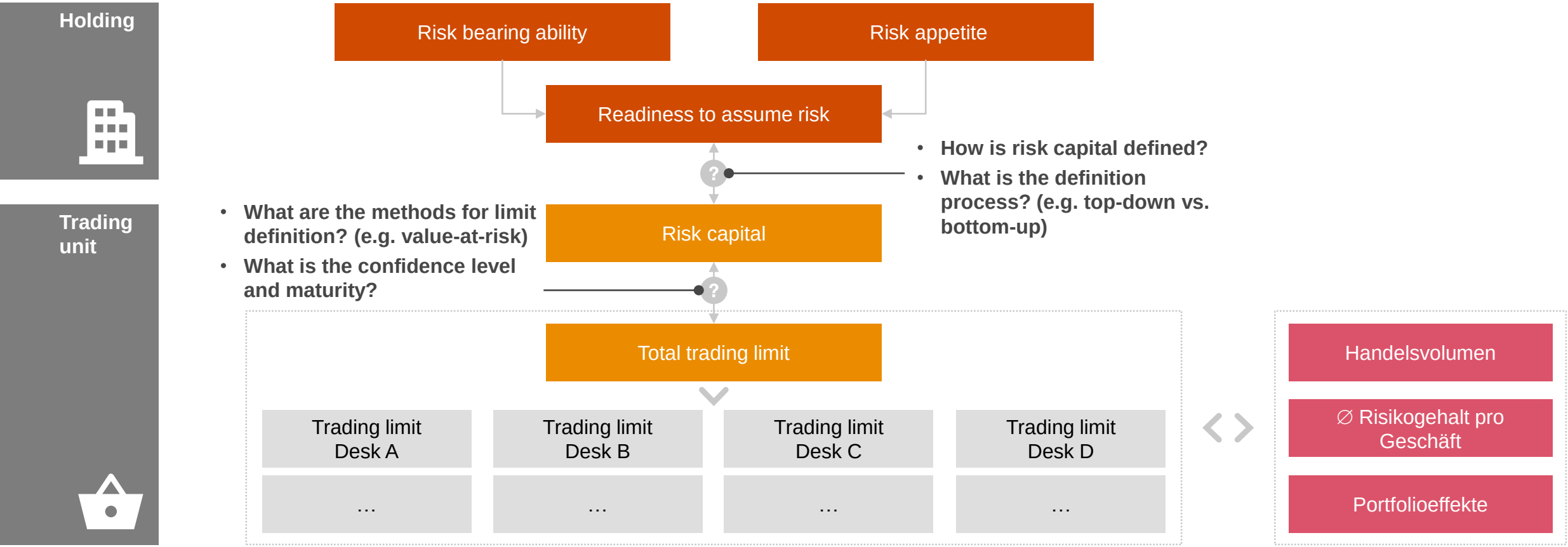
Systems, interfaces, tools

Deal cycle	Deal execution 1	Transaction support 2	Logistics 3	Risk manage-ment and reporting 4	Settlement 5	Financial reporting 6
Process steps	• Deal capture • Trading • New product/ counterparty approval • Front office analytics	• Confirmation • Deal validation • Deal modification • Contract administration • Collateral/ margins	• Scheduling • Energy management	• Operational risk • Market risk • Credit risk • P&L and position • Regulation • Validation PFC	• Payments • Actualisation volumes • Broker/ exchange settlement • Counterparty settlement	• Monthly reporting • Accounting derivatives • Management reporting

- Processes are assessed/defined following the deal life cycle starting from deal execution to financial reporting for each product category.
- This procedure can be performed for all product categories along the value chain
  - Origination
  - Long-term trading
  - Day-ahead trading
  - Intraday trading
  - Post-scheduling adjustments

Risk capital & limit structure

Market, credit and liquidity risk is limited by setting appropriate trading limits based on risk capital



Risk capital & limit structure

A typical limit structure for market risk involves risk limits as well as warning thresholds

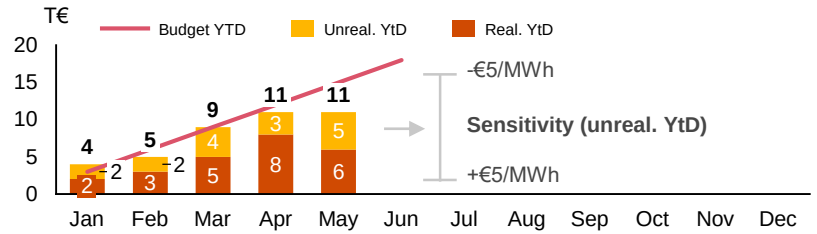
Market risk capital: …

	KPI	Limit size	Pre-breach limits (e.g. 80% of total limit)	Actions when exceeded
Warning thresholds 	**P&L (YTD)**	…	n/a	• Communication to risk committee/CFO • Increasing warning threshold or decreasing risk limits through risk committee/CFO
	Gross position	…		
Limit 	**Value at risk** (e.g. 95% over 5 days)	…	• Communication to risk controlling • Take actions to avoid limit breach (e.g. no further increase of net position, closing of open positions if possible)	• Communication to risk committee/CFO • Strict decrease of net position • Potential (temporarily) limit increase by risk committee/CFO
	Net position	…		

