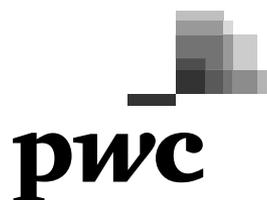


Task A: Sector performance and structural sector reform

&

Deliverable 5: Final report



Disclaimer and copyright note

This document has been prepared only for the International Bank of Reconstruction and Development ("IBRD") and solely for the purpose and on the terms agreed with the IBRD in our agreement dated 21 March 2017 relating to Task A.

The scope of our work was limited to a review of documentary evidence made available to us. We have not independently verified any information given to us relating to the services.

We accept no liability (including for negligence) to anyone else in connection with this document. We have agreed with you that the report will be provided by you to GECOL for their consideration. We would ask that it not be provided to anyone else unless otherwise agreed in writing by us.

This is a draft prepared for discussion purposes only and should not be relied upon; the contents may still be subject to amendment or withdrawal and our final conclusions and findings will be set out in our final deliverable planned for December 2017

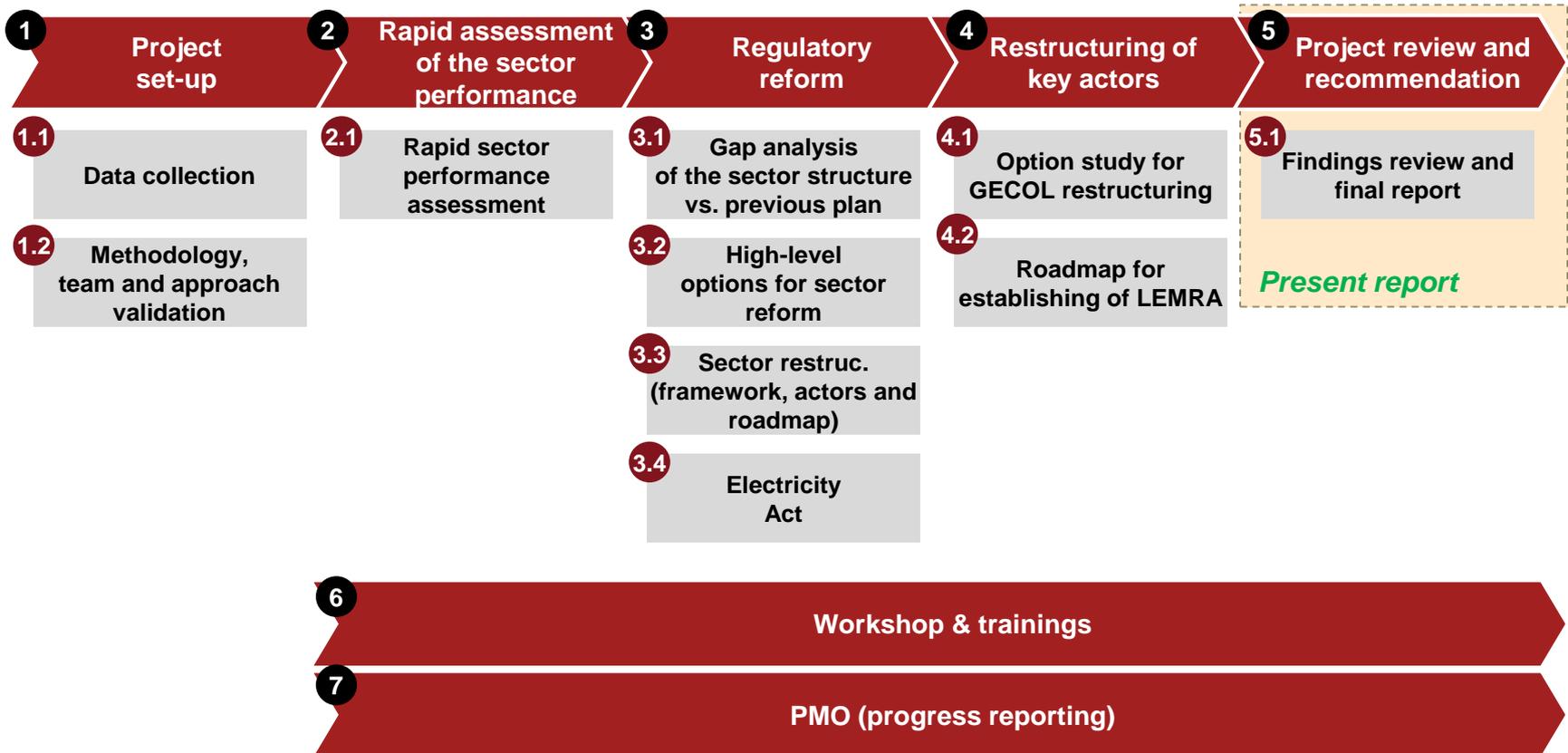
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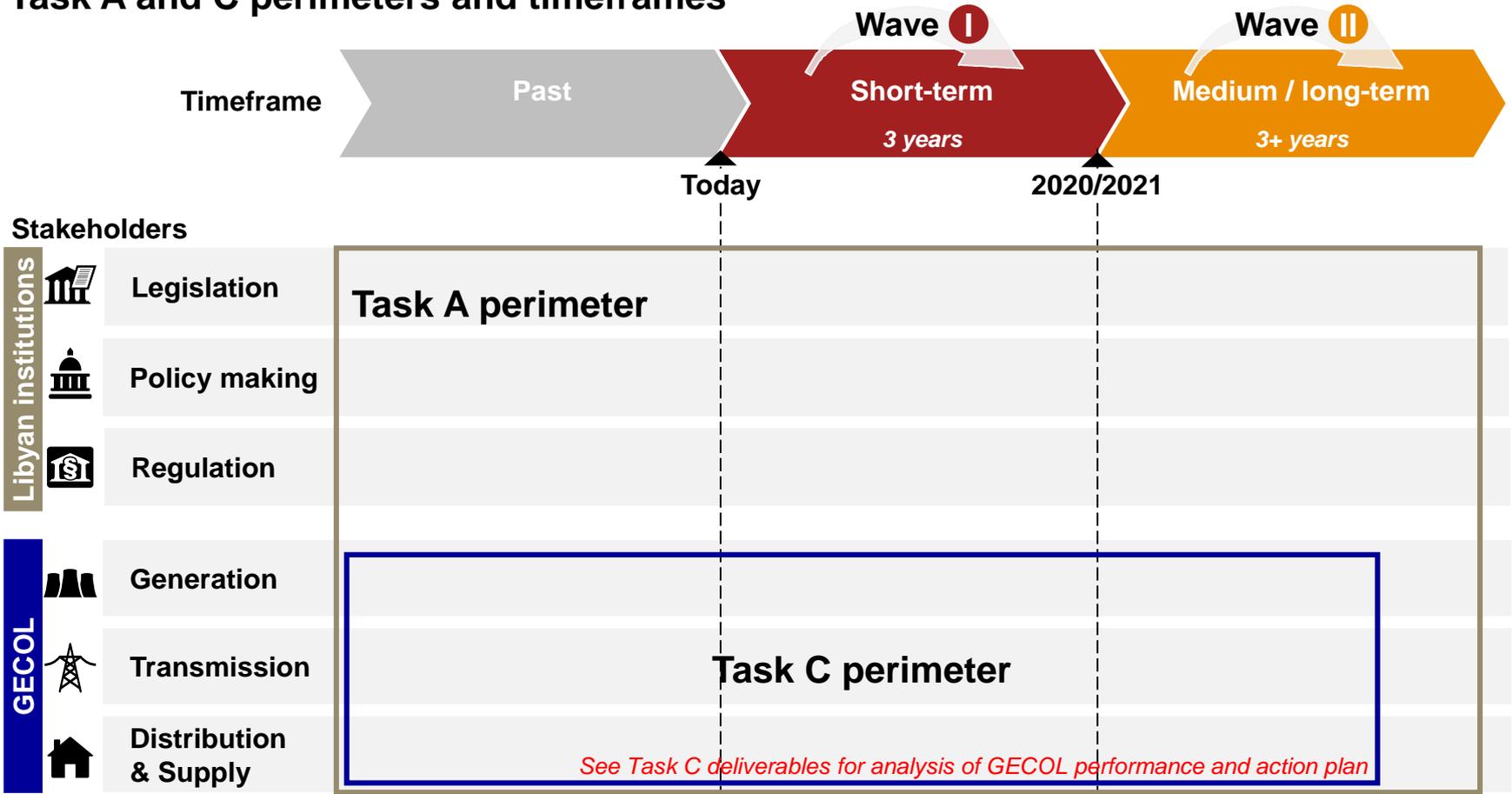
The present document is the final report of the Task A: it includes the project review and the related recommendations

Focus of the present report



Important notice: Task A addresses the Libyan institutions (differently than Task C which focuses solely on GECOL)

Task A and C perimeters and timeframes



Source: Strategy & analysis

Executive Summary

Summary of key issues faced by the electricity sector

Wave I: Fix the basics and prepare for restructuring

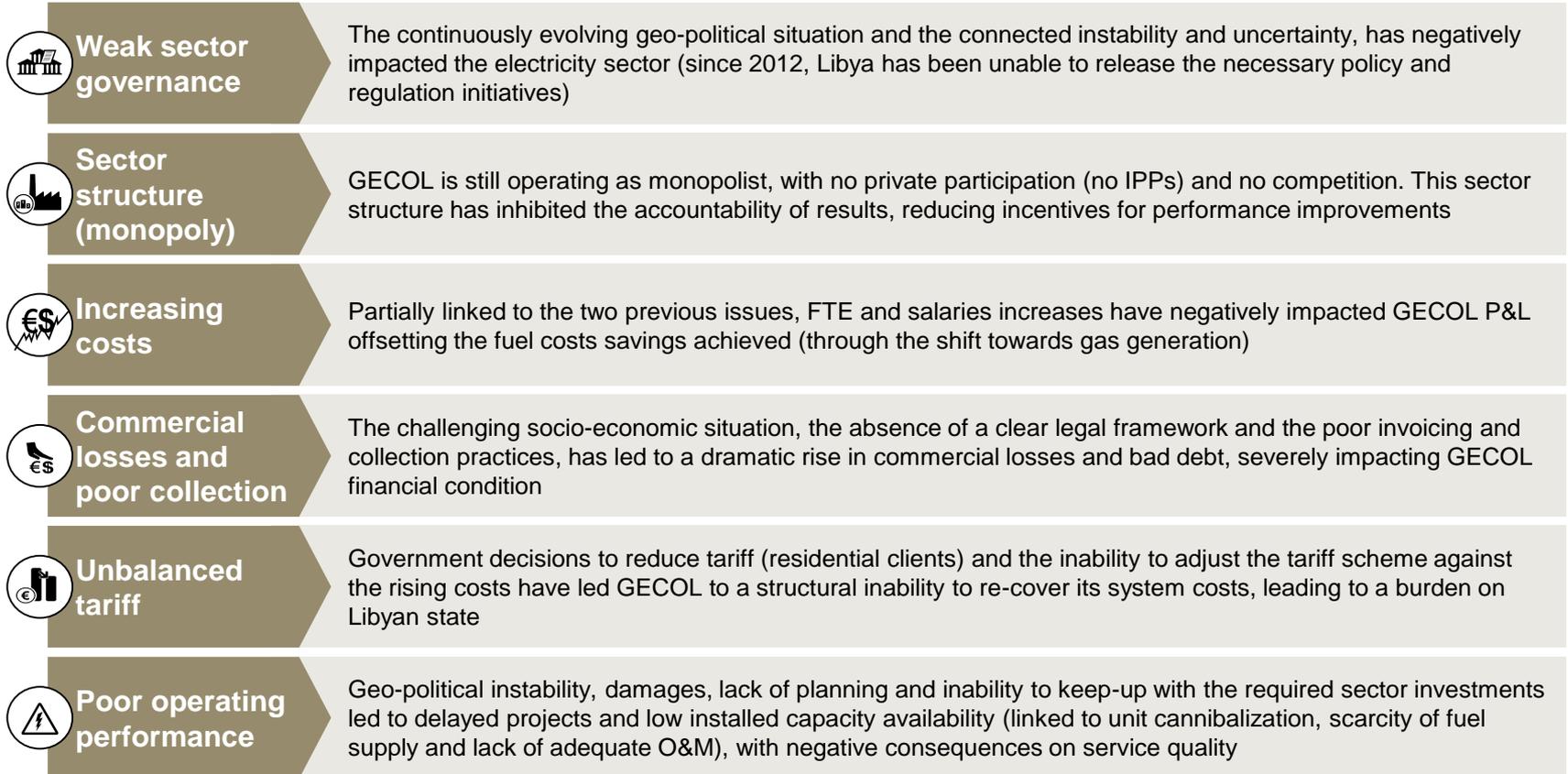
Wave II: Restructure and prepare for ambition

Options for Wave III (realize ambition)

Appendix – Inputs for Electricity Act

Task A rapid sector assessment has identified 6 key challenges on which the reform effort should be focused

Libyan electricity sector root-causes



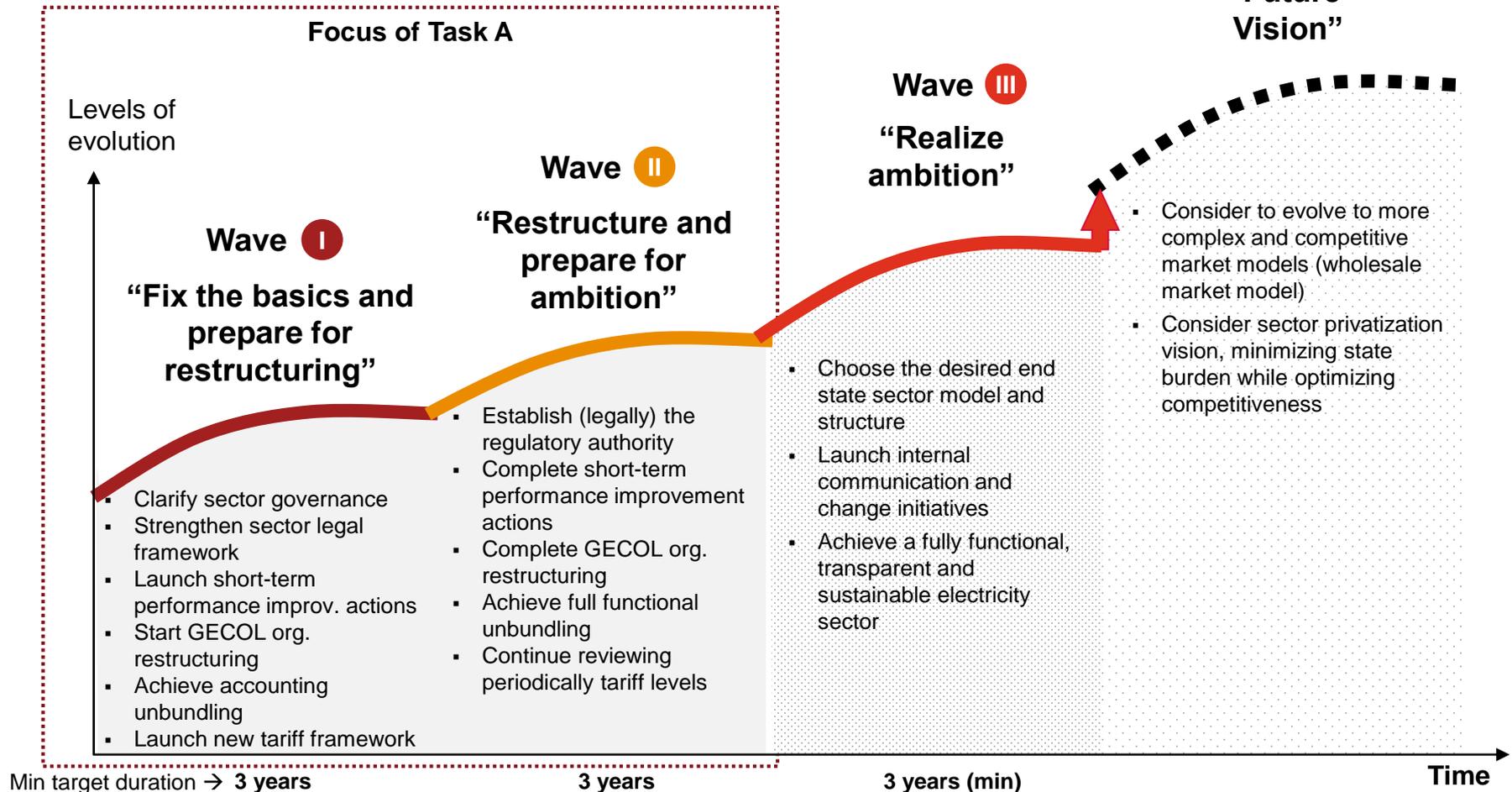
Source: Strategy& analysis

The reform was defined over a plan designed across different waves, based on different macro-objectives

Libya restructuring roadmap

Focus of Task A

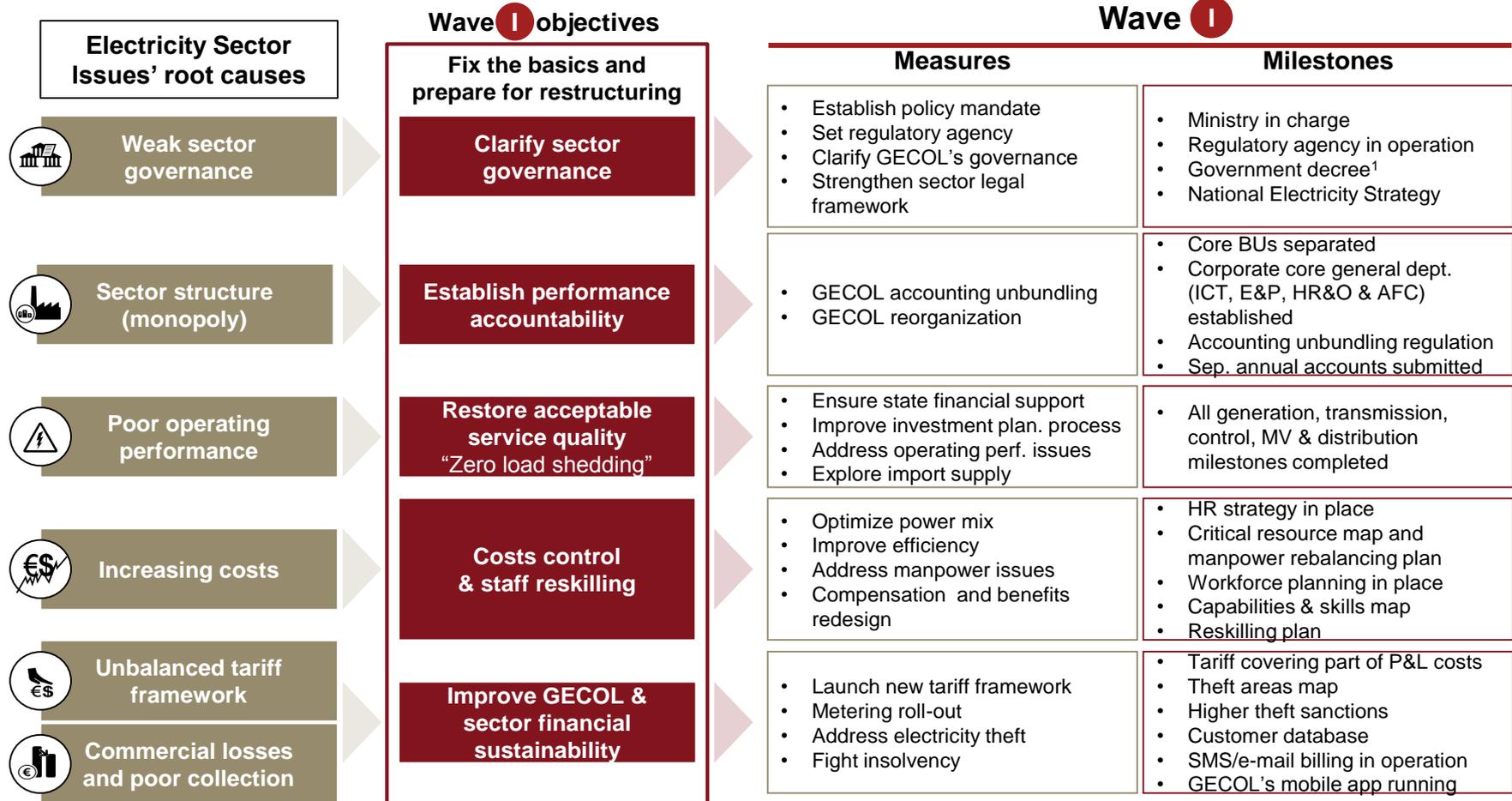
Levels of evolution



Source: Strategy& analysis

Wave I will focus on resolving the six key issues identified through a number of objectives, measures and milestones

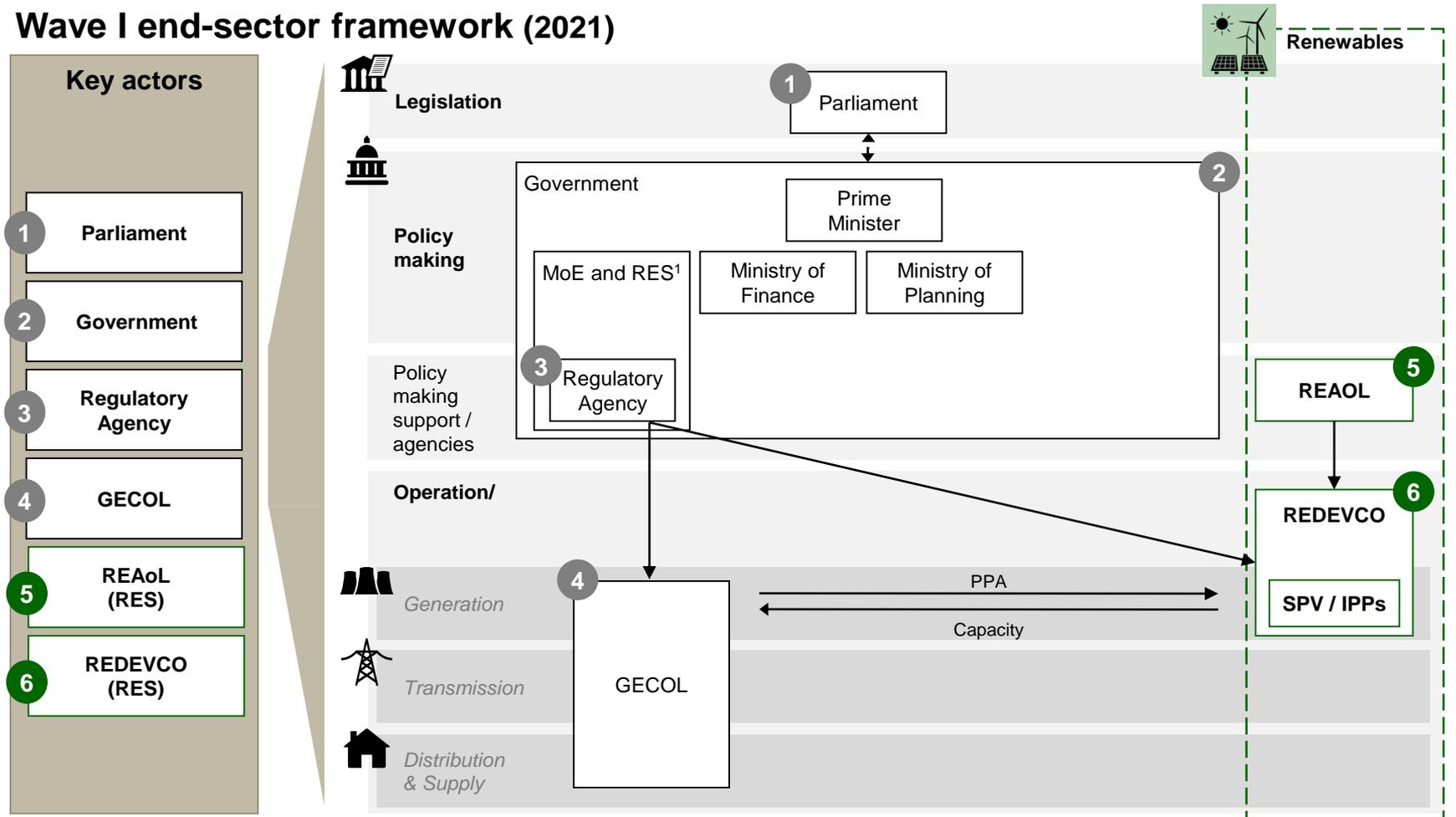
Wave I measures and milestones



1) This first Government Decree could be replaced with an Electricity Act in case a window of opportunity opens for the submission of a the electricity law to the House of Representatives; Source: Strategy& analysis

The sector will operate through 6 actors (same as today), with revised (and clearer) roles & responsibilities

Wave I end-sector framework (2021)



1) Ministry of Electricity and Renewable Energy Sources

Source: Gopa intec and Suntrace Task D Roadmap for Renewable Energy Development, Strategy & analysis

An Agency (built within the Government), will advise and support in several regulatory activities

Regulatory Agency responsibilities (Wave 1)



Responsibilities	Activities	Regulations/Manuals
<p><i>Supply matters</i></p> <p> Performance monitoring</p>	<p>Draft the KPIs Manual and set short term (3 years) KPI targets</p> <p>Provide incentives to encourage the utility to achieve targets</p> <p>Supervise system's security and reliability and propose improv. measures</p>	<p>KPIs Manual & targets</p>
<p><i>Technical matters</i></p> <p> Standards and rules</p>	<p>Develop unified regulatory accounting and reporting procedures</p> <p>Set minimum safety standards for O&M, construction and installation</p> <p>Draft the Grid Code/Interconnecting Guidelines</p>	<p>Safety standards</p> <p>Grid Code</p>
<p><i>Consumers issues</i></p> <p> Tariff</p>	<p>Draft the Tariff Regulation</p> <p>State criteria for the preparation of tariff proposals by GECOL</p>	<p>Tariff Regulation</p>
<p><i>Sector development</i></p> <p> Development</p> <p>Sector structure</p>	<p>Advise the ministry on matters related to development and operation plans</p> <p>Draft accounting unbundling regulation</p> <p>Draft operating guidelines for separated annual accounts</p> <p>Analyze and review GECOL's separated annual accounts</p>	<p>Accounting unbundling regulation</p>

Source: Strategy& analysis

One of Wave I main objectives will be to restore GECOL technical performance and service quality ...

Generation performance improvement plan

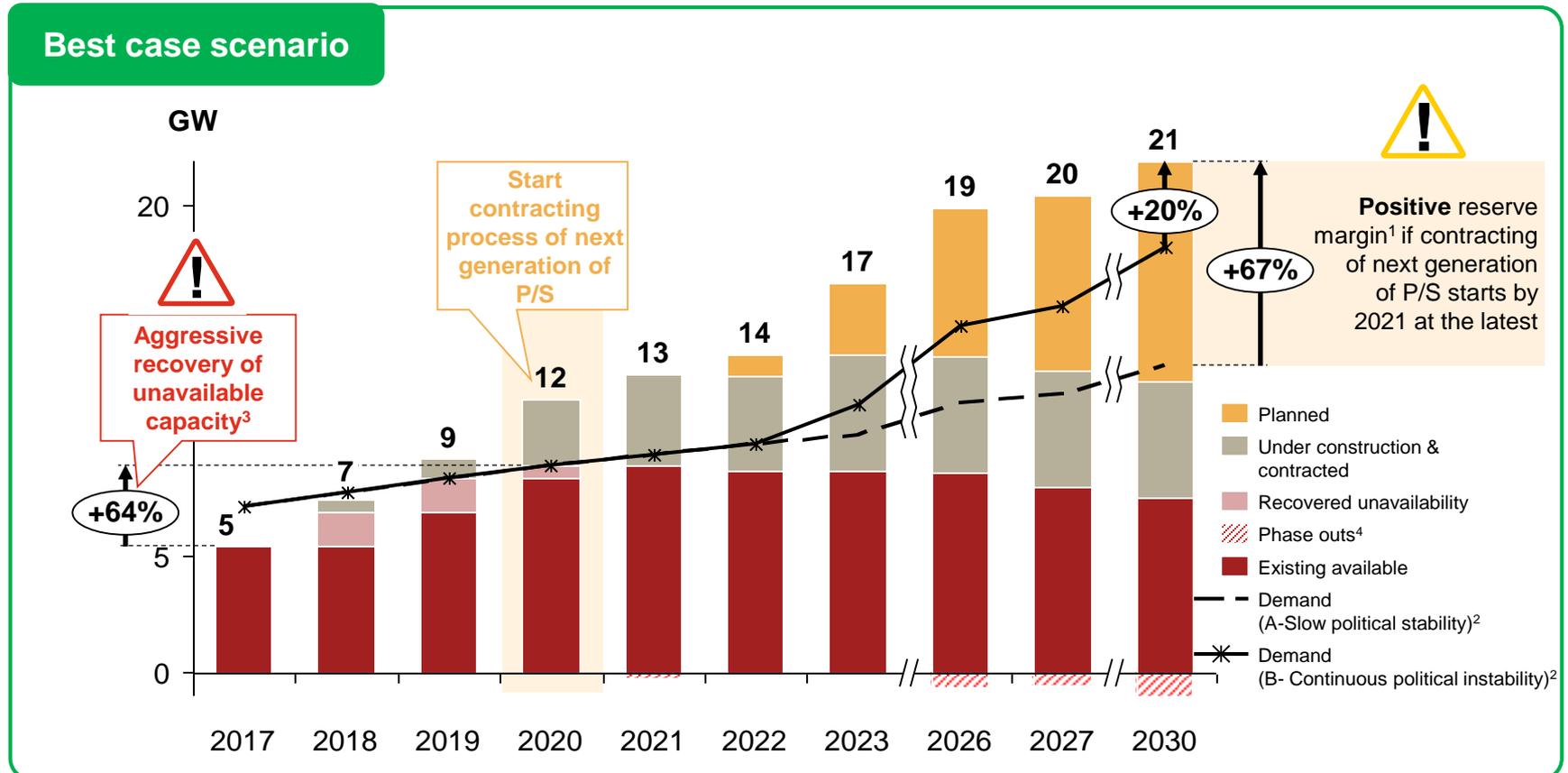
Detailed action plan provided in Task C final report

A Generation issues		Measures	Milestones
1	Overdue maintenance	<ul style="list-style-type: none"> Resolve backlog of overdue maintenance Plan maintenance of running units Retire old units Ensure availability of 3rd party plants 	<ul style="list-style-type: none"> 90% of suspended units back in service No new buildup of overdue maintenance List of units to be retirement approved 250 MW added to grid
2	Inadequate fuel supply	<ul style="list-style-type: none"> Protect fuel supplies to P/S and address fuel quality problems 	<ul style="list-style-type: none"> Zero unavailable capacity due to fuel supply Supply Sarir P/S with gas Full implementation of fuel quality control procedures
3	Delayed capacity expansion projects	<ul style="list-style-type: none"> Complete under construction projects Update load forecast and generation expansion plan Tender new generation capacity Complete EDM system 	<ul style="list-style-type: none"> Updated generation expansion plan RFP for first round of new generation projects issued Obari completed (4x125 MW online) Gulf completed (3x350 MW online) Fully functioning EDM
4	Skills shortage	<ul style="list-style-type: none"> Solve lack of O&M competences Solve Generation BU understaffing 	<ul style="list-style-type: none"> Certification program for P/S O&M personnel in place All P/S operation shifts adequately staffed with qualified personnel

Source: Awardbrand - Improving GECOL technical performance report, Strategy& analysis

...targeting to resolve Libya load shedding problems (and thus its service quality issues) by 2019...

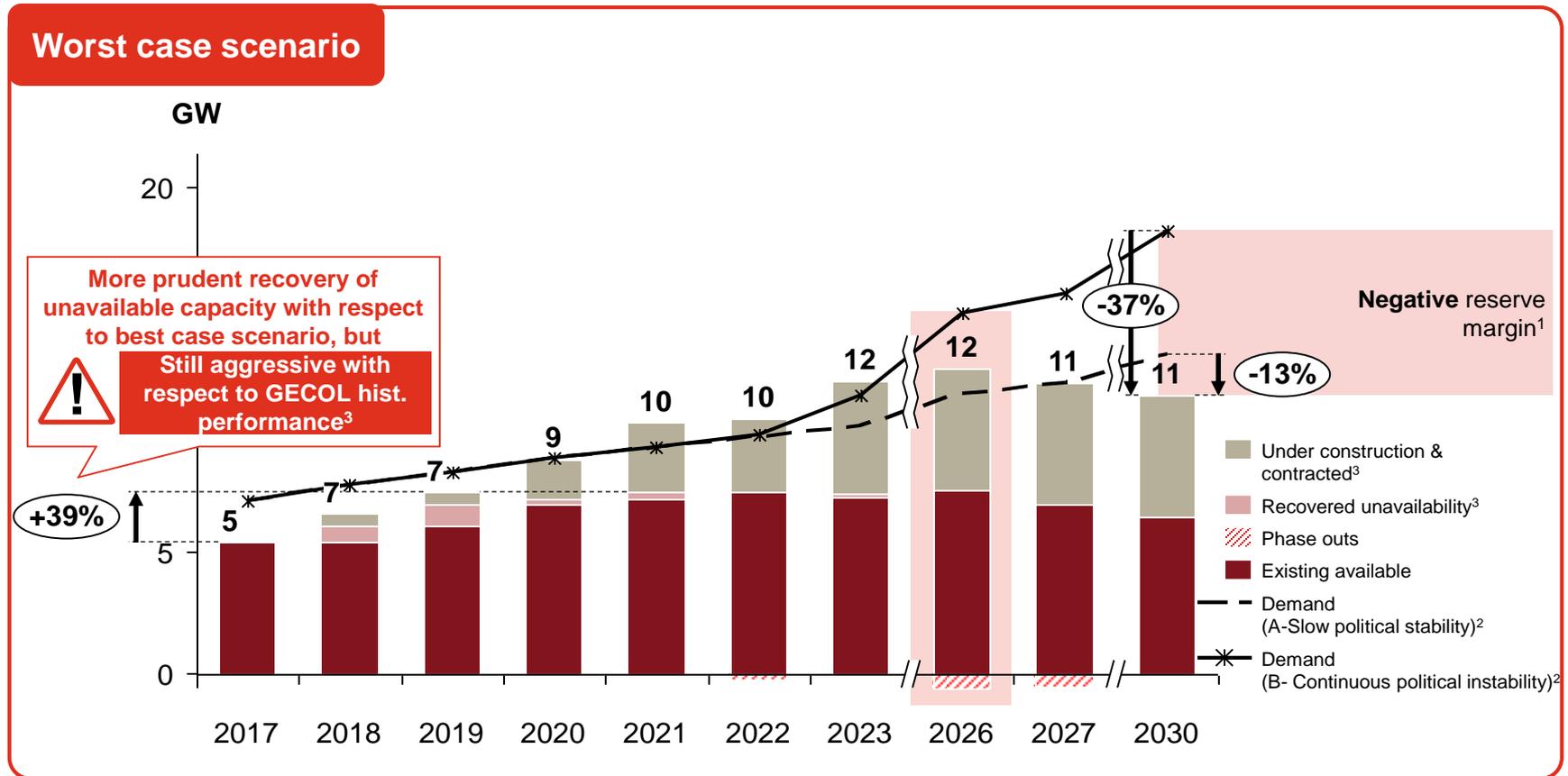
Generation expansion plan (2017-2030)



1) Computed as (Available capacity-Peak demand)/Peak demand; 2) Peak demand at generation; 3) Assuming GECOL will be able to carry out each year 15 overhauls of units overdue from past years + all overhauls of newly due units. All overdue unit overhauls and major maintenance are supposed to be cleared by 2020; 4) Conventional steam turbines that approached their retirement age but have been overhauled are assumed to have an extended life up to 2030, gas turbines to 2025. Other units are retired at their planned decommissioning year; Sources: GECOL data collection ID4, Awardbrand - Improving GECOL technical performance report, Strategy& analysis

...although under a more pessimistic (realistic?) scenario, difficulties may remain an issue until at least until 2020

Generation expansion plan (2017-2030)

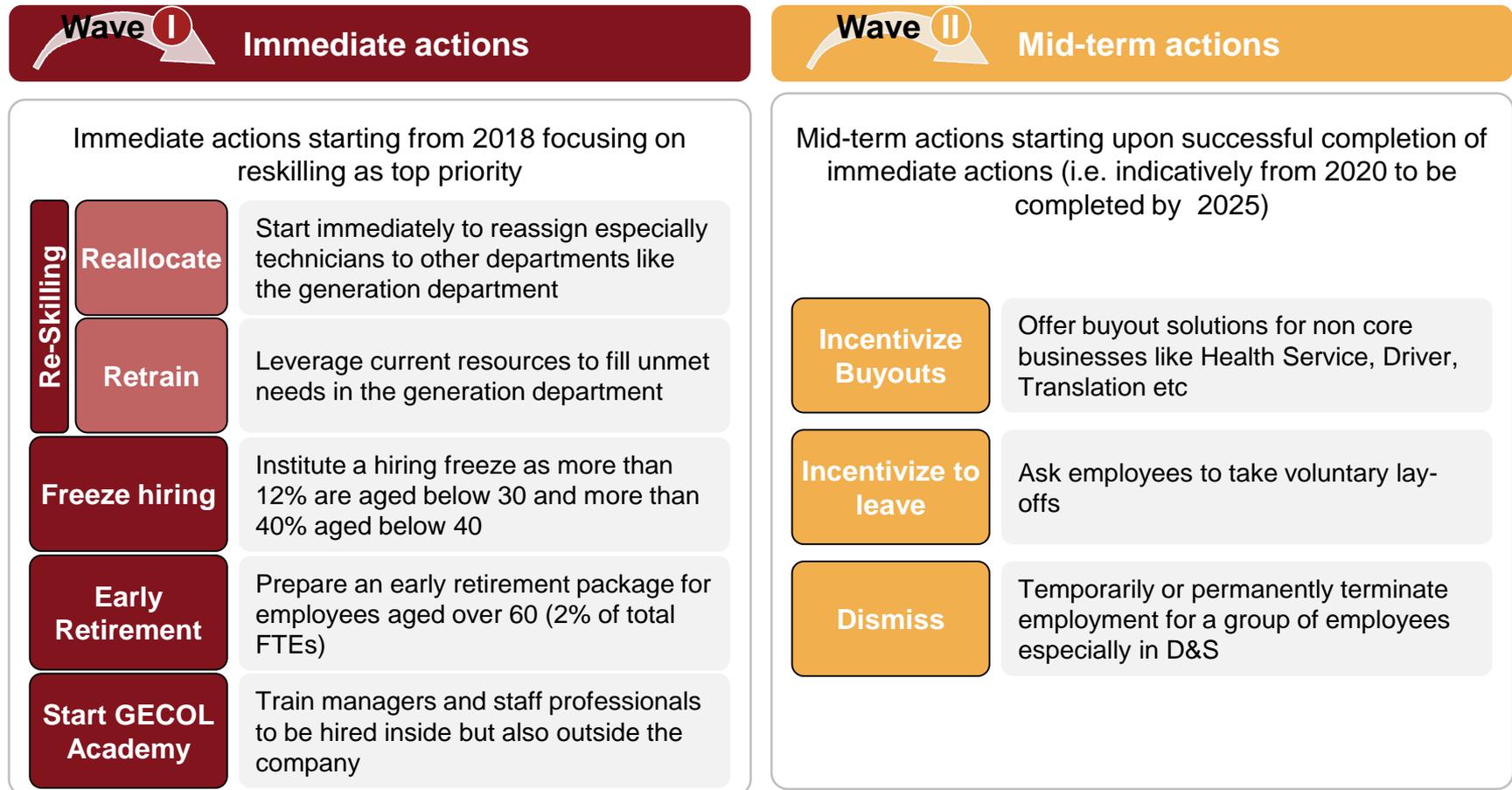


1) Computed as (Available capacity-Peak demand)/Peak demand; 2) Peak demand at generation; 3) Assumes GECOL will be able to carry out each year 4 overhauls of units overdue from past years + all overhauls of newly due units

Sources: GECOL data collection ID4, Awardbrand - Improving GECOL technical performance report, Strategy& analysis

Wave I will also focus on ending GECOL's manpower and costs growth, making of staff reskilling a priority...

