Downstream upgrade – challenges and solutions

July 5th 2013

Having a huge performance gap compared to world-class level, Russian refineries started an unprecedented modernization program in 2008

Context

Most of Russian Refineries are 30+ years old and require massive upgrade in order to meet market requirements of

- Motor fuel quality standards
- High-octane gasoline and kerosene demand
- Operational efficiency and processing depth

Modernization program of Russian Refineries

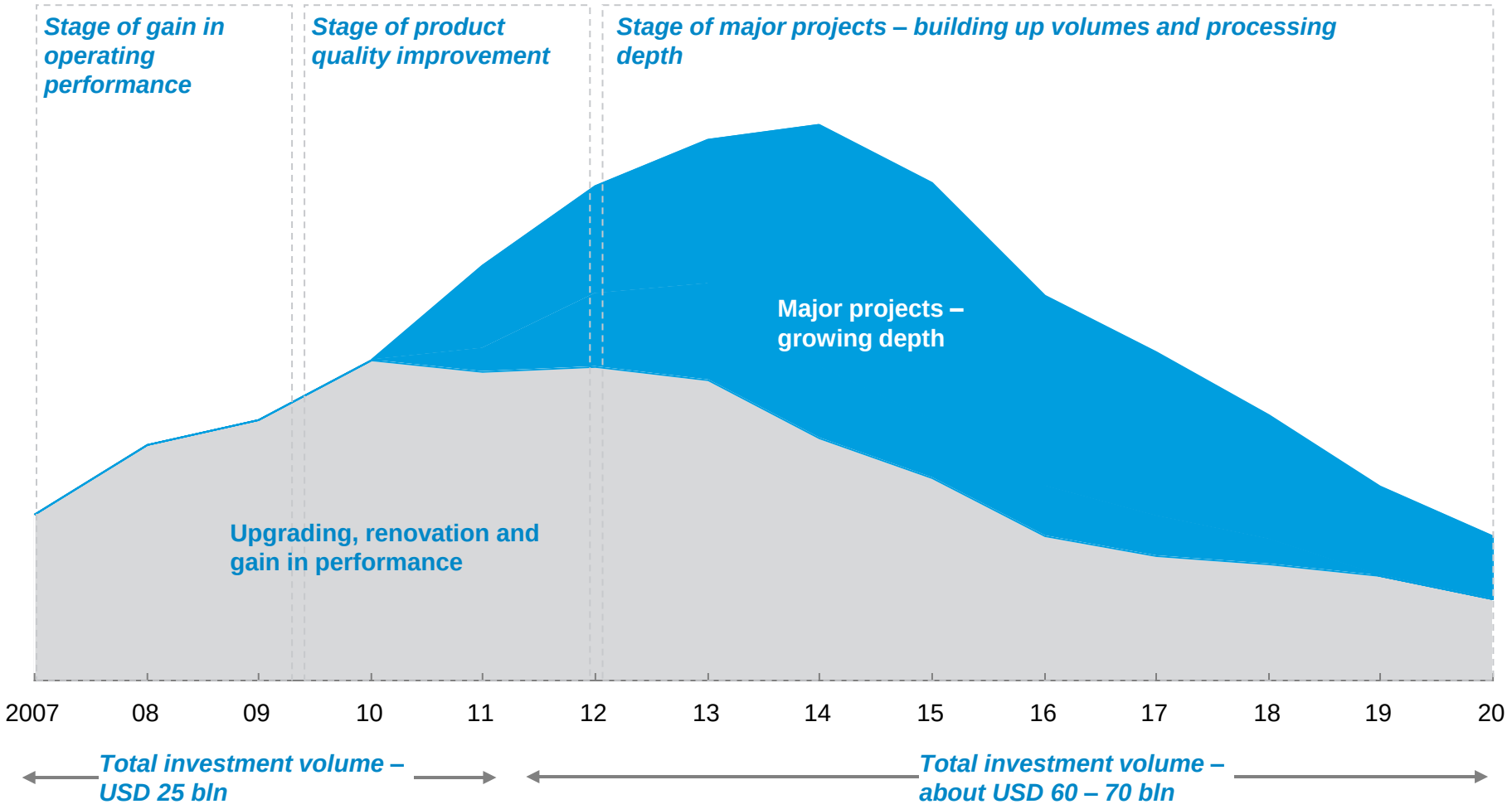
Company[1]	Number of units to be built or revamped	Budget 2010- 2020 USD billions
РОСНЕФТЬ	75	30
ЛУКОЙЛ НЕФТЯНАЯ КОМПАНИЯ	25	20
BASHNEFT JOINT STOCK OIL COMPANY	7	3
ГАЗПРОМ	22	11
СНГ «СУРГУТНЕФТЕГАЗ»	24	9
TATNEFT	10	8
Other	26	10
Total	**195**	**91**