Reporting

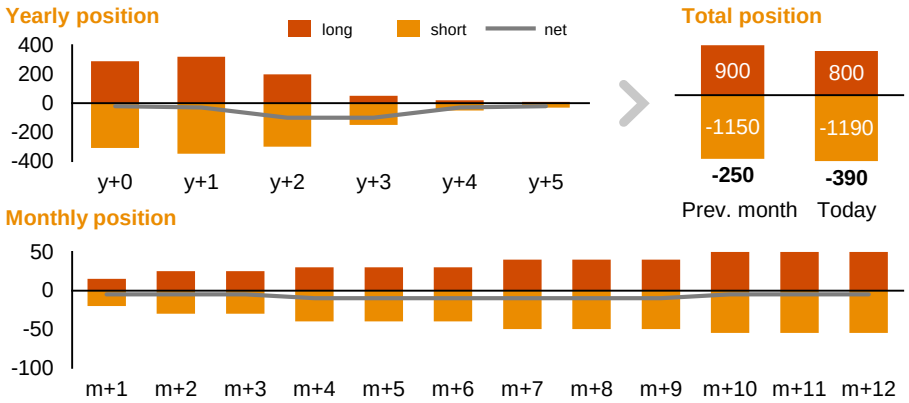
A good risk reporting is critical for management to make the right decisions at the right time

Trading P&L

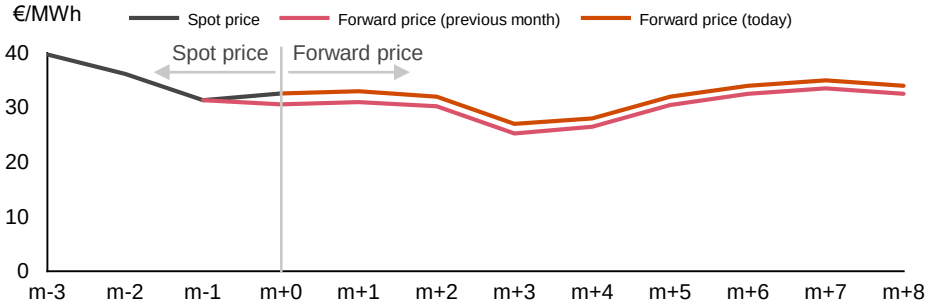


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Actual MtD	+4	+1	+4	+2	0	…	…	…	…	…	…	…
Actual YtD	+4	+5	+9	+11	+11	…	…	…	…	…	…	…
Budget YtD	+3	+6	+9	+12	+15	…	…	…	…	…	…	…
Δ Act./Budg.	+1	+1	0	-1	-4	…	…	…	…	…	…	…

Gross & net position incl. term structure



Price development



Value-at-risk & limit utilisation

	Current Month	Previous Month	Monthly Change
VaR (T€)			
VaR limit (T€)			
VaR utilisation (%)			

VaR measures the maximum loss over a holding period of 5 days at a confidence level of 95%.

- A good risk reporting shows all relevant KPIs in a transparent and appropriate manner.
- It should highlight also the relevant limits/limit utilisation and should give a performance history as well as a maturity based view of trading position in order to allow further risk assessments.
- In addition it should contain market information (price developments, price scenarios etc.).
- Level of detail should vary depending on the addressee.

3

Building a new trading organisation
Transforming an existing trading organisation
Overview of PwC's due diligence services
Extract of project references

The commodity trading & risk management team provides highly relevant expertise to our FDD services within the commodity sector

Based on the expertise and industry know-how derived from serving our commodity clients' risk, controlling and commercial functions, our commodity trading & risk management team can add significant value to our financial and commercial due diligence services for targets operating in commodity intensive industries.

Assessment of organisational set-up of trading and risk management activities

- Assessment of quality of **organisational structure**, **processes** and **IT-systems** against industry best-practice
- Identification and analysis of weak spots within the **overall setup** of the **trading and risk management departments**

Impact of commodity trading on reported financials

- Expertise in **commodity hedging** and relevant **accounting treatment** (hedge accounting, own use)
- Expertise in **reconciliation** between **commercial, accounting/accrual** and **cash impact** of commodity transactions
- **Normalisation** of **reported financials** and assessment of price scenarios on core KPI

Valuation of commodity contracts and capital requirements

- **Valuation of trading contracts** incl. **Assessment of forward price curves**
- Industry approaches for **valuation of structured contracts**
- Best-practice approaches for calculating **valuation adjustments** and **capital requirements**

Assessment of key drivers of risks and performance of commodity businesses

- **Data-based diagnostics** into **trading patterns**
- Experience in industry best-practices regarding **assessment**, **quantification** and **strategies** for **managing market**, **credit** and **liquidity risk** of commodity businesses

We applied our knowledge in various projects across different commodities and industries adding value to our FDD services by …

Undisclosed

2018

Due diligence of a gas and power trading portfolio including portfolio analysis, valuation of key contracts and calculation of adjustments for unbooked values

Due diligence

PwC

Undisclosed

2017

Review of business plan for gas and power trading business including calculation of risk capital requirements for market, liquidity and credit risk

Business plan review

PwC

2014

Valuation approach for a structured gas transaction underlying the restructuring of a trading business

Valuation

PwC

Undisclosed

2016

Due diligence of a gas supply business

Due diligence

PwC

Undisclosed

2018

Review of the business plan for a gas trading desk including risk capital and working capital requirements