Manpower related resizing approaches

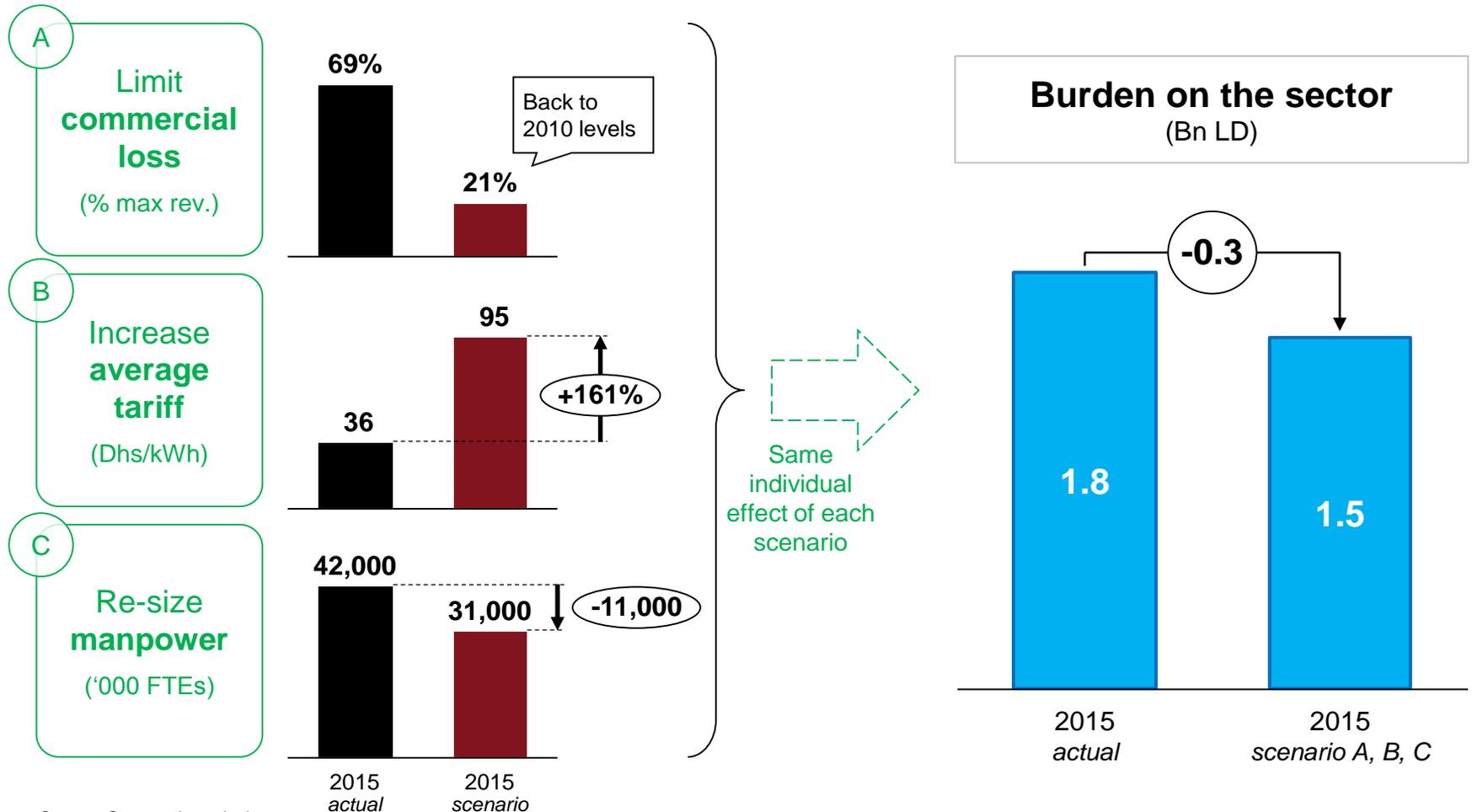


1) Process mapping and manpower rationalization report

Source: Strategy & Analysis

...while restoring financial sustainability through the fight of commercial losses (preferred to tariff increases or FTE cuts)

Comparison of scenarios achieving identical financial impact (2015)



Source: Strategy& analysis

Wave I will also see the set up of the RES framework in Libya

Measures and activities



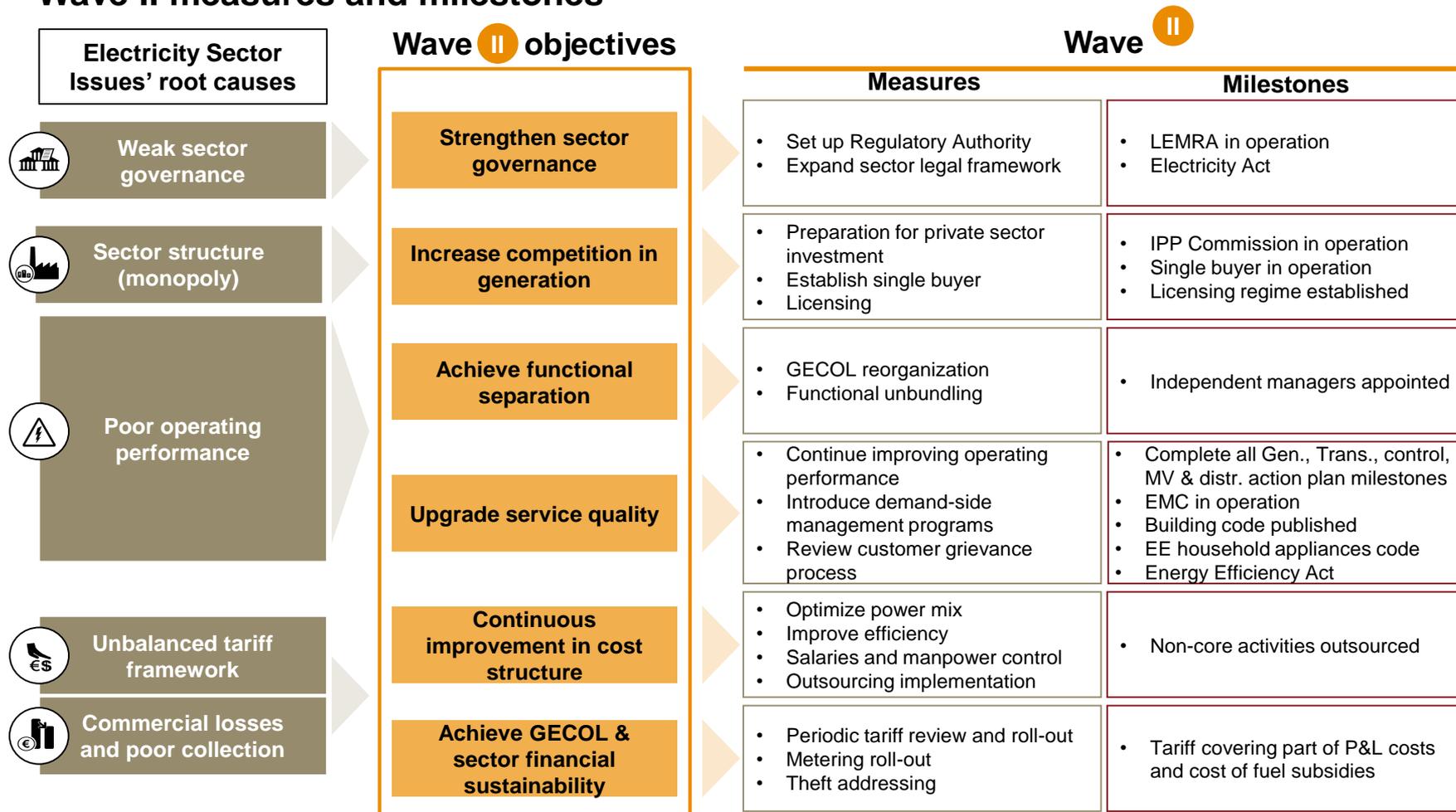
← Wave **I** 2018-2020 →

Measures	Pilot study and development					
	REDEVCO set up	Concept	Feasibility	Project & site qualification	Financing	Construction and operation
Duration	6 months	2 years				6 months
Owner	REAOl	REDEVCO				SPV/IPP
Activities	<ul style="list-style-type: none"> • REDEVCO set up <ul style="list-style-type: none"> – Appointment of BoD and initial budget allocation – Recruitment – Development of strategic plan • RES permitting and tender documentation <ul style="list-style-type: none"> – Clarify permitting process and documentation – Draft tender documentation 	<ul style="list-style-type: none"> • Concept <ul style="list-style-type: none"> – Resource mapping and site shortlist – Agreement with GECOL about sites and grid capacity – Outline business case • Iterative feasibility study process <ul style="list-style-type: none"> – Red flag and fatal flaw analysis of all relevant project details on high level (pre-feasibility) – Techno-economic concept design and detailed site assessment • Project/site qualification <ul style="list-style-type: none"> – Geotechnical and topographic survey – Environmental impact assessment (EIA) – Permitting process, PPA & other contract negotiations • Financing <ul style="list-style-type: none"> – Equity auctioning process and selection of equity investors into SPVs – Negotiation of debt financing strategy 				<ul style="list-style-type: none"> • Engineering and procurement <ul style="list-style-type: none"> – Design and procurement and installation of PV components • Construction and commercial operation
Milestones	◆ REDEVCO operations start	◆ PV pilot project study completion	◆ Wind pilot project study completion	◆ 3% RES penetration		

Source: Gopa intec and Suntrace Task D Roadmap for Renewable Energy Development, Strategy& analysis

With Wave II, Libya will continue working on the issues identified and also introduce a number of structural changes

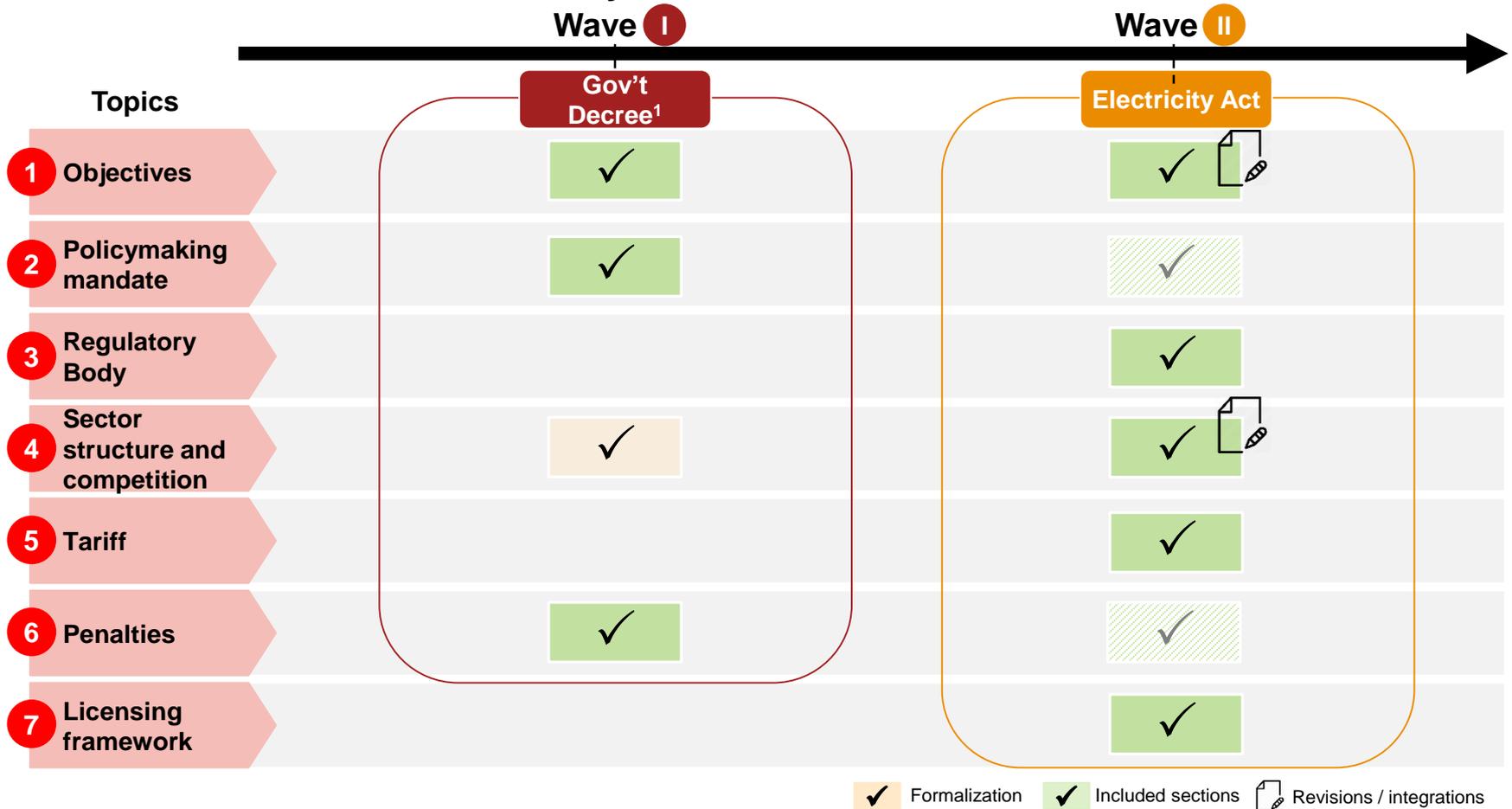
Wave II measures and milestones



Source: Strategy& analysis

Libya will vote an electricity act (while in Wave I it target Gov't decrees, because of its weak governance)

Government decree and electricity acts sections

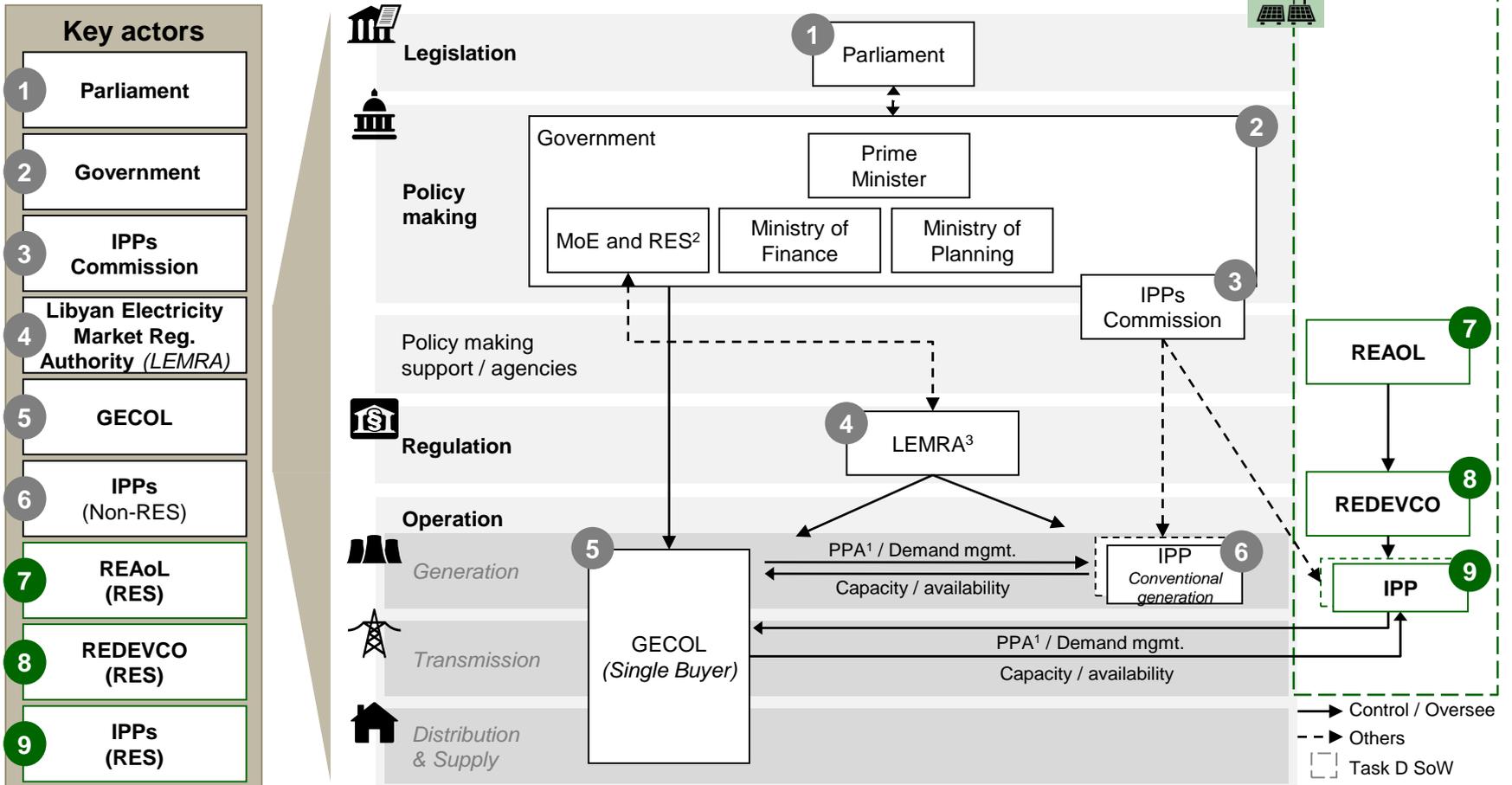


1) Government Decree will substitute the release of the Electricity Act, since the sector structure, roles & responsibilities will not be changed

Source: Strategy& analysis

In Wave II Libya will operate according to a more structured sector framework, including a Regulator and IPPs

Wave II end sector framework (2024)



1) Power Purchase Agreements are the off-take arrangements through which the IPP power exchange is regulated; 2) Ministry of Electricity and Renewable Energy Sources; 3) Further deep dive on the relationship between LEMRA and MoE and RES will be provided in LEMRA establishment detailed roadmap deliverable due by end of October

Source: Strategy& analysis

The electricity act will delegate many of the Government responsibilities to LEMRA (the new Regulatory Authority)...

Actors redistribution of responsibilities — Wave II

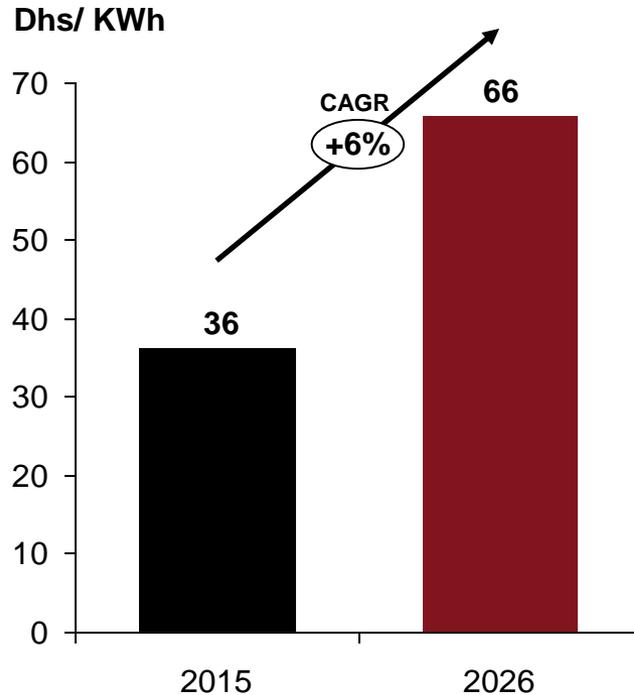
Actors	As-is		After LEMRA establishment		
	Government	GECOL	Government	Regulator	GECOL
Responsibilities					
Set performance standards	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Monitor performance	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	
Define sector vision	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		
Determine prices	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
Choose technologies		<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
Determine investments		<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
Establish sector rules	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	
Receive public input	<input checked="" type="checkbox"/>				
Balance environmental and economic goals	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		
Determine sector structure	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Receive consumer complaints		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Issue licenses	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	

Source: Strategy& analysis

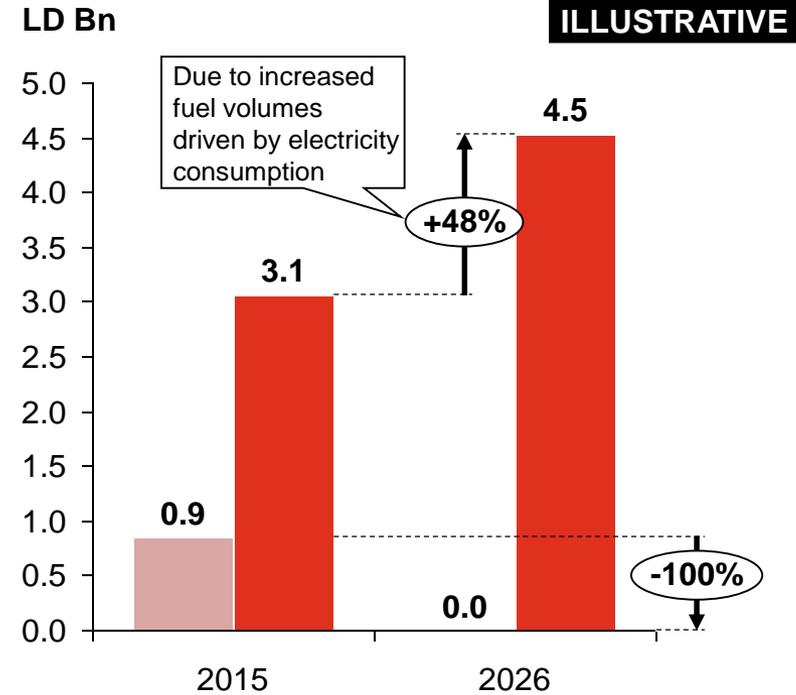
Responsibilities transferred to other actor Full responsibility Advisory function

...and Libya will achieve a more sustainable financial status, with full GECOL P&L costs coverage and lower fuel subsidies

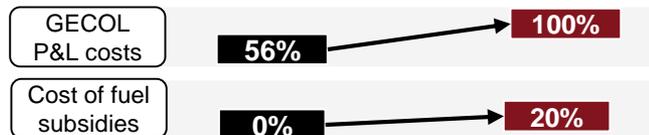
Projected avg. tariff (2015-2026)



Potential change in government subsidies (2015 vs. 2026)



Avg. tariff covering:

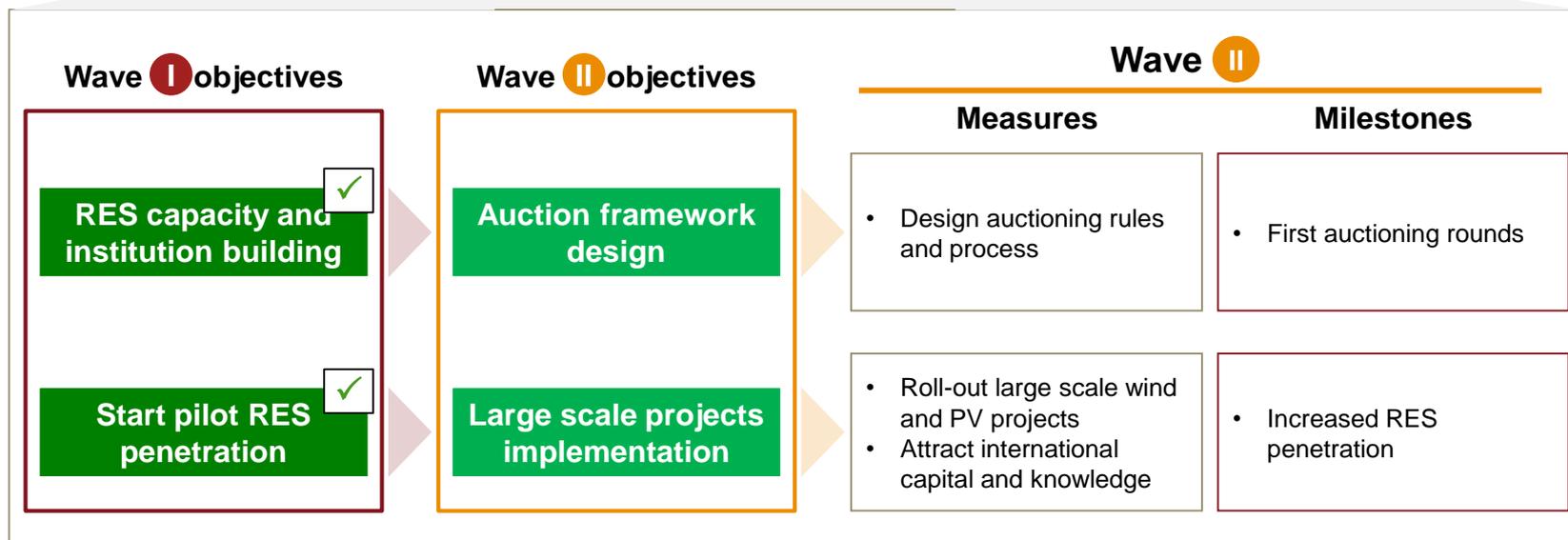


■ Government subsidies on GECOL P&L
 ■ Government subsidies on fuel cost

Sources: GECOL data collection ID7, GECOL data collection ID20, Strategy & analysis

Wave II will also see the launch of bigger scale RES projects through an auctioning framework

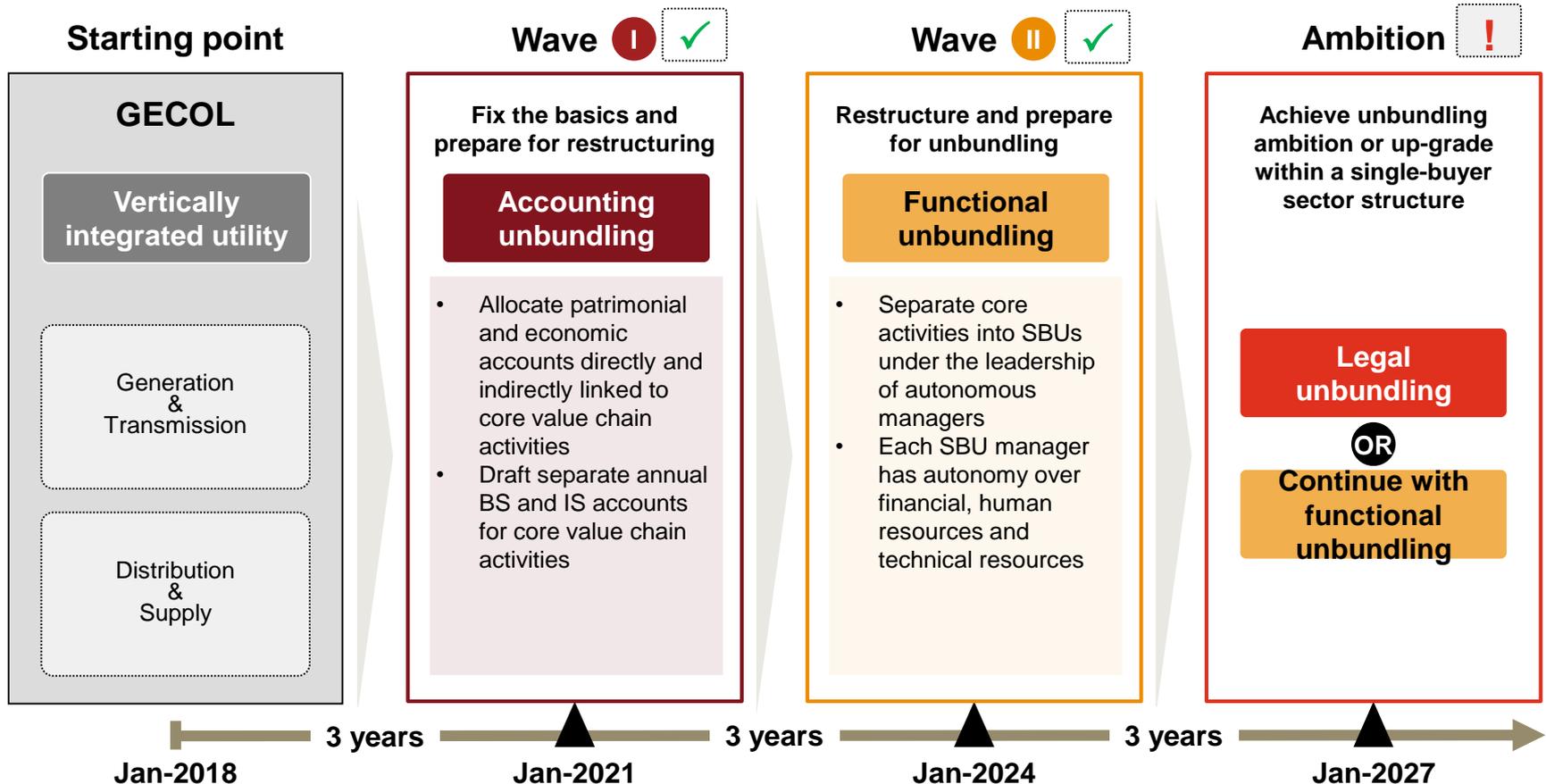
RES roadmap: wave II measures and milestones



Source: Gopa intec and Suntrace Task D Roadmap for Renewable Energy Development, Strategy& analysis

Unbundling will only become an option at the end of Wave II, after the completion of GECOL functional unbundling

GECOL unbundling path



Source: Strategy& analysis

Executive Summary

Summary of key issues faced by the electricity sector

Wave I: Fix the basics and prepare for restructuring

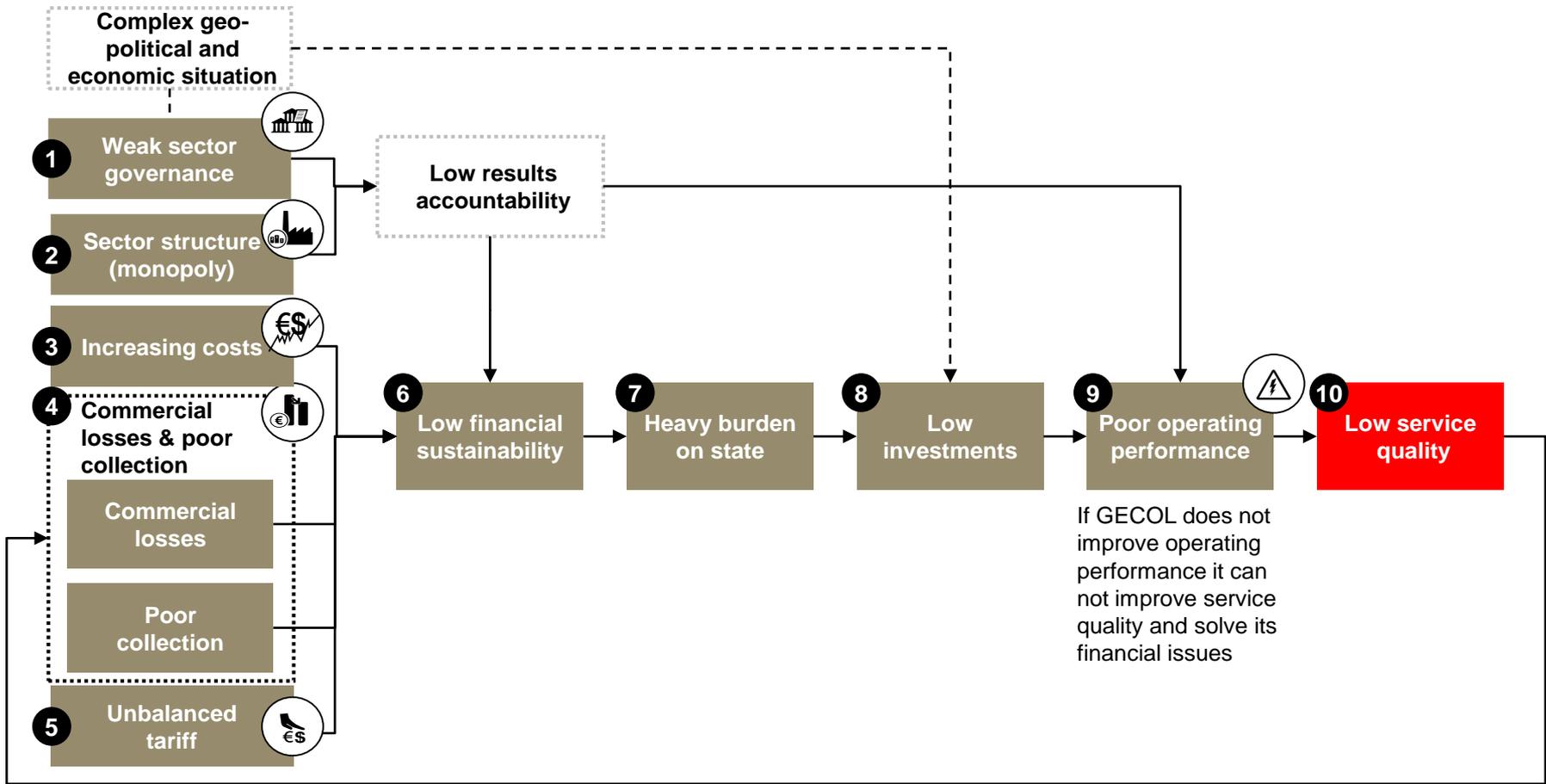
Wave II: Restructure and prepare for ambition

Options for Wave III (realize ambition)

Appendix – Inputs for Electricity Act

Task A started with a rapid sector assessment, which identified several (interrelated) issues affecting Libya today