1 Including all owned daughter companies

SOURCE: RosStat, companies data, Kortes report, McKinsey analysis

Growing scale of investments and increasing project complexity bring companies to a high risk zone

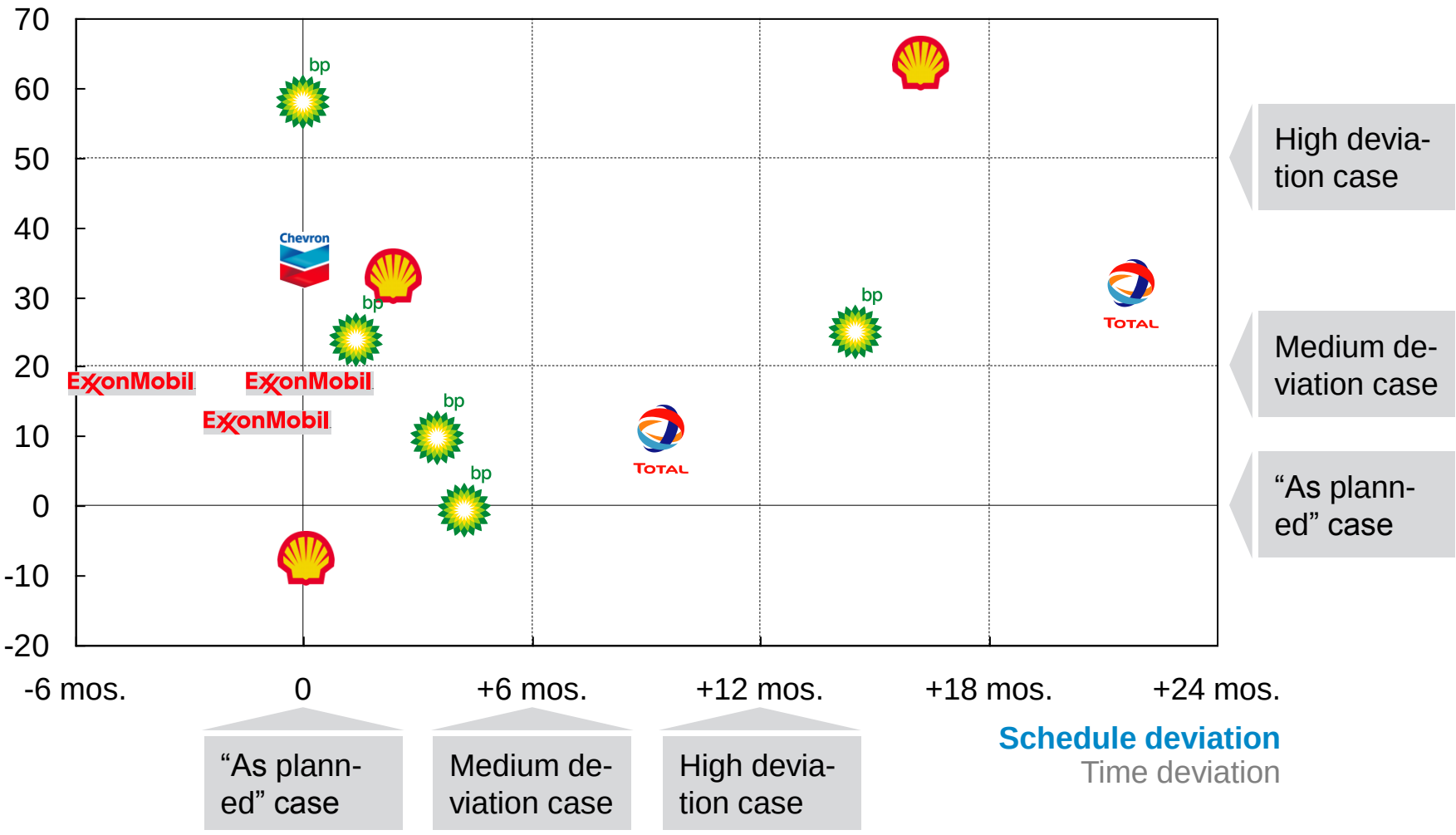
Volume of investments in oil refining



SOURCE: RosStat, companies data, Kortes report, McKinsey analysis

Even global oil majors have significant challenges to deliver on time and within budget

PETROLEUM EXAMPLE



SOURCE: Media data; market intelligence

Russian context puts additional risks on execution of large CAPEX projects

Challenges

Project management

- Limited capabilities of managing major capital projects and absence of developed owner organization
- No integrated responsibility of Contractor for project results in the applied contractual models (EPCM)
- Non-developed project management processes and tool-set
- Low accuracy of budget estimates

Design

- Limited experience in working with sophisticated technologies and shortage of Russian design institutes' capacities
- Difficulties of getting local Authorities approval by foreign EPC companies

Procurement

- Owner's unreadiness to transfer full responsibility for procurement to a contractor
- Unfamiliarity with the Russian equipment suppliers market and difficulty in working with Russian suppliers, especially for foreign EPC companies
- Specifics of Russian logistics of equipment delivery