Business plan review

PwC

2016

Valuation of a middle distillates trading book

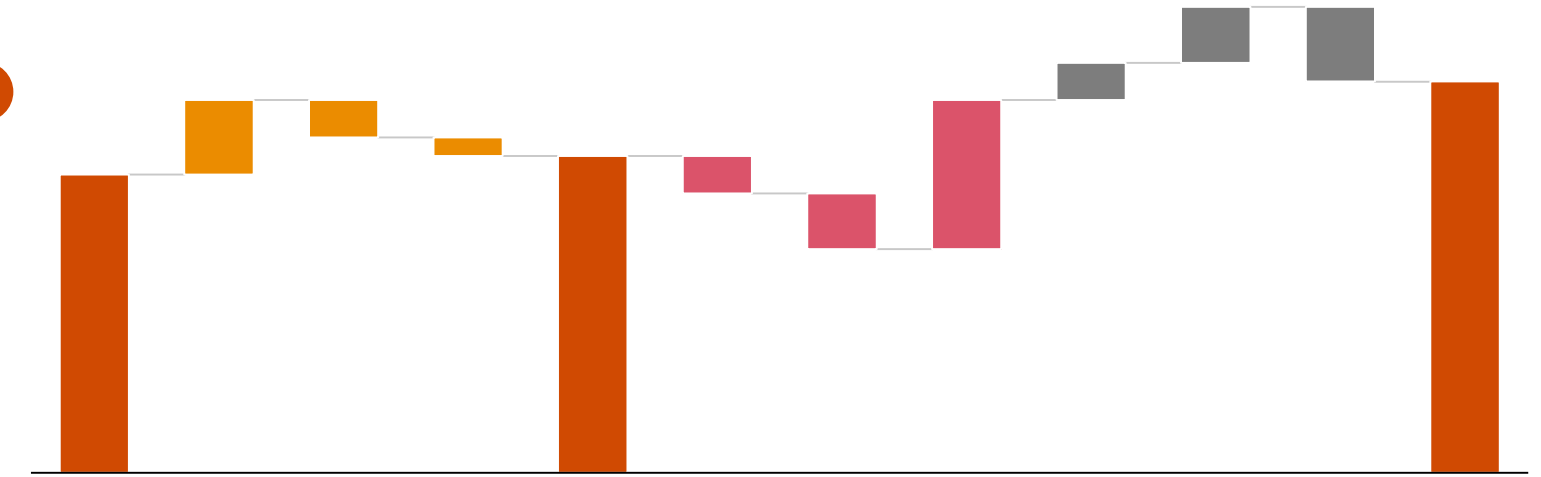
Valuation

PwC

… supporting FDD teams dissecting the impact of commodity-specific issues on IFRS financials …

The CTRM practice bundles PwC's knowledge regarding risk and performance measurement as well as commodity accounting and works extensively on the interface between our client's commercial, risk/controlling and accounting functions.

1



Risk management effects

Operative effects (e.g. storage valuation), **unbooked valuation adjustments** (e.g. credit or liquidity risk), different treatment of **accruals**

Hedge accounting effects

Effects from **commodity hedge accounting** (economic vs. Financial reporting view) on EBITDA

Other accounting effects

Adjustments due to **„own-use"-classification** or **embedded derivatives** to other balance sheet ratios

Value-added to FDD services

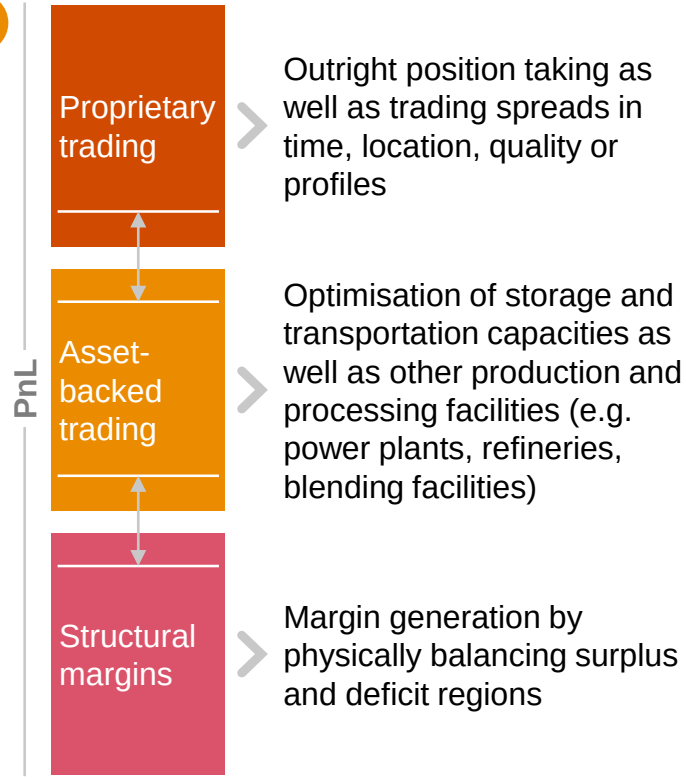
- Expertise in commodity hedging and relevant accounting treatment (hedge accounting & own use)
- Expertise in reconciliation between commercial, accounting and cash impact of commodity transactions
- Normalisation of reported financials and assessment of price scenarios on core KPI

… diving into the drivers of risk and return in complex commodity portfolios including physical assets and trading positions …

The core business of the CTRM practice consists in supporting our clients' risk and controlling functions in improving its operative commodity risk management based on state-of-art steering approaches and KPIs used by key decision-makers.