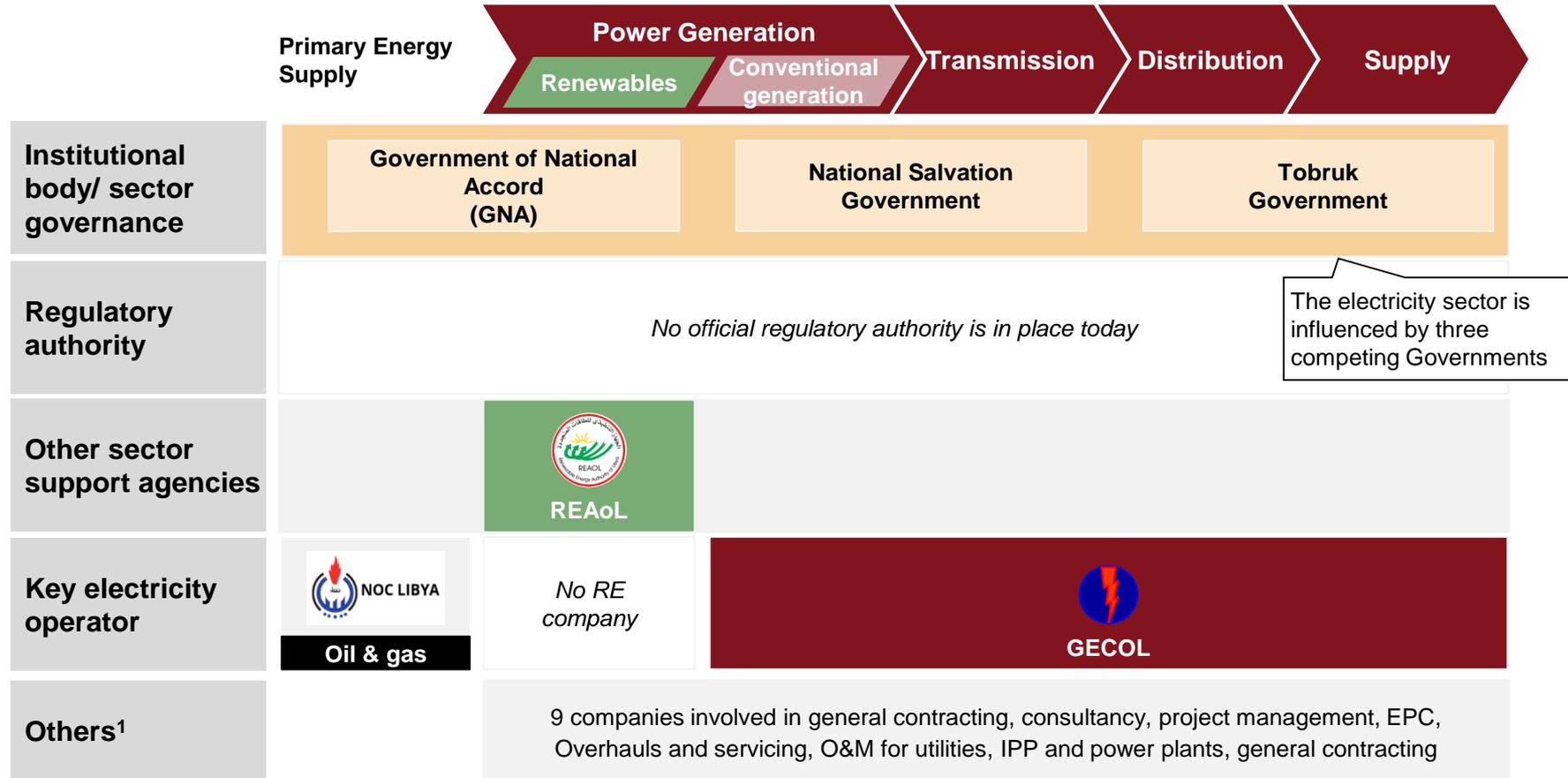
Libya electricity sector issues identified



Source: Strategy& analysis

Today, the energy sector lacks of a clear policy leadership and governance

Libyan electricity sector structure

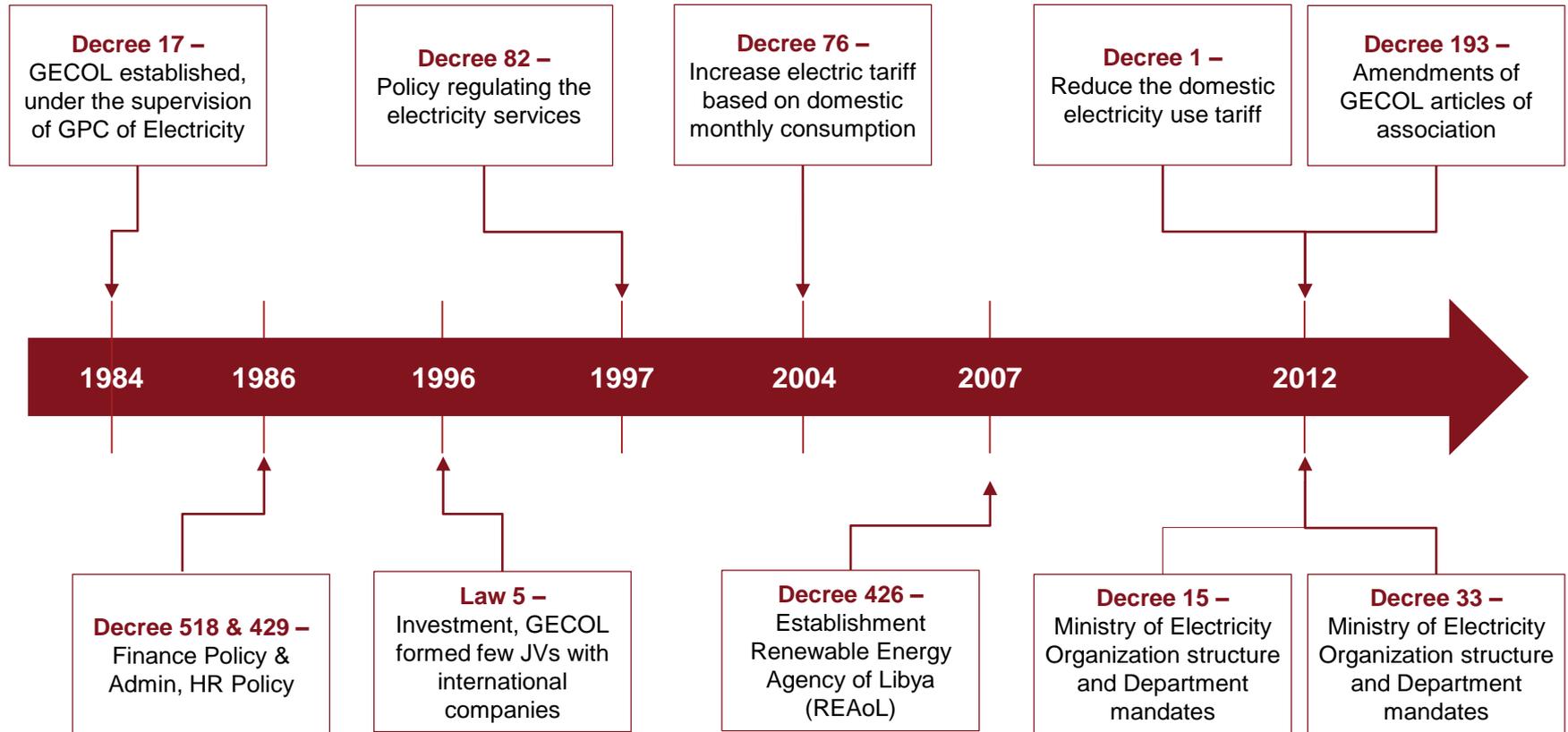


1) Ministry of planning approves capital projects budget and allocate the funds to GECOL through Ministry of Finance

Source: GECOL, Strategy & analysis

The latest most important legislative and policy initiatives in the field of energy were last taken only in 2012

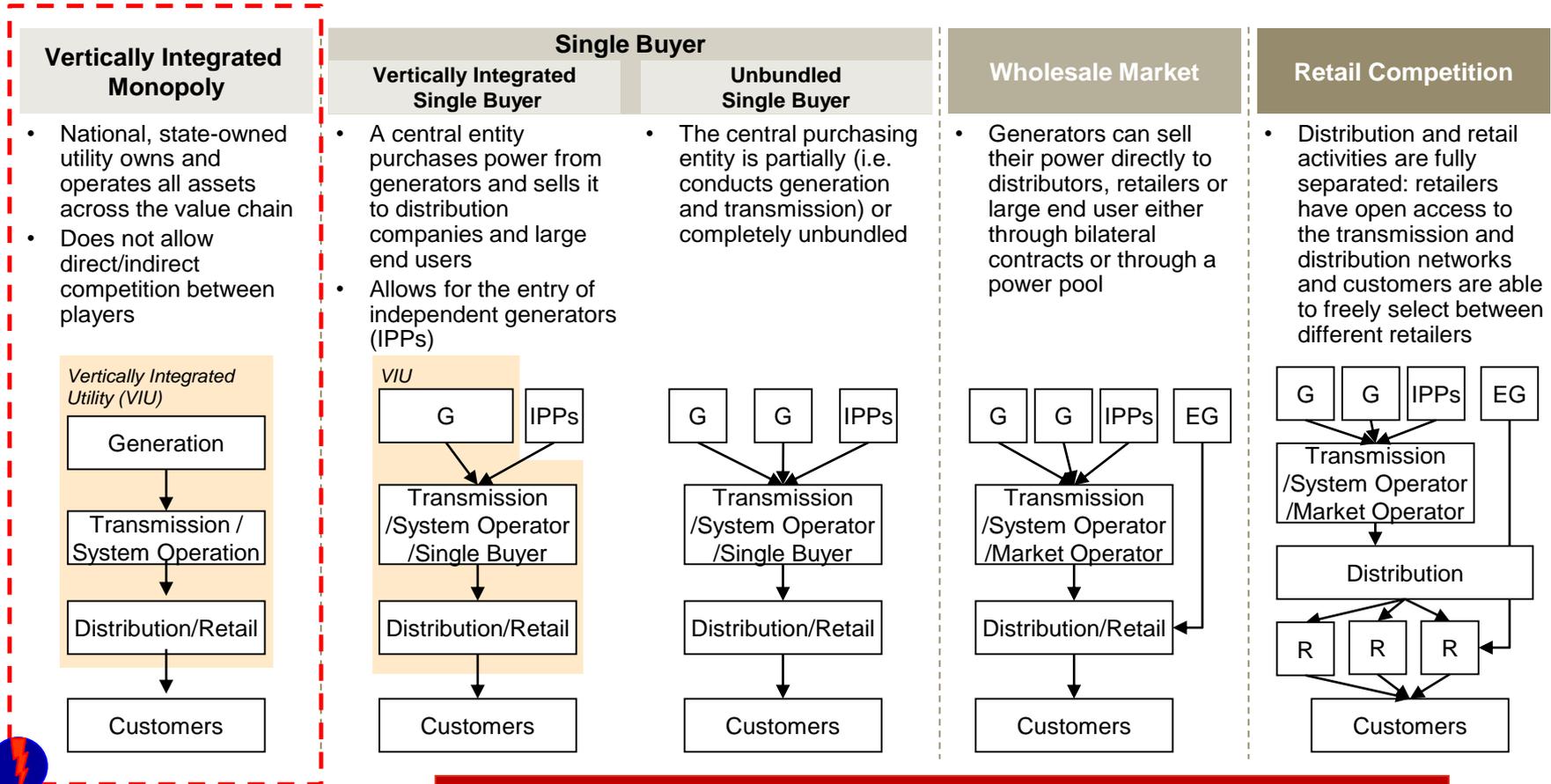
Evolution of Libya policy and regulation



Source: GECOL, Strategy & analysis

The electricity sector is structured as a vertically integrated monopoly, with no competition...

Libyan positioning among electricity sector structures models



Sector structure models are presented to provide a baseline and do not imply any suggestion for GECOL going forward

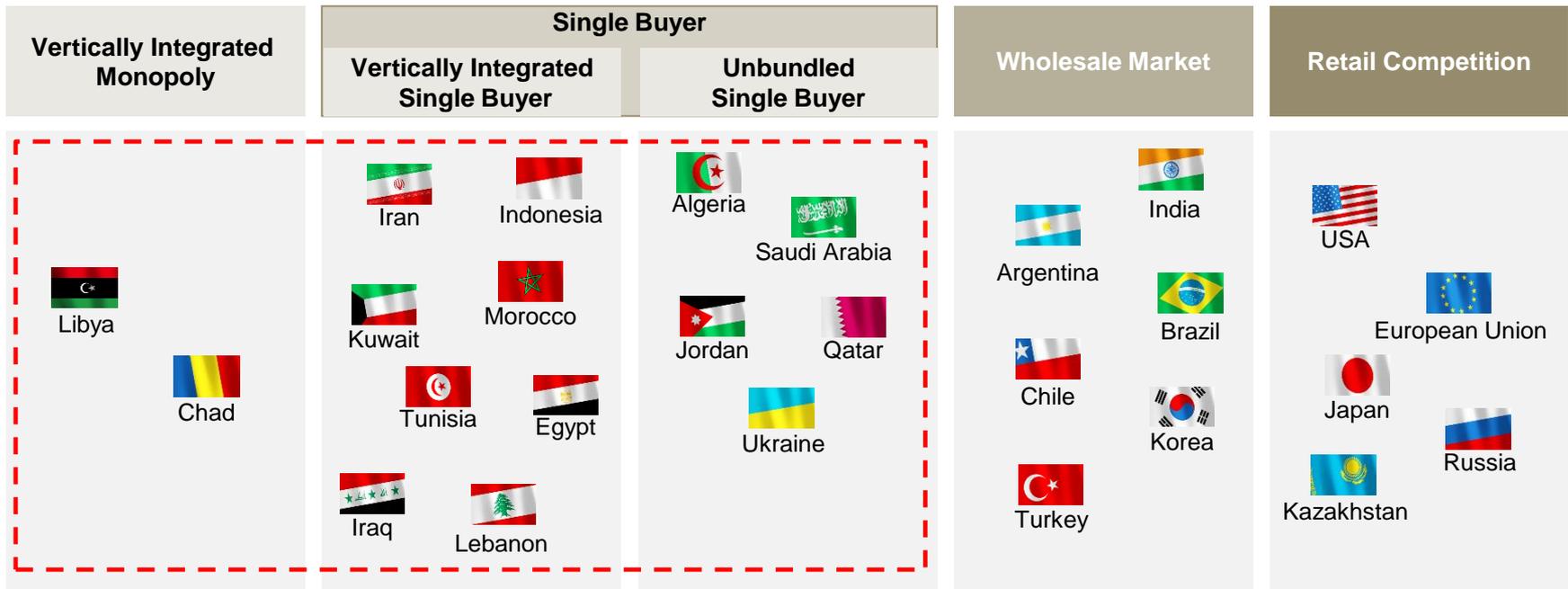
Note: Independent Power Producers (IPPs), Embedded Generator (EG); Source: Desk research, Cambridge Working paper on economics, Strategy& analysis



...while most MENA / neighboring countries are structured according to single buyer models

Examples of international sector structures

SELECTED EXAMPLES – NOT EXHAUSTIVE



MENA region / neighboring countries sample

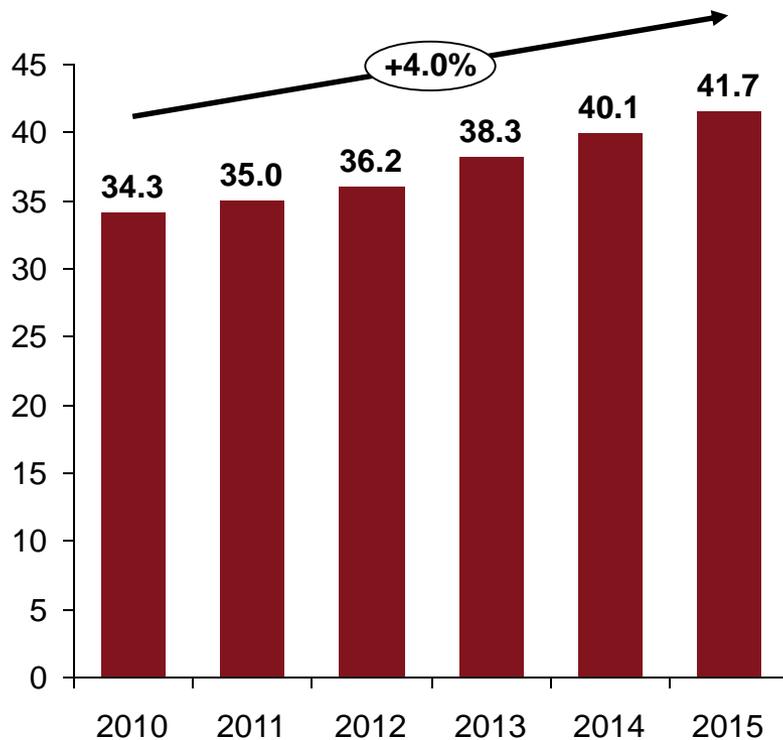
Benchmarking exercise was not used to draft the roadmap. The activities proposed in the roadmap directly respond to identified sector issues

Note: It shall be clarified that the statement does not recommend a change in sector structure based on the high-level (non exhaustive) benchmark provided but only describe an objective situation which compares Libya with other neighboring and international countries. The analysis of the most suitable sector structure has been defined separately and is not the focus of the current page. In addition, it shall also be clarified that the high-level benchmarking presented does not intend to provide neither best practices nor cases of failure. Instead, it only intends to show examples of sector structures across countries for discussion purposes only, without taking into consideration the underlying rationale and sector characteristics of each country

Source: Strategy& analysis

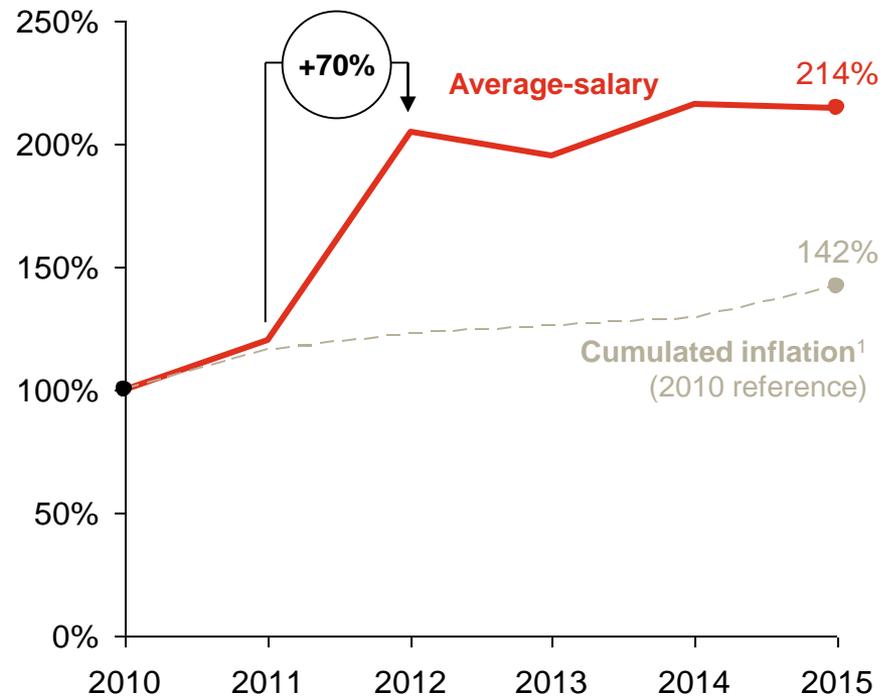
Since 2010, GECOL's number of employees and salaries have been constantly growing...

FTEs evolution (2010-15, '000)



Average-salary evolution (2010-15, LD / FTE)

Indexed vs. 2010
(100% = 2010 reference)

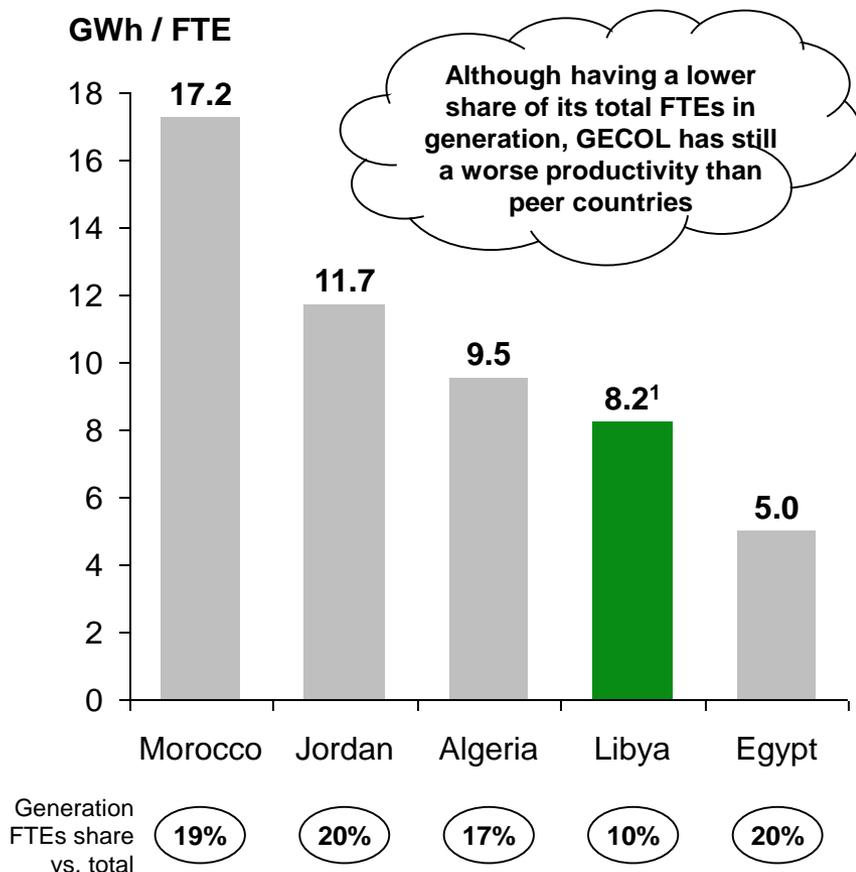


1) IHS, inflation consumer prices

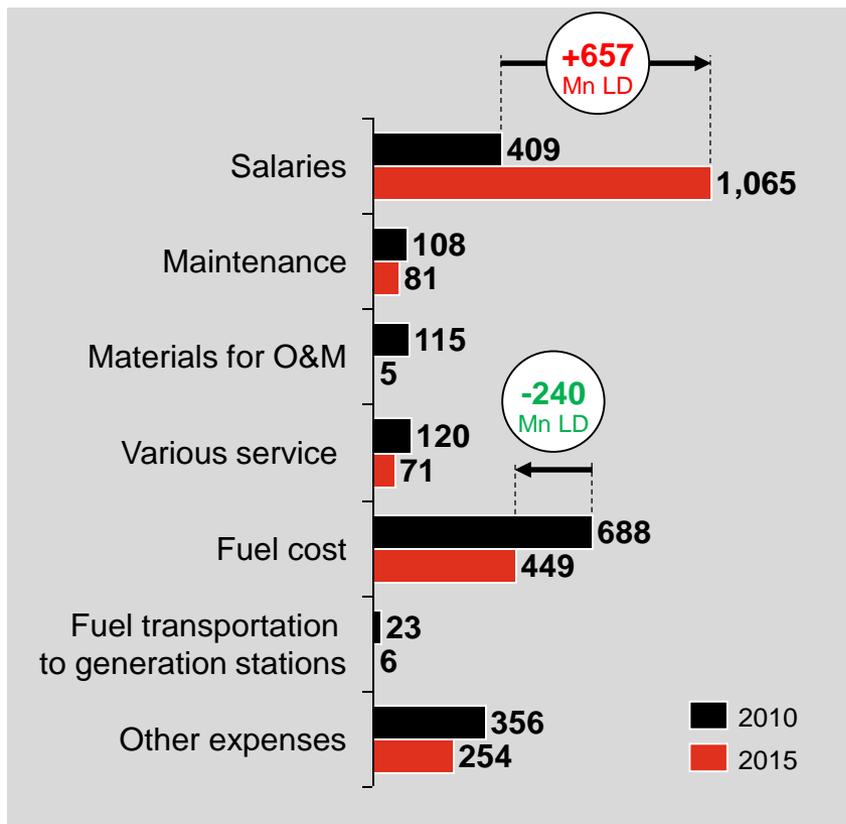
Source: GECOL data collection ID13, GECOL data collection ID17, Strategy & analysis

... affecting the company's productivity and operating costs, offsetting the positive fuel cost savings achieved

Productivity benchmark (2015)



GECOL costs evolution (2010-15, Mn LD)

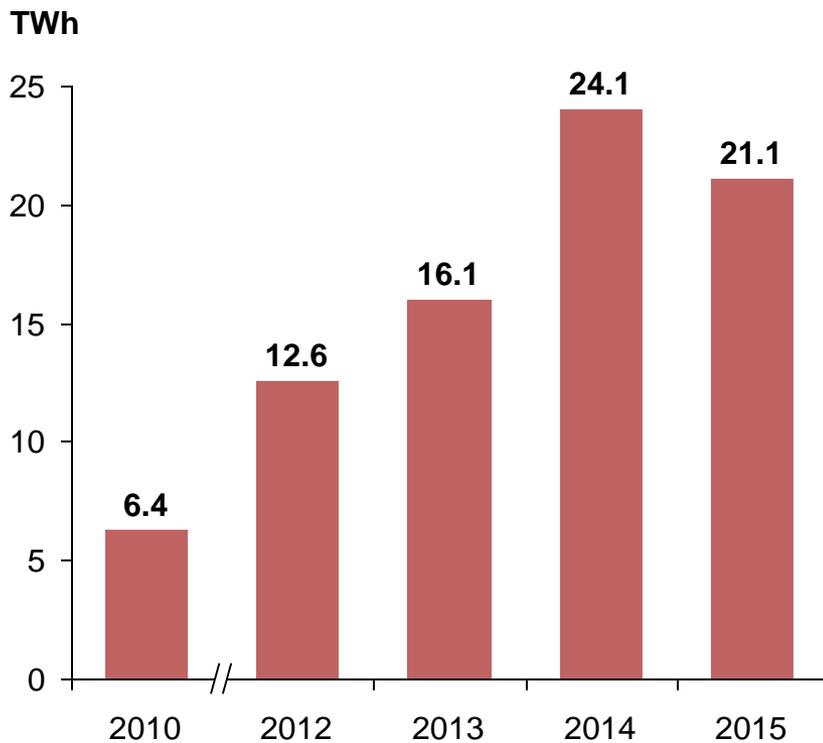


Note: includes Sonelgaz, ERC, CEGCO, SEPGCO, AES, QEPKO, ONEE-BE, Masen, and EEHC Generation Companies; 1) Updated with new data received

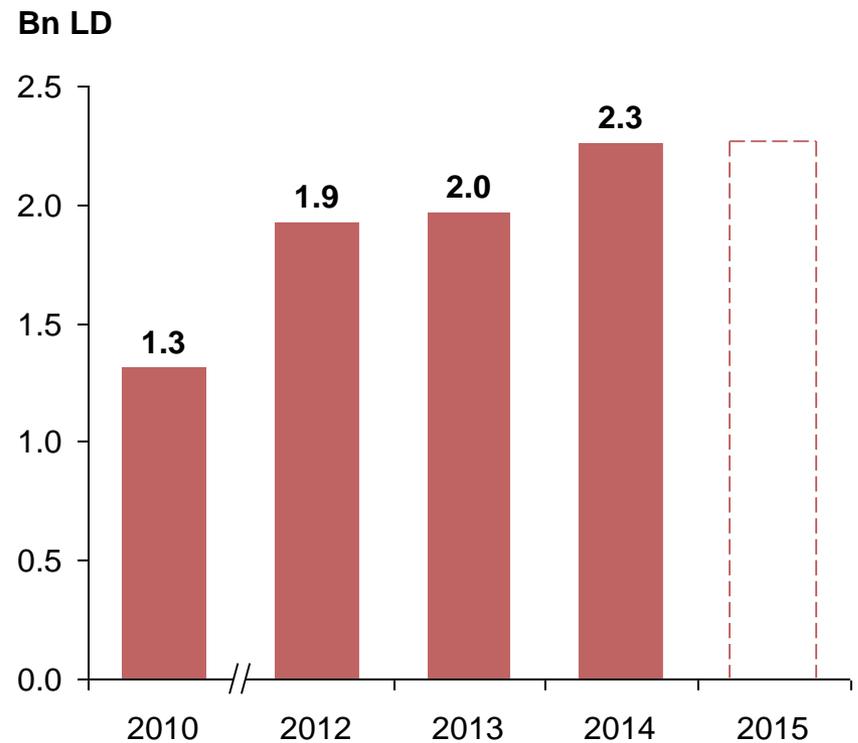
Source: GECOL data collection ID17, GECOL data collection ID24, Corporate Annual Reports, Electricity Sector Regulatory Agencies Annual Reports, Strategy & analysis

The analysis of distribution and supply highlighted a dramatic increase in commercial losses and poor collection...

Evolution of commercial losses



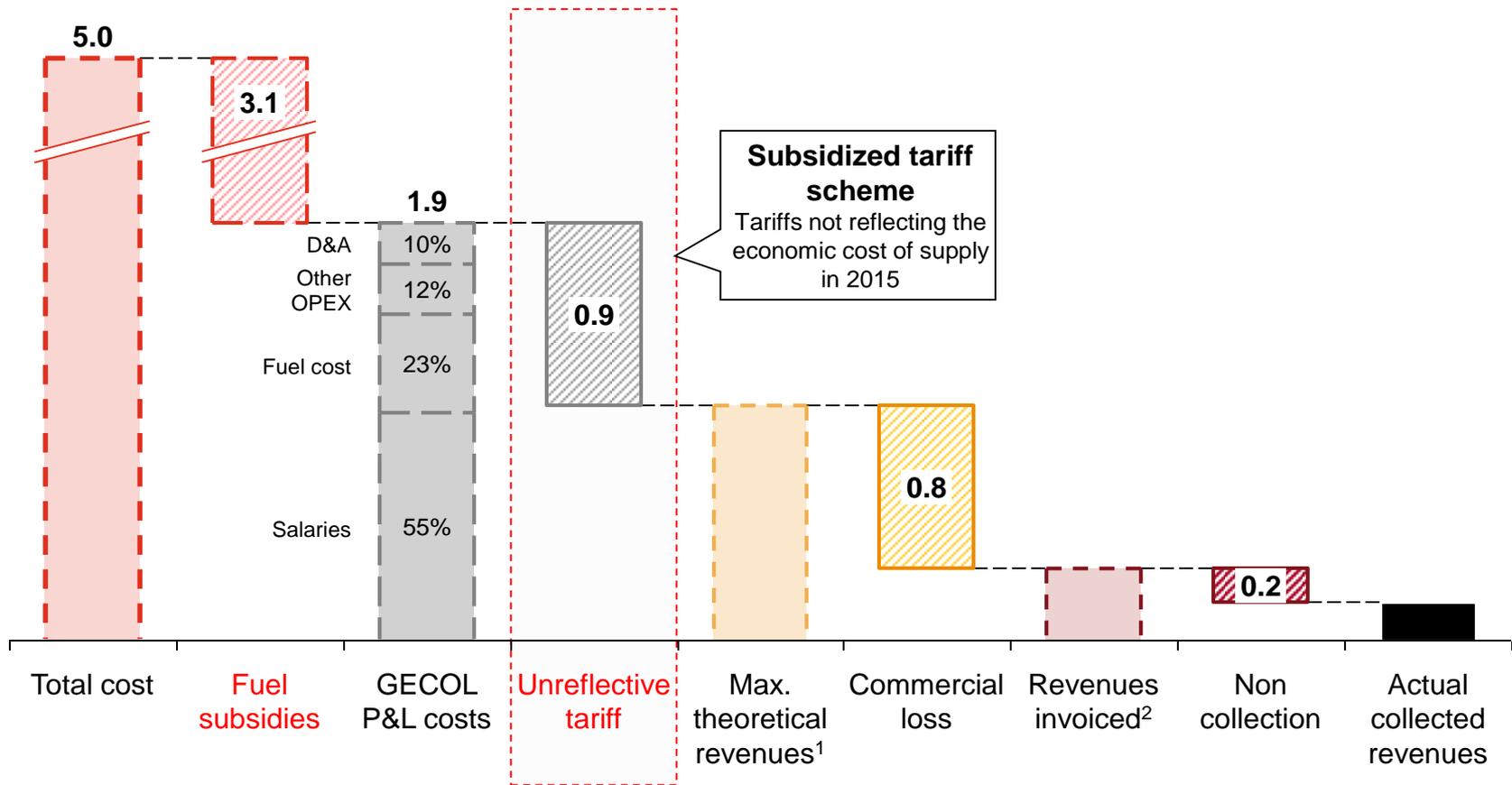
Evolution of receivables



Source: GECOL data collection ID12, GECOL data collection ID37

...worsened by a tariff framework which is structurally unable to recover costs

Burden on the sector (Bn LD, 2015)

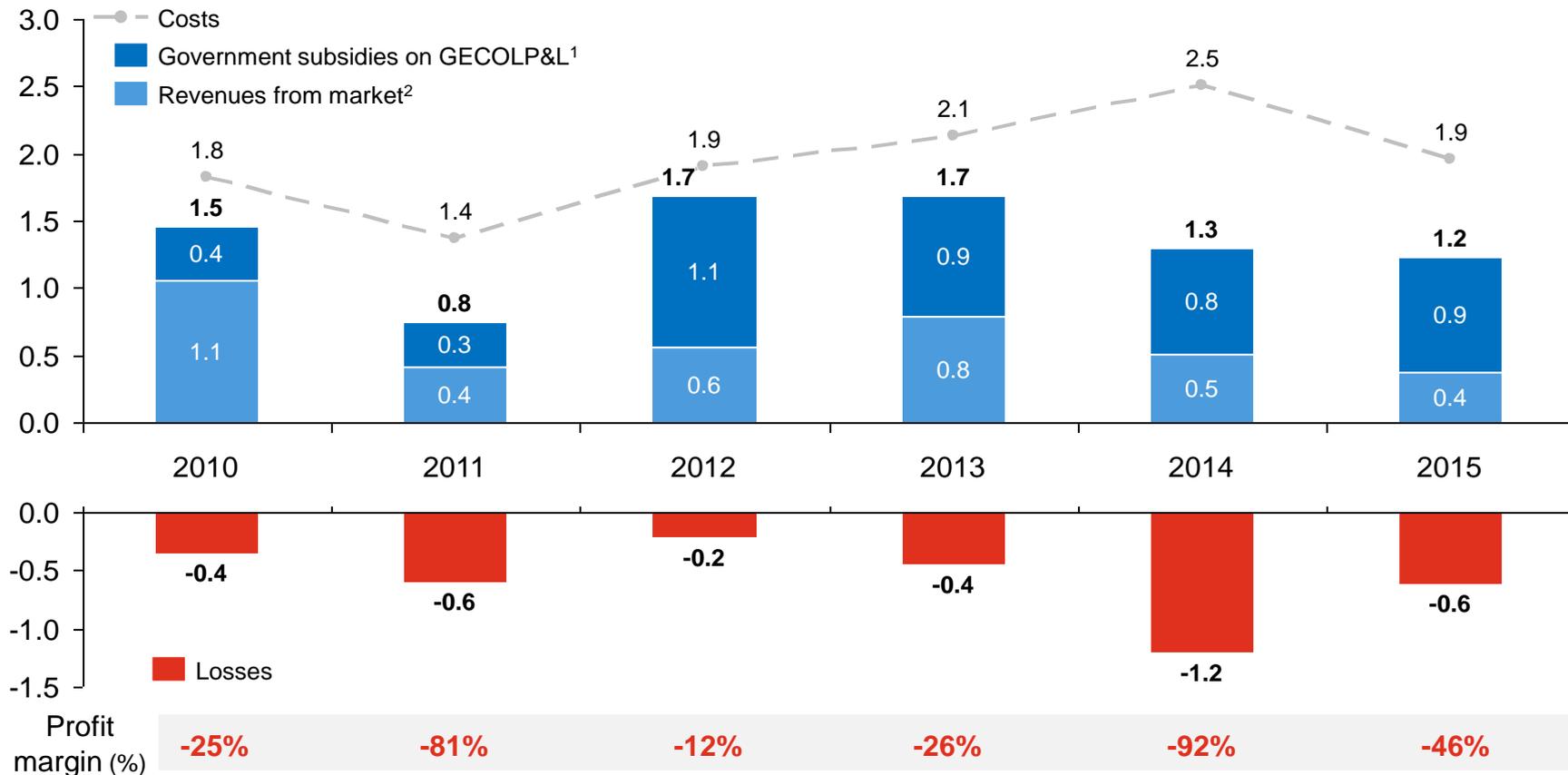


1) Sum of (Tariff by customer class) x (Consumption by customer class); 2) Considers only revenues invoiced from sale of electric power

Source: GECOL data collection ID2, GECOL data collection ID7, GECOL data collection ID13, GECOL data collection ID37, Strategy & analysis

As consequence of the unbalanced tariff and commercial losses, GECOL has registered continuous losses ...