Construction

- Rare success of foreign EPC companies managing Russian construction companies

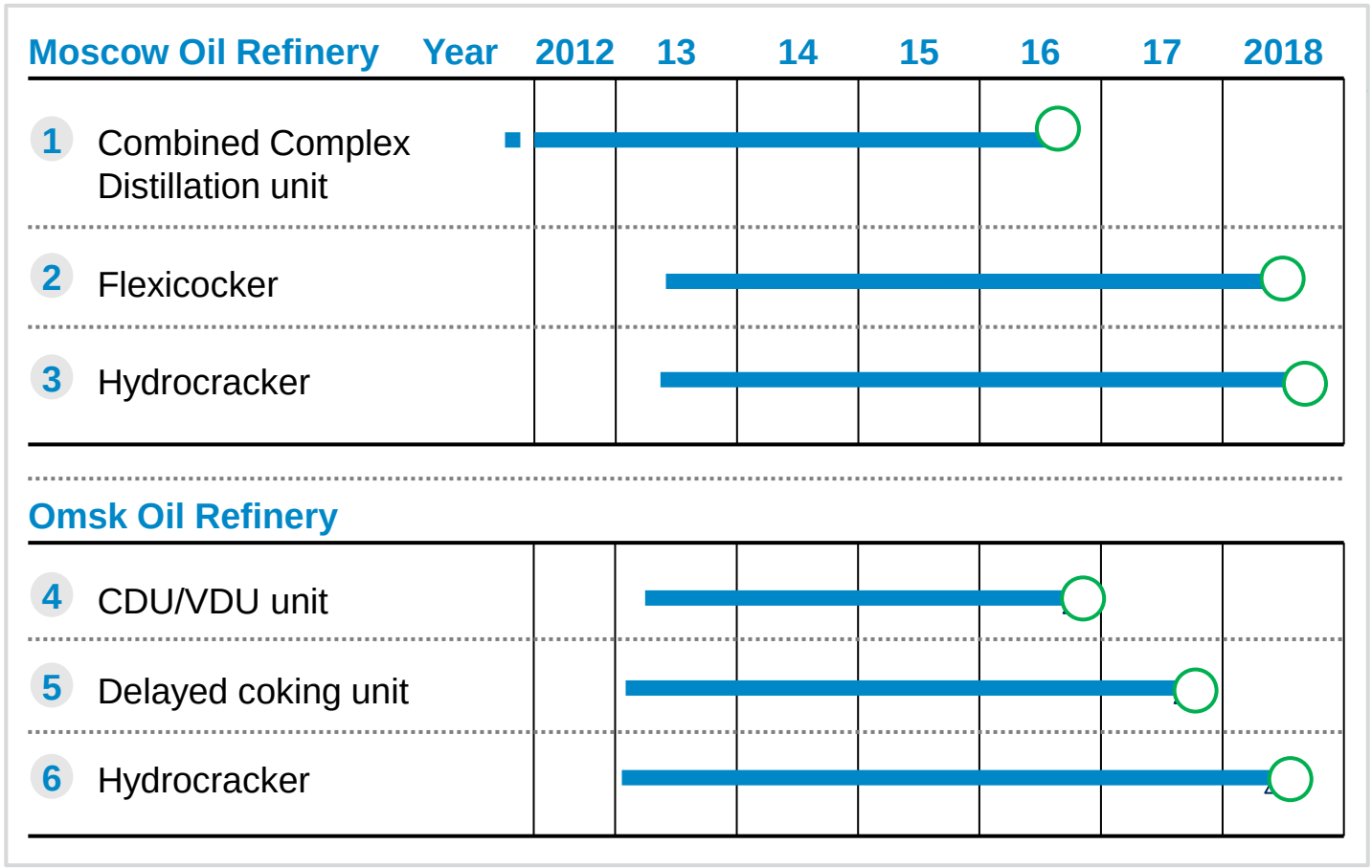
Most companies establish Central Units Responsible for Major Projects