2

Break-down of PnL components

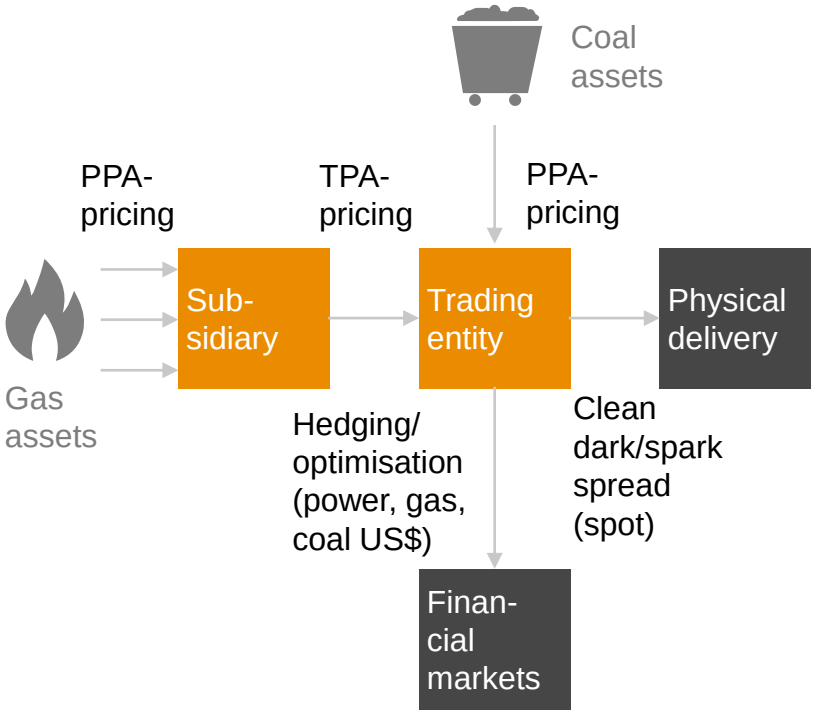


Outright position taking as well as trading spreads in time, location, quality or profiles

Optimisation of storage and transportation capacities as well as other production and processing facilities (e.g. power plants, refineries, blending facilities)

Margin generation by physically balancing surplus and deficit regions

Visualisation of Contract portfolios



Value-added to FDD services

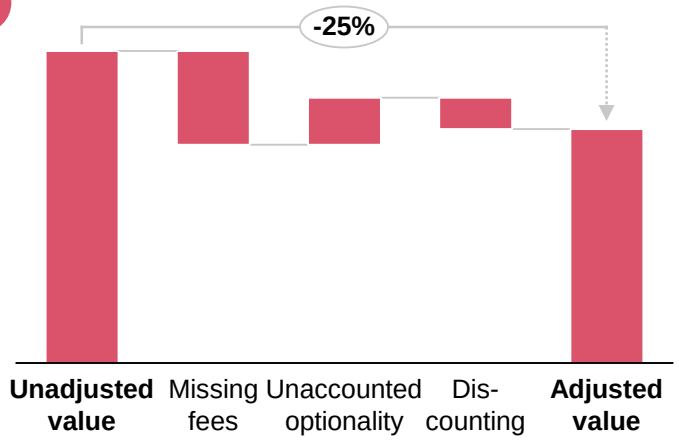
- Assessment of relevance of structural margins, asset-backed trading and proprietary trading including deep dives into rivers of trading performance and risk exposures
- Identification of key "platform" assets/contracts required for creating sustainable value from the portfolio

… performing valuations of individual positions and entire portfolios in line with the commercial view of trading organisations …

The CTRM practice can provide know-how on industry best-practice valuation approaches for various types of commodity contracts/assets and modelling of capital require-ments needed to cover market, liquidity and credit risk exposures.

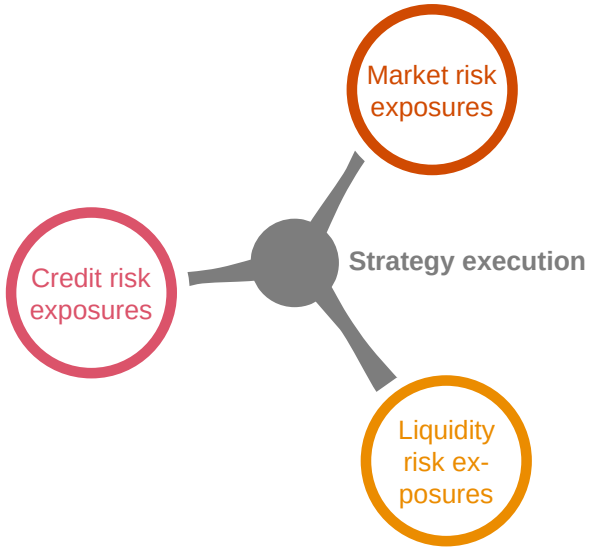
3

Valuation of commodity contracts and assets



- Identification and evaluation of key valuation assumptions
- Assessment of valuation sensitivities
- Calculation of adjustments for flexible assets, unaccounted fees, etc.