Evolution of GECOL P&L (subsidiaries included) (Bn LD)

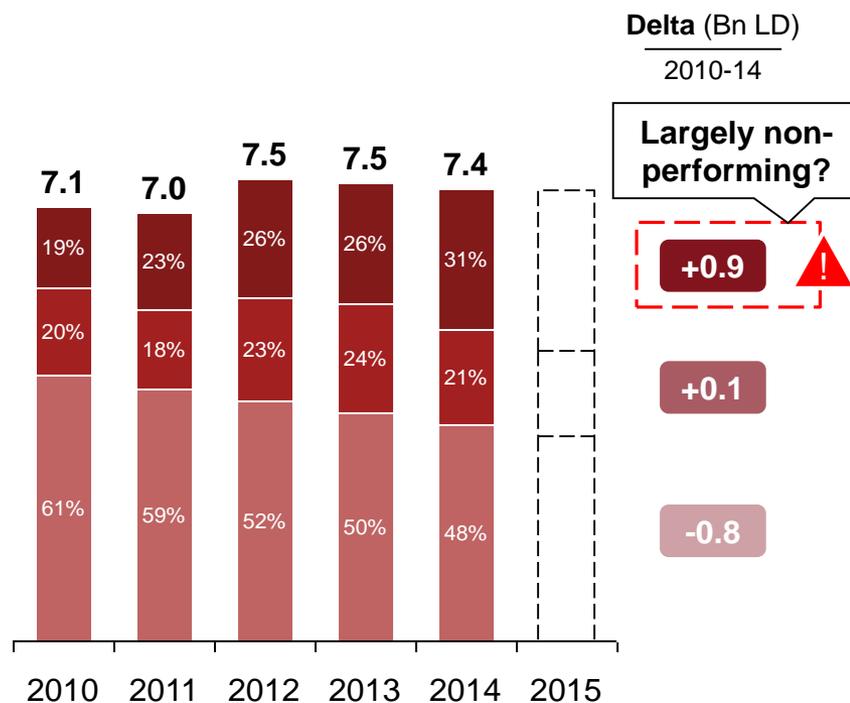


1) Subsidies actually received in GECOL P&L; 2) GECOL's total revenues in P&L including both revenues from sale of electricity and revenues from other services (i.e. water, activation of check contracts, meter renting, other services and connections, etc.)

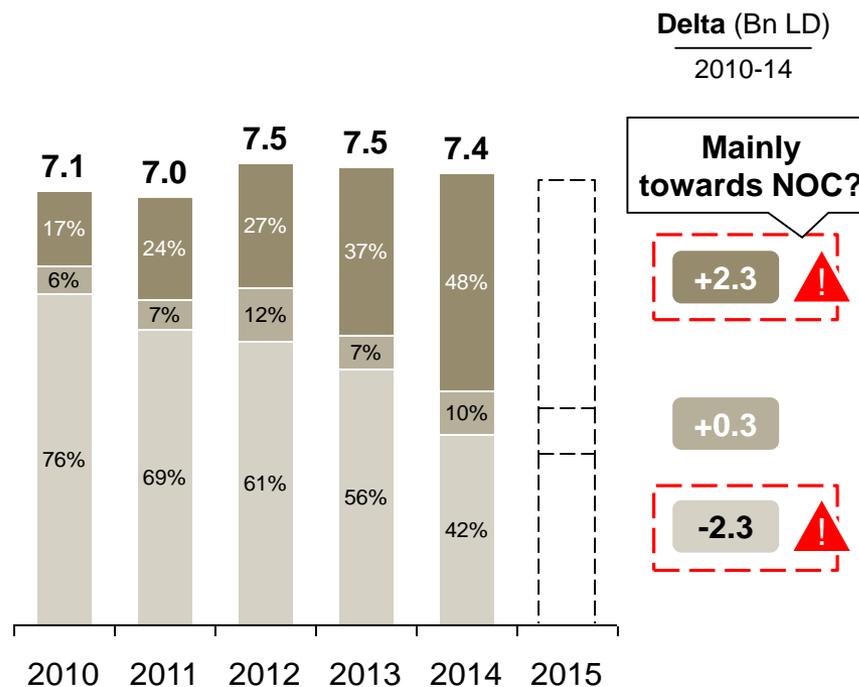
Source: GECOL collection ID13, Strategy& analysis

... with heavy impacts on the company (and thus the sector) long-term financial viability

GECOL Total Assets
(Bn LD)



GECOL Total Equity and Liabilities
(Bn LD)



- Receivables
- Other current assets
- Fixed assets

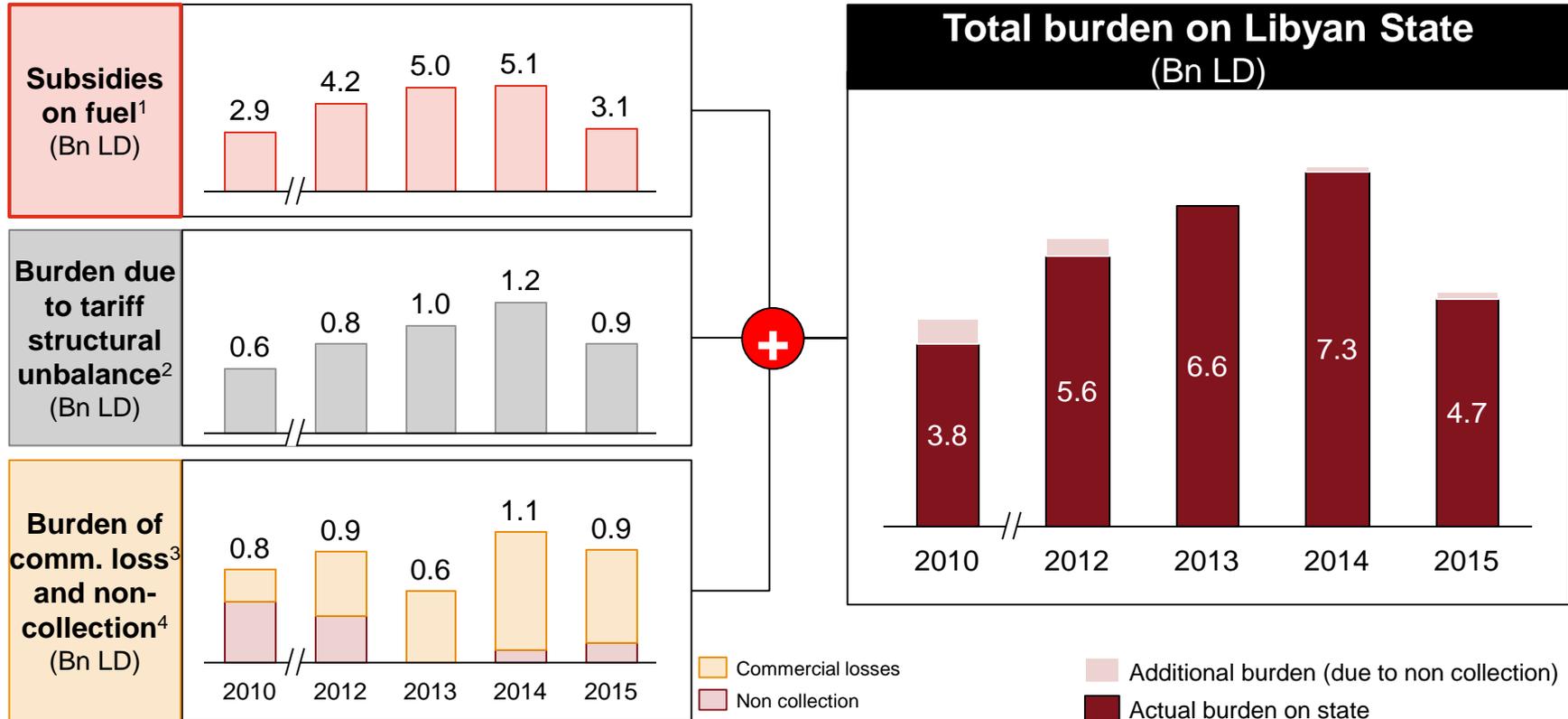
- Trades payables
- Other liabilities (exc. trade payables)
- Total Equity

Source: GECOL collection ID13, Strategy& analysis

All these issues represent a heavy burden for the Libyan State and created a very challenging financial situation ...

Evolution of financial burden on Libyan State (Bn LD, 2015)

INDICATIVE

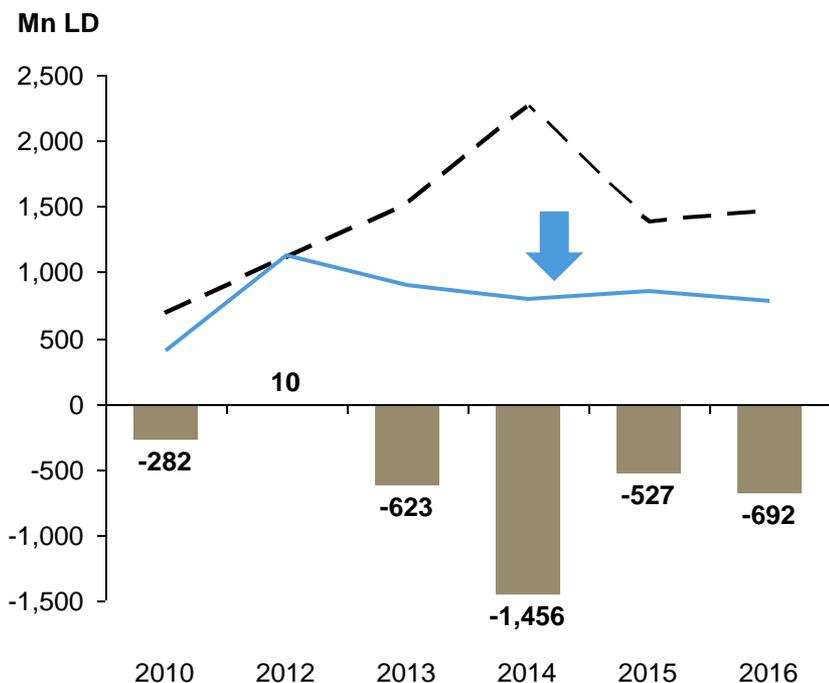


1) Calculated as the difference between the international fuel cost subsidized at 15% (assumed in agreement with NOC as opportunity price for Libya) and the subsidized price paid by GECOL to NOC; 2) Difference between GECOL P&L costs and max theoretical revenues (i.e. sum of (Tariff by customer class) x (Consumption by customer class)); 3) Difference between Max theoretical revenues and P&L revenues (electric power only); 4) Difference between P&L revenues invoiced and actual Revenues collection
 Source: GECOL data collection ID2, GECOL data collection ID7, GECOL data collection ID13, GECOL data collection ID37, Strategy& analysis

...with Government less and less able to support the sector's OPEX and CAPEX requirements

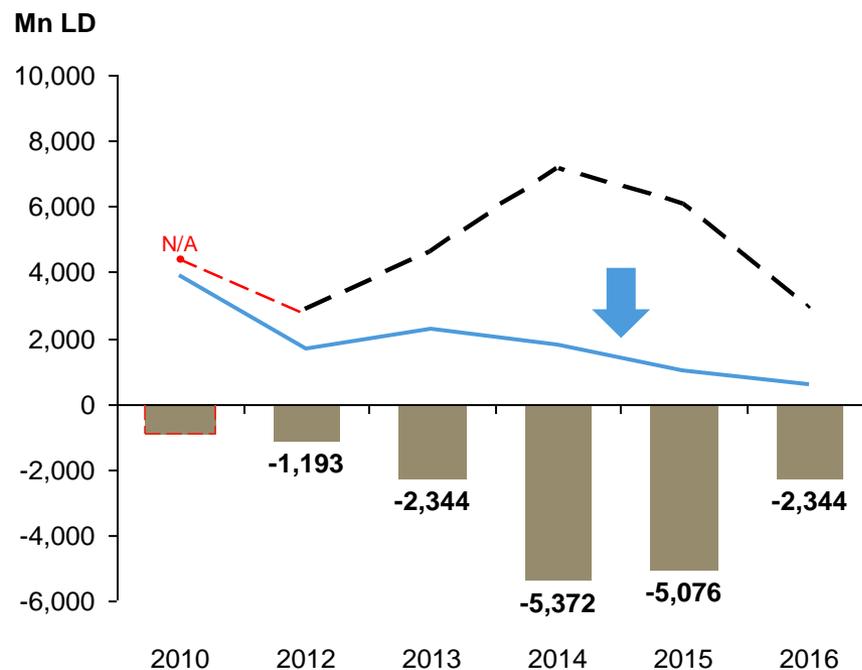
State subsidies support

To cover P&L costs > revenues



State CAPEX support

To fund investments



— Subsidy Budgeted ■ Subsidies budgeted not received
— Subsidy Received¹

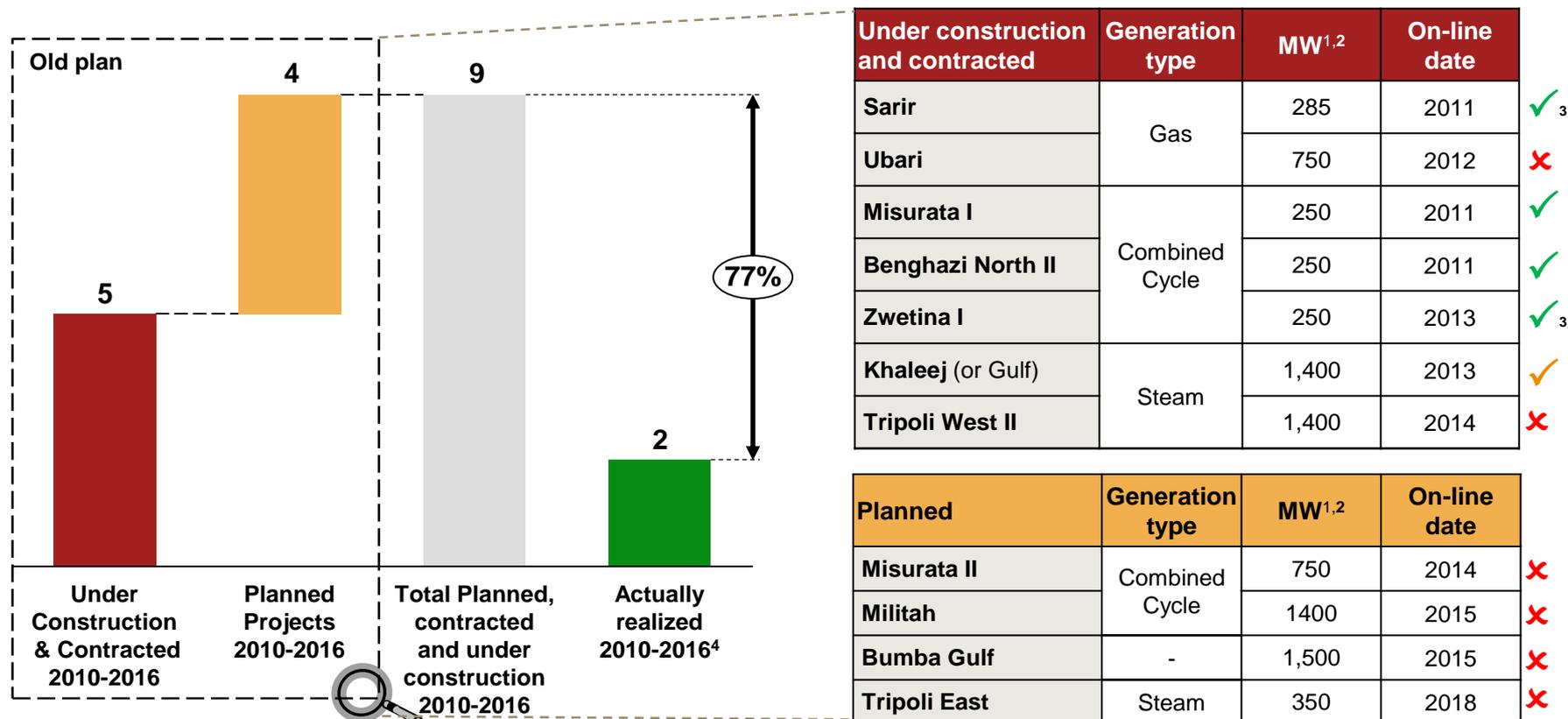
— CAPEX Budgeted ■ CAPEX budgeted not expensed
— CAPEX Expensed²

Note: Subsidy budgeted / received end-up in a burden to Libyan state but do not always equal to the state burden previously reported due to difference in sources and calculation
 1) Subsidy received in GECOL's P&L to cover the unreflective tariff; 2) CAPEX in GECOL's balance sheet

Source: GECOL data collection ID12, GECOL data collection ID13, GECOL data collection ID20, Strategy& analysis

The lack of funding (together with the country instability) led to delays in the planned projects execution

Planned capacity expansions (nameplate) vs. realized GW, 2010-2016



1) Nameplate capacity breakdown by plant still to be provided (data to be confirmed)

2) Considering the entry into force at full capacity;

3) Plant extension has been fully commissioned but due to technical or operational problems some unit are either suspended, out of service or not operational; full operation is thus estimated in 2017

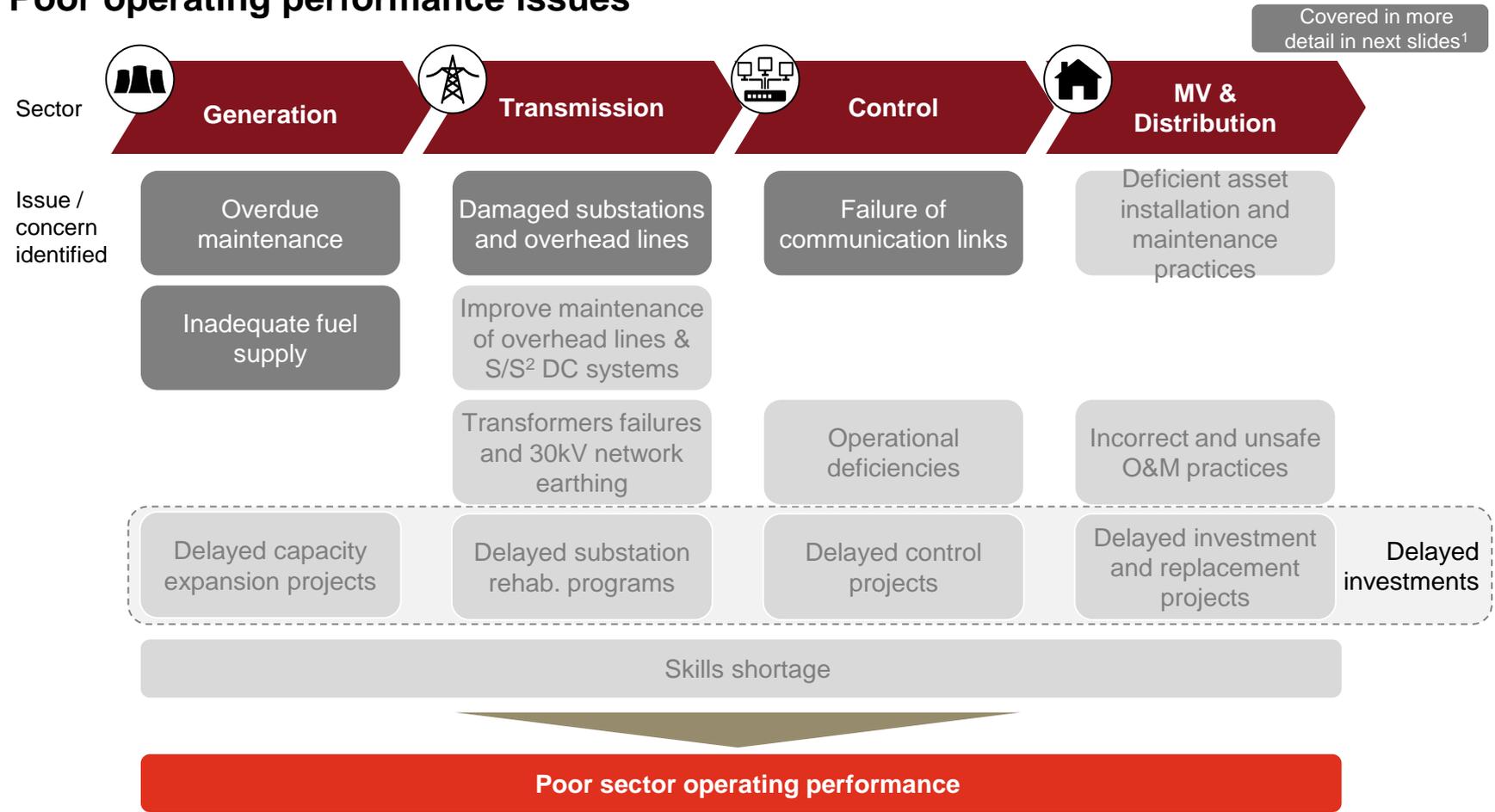
4) Data inconsistency about nameplate capacity to be resolved (possibly includes also additional plants)

Source: GECOL data collection ID1, GECOL presentation (2010), Strategy& analysis

- ✓ Projects planned in 2010, fully finalized in 2016
- ✓ Projects planned in 2010, partially finalized in 2016
- ✗ Projects planned in 2010, still not operative in 2016

Delayed investments combined with other issues led to a poor sector operating performance

Poor operating performance issues

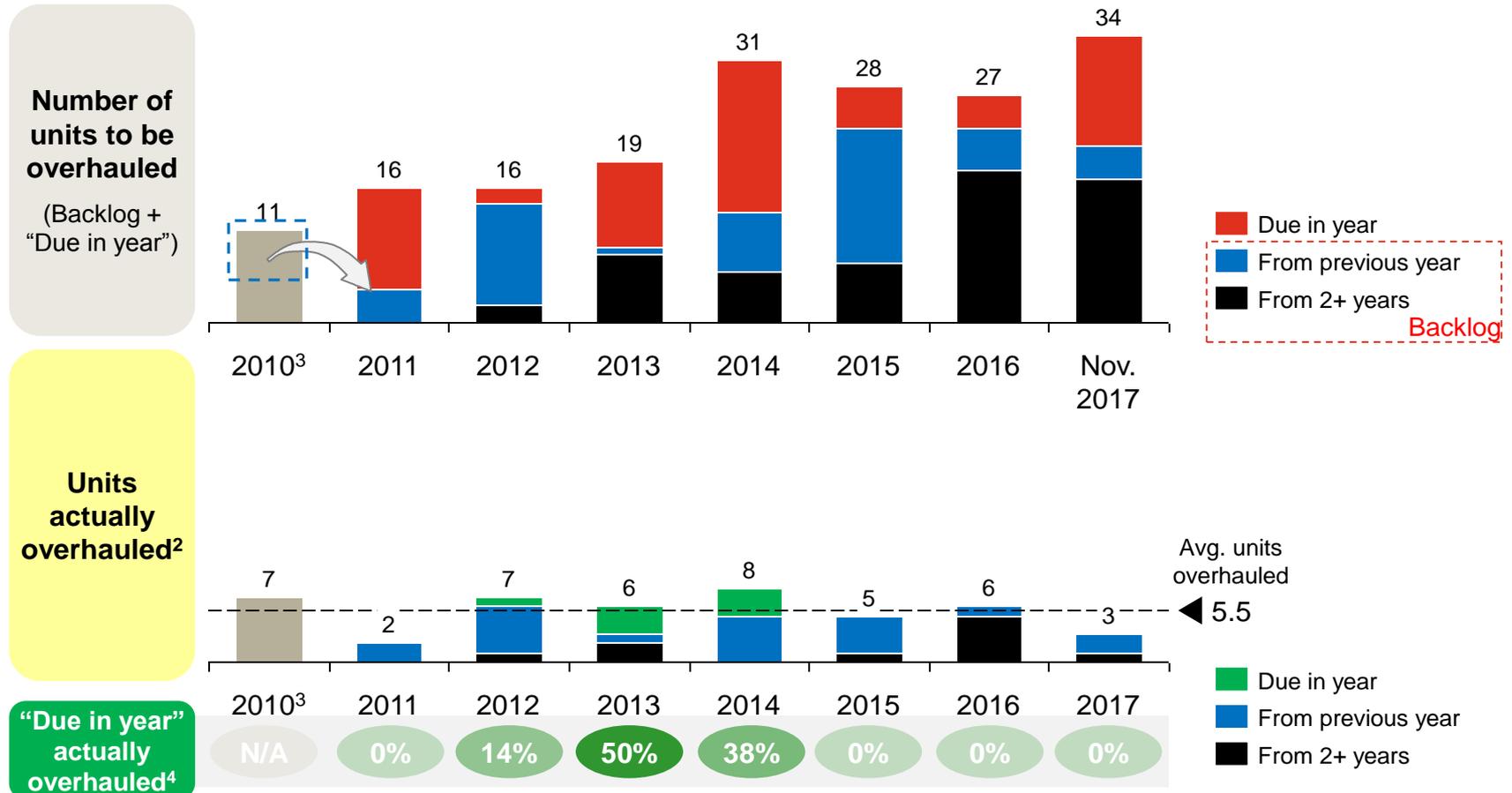


1) For further detail, see "Task C – 4.2. Improving GECOL technical performance report; 2) Substations (S/S)

Source: Awardbrand - Improving GECOL technical performance report, Strategy& analysis

In the past years, GECOL was unable to cope with its plants maintenance needs: in '17, 34 units were pending overhaul...

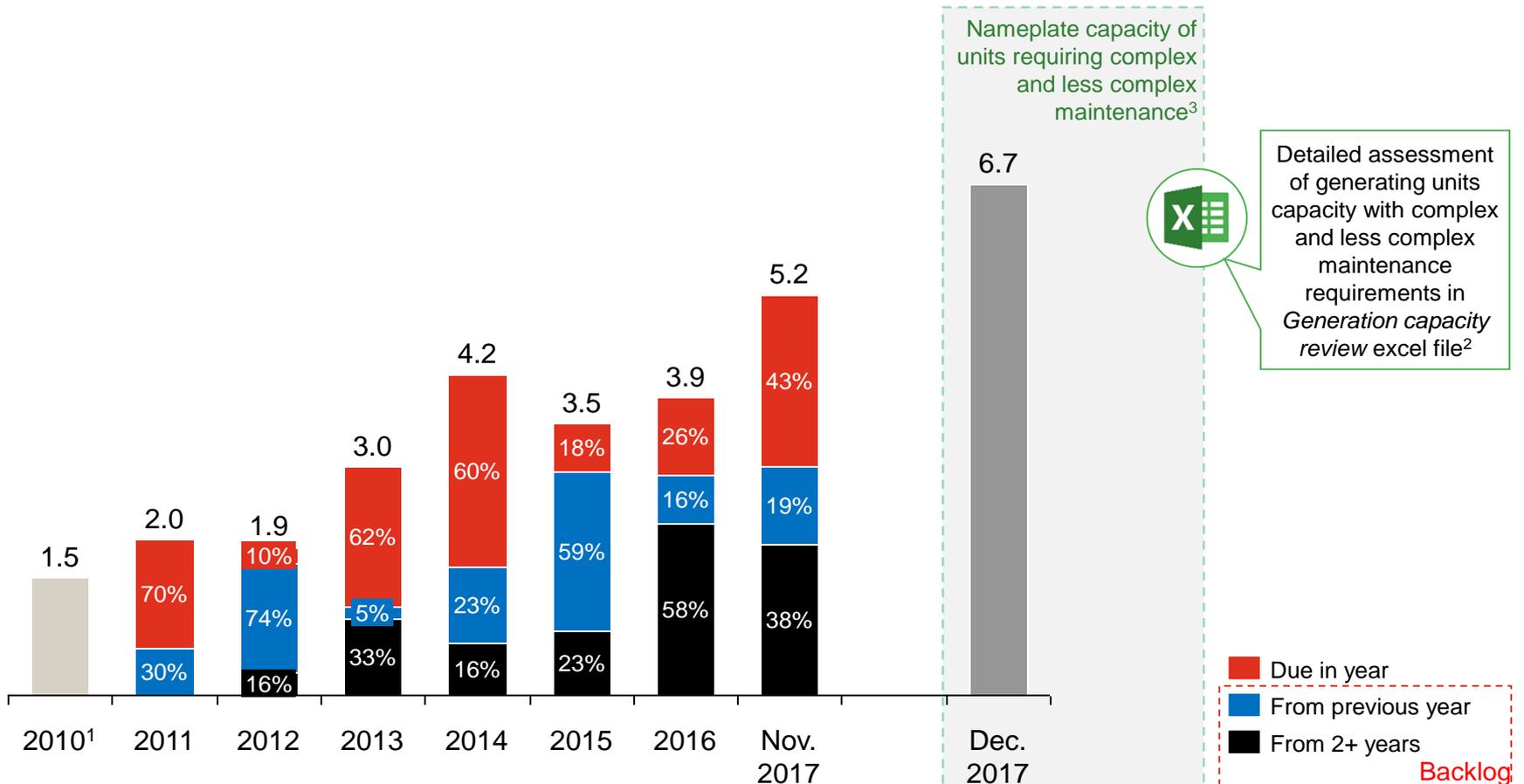
Generating units overhauls (2010-2017¹)



1) Generating units overhauls up to November 2017; 2) Overhauls are considered in the year of their completion; 3) No clear identification of backlog was available for 2010; 4) "Due in year" overhauled units divided by total overhauled units; Source: Awardbrand - Improving GECOL technical performance report, Strategy& analysis

...accounting for a total installed capacity with maintenance issues ranging between 5.2 GW and 6.7 GW

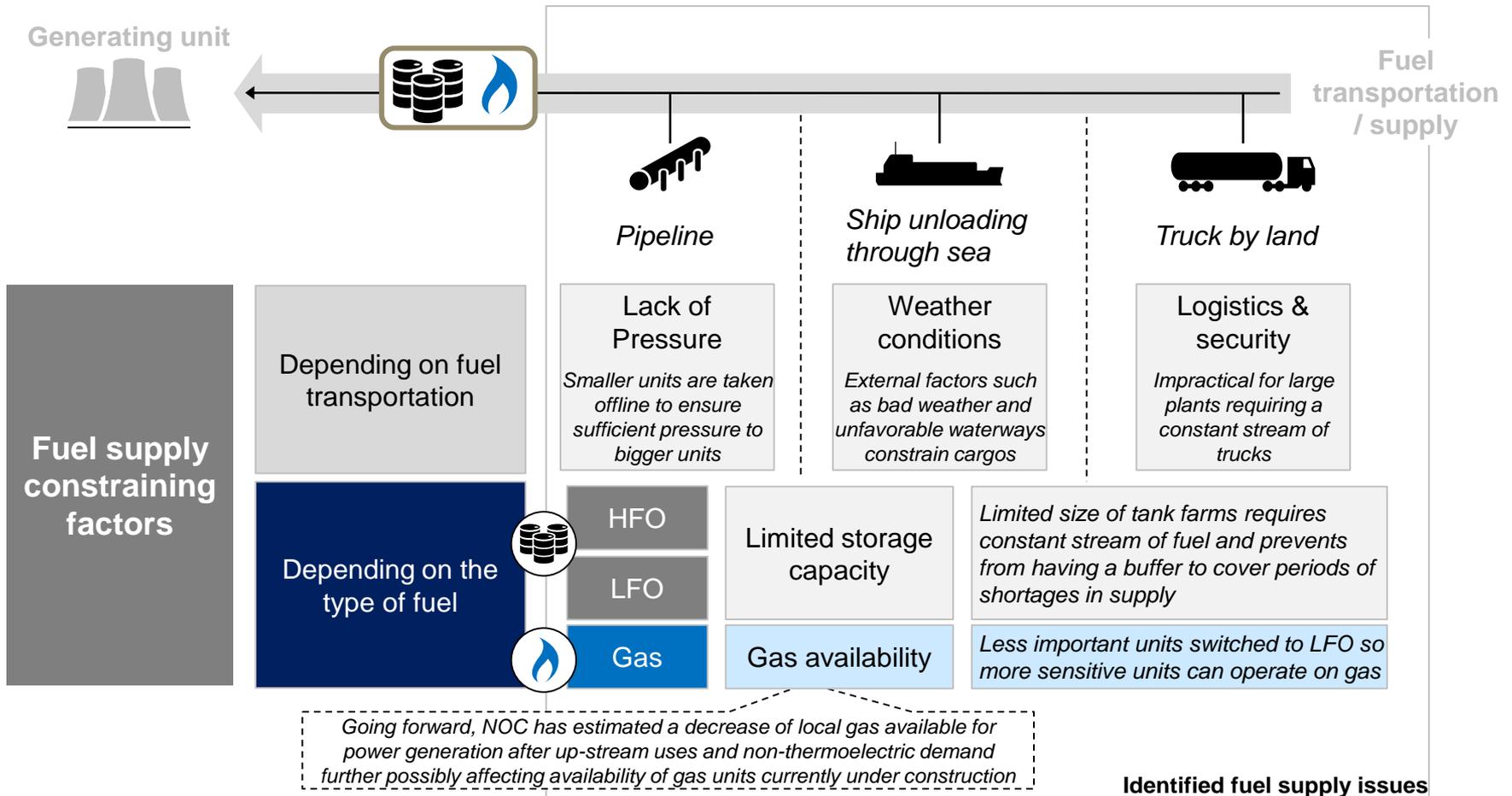
Evolution of due for overhaul units nameplate capacity (GW, 2010-2017)



1) No clear identification of backlog was available for 2010; 2) Data provided in December 2017 by GECOL generation department task force created ad hoc for the capacity assessment of the generation fleet; 3) Less complex maintenance includes both overhauls and units that require replacement of parts but not a complete overhaul (replacement of pumps, bearings, etc.); Source: Awardbrand - Improving GECOL technical performance report, Strategy& analysis

In addition to the maintenance issue, GECOL's P/S are adversely affected by fuel supply constraining factors

Fuel supply constraining factors today

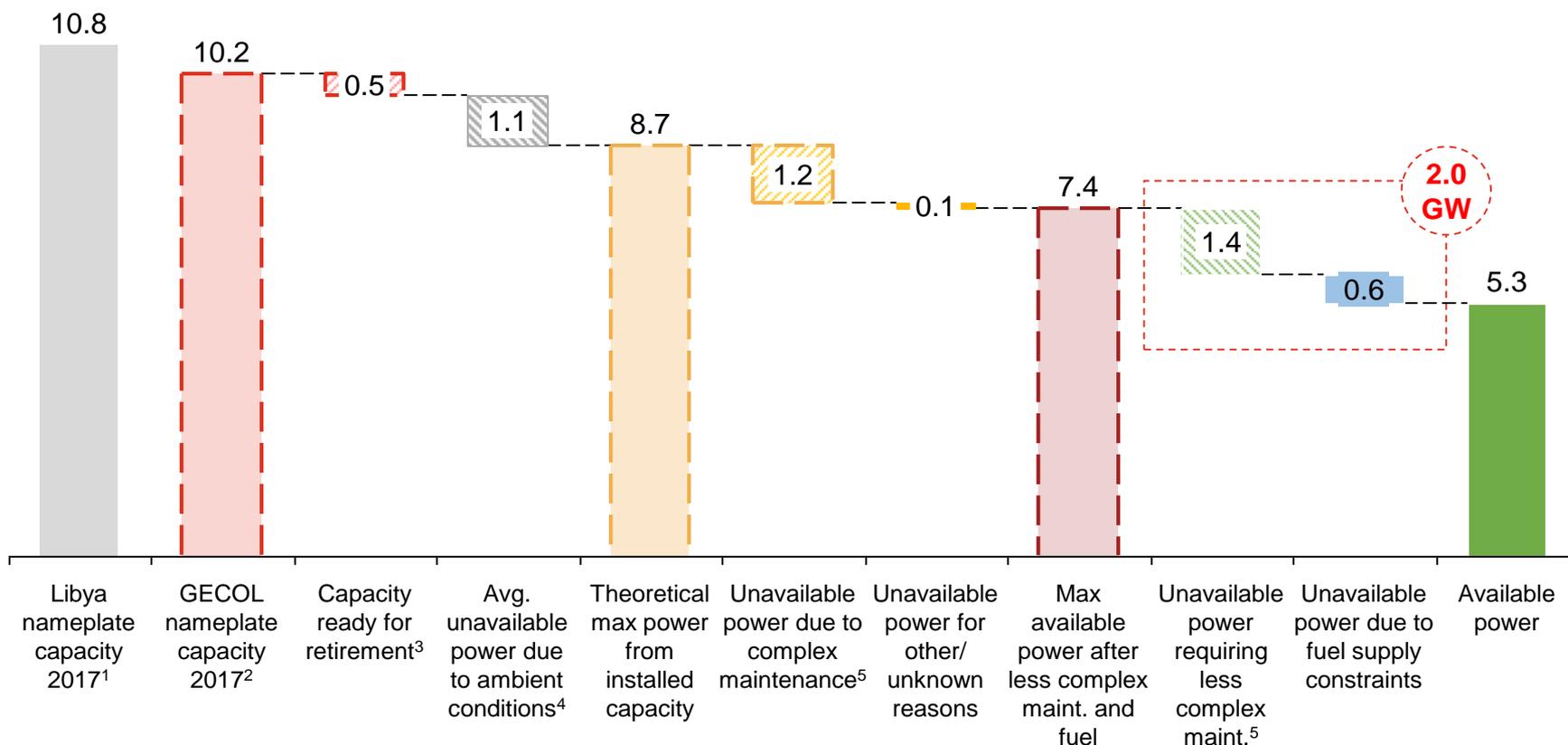


Note: Improving GECOL technical performance report has identified in 600MW the available capacity directly connected to fuel supply constraining factors today

Source: Awardbrand - Improving GECOL technical performance report, Strategy& analysis

Combined overdue less complex maintenance and fuel constraints are the cause of 2.0GW unavailable power...