Need to build owner ability to manage Large Scale CAPEX projects

Goals of a Central Unit

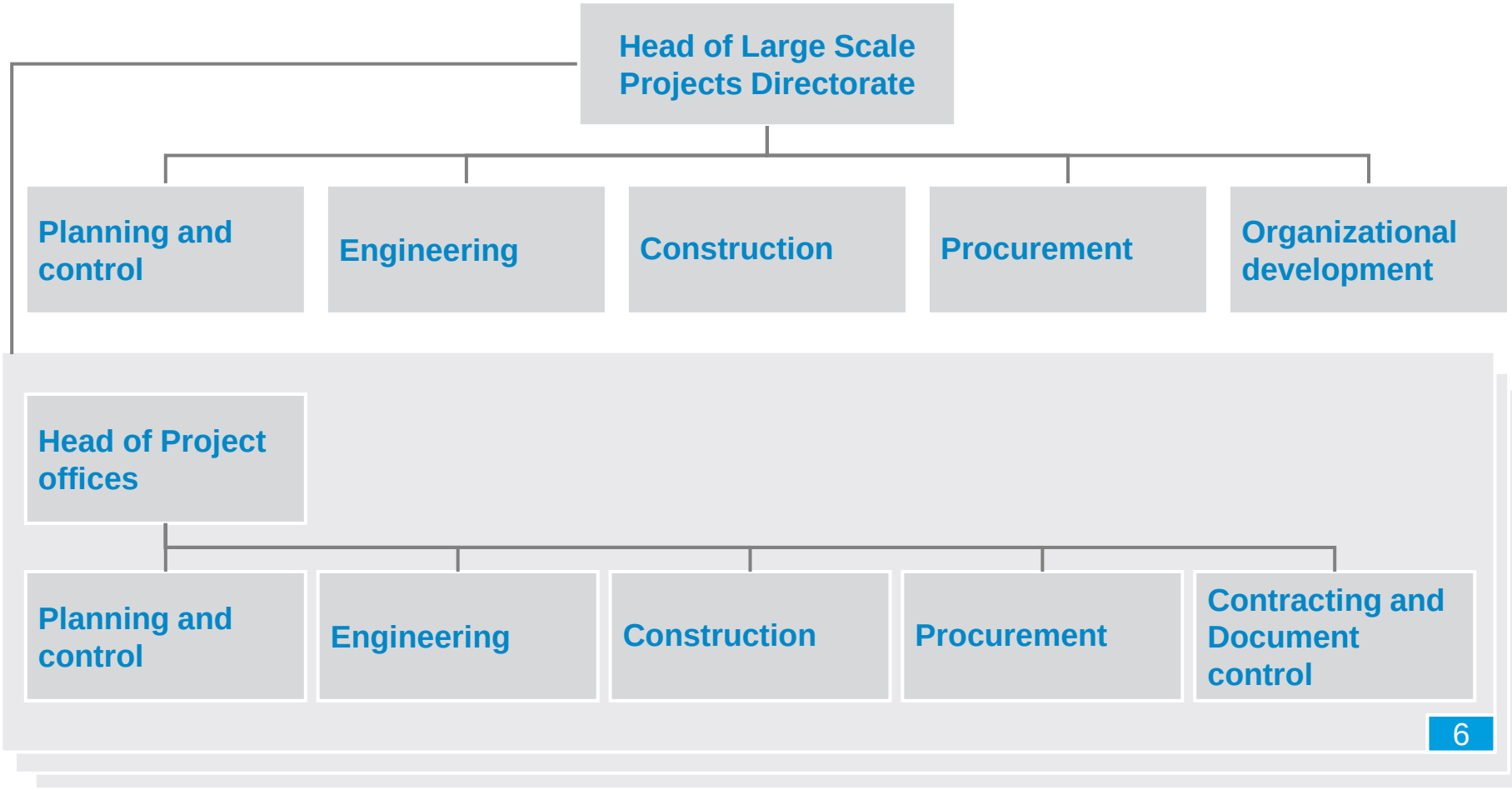
- Ensure execution of major projects portfolio in accordance to Q/C/D targets
- Develop competence of owner organization for managing major projects
- Implement international standards of major project management
- Implement advanced project execution models using the synergy of expertise of Russian and international engineering and construction contractors

The ambitious goal of the Central CAPEX Unit in GPN is execution of 6 large projects in parallel, on time and within budget



Effect from 1 month schedule reduction for each project is USD 10 – 20 mln

Project Offices are directly reporting to Large Scale Projects Directorate (LSPD)



Just recruiting personnel is insufficient: Capability building effort is critical for team effectiveness