Calculation of capital requirements for sustaining the commodity trading strategy



- Market risk of current portfolio (e. g., VaR)
- Liquidity required for managing/maintaining the portfolio
- Capital required to cover credit risk exposure in OTC markets

Value-added to FDD services

Provide input into client's SPA negotiations on

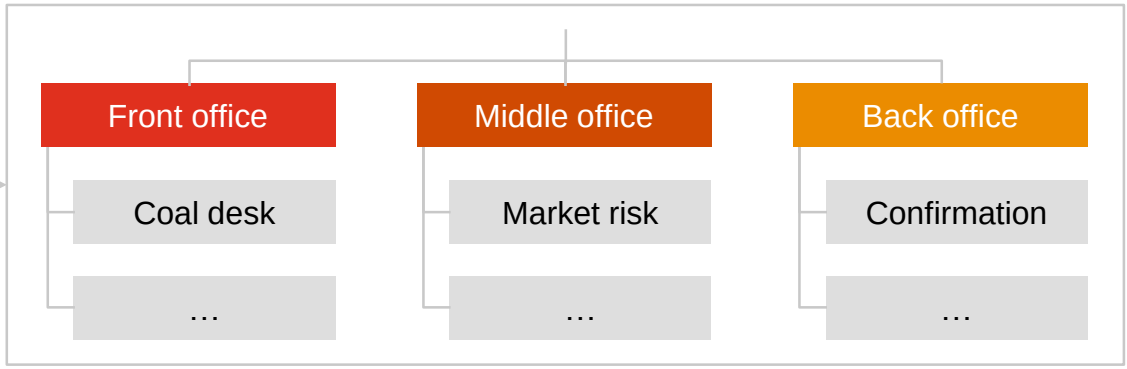
1. Portfolio and contract valuations including valuation adjustments in line with industry best-practice
2. The amounts of capital and liquidity required for holding/managing commodity positions

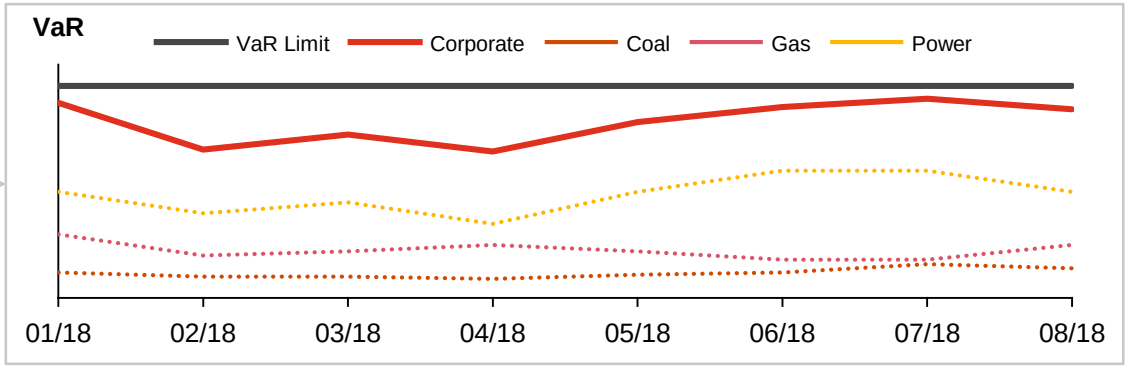
… evaluating the design of the organisational setup, processes and IT-systems within the trading and risk management departments

The CTRM practice supports our clients in designing and implementing an organisational structure, appro-priate processes and the required IT-Infrastructure customised to their individual trading and risk manage-ment strategies.

4

- Organisation
- Governance
- Risks
- Processes & controls
- IT systems





Value-added to FDD services

- Assessment of organisational structure, processes and IT-Systems against industry best-practice
- Identification and analysis of weak spots within the overall set-up of the trading and risk management departments

3

Building a new trading organisation
Transforming an existing trading organisation
Overview of PwC’s due diligence services
Extract of project references

Extract (1/3)

References for transformation of trading unit and risk management

The references below briefly outline a number of PwC's projects, which dealt with the transformation of the trading unit and risk management. Further references will be provided upon request.

	Project description	Approach	Result
Top German Utility Review of trading governance and risk management	• Following a carve-out, the client needed to rebuild a new Energy Trading function. • Within this context, they had to defined a new governance and organisational structure and a new process and control landscape.	• PwC reviewed the new trading function along the dimensions governance, organisation, processes and controls for all trading activities (front office, middle office, back office, risk management) according to best practices and peers. • This included several interviews and the review of process charts, guidelines, policies, organisational charts, role descriptions, process control definitions etc. • Based on the review, PwC provided recommendations on all dimensions on an ongoing basis within the overall project.	• Quality assurance of the organisation (e.g. ensuring segregation of duties), the governance (e.g. conformity of hedging strategies with overall risk management principles) and processes (e.g. avoidance of operational risks) • Improvements of the proposed concepts
Swiss Power Trading Company Reorganisation of the front office organisation	Our client's objective was to restructure its front office organisation in order to enable the trading unit to take advantage of recent structural shifts in the traded power markets.	On the client's "to-be" split of trading activities, we supported the client to implement the required changes to the front office organisation, business processes and systems within the required time frame allocation.	• Realigned book structure which reflect the new business model • New interfaces between production, trading and sales • Defined principles for P&L

Extract (2/3)
References for transformation of trading unit and risk management

The references below briefly outline a number of PwC's projects, which dealt with the transformation of the trading unit and risk management. Further references will be provided upon request.