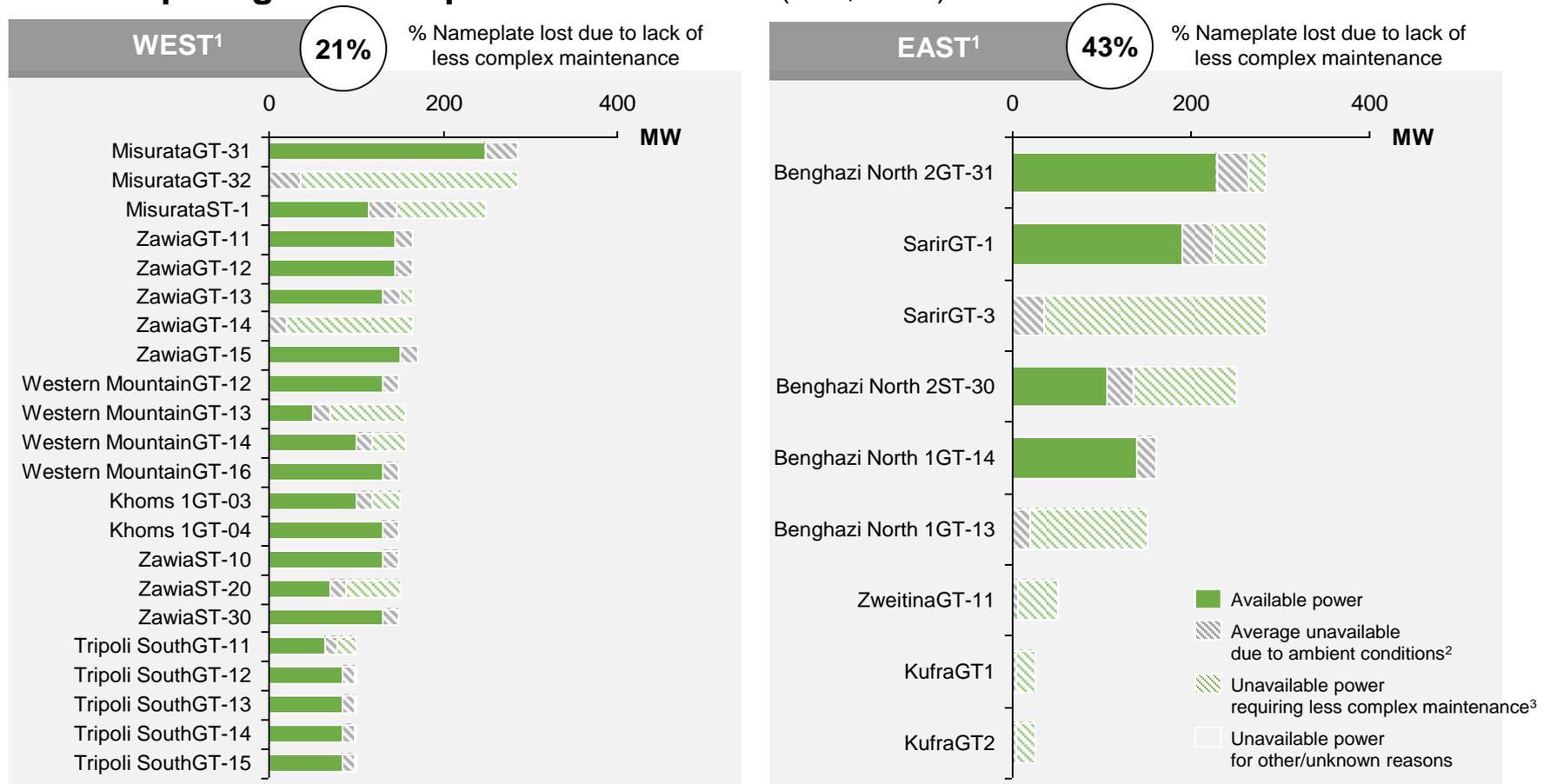
Breakdown of GECOL unavailable capacity¹ (GW, 2017)



1) Includes third party power stations: Sarir MMRA and Misurata Steel; 2) Includes GECOL main power stations and ready for retirement units; 3) Updated ready for retirement capacity agreed with GECOL in December 2017; 4) Unavailable power due to ambient conditions was assumed to be equal to 0 for steam turbines and equal to nameplate times a derating factor of 12.5% for gas turbines; 5) Maintenance was classified as less complex maintenance if it can be solved within a short period of time (max 4 months; for example gas turbines whose maintenance is recurring every 3-4 months) while overhauls on steam units and all maintenance requiring more than 4 months was considered complex maintenance; Source: Awardbrand - Improving GECOL technical performance report, Strategy& analysis

...with a worse situation in the East (with 43% of nameplate capacity lost due to lack of less complex maintenance)

Units requiring less complex maintenance³ (MW, 2017)



1) West includes Western, Southern, Tripoli and Central regions, while East includes Wahat, Benghazi and Eastern regions; 2) Unavailable power due to ambient conditions was assumed to be equal to be 0 for steam turbines and equal to nameplate times a derating factor of 12.5% for gas turbines; 3) Maintenance classified as less complex if it can be solved within a short period of time (max 4 months); Source: Awardbrand - Improving GECOL technical performance report, Strategy& analysis

Damages to transmission substations and overhead lines led to a decrease in grid reliability

Damaged substations and overhead lines



Transmission

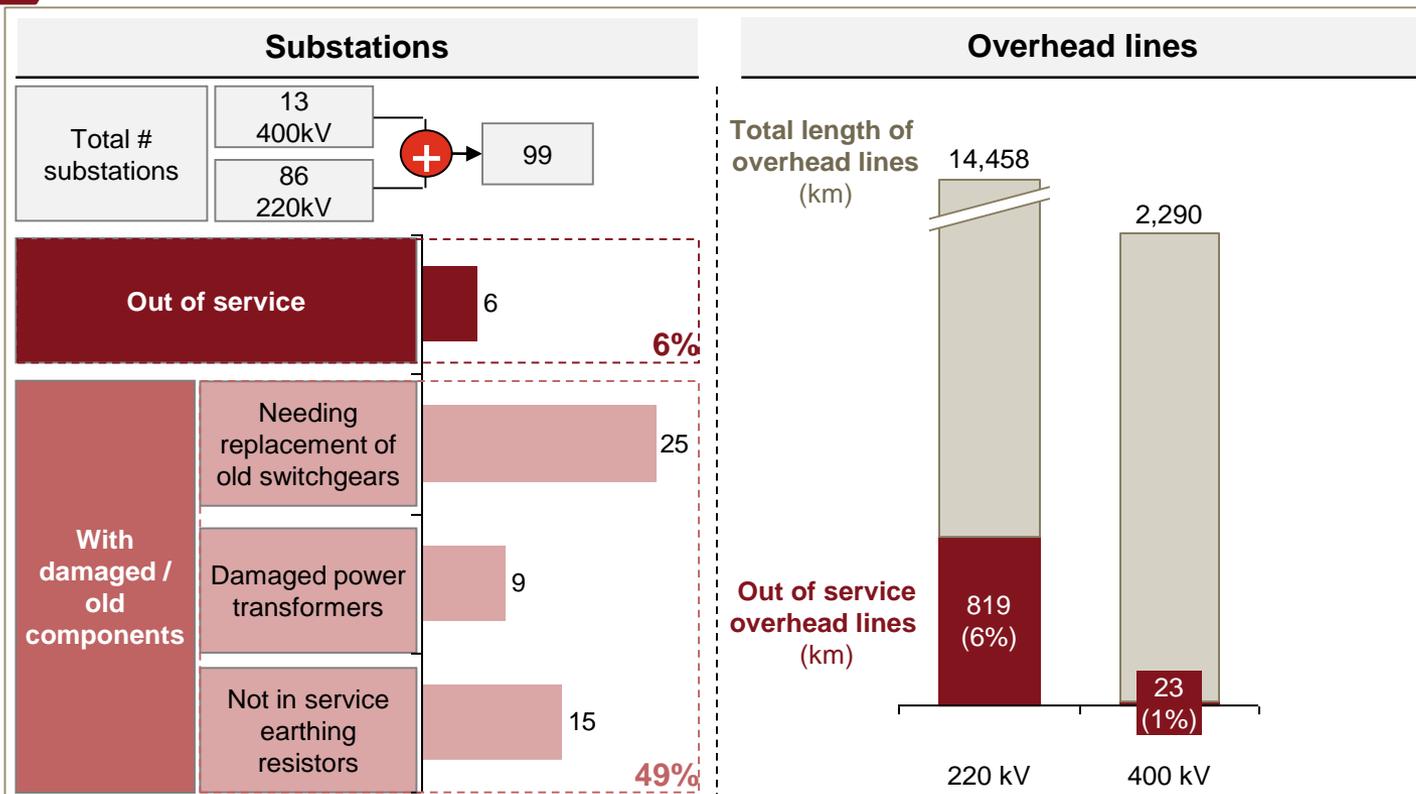
Damaged substations and overhead lines

Improve maintenance of overhead lines & substations DC systems

Transformers failures and 30kV network earthing

Delayed substation rehab. programs

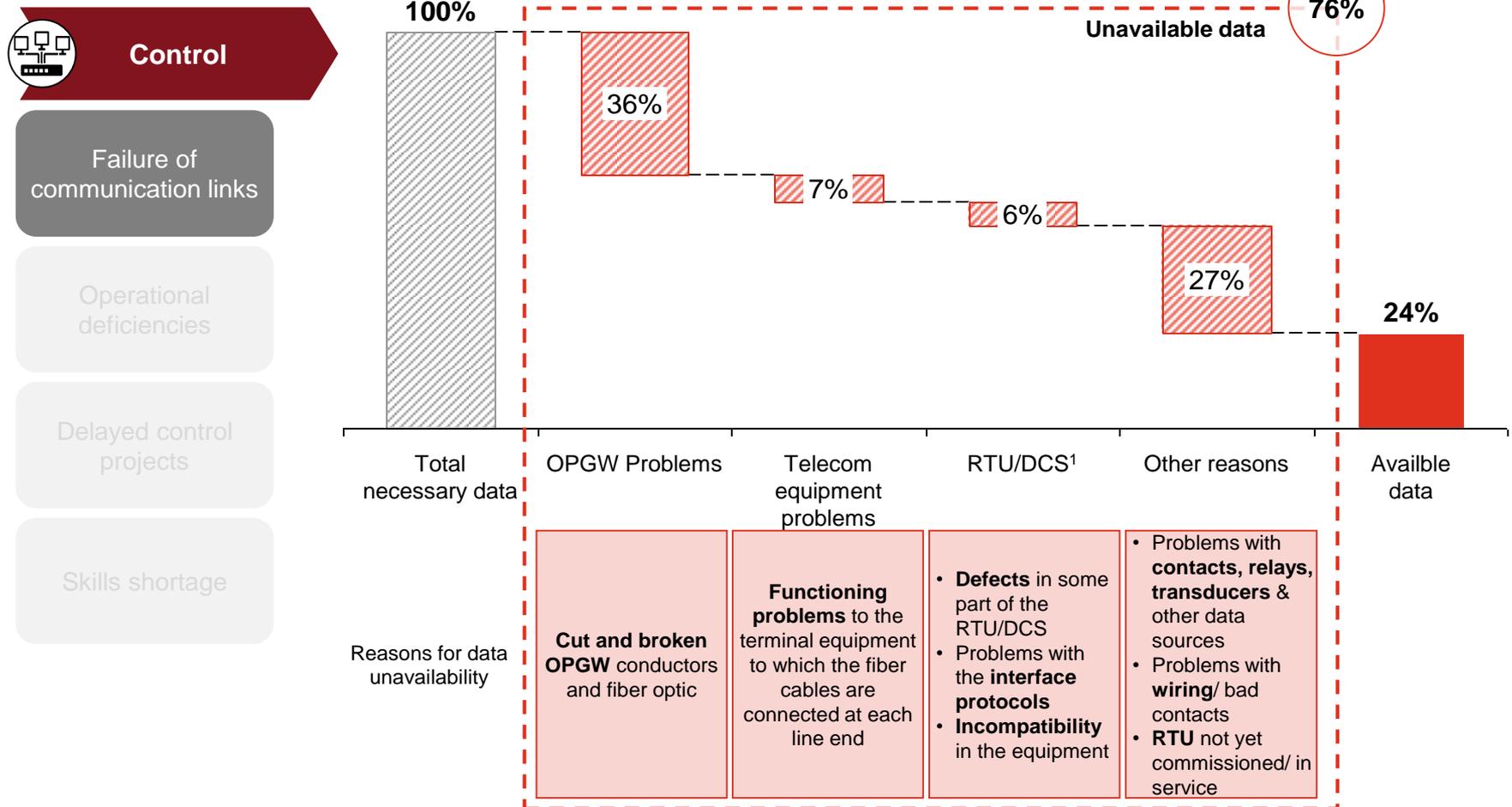
Skills shortage



Source: Awardbrand - Improving GECOL technical performance report, Strategy& analysis

Issues with communication links increased the network operating control, also increasing operating risk

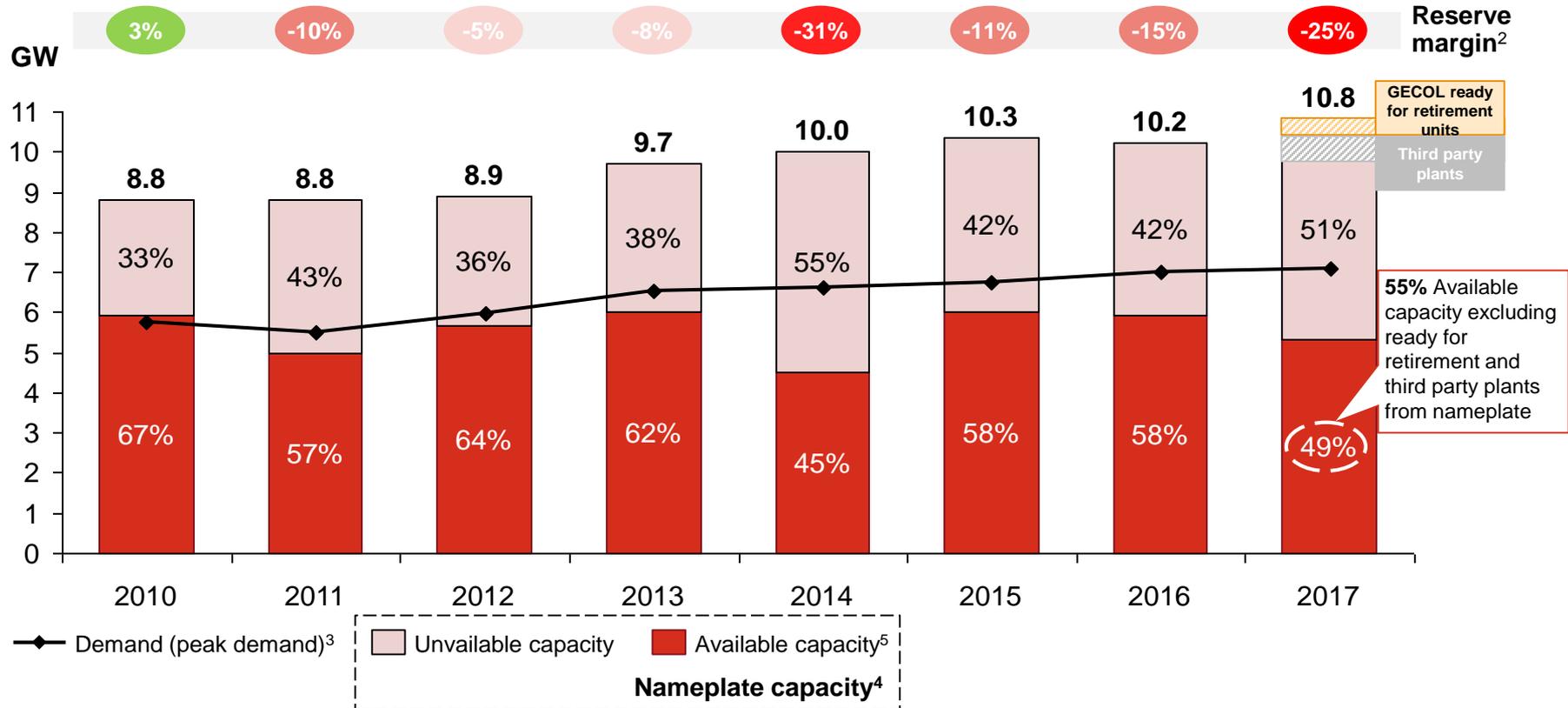
Status of NCC/TRCC SCADA availability and quality of data



¹ Remote Terminal Units (RTU) / Digital Control Systems (DCS); Source: Awardbrand - Improving GECOL technical performance report, Strategy& analysis

Low capacity availability and growing demand has thus led to negative reserve margin and consequent load shedding

S/D evolution¹

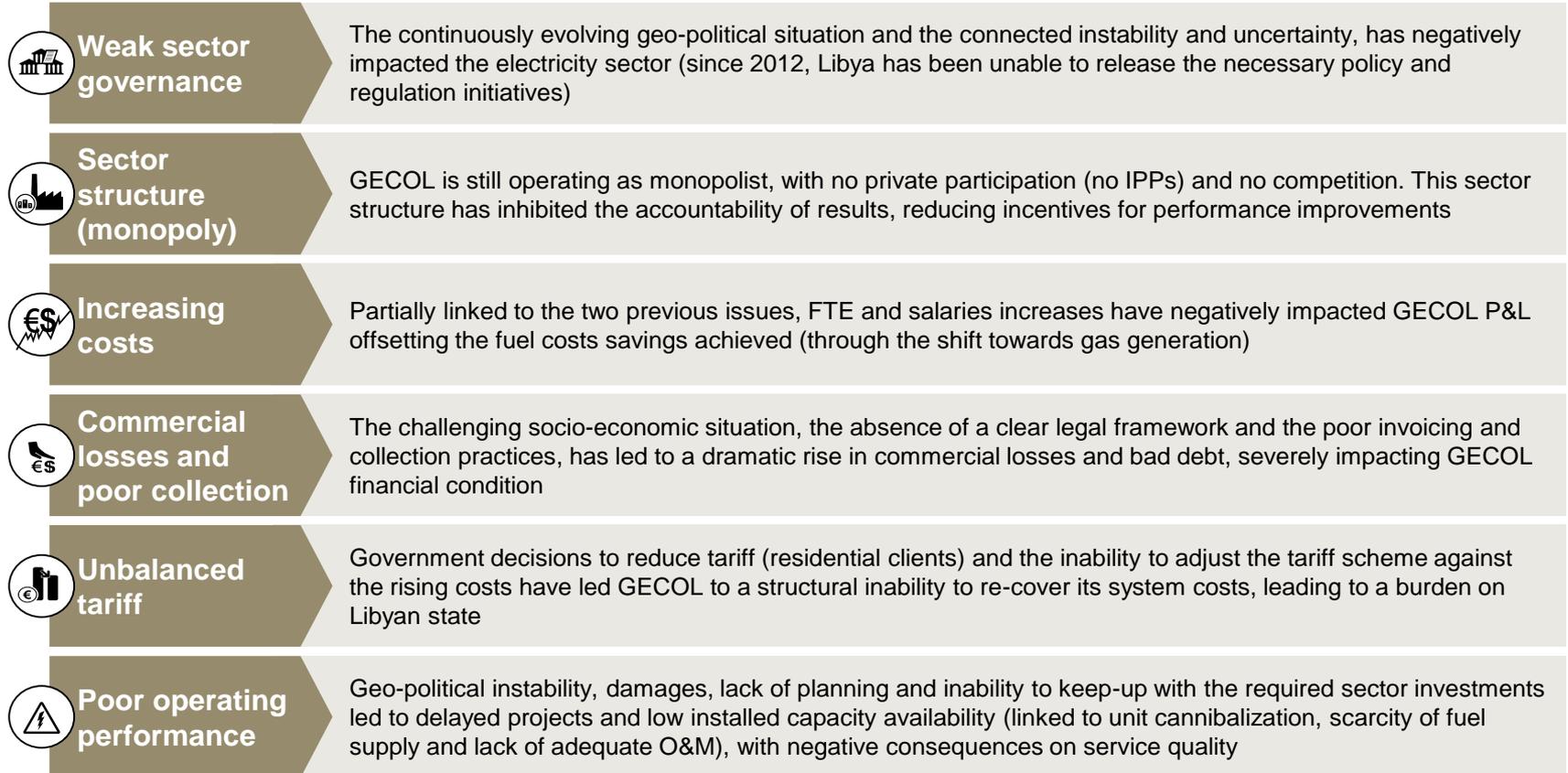


1) Tripoli West unit 1 and 3 are assumed to be retired respectively in 2013 and 2011, University small gas plant is assumed to be retired in 2016; 2) (Available capacity – Peak demand) / (Peak demand); 3) Demand at generation level. Demand for 2017 is forecasted demand under Scenario C-Slow political stability scenario-UPDATED ; 4) Nameplate capacity estimated considering unit rated nameplate capacity and year in which the unit came in service. Total nameplate capacity includes 3rd party plants and units that are considered ready for retirement in 2017; 5) Considers only time availability computed on generating unit hours of operations during the year;

Source: GECOL data collection ID4, Awardbrand - Improving GECOL technical performance report (Data received from GECOL Generation department), Strategy& analysis

In conclusion, among all inter-related issues, 6 root-causes on which the reform effort should be focused were identified

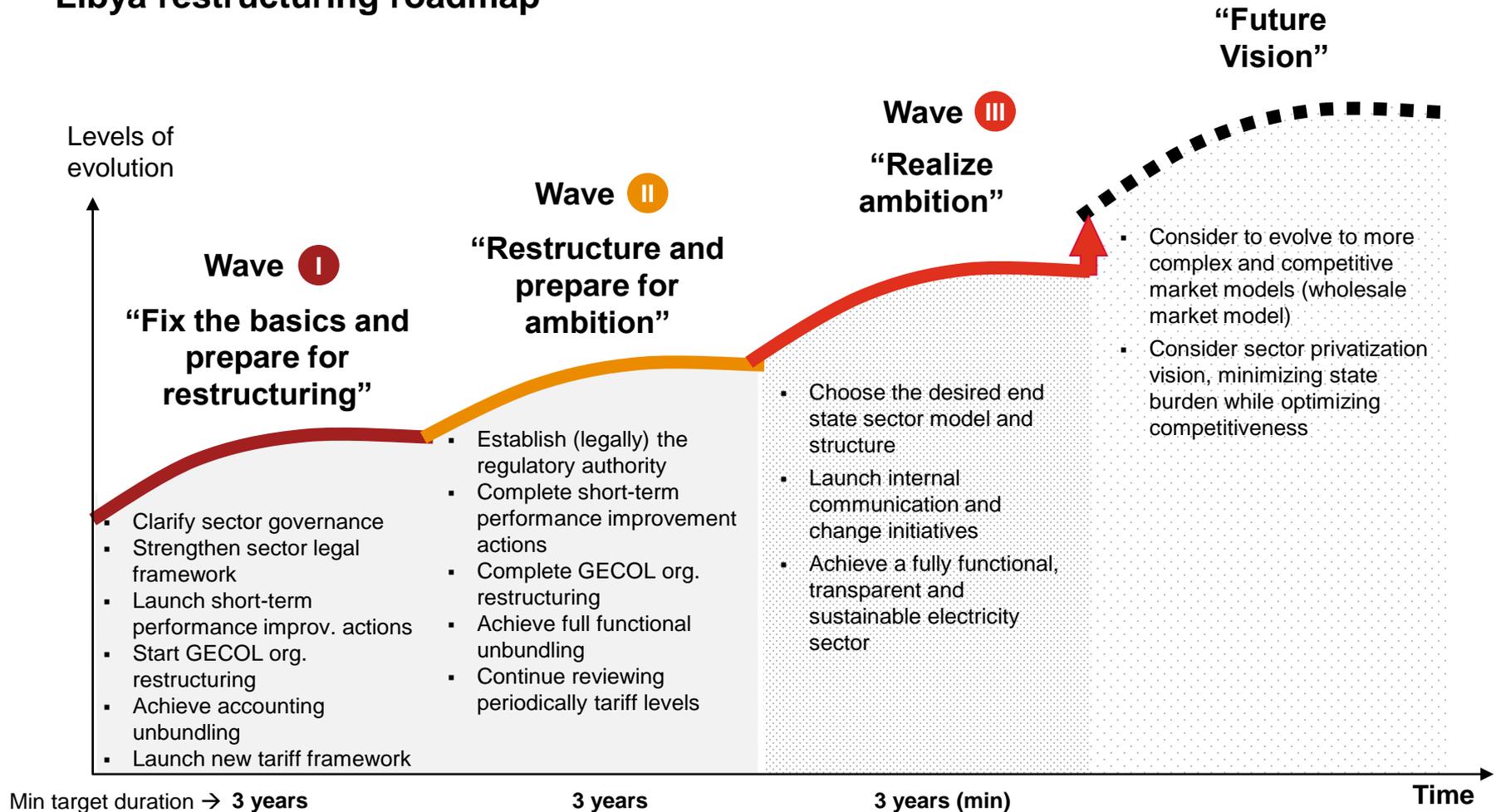
Libyan electricity sector root-causes



Source: Strategy& analysis

The electricity sector reform has thus been designed across three waves based on different macro-objectives

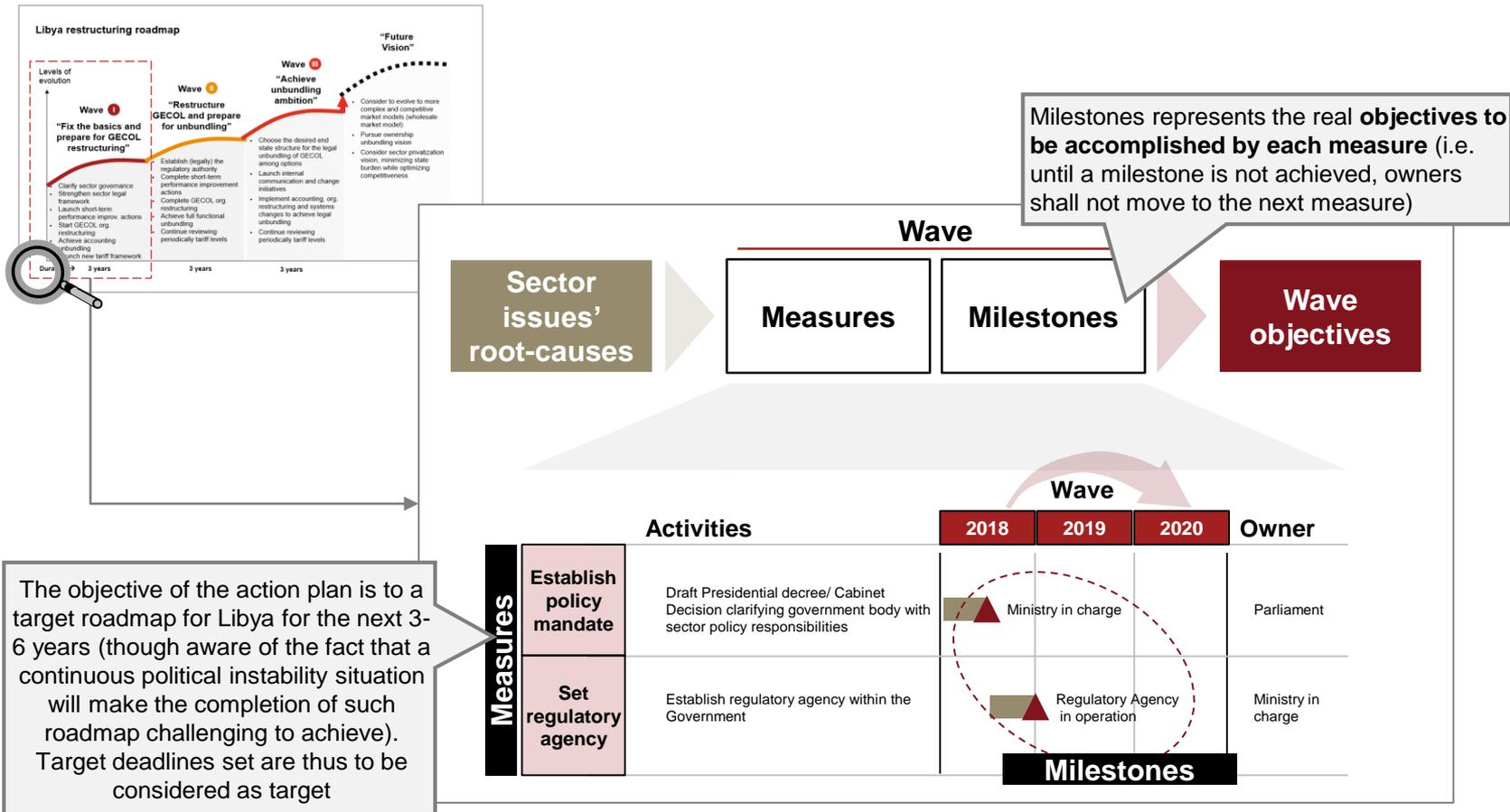
Libya restructuring roadmap



Source: Strategy& analysis

Each wave proposes a number of measures and milestones to address the root causes and attain specific objectives

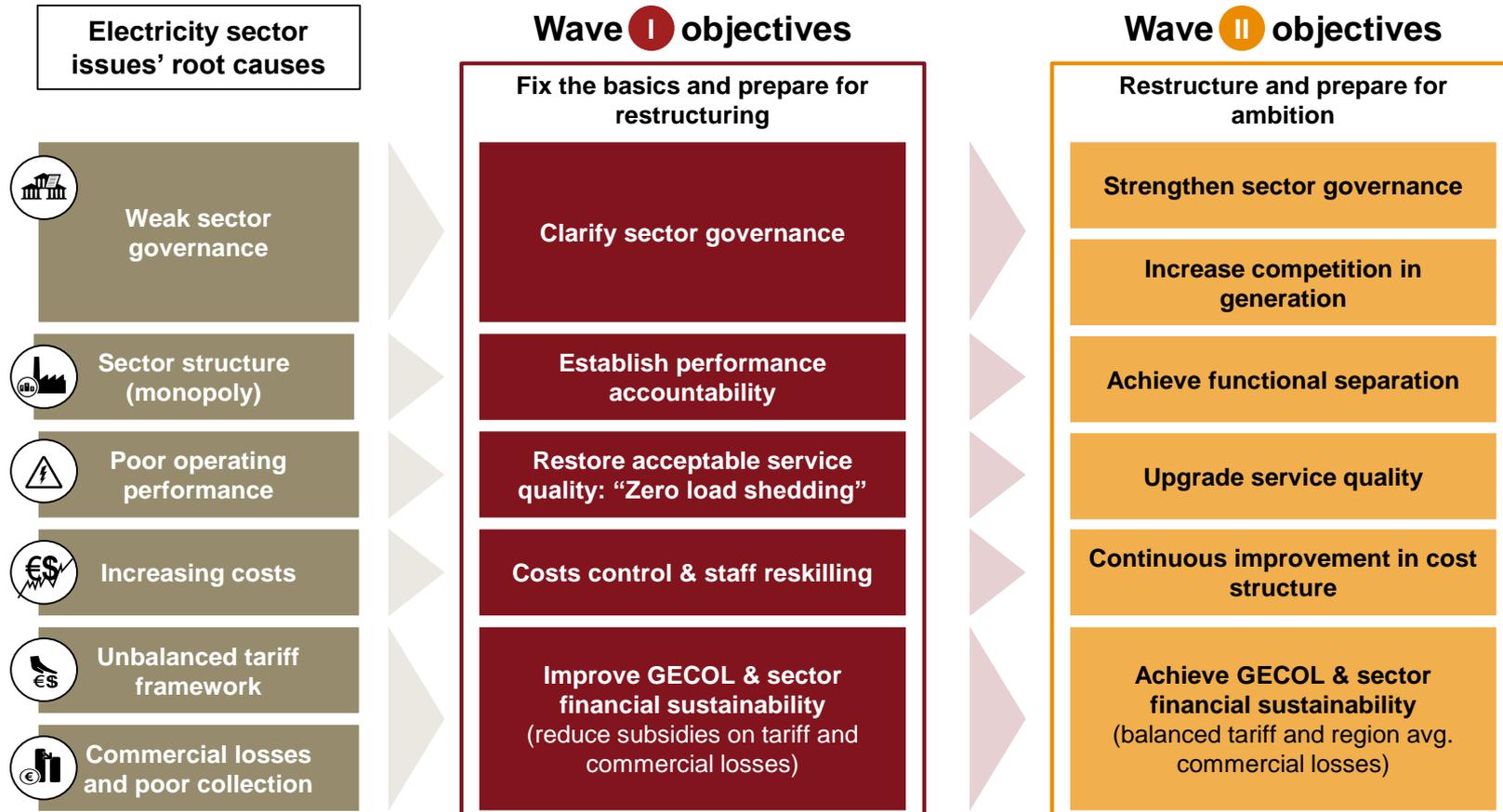
Approach for electricity sector reform roadmap



Source: Strategy & analysis

Wave I focuses on addressing Libya’s most pressing issues, while wave II focuses more on the sector restructuring

Sector issues and restructuring roadmap waves’ objectives



Source: Strategy& analysis

Executive Summary

Summary of key issues faced by the electricity sector

Wave I: Fix the basics and prepare for restructuring

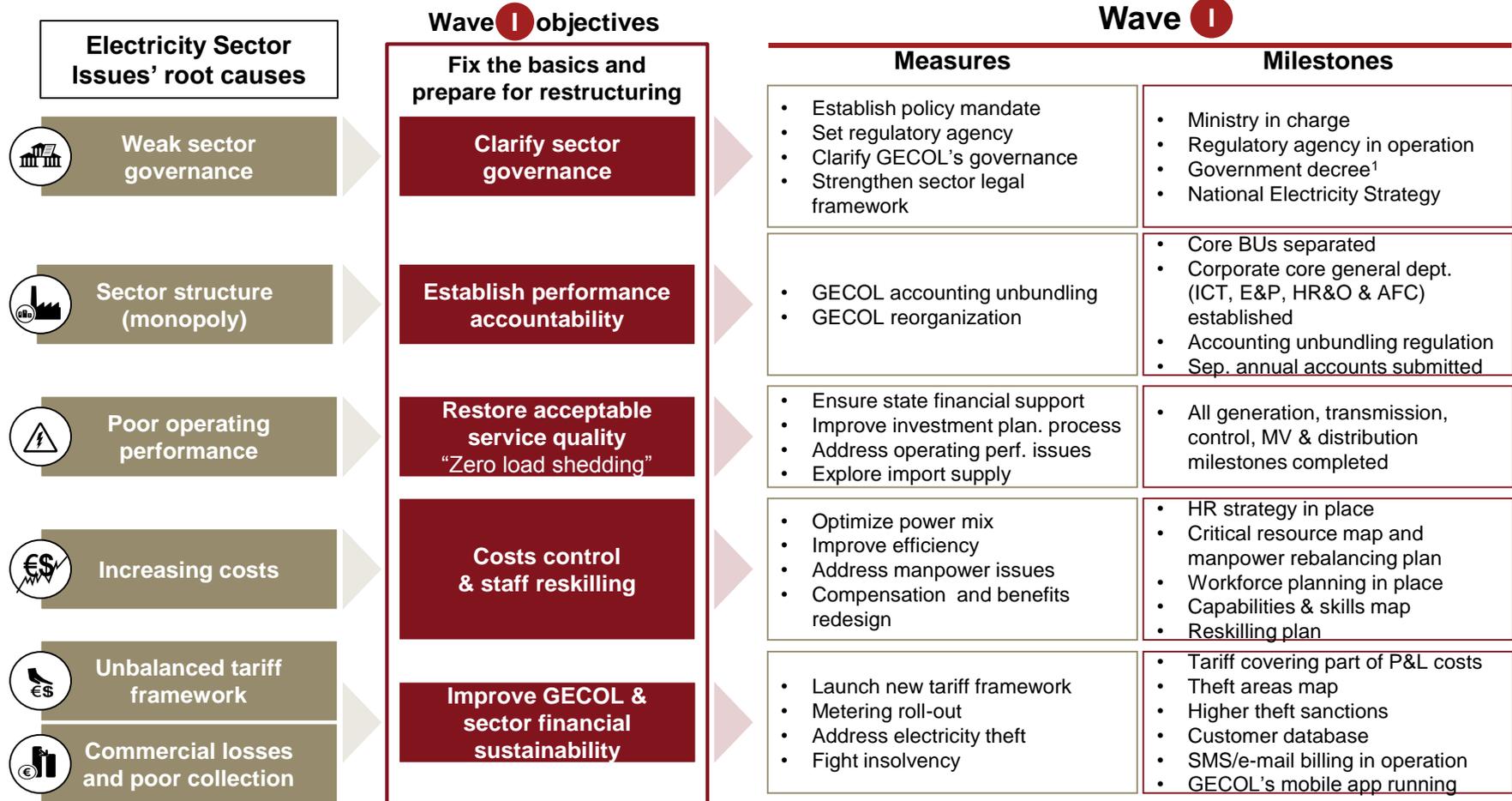
Wave II: Restructure and prepare for ambition

Options for Wave III (realize ambition)

Appendix – Inputs for Electricity Act

Wave I focuses on five objectives through a number of measures and milestones...