Orientation program

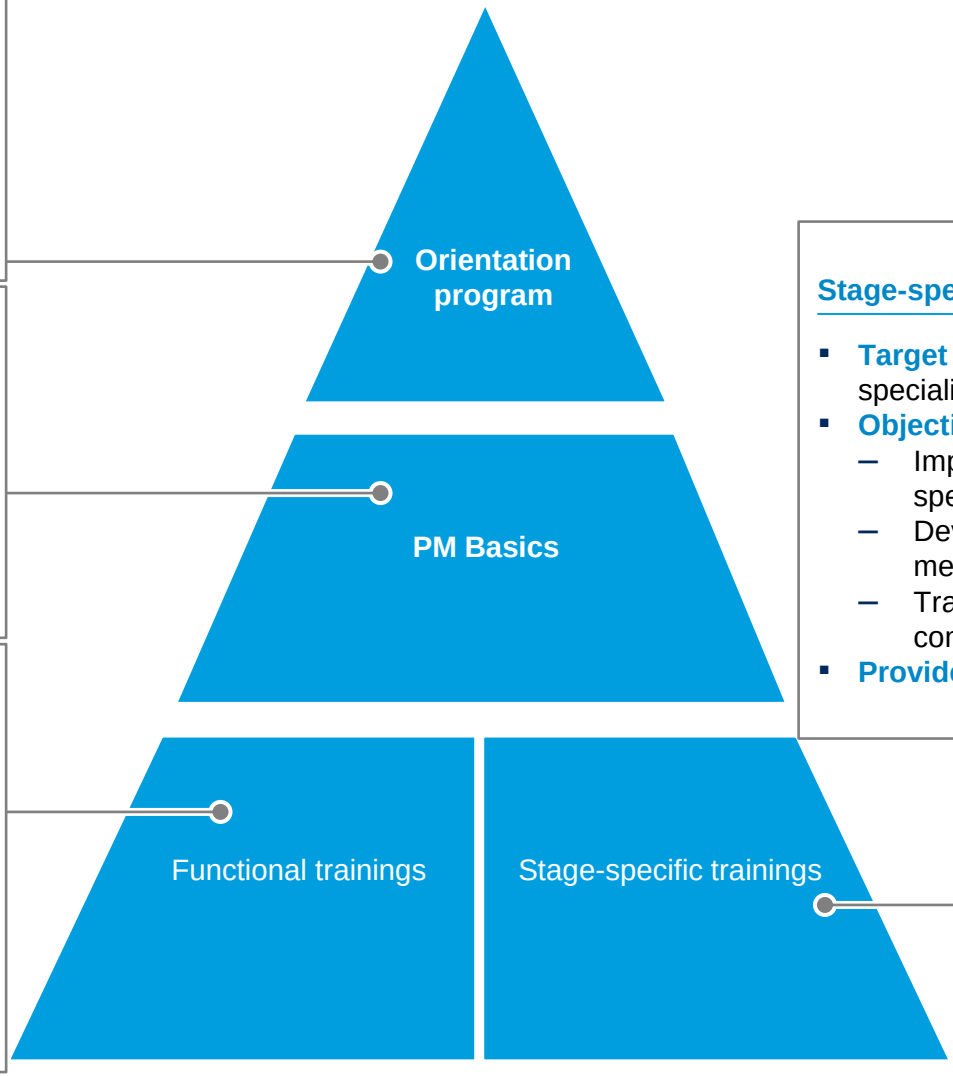
- **Target group**:
- New comers and heads of interlinked units
- **Objective**: Agree on key principles of the project management system
- **Provider**: Experts (e.g. McKinsey)

PM Basics

- **Target group**: management of LSPD and PO
- **Objective**: Implement fundamental processes and tools
- **Provider**: Experts (e.g. McKinsey)

Functional modules

- **Target group**: functional specialists
- **Objective**:
  - Implement specific functional processes and tools
  - Define relationships between functional specialists and PO
- **Provider**: PMC



Stage-specific modules

- **Target group:** functional specialists
- **Objective:**
  - Implement processes of a specific project stage
  - Develop interaction mechanisms
  - Transfer of stage specific competencies
- **Provider:** PMC

PMC contractors were selected as the main expert support to Project offices and a source of knowledge for capability building

Function	Areas of work
Organization and coordination of works	▪ Interaction with FEED and EPC contractors – Document quality control process – Progress monitoring (reports, meetings, records) – Change order management ▪ Interaction between different PO's (in case of interrelated technical solutions)
Project Management knowledge base	▪ Planning and control of project schedule ▪ Identification and control of project costs ▪ Risk management ▪ Resource management (mobilization/demobilization/evaluation) ▪ Taking decision on the selection of equipment and materials (total cost of ownership analysis, demand analysis, LCC) ▪ Selection of contractors (EPC, etc.) ▪ Contract management ▪ Document management ▪ Creation of LSPD knowledge database
Extensive technical expertise	▪ PMC provides experts for particular areas of expertise in the absence of qualified employees in the PO structure