	Project description	Approach	Result
Swiss Power Trading Company Review of the trading unit incl. transformation support	• Client had experienced a strong growth in business and trading volumes and asked for a review of its trading organisation. • PwC reviewed the organisation and dimensions of the trading unit based on interviews, documentations and live-sessions.	• PwC performed an analysis of trading strategy, organisation, processes, reporting, risk management and IT systems compared to peers and best practices. • The analysis showed several specific recommendations on the different dimensions. • PwC developed approaches to address selected recommendations and supported in implementation.	• Clarity on status-quo of the trading unit • Transparency on risks (strategic, financial, operational, compliance). • Improved target operating model with improvements especially in pricing, risk management and reporting.
Swiss Power Trading Company Review of trading processes with a focus on operational risk	• Client asked for a review of its trading processes in order to identify potential operational process risks. • PwC performed a risk based review of the whole process- and IT landscape along the value chain based on the data flow of the position from planning/conclusion to billing.	• PwC performed detailed interviews and deep dive workshops with all relevant departments across the value chain of the trading organisation and identified process risks. • After clustering the results PwC delivered specific recommendations and appropriate measures in order to address the significant risks. • The individual recommendations were structured within a roadmap.	• Transparency on existing risks within the process and IT landscape. • Clear understanding of required measures to address these risks.

Extract (3/3)

References for transformation of trading unit and risk management

The references below briefly outline a number of PwC's projects, which dealt with the transformation of the trading unit and risk management. Further references will be provided upon request.

	Project description	Approach	Result
Top German Energy Trader Analysis of data flows for Risk Measurement Software and related risk control processes	In the client organisation the risk control activities are conducted by using a centralised tool for risk measurement via VaR- and PaR-measures. Several deal capture systems and market information agencies deliver data into this system and there is no standardised risk reporting.	PwC Germany audited this software. Our audit included • Analysis and verification of input data streams • Testing of main assumptions for risk reporting model • Mathematical check of mathematical VaR and PaR model • Reviewing reporting structures and identification of improvements on executive reporting	Confidence on correctness of the risk management software (data flow, methods, results).

4

Overview of PwC's regulatory services

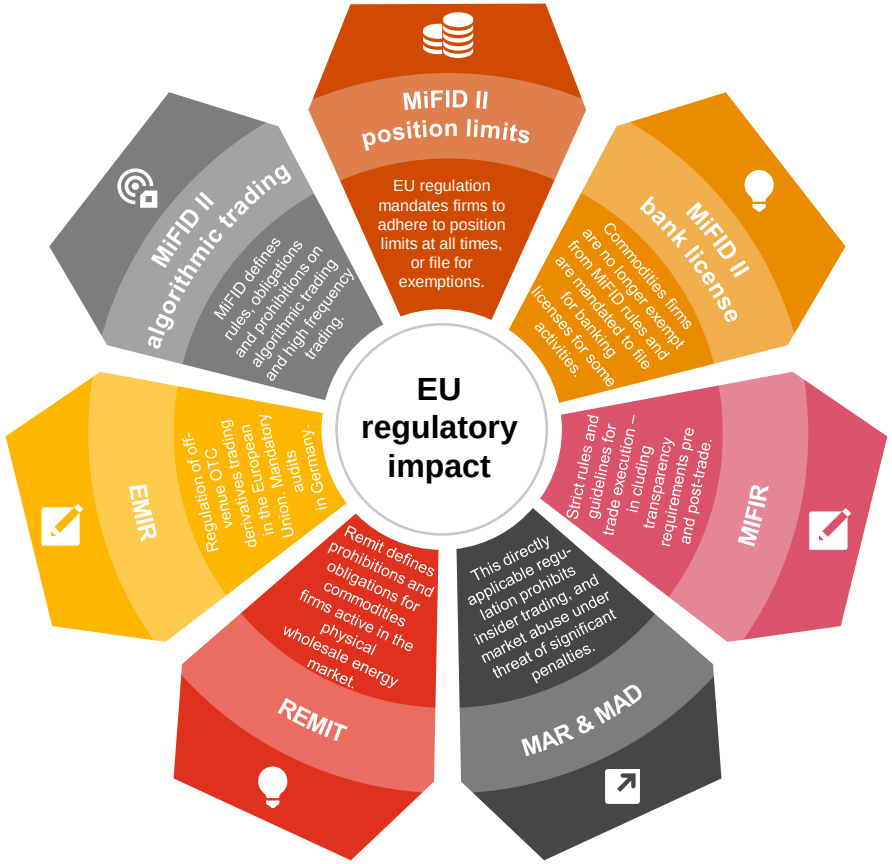
Navigate the regulatory maze with PwC's strategic advice and consulting

Our clients three key challenges

1 Firms on the pan-European commodities value chain face **increasingly large regulatory challenges** as additional regulations come into effect. New prohibitions and obligations materially tighten existing rules.