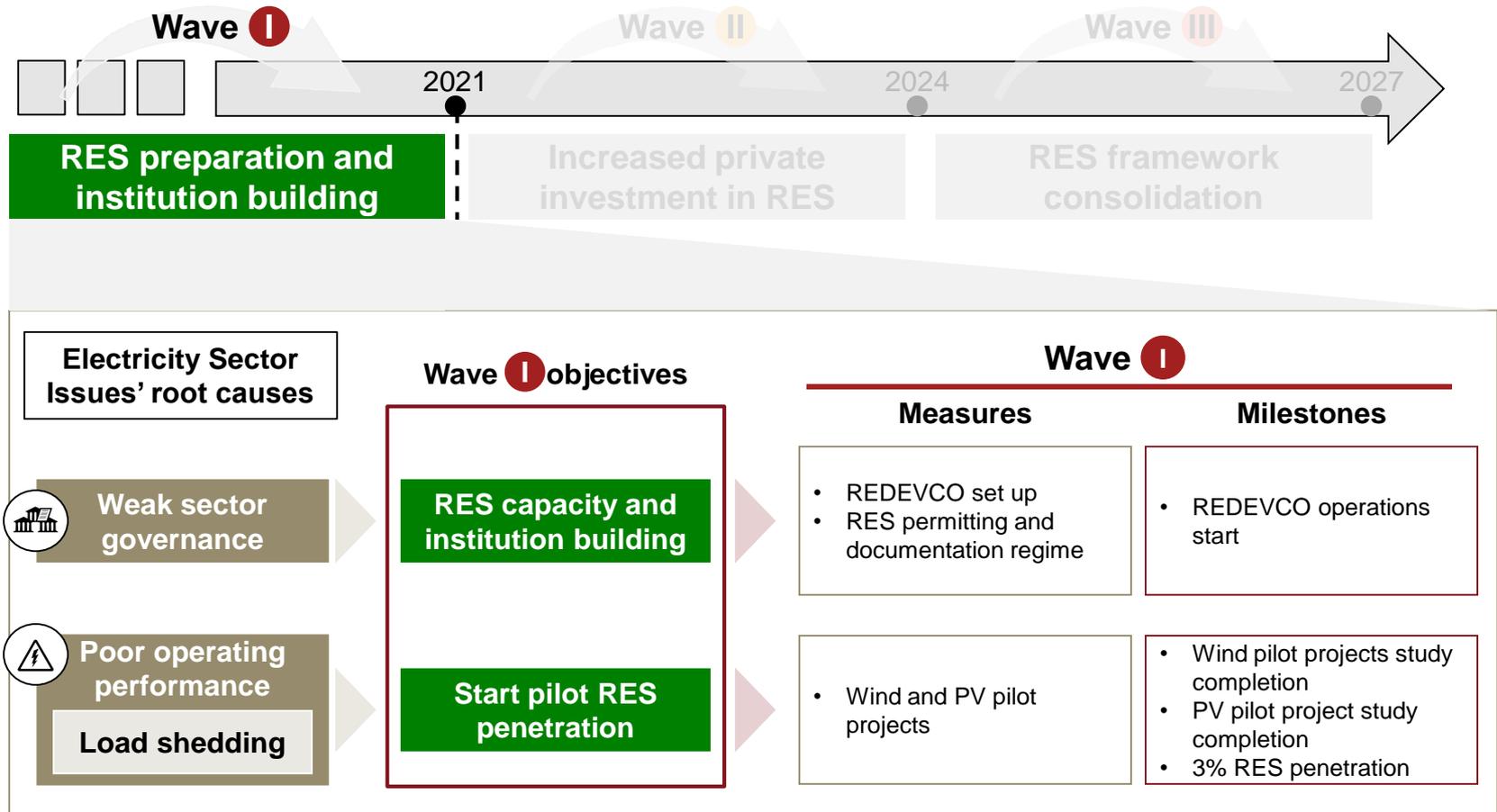
Wave I measures and milestones



1) This first Government Decree could be replaced with an Electricity Act in case a window of opportunity opens for the submission of a the electricity law to the House of Representatives; Source: Strategy& analysis

...and lays the foundations for the introduction of RES

RES roadmap: wave I measures and milestones



Source: Gopa intec and Suntrace Task D Roadmap for Renewable Energy Development, Strategy& analysis

Libya shall first clarify its sector governance, setting-up well-defined institutions with policymaking responsibilities

Measures and activities

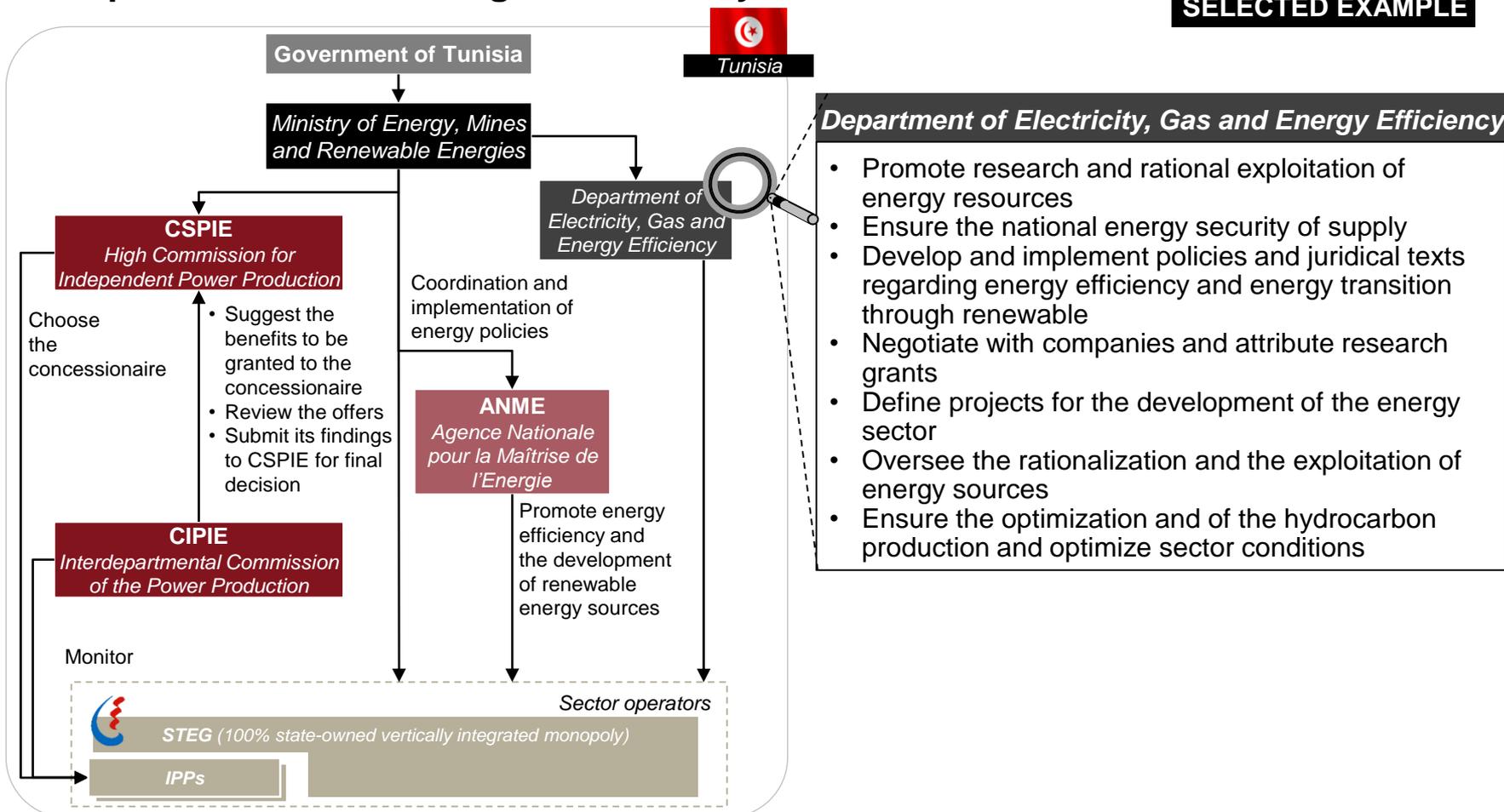
Measures	Activities	Year	2018	2019	2020	Owner
Establish policy mandate	Draft Presidential decree/Cabinet Decision clarifying government body with sector policy responsibilities ¹		Ministry in charge			Parliament
	A Establish regulatory agency within the government ²		Regulatory Agency in operation			Ministry in charge
Set regulatory agency	B Regulatory agency in operation					Regulatory Agency
						<i>Focus in next slides</i>
Clarify GECOL's governance	Review composition of GECOL's General Assembly					Government
	Streamline and right-size BoD reallocating non-typical functions					GECOL
Strengthen sector legal framework	Begin reform discussion & draft the bill for the Government decree					Ministry in charge
	Sign and endorse the Government decree ³					Government
	Draft the National Electricity Strategy					Ministry in charge, Regulatory Authority, GECOL, NOC ⁴
	Sign and endorse the National Electricity Strategy					Parliament

1) MoE and Renewable Energy was established through Cabinet Decision (33) of 2012, but its mandate has not been renewed; 2) Beside its regulatory functions, this government agency will be in charge for leading the sector reform implementation; 3) This first Government Decree could be replaced with an Electricity Act in case a window of opportunity opens for the submission of a the electricity law to the House of Representatives; 4) Ministry in charge is the activity owner but the draft results from a comprehensive public consultation process with sector's institutional stakeholders (i.e. Regulatory Agency) and industry representatives (i.e. GECOL, NOC); Source: Strategy& analysis

Libya objective should be to identify a clear Minister in charge of electricity, as for example Tunisia

Example of minister in charge of electricity

SELECTED EXAMPLE

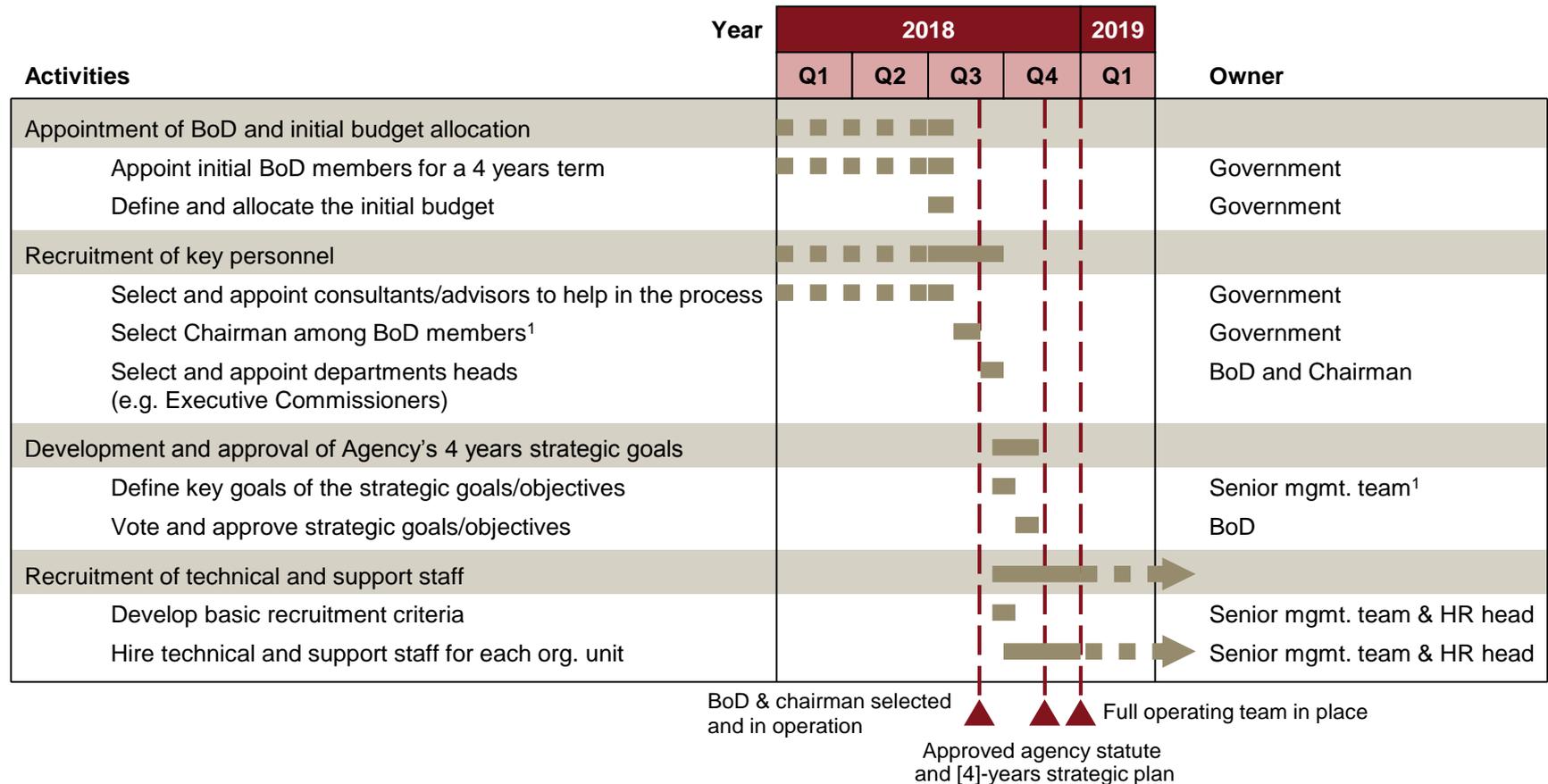


Sources: Res4Med Country Profile, STEG website, Regional Center for Renewable Energy Efficiency Country Profile, ANME website, Strategy& analysis

By end of 2018, the Government shall then set-up an Agency, which shall begin operations in Q1 2019

Regulatory agency setting roadmap

A REGULATORY AGENCY SET UP



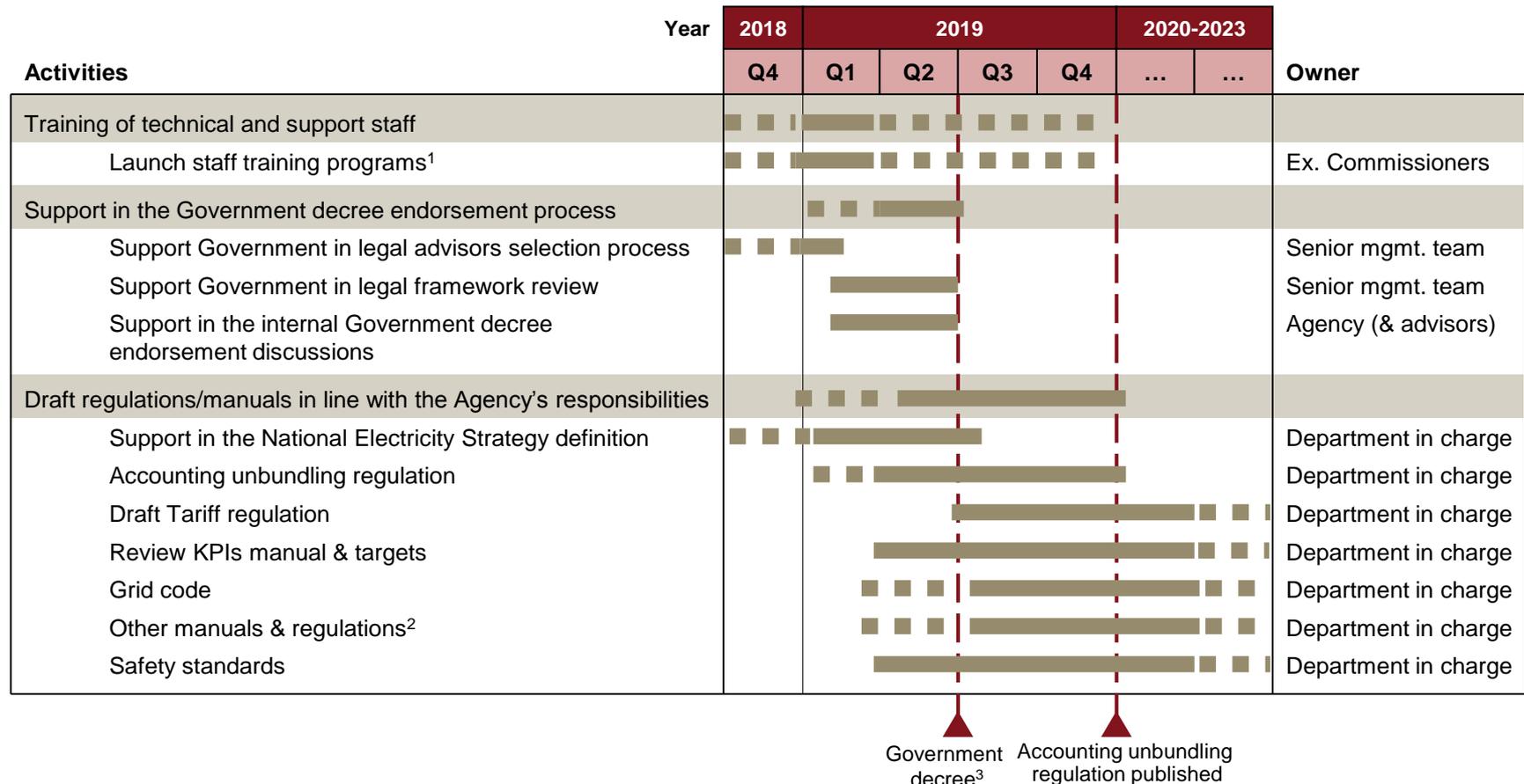
1) Executive Commissioners

Source: Strategy& analysis

For 4 years starting from 2019, the Agency will support the Government in drafting all the necessary rules & regulations

Regulatory agency setting roadmap

B REGULATORY AGENCY OPERATION



1) As an example, during its first 3 years the Saudi Arabian Regulatory Authority (ECRA) began English and IT skills trainings for all staff resources; 2) In line with the Agency 4-years strategic goals & objectives; 3) This first Government Decree could be replaced with an Electricity Act in case a window of opportunity opens for the submission of a the electricity law to the House of Representatives; Source: Strategy & analysis

The Agency shall focus on drafting manuals/regulations for performance monitoring, tariff and account unbundling ...

Regulatory Agency responsibilities (Wave 1)



Responsibilities	Activities	Regulations/Manuals
<p><i>Supply matters</i></p> <p> Performance monitoring</p>	<p>Draft the KPIs Manual and set short term (3 years) KPI targets</p> <p>Provide incentives to encourage the utility to achieve targets</p> <p>Supervise system's security and reliability and propose improv. measures</p>	<p>KPIs Manual & targets</p>
<p><i>Technical matters</i></p> <p> Standards and rules</p>	<p>Develop unified regulatory accounting and reporting procedures</p> <p>Set minimum safety standards for O&M, construction and installation</p> <p>Draft the Grid Code/Interconnecting Guidelines</p>	<p>Safety standards</p> <p>Grid Code</p>
<p><i>Consumers issues</i></p> <p> Tariff</p>	<p>Draft the Tariff Regulation</p> <p>State criteria for the preparation of tariff proposals by GECOL</p>	<p>Tariff Regulation</p>
<p><i>Sector development</i></p> <p> Development</p> <p>Sector structure</p>	<p>Advise the ministry on matters related to development and operation plans</p> <p>Draft accounting unbundling regulation</p> <p>Draft operating guidelines for separated annual accounts</p> <p>Analyze and review GECOL's separated annual accounts</p>	<p>Accounting unbundling regulation</p>

Source: Strategy& analysis

... Advising the Government, who remains in charge of accomplishing all the key regulatory functions

Actors redistribution of responsibilities (Wave I)



Actors	As-is		After Regulatory Agency set up		
	Government	GECOL	Government	Regulatory Agency	GECOL
Set performance standards	☑		☑	✓	
Monitor performance	☑		☑	✓	
Define sector vision	☑		☑		
Determine prices	☑	☑	☑	✓	
Choose technologies		☑			☑
Determine investments		☑			☑
Establish sector rules	☑		☑	✓	
Receive public input	☑	☑	☑	✓	☑
Balance environmental and economic goals	☑		☑		
Determine sector structure	☑		☑	✓	
Receive consumer complaints		☑		✓	☑

☑ Full responsibility ✓ Advisory function

Source: Strategy& analysis

In line with its limited responsibilities, the Agency shall have a simple and centralized structure with only 3 departments

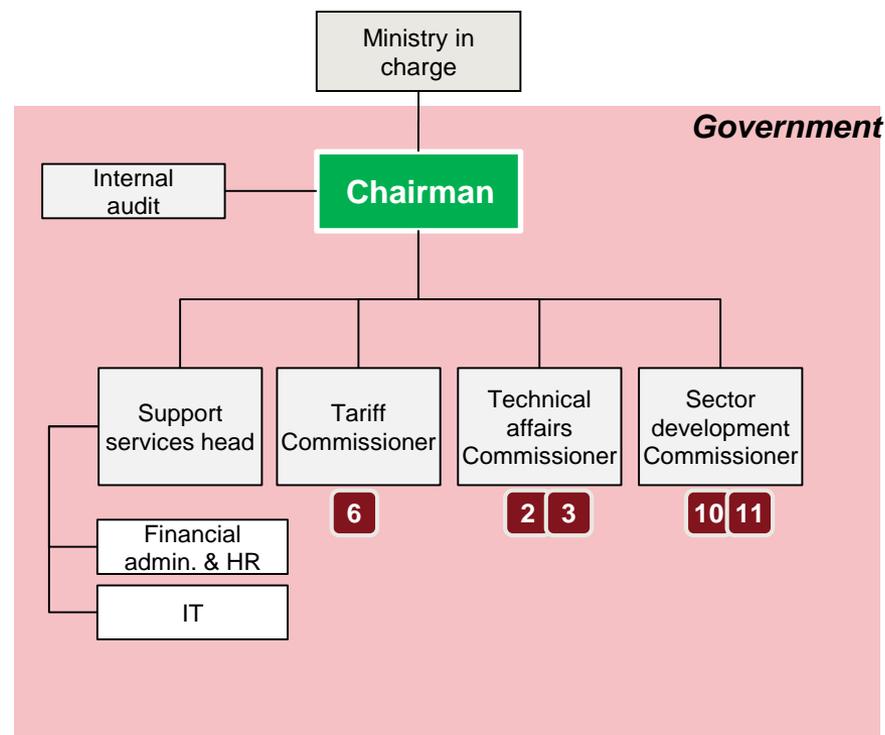
Agency organizational structure

Responsibilities



Proposed organizational structure

(Regulatory Agency – Wave I)



The Regulatory Agency will focus on supporting GECOL and the sector in pursuing its accounting unbundling...

Measures and activities

Measures	Activities	Year	2018	2019	2020	Owner
GECOL accounting unbundling	Draft accounting unbundling regulation ¹			Accounting unbundling regulation published		Regulatory Agency
	Set up a timing and procedures for separated annual account submission					Regulatory Agency
	Establish clear accounting system to allocate directly and indirectly related BS and IS accounts to value chain activities					GECOL
	Draft separated annual accounts (IS and BS) for each BU					GECOL
	Submit separated annual accounts (IS and BS) for each value chain activity to the regulatory agency					GECOL

▲ Milestone

1) Includes instructions to draft separated annual accounts and rules for submission to the Regulatory Agency for review;

Source: Strategy& analysis

...helping to establish an improved GECOL accountability at its operating (also achieved by GECOL first re-organization)

Measures and activities

Measures	Activities	Year	2018	2019	2020	Owner
GECOL re-organization	Separate Generation and Transmission into different BUs				▲	GECOL
	Create new core ICT function (managed by CIO) reporting directly to MD				Core BUs separated	GECOL
	Move IT away from network into ICT corporate core dept. with direct report to MD			▲		GECOL
	Move Communications unit under Transmission BU					GECOL
	Group Generation, Transmission, Distribution projects in an integrated E&P function					GECOL
	Move Projects Planning & Studies to E&P function					GECOL
	Move Projects Accounting away from Contracts and Dev. Accounts within E&P function				▲	GECOL
	Move Tenders & Contracts from Contracts & Dev. to Procurement					GECOL
	Create AFC function managed by CFO reporting to MD					GECOL
	Move related units ¹ in the newly created AFC core function, led by a new CFO				▲	GECOL
	Consolidate in HR&O department (under MD) all the HR-related core functions leaving non-core HR activities within Support Services			▲		GECOL
				HR&O corporate core established		

▲ Milestones

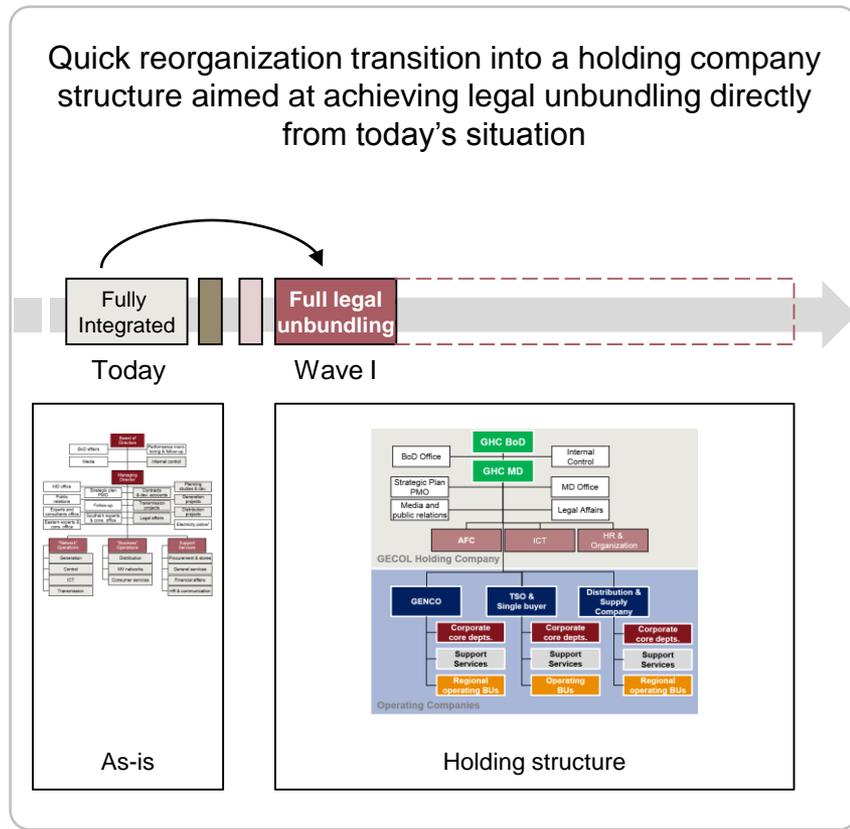
1) Units to be migrated to AFC are: Performance Monitoring general dept. (from BoD), core activities of Financial Affairs (e.g. Financial Planning and Ledger & Fin. reports) and L/C Financing and Customs Clearance from Contracts and Development accounts;

Source: Strategy& analysis

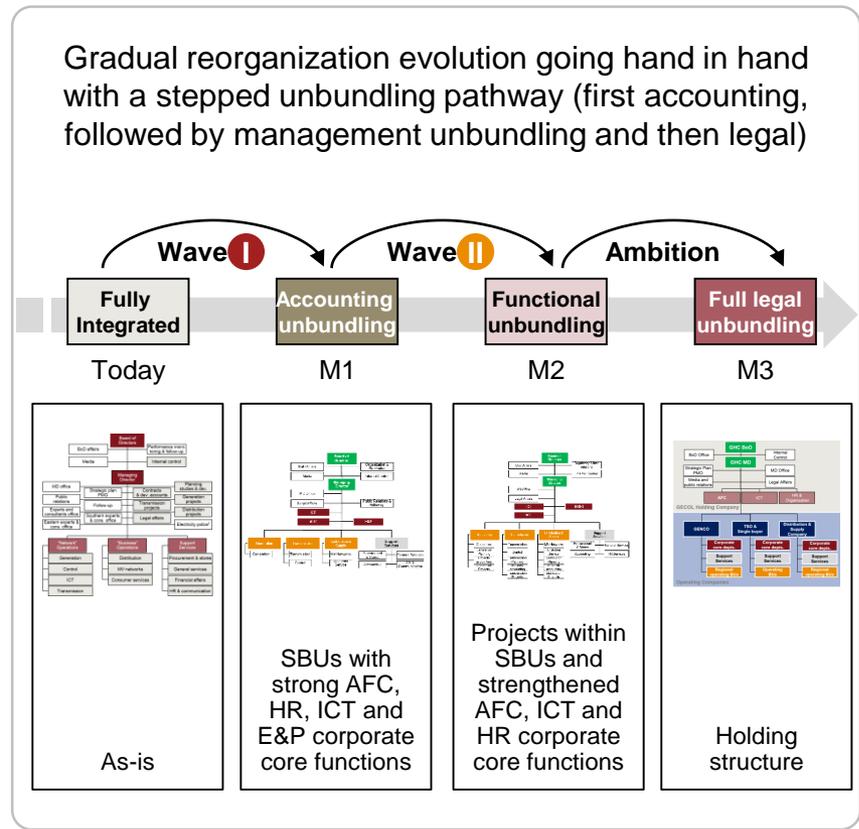
Different organizational restructuring approaches and hypotheses were considered for GECOL...

Reorganization options

Option 1 **Radical**



Option 2 **Gradual**



Source: Strategy& analysis

...and Wave 1 recommendation is to deploy a gradual approach to re-organize GECOL

Options assessment



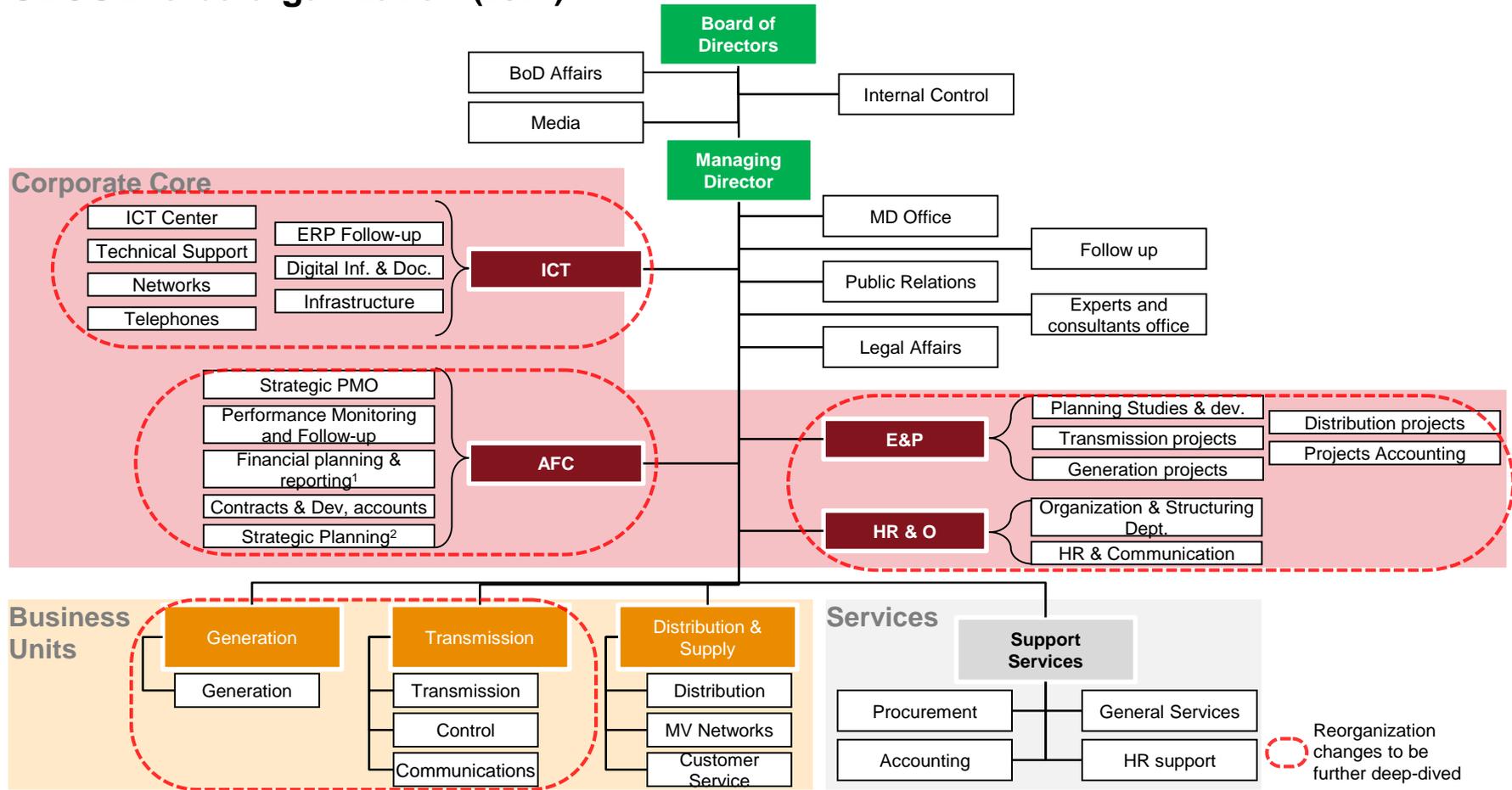
	Option 1 Radical	Option 2 Gradual
+ PROS	<ul style="list-style-type: none"> Possibly ensures results accountability and improved operational efficiency Rapid evolution away from monopoly towards more competitive sector structures 	<ul style="list-style-type: none"> Enabled early-on SBUs accountability for results and independent management Parallel change of organizational structure, processes and operating model
I CONS	<ul style="list-style-type: none"> Challenging implementation both in terms of target structure and timing Marked disruption risks for GECOL Inflexible employee redeployment 	<ul style="list-style-type: none"> Lengthier change process
⚡ RISKS	<ul style="list-style-type: none"> Delayed benefits realized due to inefficiency of resulting operating companies Lost synergies and potential replication of activities among operating companies 	<ul style="list-style-type: none"> Delayed unbundled industry structure and risk of being “trapped” into intermediate steps without reaching the final target
⚙️ EASE	<ul style="list-style-type: none"> Large consensus and leadership required Extensive coordination effort needed among organizational units Required accounting and functional separation 	<ul style="list-style-type: none"> Persistent effort and commitment to ultimate target necessary

1) Strategy for institutional development of GECOL report

Source: Strategy & Analysis

GECOL reorganization shall focus on the establishment of performance accountability (separate BUs & CC functions)

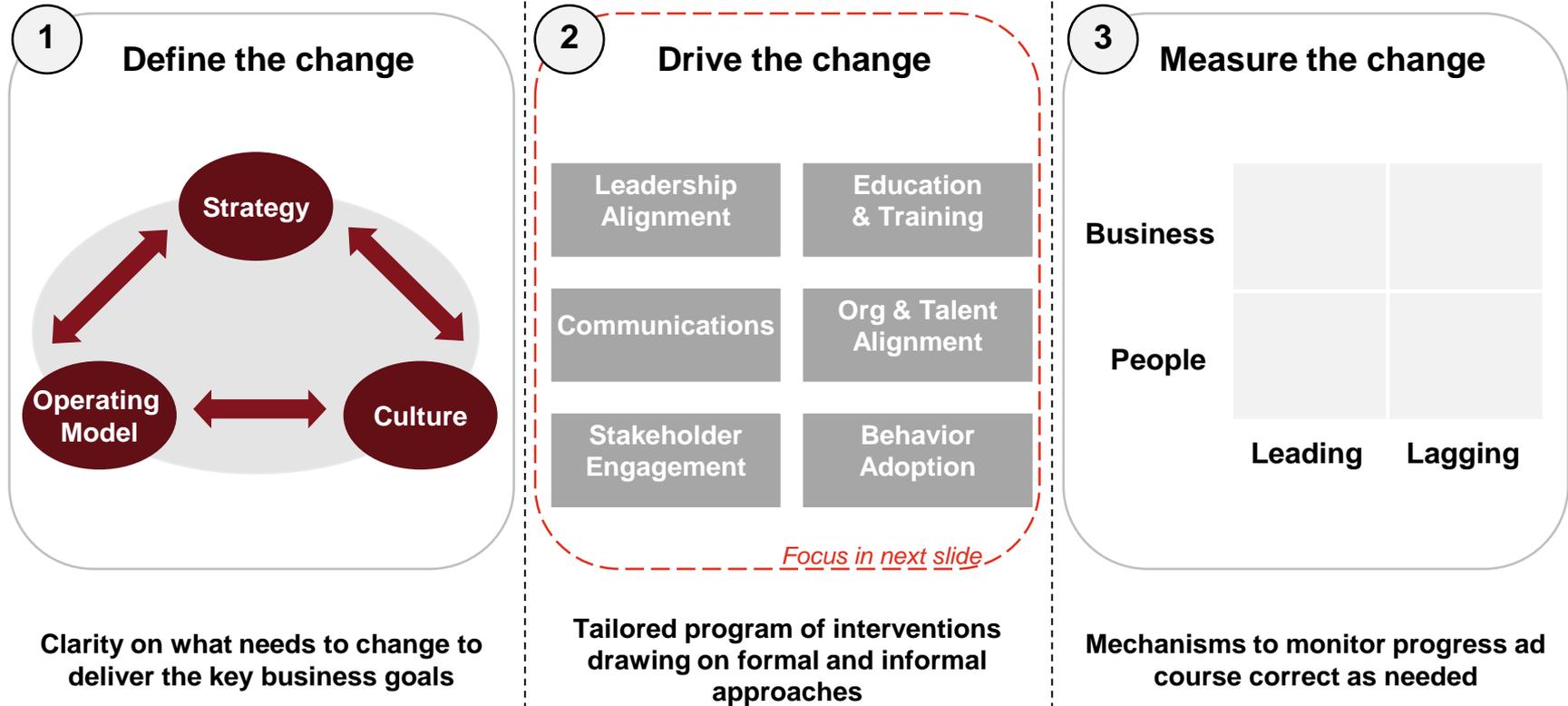
GECOL to be organization (2021)



1) Includes corporate core activities from Financial Affairs (i.e. General ledger and financial reports, Financial Planning and Fixed assets and insurance); 2) Strategic Planning unit from the Planning Studies & development division; Sources: GECOL (company organization chart 2015), Strategy & analysis

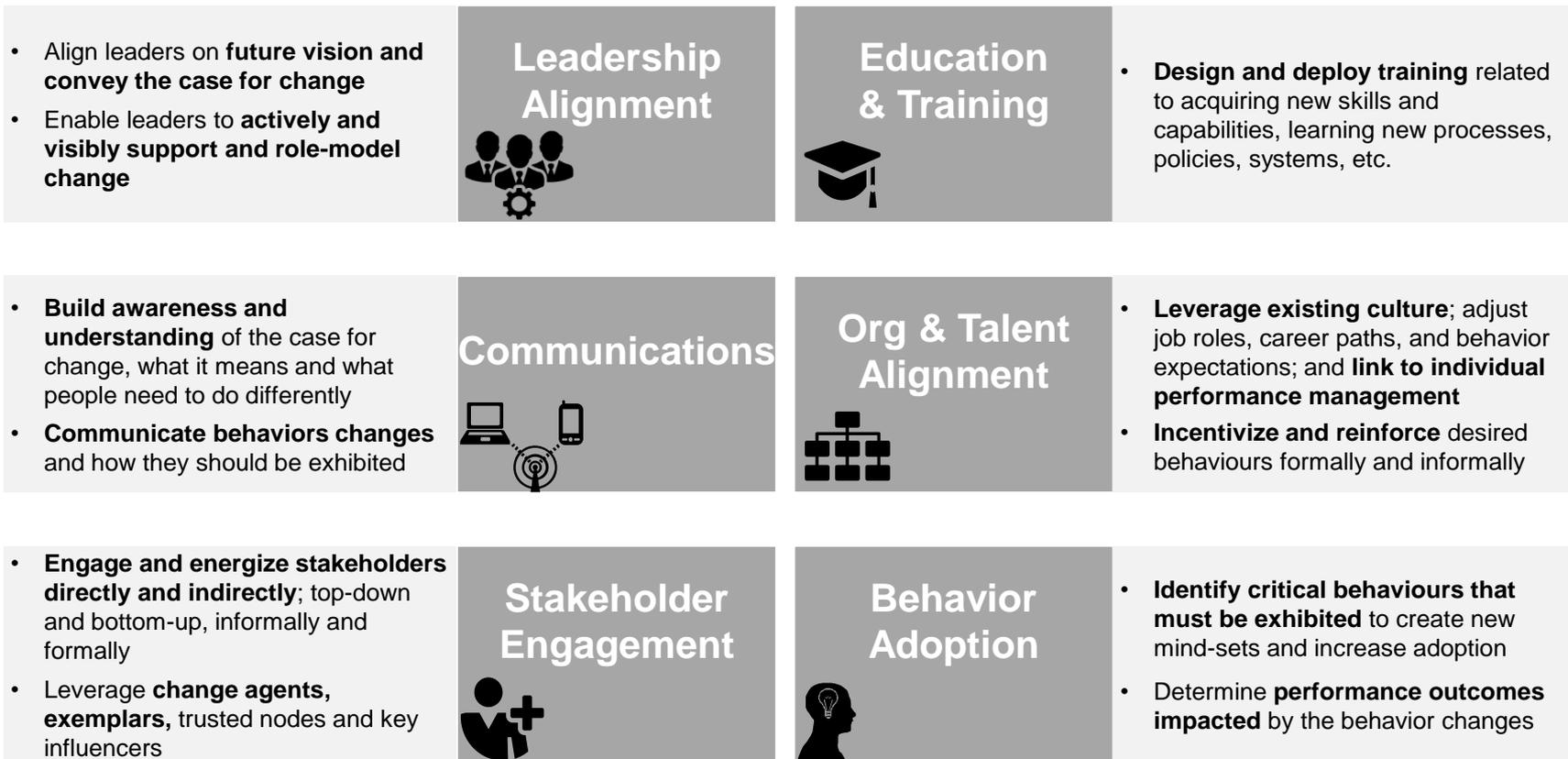
Re-organization shall be supported by a corporate-wide change management program...