Implementation of international standards for large projects management is one of the key tasks of the Central CAPEX Unit

Pre-study	Base project	FEED	EPC/EPCM	Operation
Procedure of going though all stages of the project				Post-investment monitoring and evaluation
Strategy	Selecting licensor	Development of the FEED/PD	Detailed design	
Feasibility study	Project implementation model	Purchase of the LLI equipment	Purchase of equipment	
	Basic engineering	Selecting EPC contractor	Selecting construction contractor	
	Selecting PMC		Construction	
	Selecting FEED/ PD designer		Commissioning	
	Reporting on the status of projects			
	Codification of knowledge			

McKinsey – hired to support Central Unit in this area

Applied contractual models (EPCM) do not provide end-to-end responsibility of EPCs for project results

Responsibility
- ✓ Full
- ✓ Partial
- ☐ None

Context

At the moment, EPCM scheme has been approved as the standard contract model

Reasons behind the decision:

- Lack of experience of Russian Owners in the implementation of major projects under the EPC model on the turn-key basis
- No guarantees that the interests of the Owner during the procurement process will be carried out by the contractor (P)
- Insufficient experience of EPC companies with domestic manufacturers
- Complexity of managing Russian construction contractors by western EPC companies
- Limitation on use of foreign construction contractors

Responsibility of EPC contractor in the EPCM contract model

Design

Full responsibility
- Technical solutions ✓
- Timing ✓
- Budget ✓

Procurement

Partial responsibility
- Technical solutions ✓
- Timing: analysis of suppliers proposals ✓
- Budget ☐

Construction

Partial responsibility
- Technical solutions ✓
- Timing: preparation of construction plan ✓
- Budget ☐

World practice – model with integrated responsibility

Full responsibility
- Technical solutions ✓
- Timing ✓
- Budget ✓

Existing contractual model has to be upgraded in order to reflect end-to-end responsibility of contractor

Changing the model to “more EPC-like” has a potential to reduce time and improve return on investments

Responsibility
- ✓ Full
- ✓ Partial
- ☐ None

Actions

- New EPC model is syndicated with stakeholders
- Upgraded EPC model aimed at reducing time while also taking into account measures to overcome the limitations
- Owner concentrates resources on preparation of effective contractor relationships and control of critical commercial and technical issues

	Model 1 – EPCM For projects/objects with undefined scope of work	Model 2 – EPC For projects/objects with defined scope of work
Design	**Full responsibility** ▪ Technical solutions ✓ ▪ Timing ✓ ▪ Budget ✓	**Full responsibility** ▪ Technical solutions ✓ ▪ Timing ✓ ▪ Budget ✓
Procurement	**Extended responsibility** ▪ Technical solutions ✓ ▪ Timing ✓ ▪ **Budget (under the corporate Procurement)** ✓	
Construction	**Extended responsibility** ▪ Technical solutions ✓ ▪ Timing ✓ ▪ **Budget (under the LSPD control)** ✓	

Next steps

- To assess the market of contractors in order to determine a possibility of competitive contractor selection for the proposed contract models to individual utilities, infrastructure and off-sites objects
- To submit to the executive board a proposal for contract models for each type of objects with a pricing scheme for each type of work

Companies which can provide high quality services for large projects are well known and their choice list is rather limited

NOT EXHAUSTIVE

	Key selection criteria
Licensors	▪ Operational efficiency ▪ CAPEX ▪ Technology expertise ▪ Time of Basic design ▪ Warranty terms
FEED/EPC	▪ Successful experience in implementing similar technology projects globally and in Russia ▪ Commercial terms ▪ Proposed approach of project execution (technical and organizational) ▪ Network and expertise of the subcontractors
Russian Design Institutes	▪ Experience in implementing similar projects in Russia ▪ Good track of record of work with GPN ▪ Successful experience in managing Russian state review procedures
PMC	▪ Expertise of the team ▪ Commercial terms ▪ Positive experience of implementing similar projects globally and PMC experience in Russia