2 **Cross-regulation interdependencies** – such as MiFID II's impact on EMIR – and seeming **overlaps** require an intimate knowledge of the whole regulatory body in order to correct interpret new rules.

3 The regulatory landscape is always in flux. Today it is not enough to just comply with today's rules – but in addition to **strategically prepare for tomorrow's changes.** Together with a strong partner such as PwC.



Examples of regulatory projects and their key client benefits

Regulation	Project focus
MiFID II & MIFIR	• Strategic advise on commercial strategies in light of MiFID II • Advice on how to comply with MiFID II's ancillary exemption under consideration of book structures, hedging activities as well as preparation of calculations • Advice on MiFID II position limits, position reporting and transaction reporting requirements and best practises • Advice on rules and prohibitions regarding algorithmic trading, and high frequency algorithmic trading under MiFID II • Advice on the preparation of risk and hedging policies in light of MiFID II requirements • Advice on the demarcation of financial instruments under MiFID II
MAR & MAD	• Advice and consulting work on all regards of the market abuse regulation, including the matters of inside information, insider dealing, legitimate behaviour, market soundings, market manipulation, accepted market practises, market abuse, disclosure requirements, insider lists as well as managers transactions • Review and re-drafting of industry-best practise processes and policies in line with the regulation
REMIT	• Advice and consulting for firms trading in physical natural gas and power wholesale under REMIT, including publication of information, market manipulation and abuse, market monitoring, data collection as well as regulatory demarcation between MAR, MAD and REMIT • Review and re-drafting of industry best practise processes and policies in line with the regulation
EMIR	• Auditing of EMIR compliance • Advise and consulting work on new developments with regards to EMIR (i.e. increased regulatory scope effected by MiFID II)

Key benefits

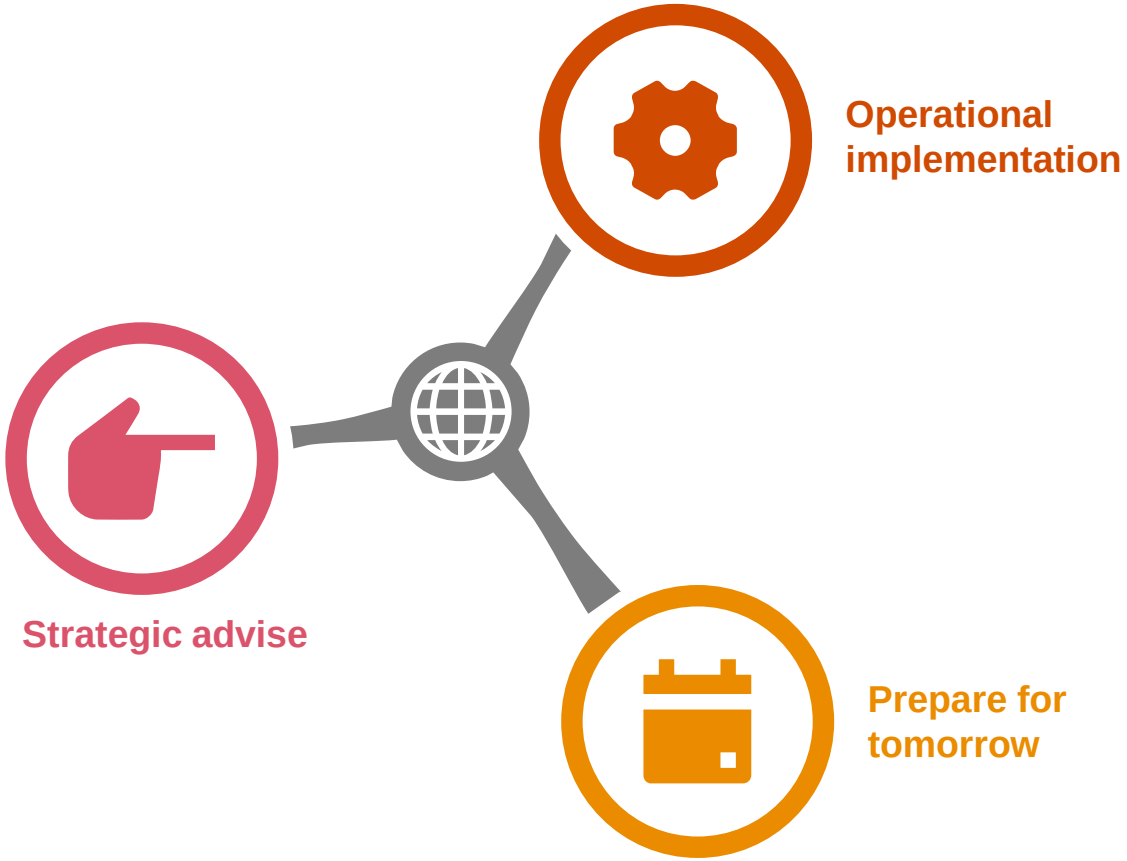
- **PwC as a partner with extensive experience:** We advise clients ranging from multi-national asset-backed commodities traders to boutique trading houses and municipal utilities across all of Europe to navigate the regulatory maze.
- **Regulatory certainty.** Powered by our network inside and outside the industry and our extensive project experience in the regulatory space we ensure our clients fully comply with the regulation while avoiding unnecessary burden through best practise approaches.