Change program phases



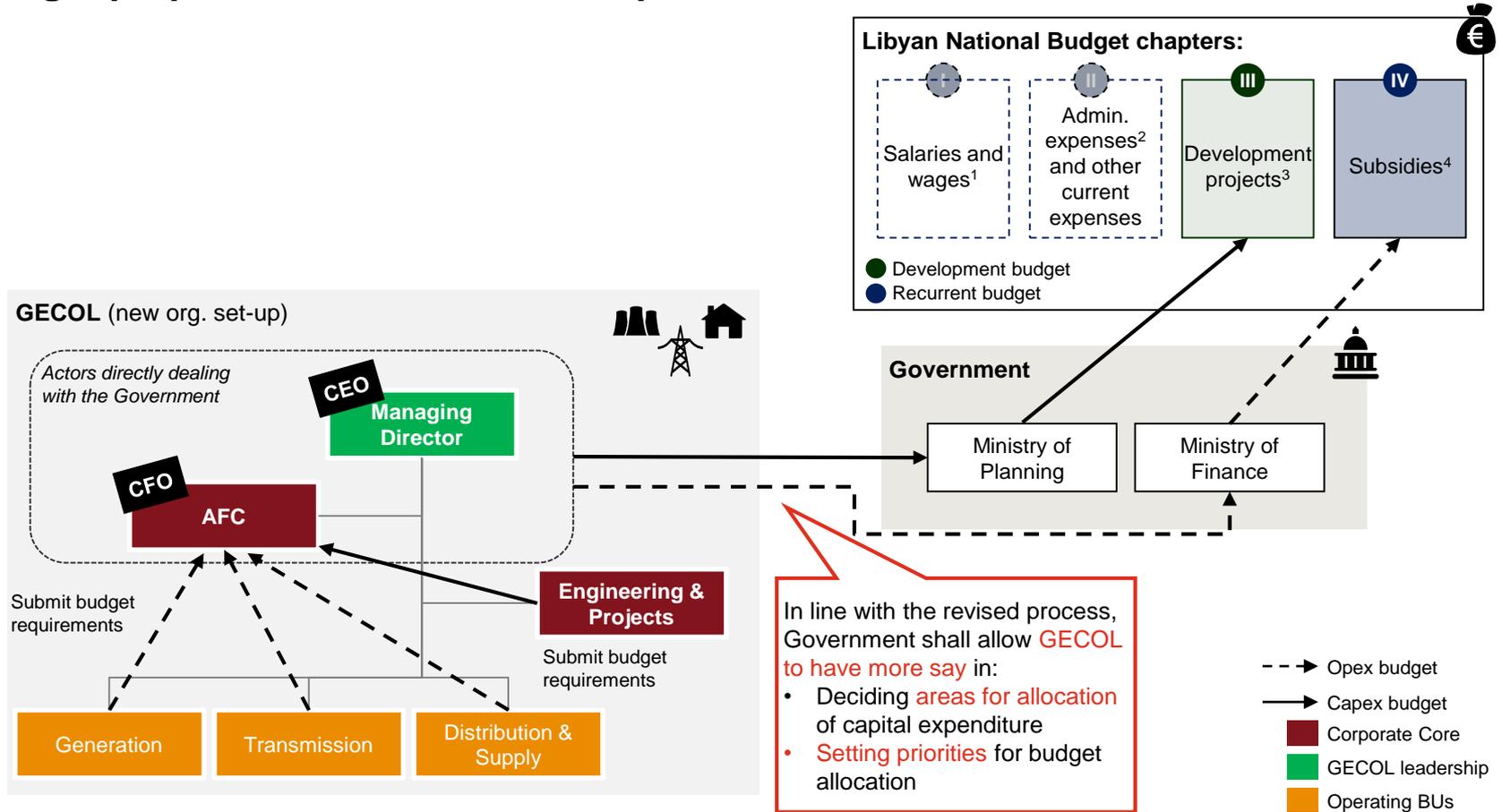
...which will drive the change (to be achieved through 6 main levers)

Drive the change measures



In Wave I, the Government should also work on a more efficient investment budgets & planning with GECOL...

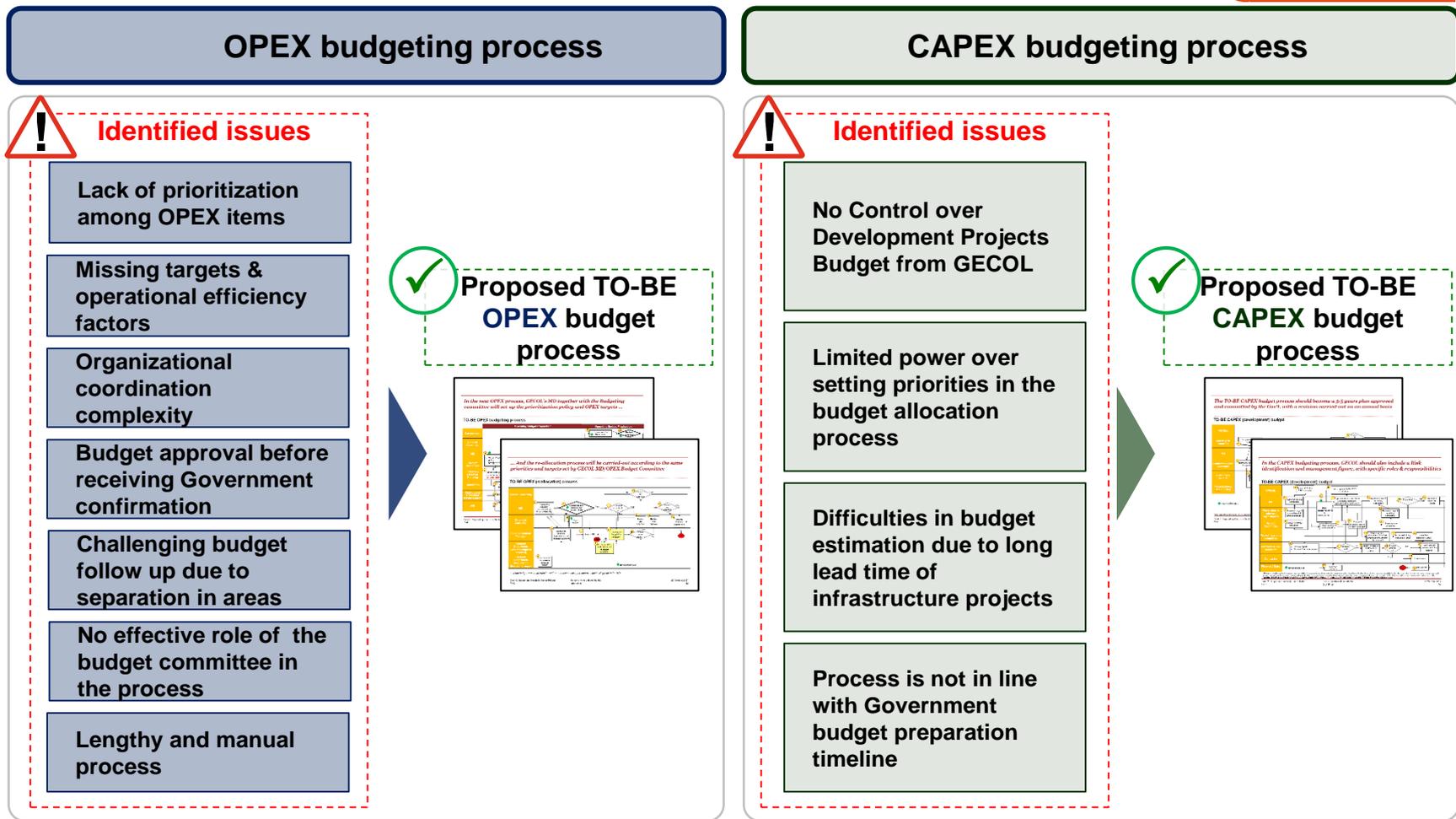
Budget preparation and submission process



1) Includes social security; 2) Administrative expenses for government authorities and ministries; 3) e.g. new plants, housing projects; 4) Includes credits for public debt, food programs, oil&gas and electricity subsidies. For what concerns GECOL includes subsidies on fuel and GECOL's losses on P&L

Sources: Strategy& analysis

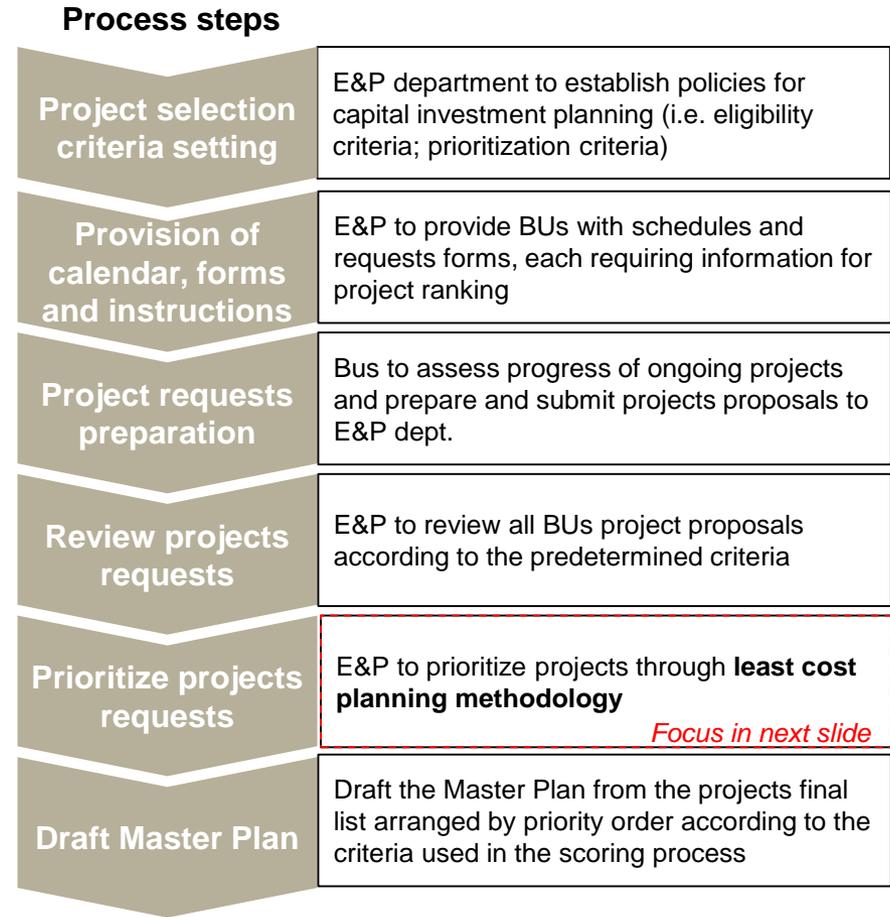
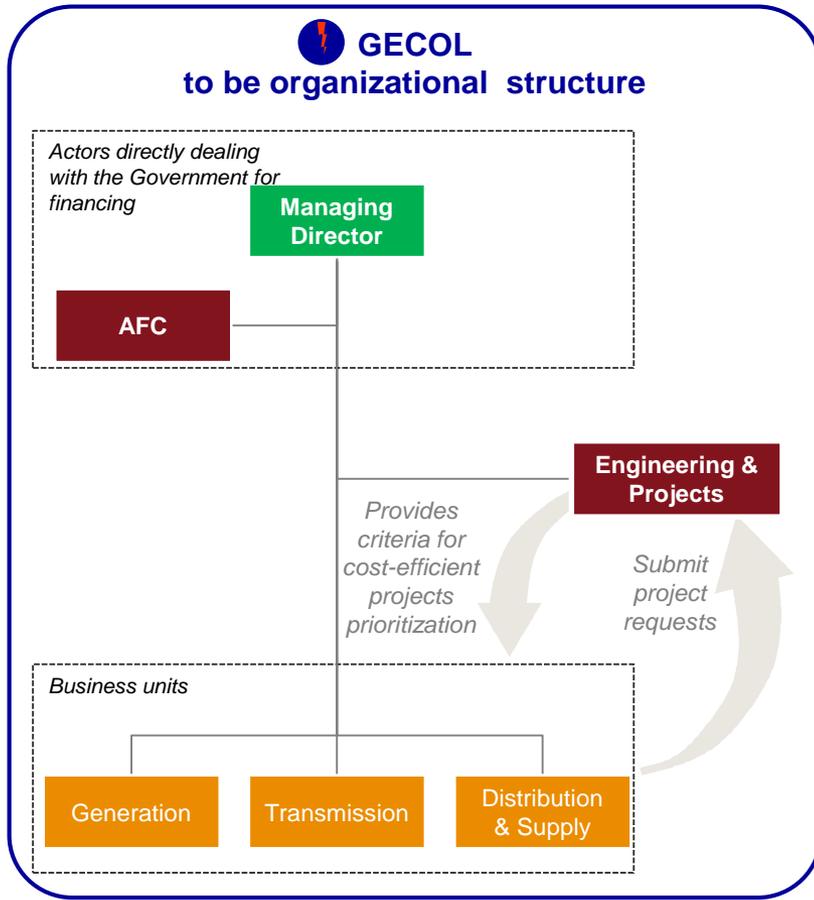
...resolving the existing CAPEX and OPEX budgeting issues identified through improved processes



1) Task C: Deliverable 2.2 - Process mapping report; Sources: Strategy& analysis

Together with the CAPEX budgeting process, GECOL shall also improve its investment planning process...

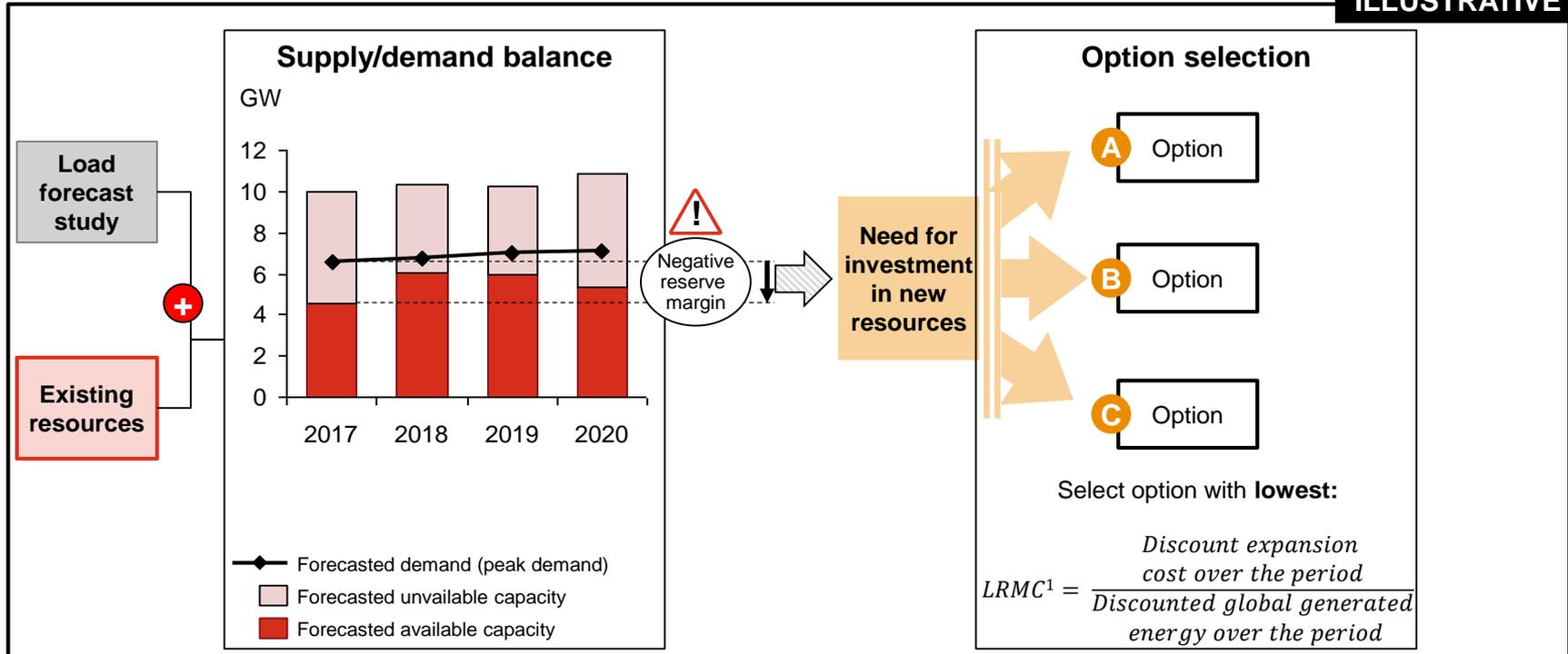
Investment planning process



...Using a least cost planning methodology for project selection and implementation

Least-cost planning methodology

ILLUSTRATIVE



Through least cost planning methodology GECOL shall identify the least cost mix of resources that would deliver sufficient power to meet projected increases in demand for electricity without unplanned terminations (i.e. ensuring a reliable service)

1) Long-run marginal cost including additional investment cost, O&M costs and fuel costs; Sources: Strategy& analysis

Thanks to the renewed Government support, GECOL will accomplish its technical improvement in generation

Generation performance improvement plan

Detailed action plan provided in Task C final report

A Generation issues		Measures	Milestones
1	Overdue maintenance	<ul style="list-style-type: none"> Resolve backlog of overdue maintenance Plan maintenance of running units Retire old units Ensure availability of 3rd party plants 	<ul style="list-style-type: none"> 90% of suspended units back in service No new buildup of overdue maintenance List of units to be retirement approved 250 MW added to grid
2	Inadequate fuel supply	<ul style="list-style-type: none"> Protect fuel supplies to P/S and address fuel quality problems 	<ul style="list-style-type: none"> Zero unavailable capacity due to fuel supply Supply Sarir P/S with gas Full implementation of fuel quality control procedures
3	Delayed capacity expansion projects	<ul style="list-style-type: none"> Complete under construction projects Update load forecast and generation expansion plan Tender new generation capacity Complete EDM system 	<ul style="list-style-type: none"> Updated generation expansion plan RFP for first round of new generation projects issued Obari completed (4x125 MW online) Gulf completed (3x350 MW online) Fully functioning EDM
4	Skills shortage	<ul style="list-style-type: none"> Solve lack of O&M competences Solve Generation BU understaffing 	<ul style="list-style-type: none"> Certification program for P/S O&M personnel in place All P/S operation shifts adequately staffed with qualified personnel

Source: Awardbrand - Improving GECOL technical performance report, Strategy& analysis

To estimate GECOL's future generating performance improvement, we developed two extreme scenarios

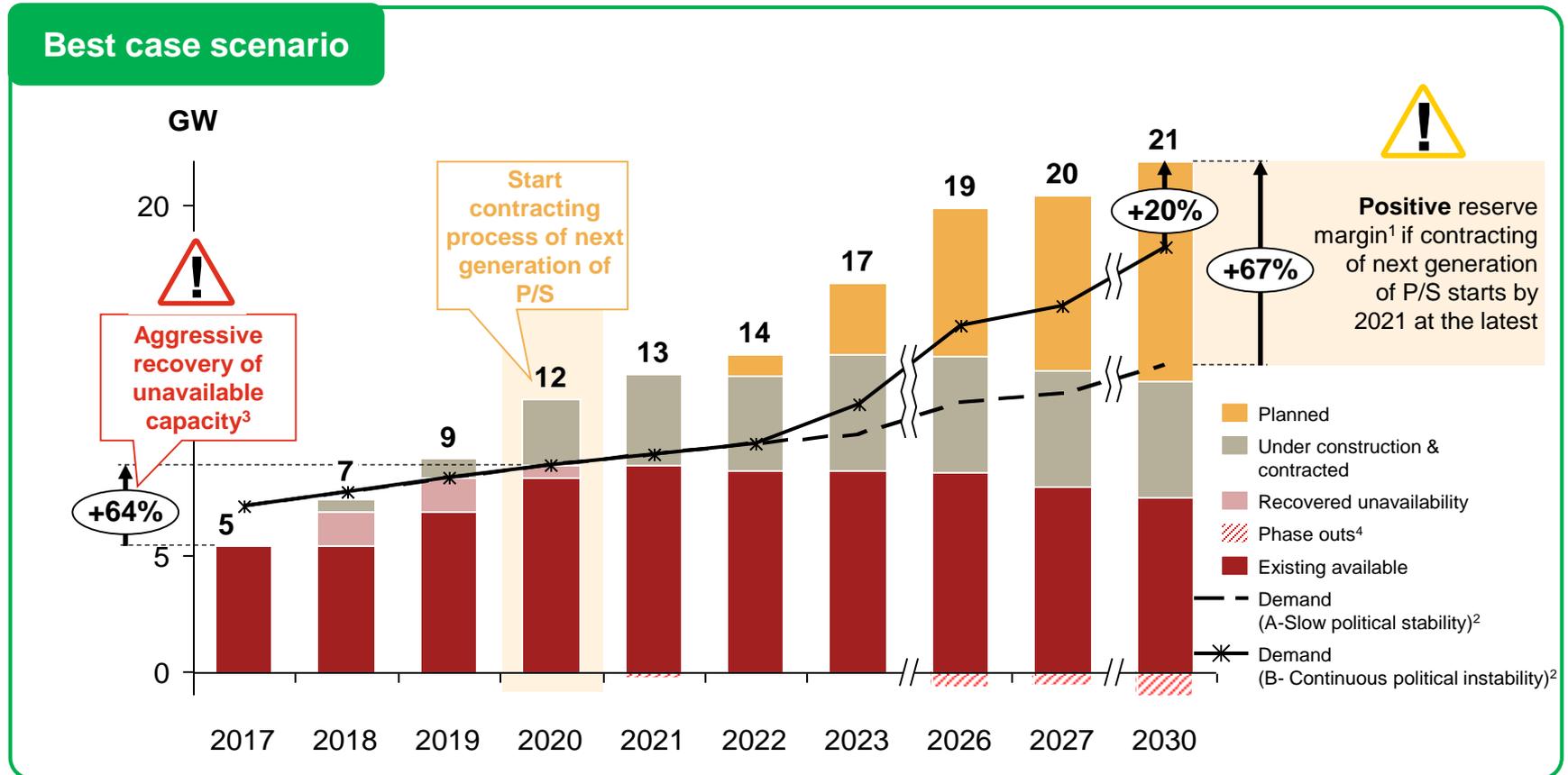
Simplified scenarios assumptions

Variable	Scenario name (2017-2030)	Existing plants	Under construction and contracted plants	Planned plants
1 Overhauls/ major maintenance	Worst	<ul style="list-style-type: none"> Each year: 4 units overdue from past years + all overhauls of newly due units Cleared by 2024 	Not applicable	Not applicable
	Best	<ul style="list-style-type: none"> Each year: 15 units overdue from past years + all overhauls of newly due units Cleared by 2020 		
2 Fuel constraints	Worst	<ul style="list-style-type: none"> Resolved by 2024 None considered after 	No constraints on fuel supply considered	Not included
	Best	<ul style="list-style-type: none"> Resolved by 2020 None considered after 		No constraints on fuel supply considered
3 Derating factor	Worst	<ul style="list-style-type: none"> 0% for steam turbines 12% to 20% for single cycle and combined cycle gas turbines depending on historical derating and location 	<ul style="list-style-type: none"> 0% for steam turbines 12% to 20% for single cycle and combined cycle gas turbines depending on geographical location 	Not included
	Best			<ul style="list-style-type: none"> 0% for steam turbines 12% to 20% for gas turbines depending on geographic location

Source: Awardbrand - Improving GECOL technical performance report, Strategy& analysis

Under highly aggressive assumptions, GECOL shall be able to restore its service quality by 2019...

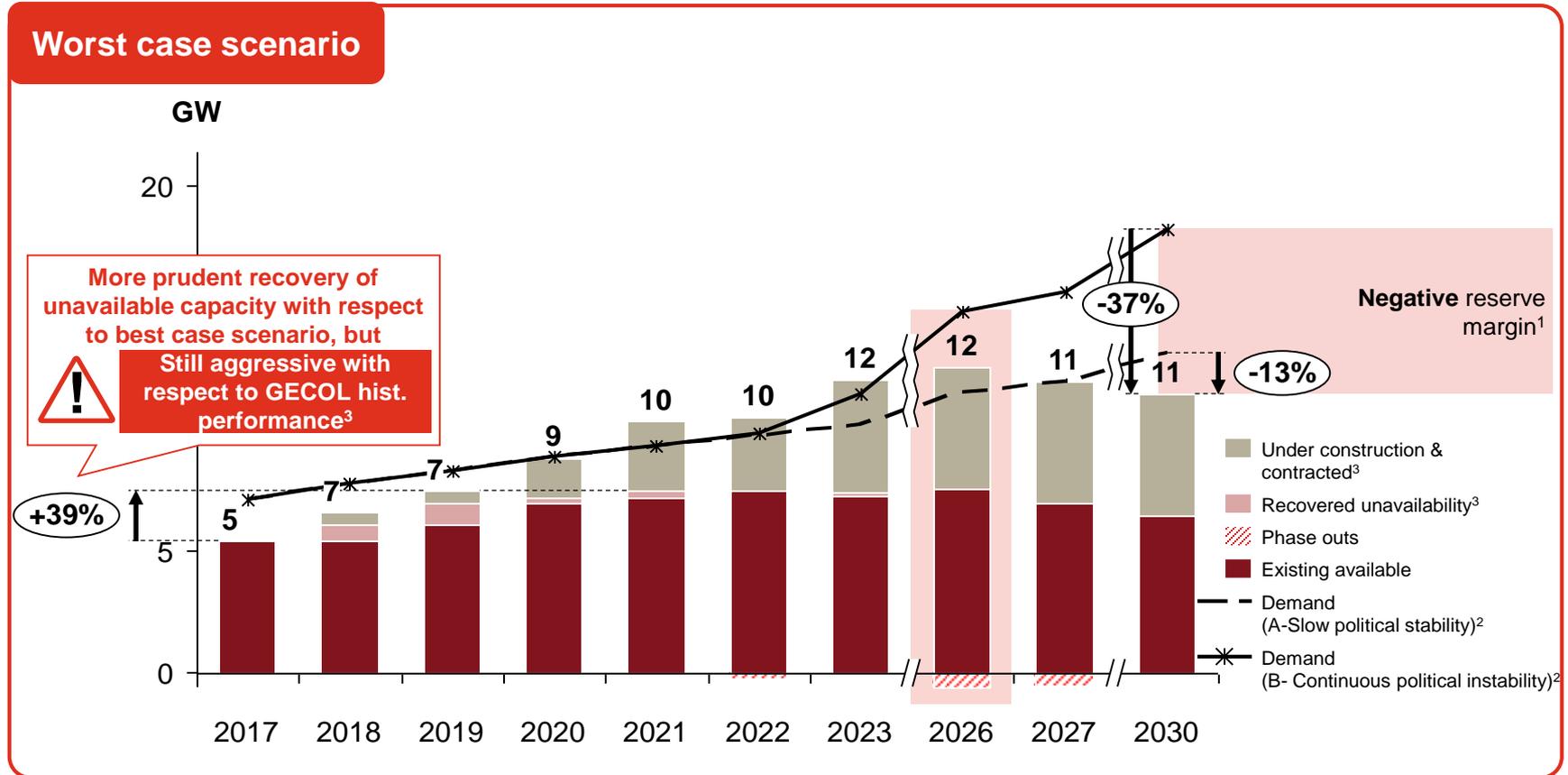
Generation expansion plan (2017-2030)



1) Computed as (Available capacity-Peak demand)/Peak demand; 2) Peak demand at generation; 3) Assuming GECOL will be able to carry out each year 15 overhauls of units overdue from past years + all overhauls of newly due units. All overdue unit overhauls and major maintenance are supposed to be cleared by 2020; 4) Conventional steam turbines that approached their retirement age but have been overhauled are assumed to have an extended life up to 2030, gas turbines to 2025. Other units are retired at their planned decommissioning year; Sources: GECOL data collection ID4, Awardbrand - Improving GECOL technical performance report, Strategy& analysis

...but under more pessimistic (realistic?) scenario, load shedding may still remain an issue until 2020

Generation expansion plan (2017-2030)



1) Computed as (Available capacity-Peak demand)/Peak demand; 2) Peak demand at generation; 3) Assumes GECOL will be able to carry out each year 4 overhauls of units overdue from past years + all overhauls of newly due units

Sources: GECOL data collection ID4, Awardbrand - Improving GECOL technical performance report, Strategy& analysis

Within Wave 1, GECOL will also address its key transmission system issues

Transmission performance improvement plan

Detailed action plan provided in Task C final report

B Transmission issues	Measures	Milestones
1 Damaged substations and overhead lines	<ul style="list-style-type: none"> • Repair out of service substations • Repair damaged overhead lines 	<ul style="list-style-type: none"> • All substations back in service • All transmission lines in service
2 Delayed substations rehab. programs	<ul style="list-style-type: none"> • Rehabilitate / replace old assets 	<ul style="list-style-type: none"> • Commission all stations • Overhaul all 220kV substations
3 Transformers failures and 30kV network earthing	<ul style="list-style-type: none"> • Reconnect 30kV earthing resistors • Investigate transformers failures • Improve transformers preventive maintenance 	<ul style="list-style-type: none"> • All resistors connected • Systematic analysis of all future failures of grid components instituted • Oil analysis laboratories fully operational
4 Improve maintenance of overhead lines & S/S ² DC systems	<ul style="list-style-type: none"> • Improve lines maintenance • Improve substation DC¹ system maintenance 	<ul style="list-style-type: none"> • All 220 & 400KV lines regularly inspected and maintained • All DC systems inspected and maintained
5 Skills shortage	<ul style="list-style-type: none"> • Improve O&M staff knowledge and competences • Train new generation of overhead linesmen • Develop capabilities for live line maintenance 	<ul style="list-style-type: none"> • Certified new linesmen

1) Direct Current (DC); 2) Substations (S/S)

Source: Awardbrand - Improving GECOL technical performance report, Strategy& analysis

In parallel, GECOL will also need to resolve the four key issues with its control department

Control performance improvement plan

Detailed action plan provided in Task C final report

C Control issues		Measures	Milestones
1	Failure of communication links	<ul style="list-style-type: none"> Repair damaged OPGW links Solve bad data quality 	<ul style="list-style-type: none"> Restored damaged OPGW links 98% of bad data sources solved
2	Delayed control projects	<ul style="list-style-type: none"> Complete control center projects 	<ul style="list-style-type: none"> NCC upgrade and back up completed TRCC maintained and upgraded BRCC commissioned and operational TDCC, ZDCC, and BDCC commissioned and operational
3	Operational deficiencies	<ul style="list-style-type: none"> Utilize SCADA control functionalities Provide spinning reserve Form permanent event analysis team(s) Reinstate AGC¹ functionality Modernize procedures and codes 	<ul style="list-style-type: none"> 80% / 90% of SCADA system control functionalities in use Adequate spinning reserve is maintained All AGC are operating Control codes and procedures are implemented
4	Skills shortage	<ul style="list-style-type: none"> Pursue staff development and training 	<ul style="list-style-type: none"> All control staff are trained and certified

1) Automatic Generation Control (AGC)

Source: Awardbrand - Improving GECOL technical performance report, Strategy& analysis

GECOL will the need to set and launch a series of milestones and measures to address its MV & Distribution issues ...