From strategy to implementation

PwC as a EU regulations one stop shop

Our value proposition: Advise & implementation

- Our teams are capable to offer strategic advice on EU regulation followed by operational implementation while keeping an eye on the market
  1. Our core teams are comprised of highly experienced professionals with a business, risk management and trading backgrounds who can **offer strategic advice on how to approach regulatory challenges** – for example by developing a strategy on how to ensure compliance with specific prohibitions of MiFID II.
  2. As a next step we can work with clients on how to specifically **implement the strategy at a micro-level** – for example by developing specific templates in a software of the client's choosing and by drafting the fitting working instructions.
- EU regulation is always in flux. Our deep network across PwC's global firms as well as with policy makers and industry leaders allows us **to keep and eye on the current and future state of the regulation.** A key benefit for our clients.



5

PwC ETRM and industry publications

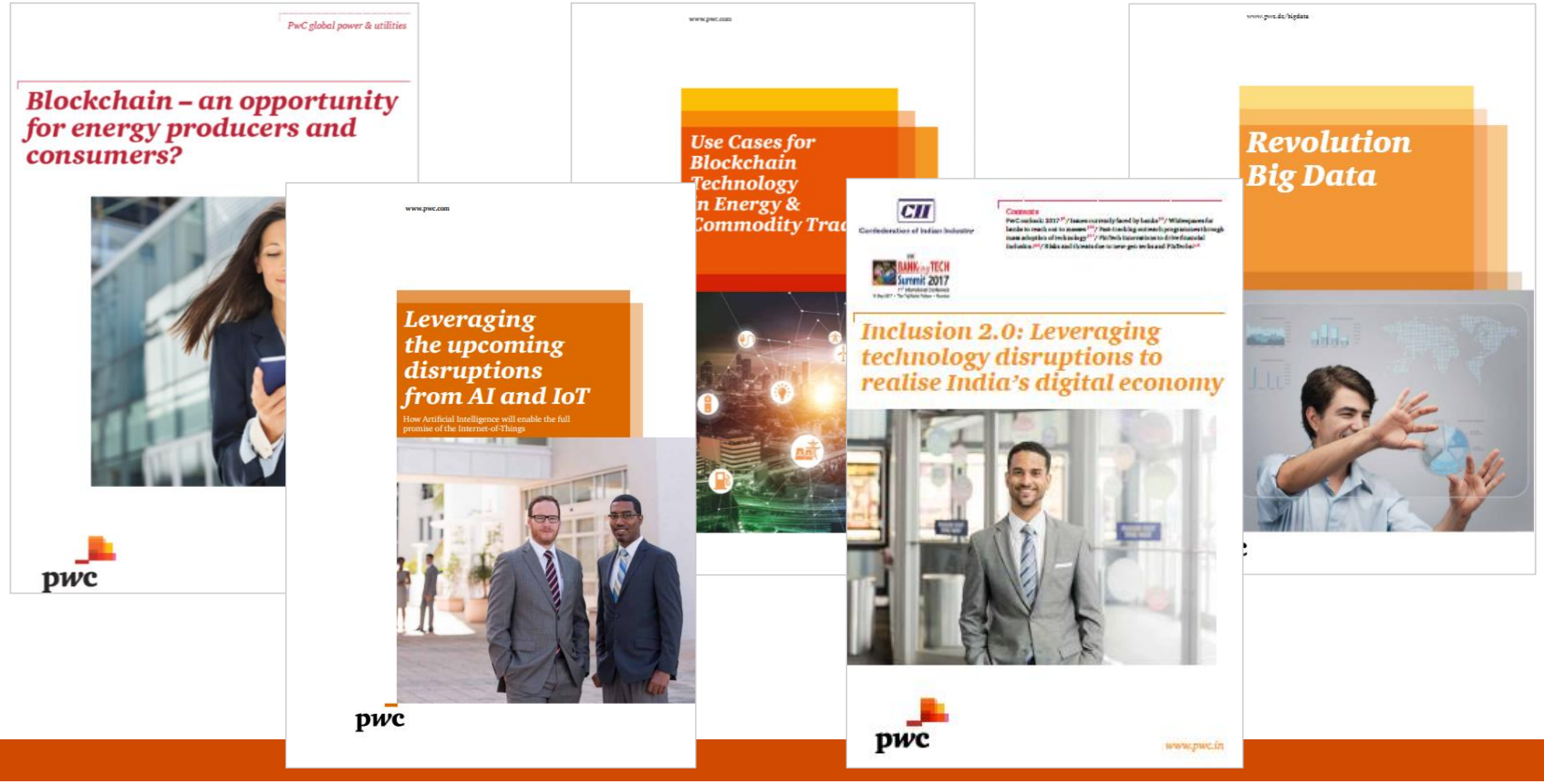
Publications (1/2)

PwC is an independent and objective advisor in the energy and ETRM sector and has published several studies in this area

PwC is seen as a state of the art partner in many economical areas and is established as an independent advisor throughout the energy and ETRM world. Clients can profit through our experience and delivered quality frame works from our delivered projects. Below publications should serve as an example for the innovative knowledge and expert tool, which is available to us.

Publications (2/2)

PwC is constantly sharing interesting content on digitalisation, the latest digital news and digital initiatives in Germany to support our client business



6

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Thank you

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