MV & distribution performance improvement plan

Detailed action plan provided in Task C final report

<div style="background-color: #d3d3d3; padding: 5px;"> <p>D</p> <p>MV & Distribution issues</p> <p>1 Deficient asset installation and maintenance practices</p> </div>	<p>Measures</p>	<p>Milestones</p>
	<ul style="list-style-type: none"> • Improve cable handling and laying practices • Correct errors in cable jointing and termination works • Put AVRs¹ of transformers with OLTCs² in service • Correct bad practices in installation and O&M of transformers • Use only treated oils in transformers • Establish workshops to repair damaged transformers • Correct errors in erection of wood pole overhead lines • Improve protection against ingress of dust and pollution into substations • Introduce a comprehensive preventive maintenance program • Replace old equipment (old switchgear) • Restore LV switchboards to correct working condition • Install earth fault alarm and indications on existing and future RMUs³ • Incident data collection and management 	<ul style="list-style-type: none"> • All storekeepers trained and certified • All project supervisors and network contractors trained and certified • All cable jointists trained and certified • All AVRs of Transformers with OLTC in service • All regions equipped with oil treatment machines • Transformer repair facilities established • Preventive maintenance system is fully implemented • All old minimum oil circuit breakers replaced • All LV switchboards repaired and maintained • All RMUs' E/F alarm facilities in service • Distribution standards updated and staff is conversant to compliance • Comprehensive incident data and action plan developed to manage and reduce outages

1) Automatic Voltage Regulators (AVRs) ; 2) On load tap changers (OLTCs); 3) Ring Main Units (RMUs)

Source: Awardbrand - Improving GECOL technical performance report, Strategy& analysis

..tackling the delayed investments problems, and acting on the dangerous operating conditions and the skills shortages

MV & distribution performance improvement plan

Detailed action plan provided in Task C final report

D MV & Distribution issues		Measures	Milestones
2 Delayed investment and replacement projects		<ul style="list-style-type: none"> Restart halted projects Change to Aluminum Bundled Cables (ABC) in both LV and HV rural distribution 	<ul style="list-style-type: none"> Use available project equipment over the coming 2 years 80% of halted projects completed
3 Incorrect and unsafe O&M practices		<ul style="list-style-type: none"> Enforce GECOL technical and other standards Strengthen safety standards enforcement 	<ul style="list-style-type: none"> Safety management systems successfully implemented Rate of serious and fatal accidents reduced by 90%
4 Skills shortage		<ul style="list-style-type: none"> Develop a career training development plan 	<ul style="list-style-type: none"> Career development system implemented

Source: Awardbrand - Improving GECOL technical performance report, Strategy& analysis

Libyan institutions will then need to support GECOL in the improvement of its financial position and re-skilling priority

Manpower-related resizing approaches

Wave I Immediate actions

Immediate actions starting from 2018 focusing on reskilling as top priority

Re-Skilling	Reallocate	Start immediately to reassign especially technicians to other departments like the generation department
	Retrain	Leverage current resources to fill unmet needs in the generation department
	Freeze hiring	Institute a hiring freeze as more than 12% are aged below 30 and more than 40% aged below 40
	Early Retirement	Prepare an early retirement package for employees aged over 60 (2% of total FTEs)
	Start GECOL Academy	Train managers and staff professionals to be hired inside but also outside the company

Wave II Mid-term actions

Mid-term actions starting upon successful completion of immediate actions (i.e. indicatively from 2020 to be completed by 2025)

Incentivize Buyouts	Offer buyout solutions for non core businesses like Health Service, Driver, Translation etc
Incentivize to leave	Ask employees to take voluntary lay-offs
Dismiss	Temporarily or permanently terminate employment for a group of employees especially in D&S

1) Process mapping and manpower rationalization report

Source: Strategy& Analysis

GECOL shall focus on addressing its manpower issues to improve its financial situation through an ad-hoc plan...

Measures and activities

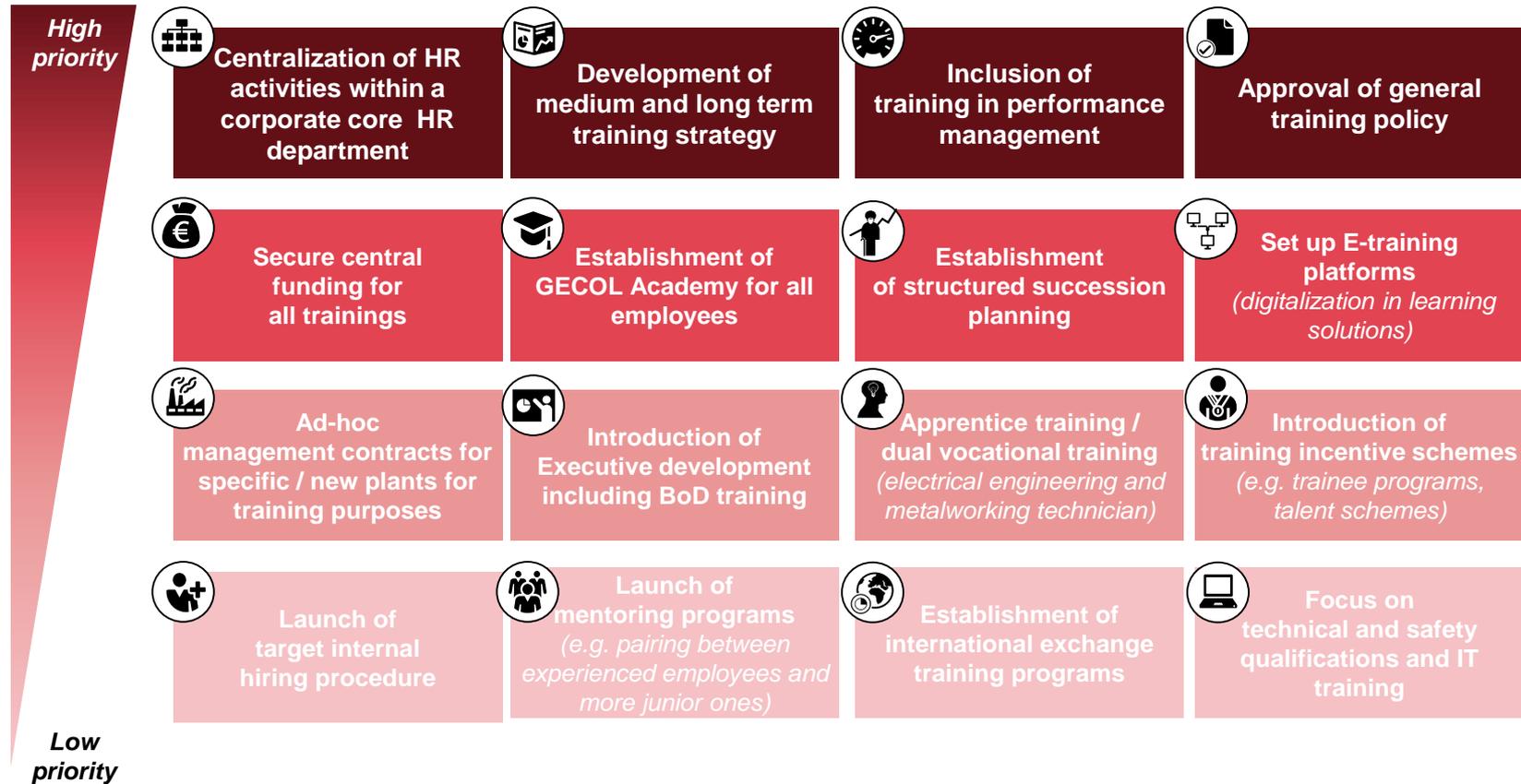
Measures	Activities	Year	2018	2019	2020	Owner
Optimize power mix	Optimize generation mix, assessing gas vs. other fuel feasibility		→			GECOL
Improve efficiency	Assess thermal efficiency improvement options		←			GECOL
	Deploy new maintenance strategy / program		→			GECOL
Address manpower issues¹	Centralize HR activities		→			GECOL
	HR strategy development			▲		GECOL
	Manpower rebalancing & workforce planning		→			GECOL
	Corporate reskilling		→			GECOL
	Performance management		→			GECOL
	Succession planning		→			GECOL
	<i>Detailed manpower action plan provided in Task C final report</i>					
Compensation and benefits redesign	Baseline current compensation and benefits		→			GECOL
	Benchmark local compensation and benefits practices for comparable companies		→			GECOL
	Develop compensation and benefits revision plan		→			GECOL
	Integrate redesigned compensation and benefits within ERP system		→			GECOL
	Implement revised compensation and benefits plan		→			GECOL
						▲ Milestone

Note: Costs control & staff re-skilling measures implementation is to be facilitated through a revision of the KPI system

1) To be further completed with manpower sizing measures from Task C part 2.3, the final comprehensive roadmap will be provided by October 2017); Source: Strategy& analysis

...and in parallel also launch a corporate-wide reskilling plan

Proposed reskilling initiatives



The Government and the regulatory agency will support GECOL in addressing its financial sustainability problems

Detailed GECOL financial improvement action plan provided in Task C final report

Measures and activities

Measures	Activities	Year	2018	2019	2020	Owner
Launch new Tariff framework	Plan the tariff change communication program		[Bar]			GECOL
	Implement the tariff change communication campaign		[Bar]			GECOL
	Data collection related to year n-1		[Bar]			GECOL
	Data projections for year n+1		[Bar]			GECOL
	Preliminary rate design for year n+1		[Bar]			GECOL
	Preliminary tariff submission to Regulatory Agency			◆	◆	GECOL
	Review of projections and proposed rate			[Bar]		Regulator
	Launch new tariff framework				▲	GECOL
Metering roll-out	Establish court jurisdiction over customer disputes and theft		[Bar]			Ministry in charge
	Identify strategy for metering strengthening		[Bar]			GECOL
	Metering substitution/installation strategy roll-out		[Bar]			GECOL
	Perform monthly metering reads		[Bar]			GECOL
Address electricity theft	Clarify electricity police position as GECOL's employees		[Bar]			GECOL
	Increase sanctions for electricity theft			▲	Higher theft sanctions	Ministry in charge
	Draw a detailed map of potential theft areas		▲	Thrift areas map		GECOL
	Perform recurrent inspection of potential theft areas		[Bar]			GECOL
Fight insolvency	Eliminate the "no cut-off" policy	◆				Government
	Establish court jurisdiction over customer insolvency claims		[Bar]			Ministry in charge
	Upgrade invoicing and overdue notifications process from manual to electronic (i.e. e-mail)		[Bar]			GECOL
	Build a database with customers' information (e.g. e-mail addresses, phone numbers)			▲	Customers database	GECOL
	Set up SMS and e-mail overdue notification systems ²			[Bar]		GECOL
	Develop program to launch GECOL's mobile payment app			[Bar]		GECOL
				▲	SMS/e-mail billing in operation	GECOL
				▲	GECOL's mobile app running	GECOL

Note: Reduce subsidies on tariff & commercial losses measures implementation is to be facilitated through a revision of the KPI system

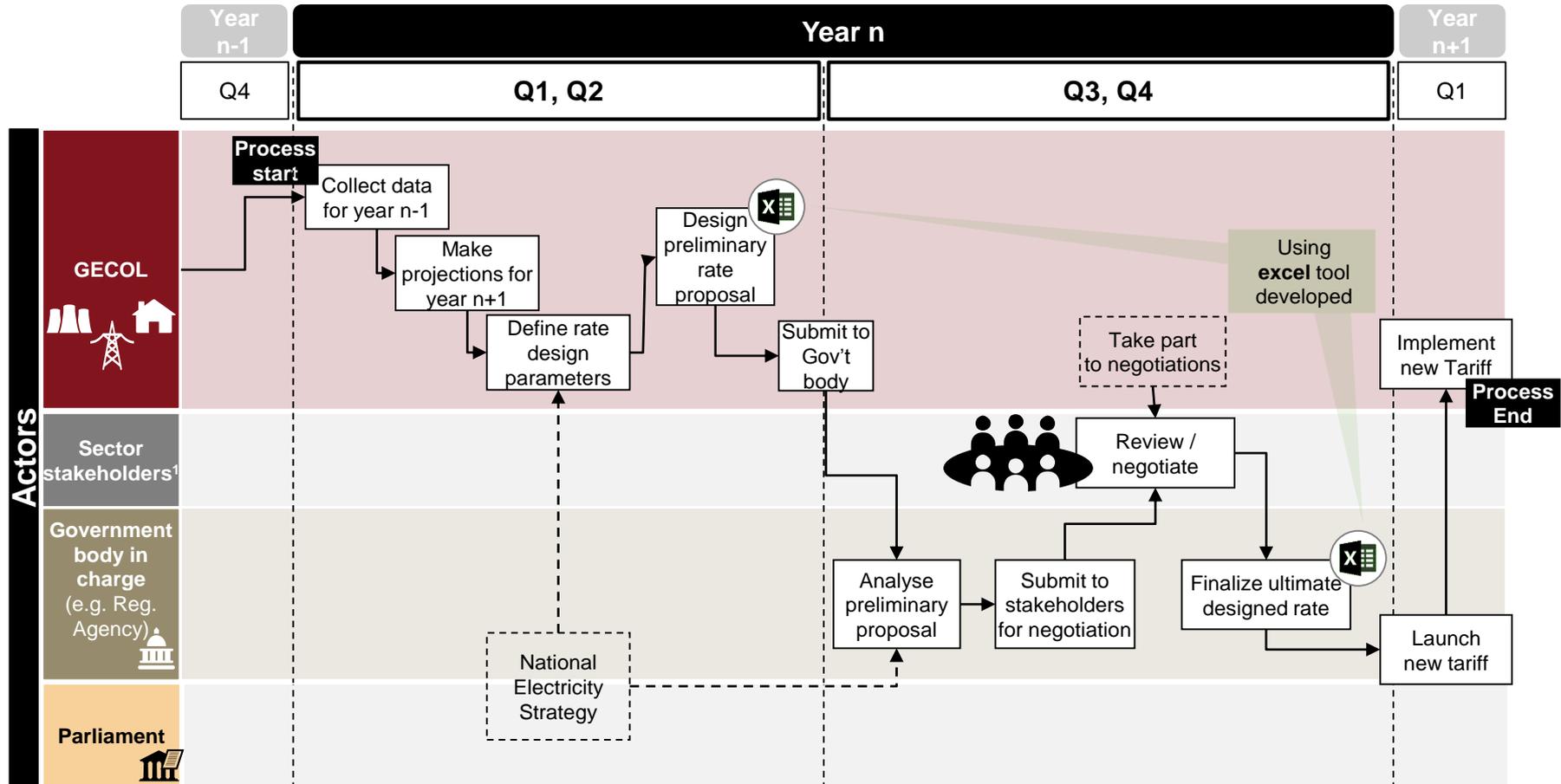
1) e.g. 90% of P&L costs benefiting from subsidies fuel pricing combined with a lifeline tariff to protect the most vulnerable customer classes

(i.e. gradually phase out energy price subsidies through well targeted SSN); 2) Pilot program already launched from GECOL; Source: Strategy& analysis

▲ Milestone
◆ One shot activity

In coordination, the new Government Agency and GECOL will begin a periodic (and structured) tariff review process

Tariff review and negotiation process (2018-2021)



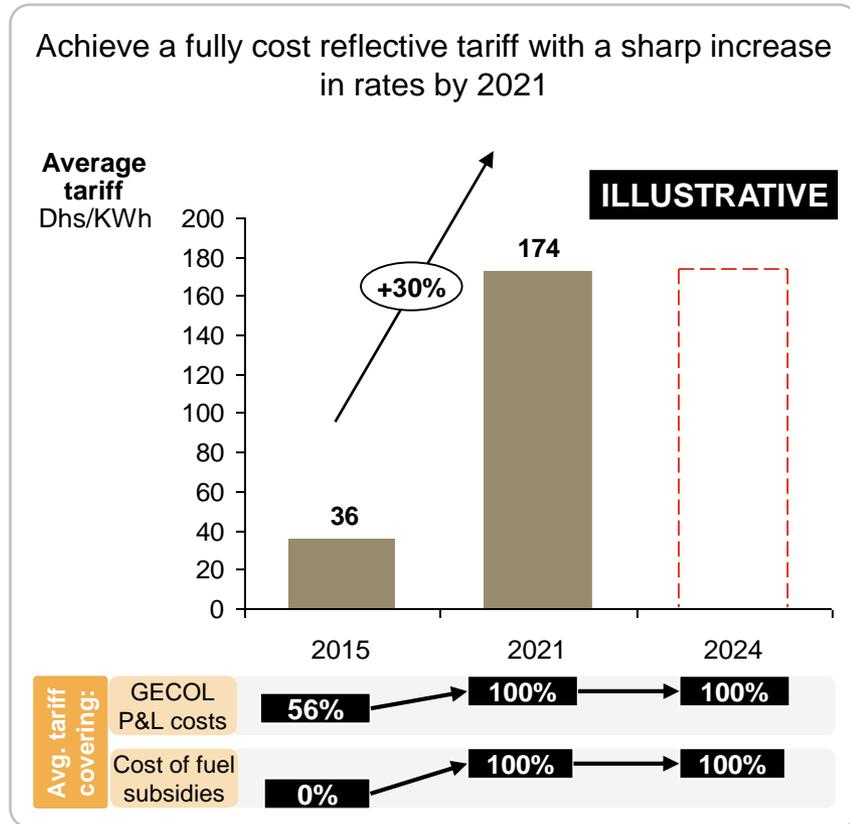
1) Stakeholders might include representatives from GECOL, Government, consumers and other organizations involved in the electricity sector operations (e.g. NOC)

Source: Strategy& analysis

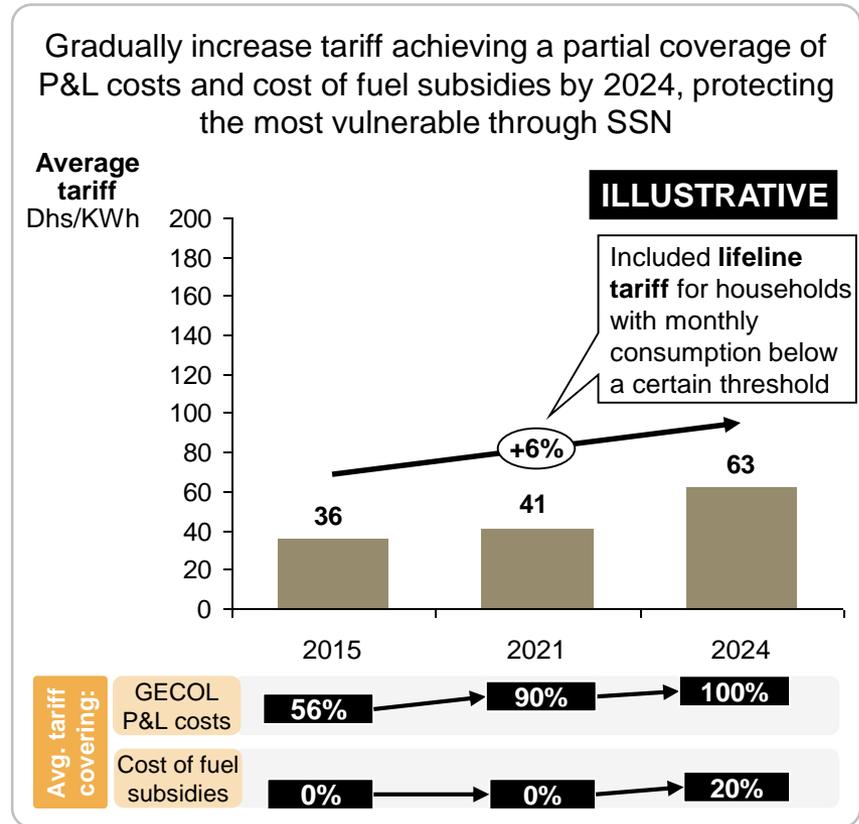
As a lever to achieve better financial sustainability, GECOL may target to modify its tariff either sharply or prudently

Tariff framework improvement options

Option 1 **Sharp** 



Option 2 **Prudent** 



Source: Strategy & Analysis

A more prudent approach to tariff increase was instead recommended ...

Options assessment



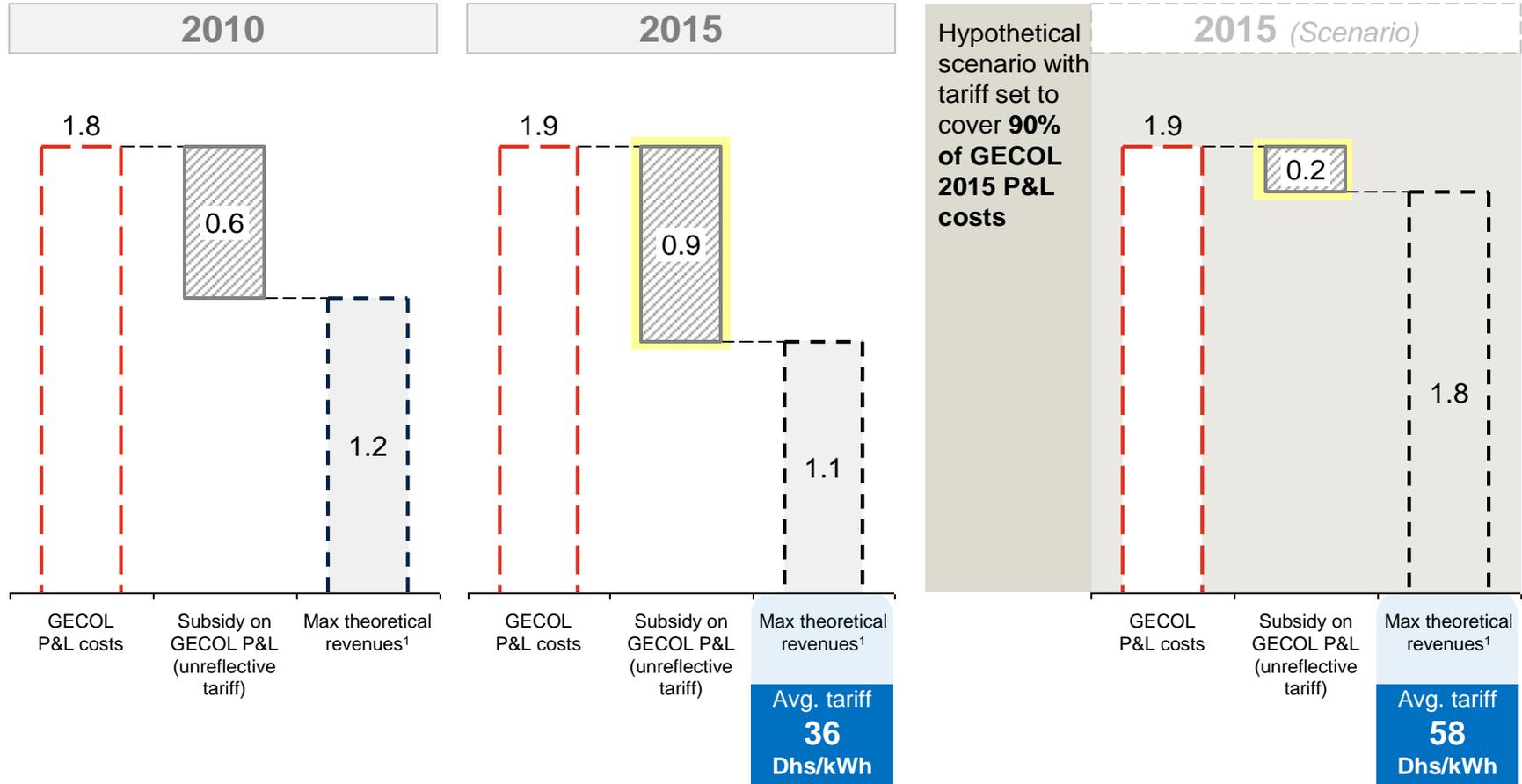
	Option 1 Sharp 	Option 2 Prudent 
PROS 	<ul style="list-style-type: none"> Short term improvement on government budget due to potentially reduced subsidies (if successful) Quick enhancement of GECOL's financial situation (if successful) Customers strongly incentivized to reduce demand 	<ul style="list-style-type: none"> Softer impact on customers resulting in enhanced public acceptance Smooth implementation of required technology without heavy investments needed Gradual price increases might be paralleled by service level improvements
CONS 	<ul style="list-style-type: none"> Inconsistent with current macroeconomic situation and customers purchasing power Large investment in advanced metering technology to ensure billing and collection required 	<ul style="list-style-type: none"> Delayed benefits on GECOL's financial situation Key role of progressive service level improvements in guaranteeing public acceptance of increased rates
RISKS 	<ul style="list-style-type: none"> Peaking electricity theft and skyrocketing bad debt due to customers inability to pay bills High pricing not comparable with service level provided to customers 	<ul style="list-style-type: none"> Delayed GECOL's financial sustainability which might inhibit further sector development (unbundling path) Late adjustment of demand to new rates which might worsen reserve margin
EASE 	 <ul style="list-style-type: none"> Overall strong economic situation improvement needed Required revolutionary change in customers approach towards electricity subsidization 	 <ul style="list-style-type: none"> Strong communication campaign needed to convey reasons for tariff increase to customers Strong government support needed throughout the process

1) Financial performance assessment and financial models report (tariff framework review, tariff structure set-up and reform pathway and excel tools)

Source: Strategy& Analysis

...because, although a tariff increase may allow GECOL to reduce the State burden and improve sustainability...

Tariff evolution considerations (Bn LD)



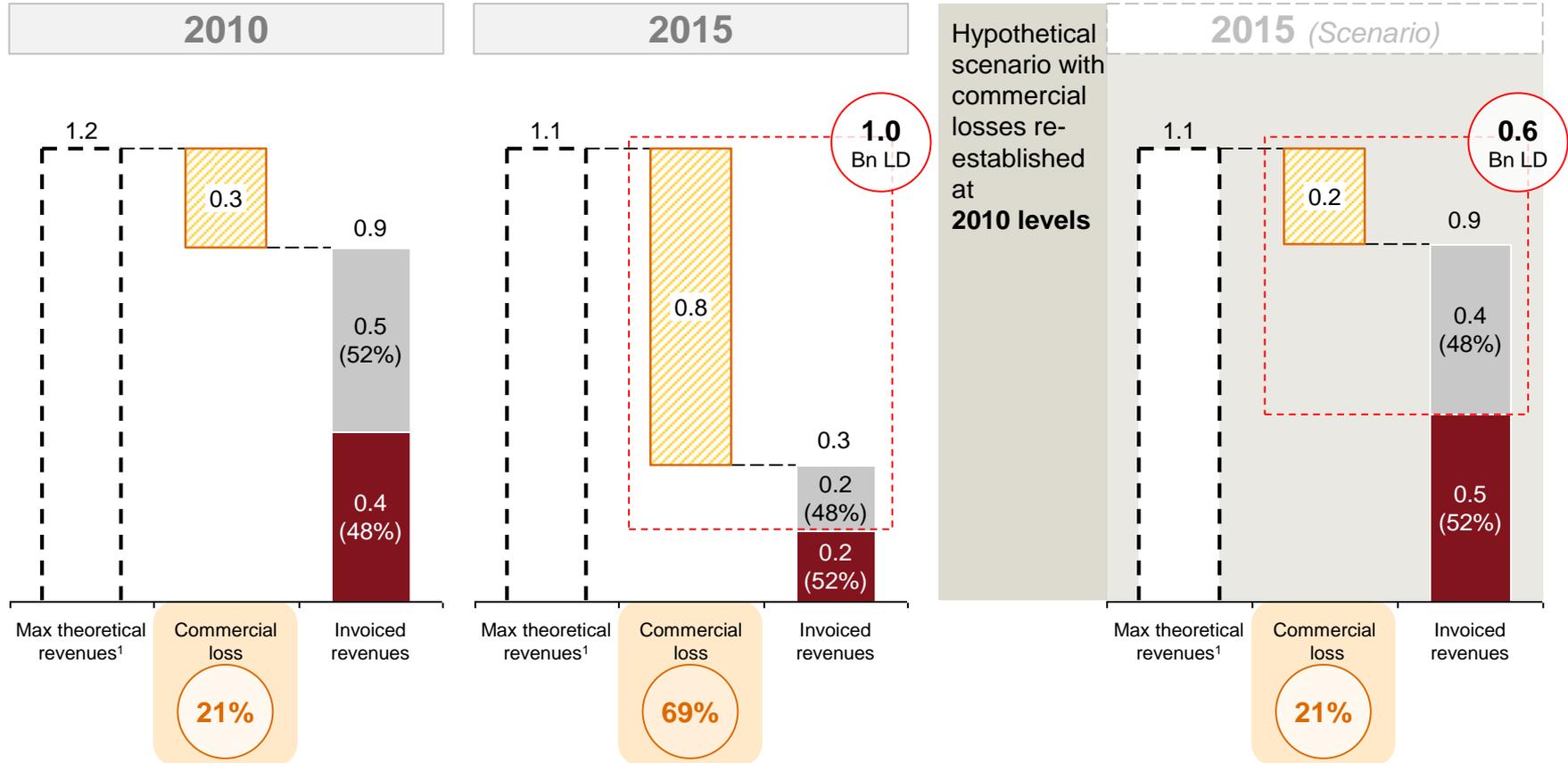
1) Sum of (Tariff by customer class) x (Consumption by customer class)

Source: GECOL data collection ID2, GECOL data collection ID7, GECOL data collection ID13, GECOL data collection ID37, Strategy & analysis

... the same positive impact could be achieved through the reduction in commercial losses (to 2010 levels?)

Commercial losses / cash collection considerations (Bn LD)

Improvement measures within Task C – Step. 4.1

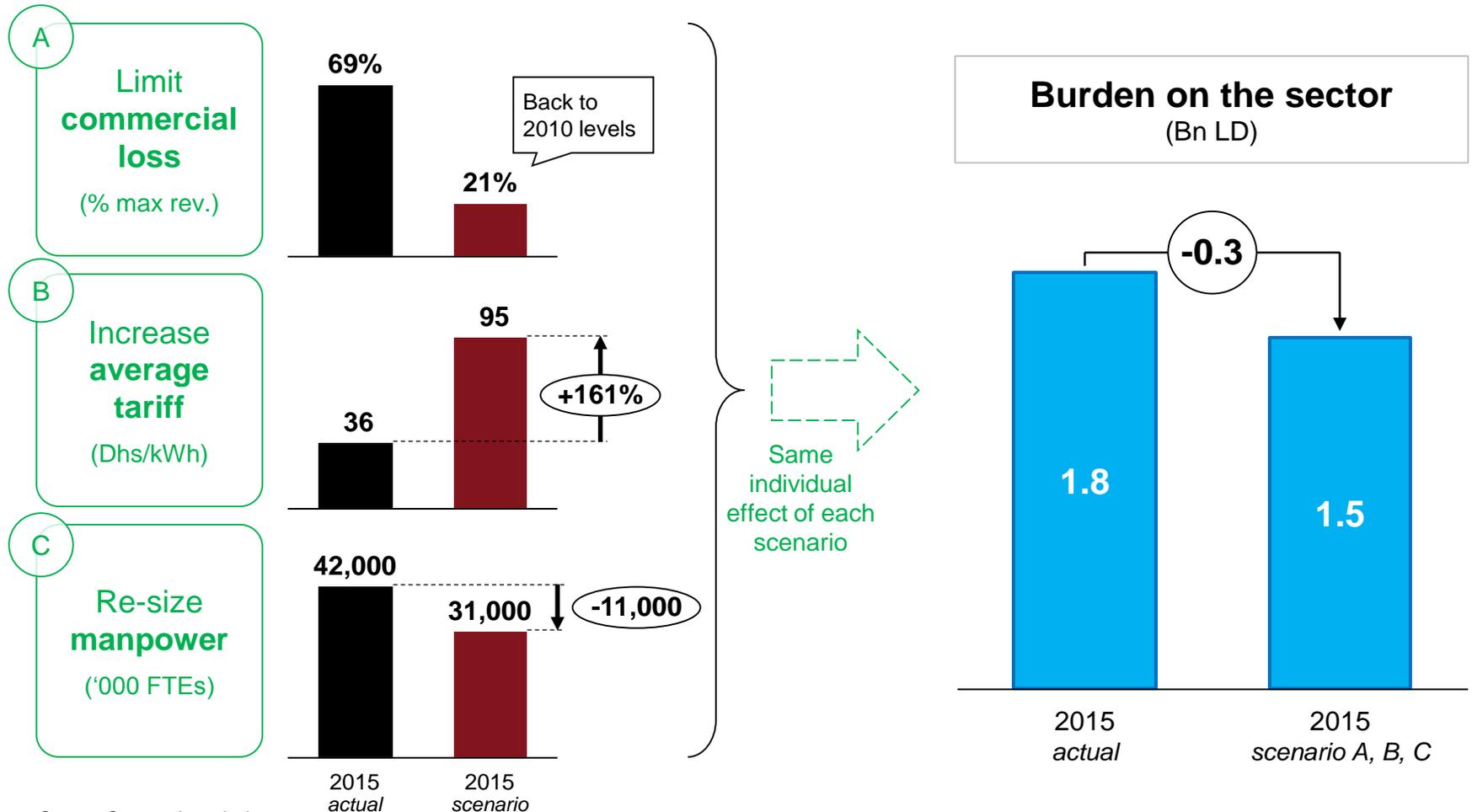


1) Sum of (Tariff by customer class) x (Consumption by customer class)

Source: GECOL data collection ID7, GECOL data collection ID20, Strategy& analysis

A reduction in commercial losses would have the same impact of +160% tariff increase or 11,000 FTE lay-offs ...

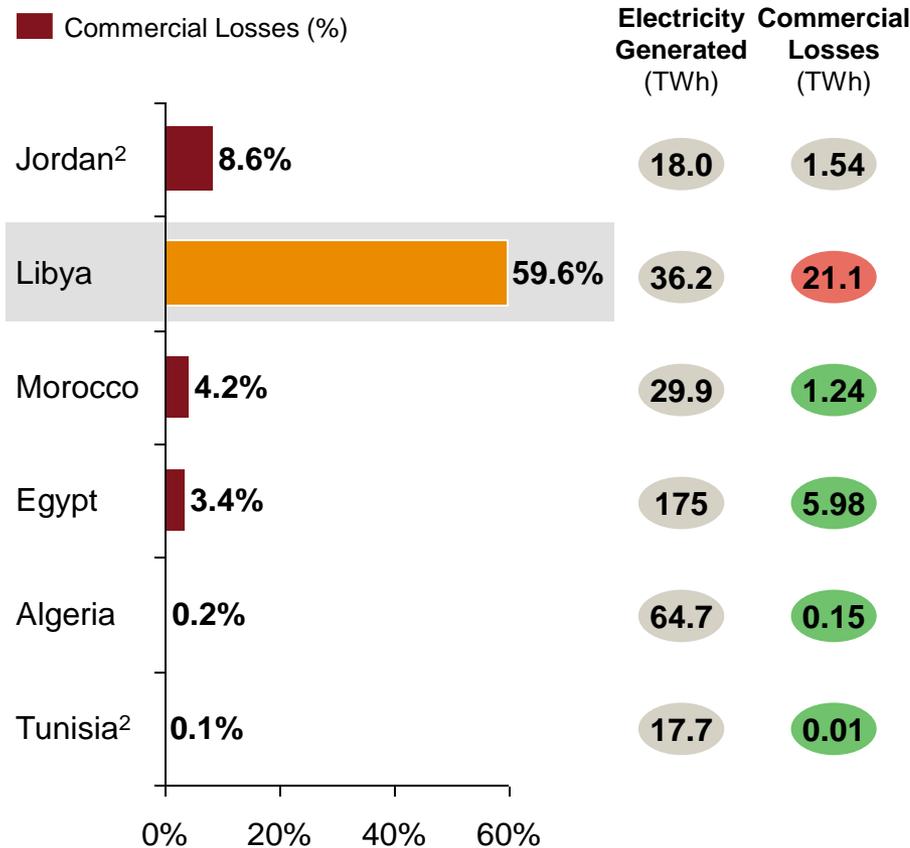
Comparison of scenarios achieving identical financial impact (2015)



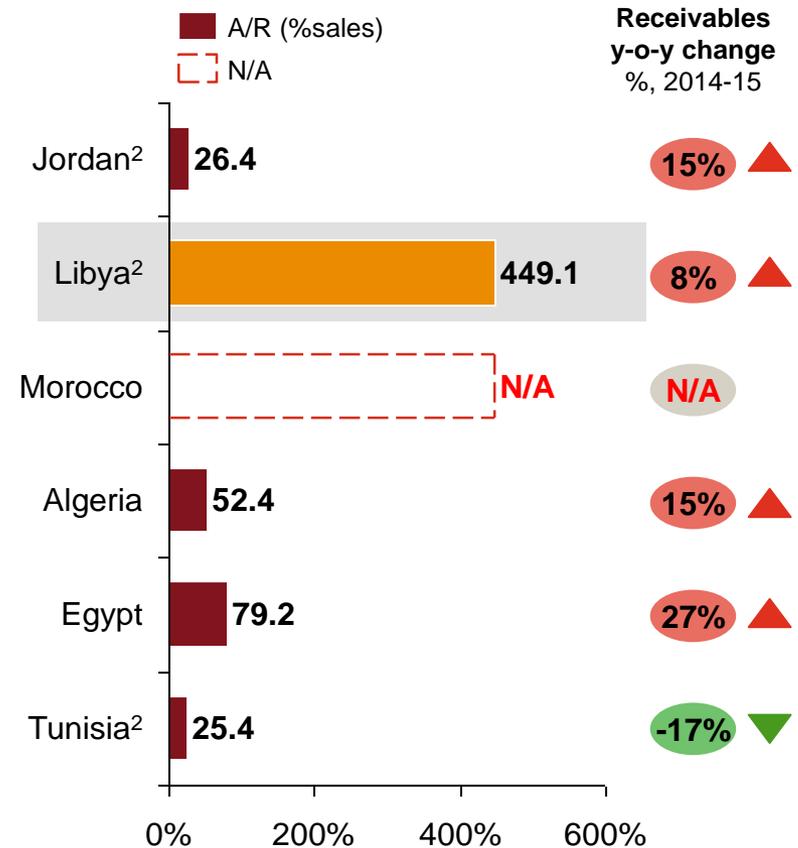
Source: Strategy& analysis

...and it should be the key priority for Libya, as also proven by the comparison with its regional peers

Commercial losses benchmarking¹



Receivables on total sales benchmarking



1) Commercial losses are estimated as Gross Generation + Imports - Technical Losses - Billed electricity. Data referring to these items are retrieved from last available annual report for the following companies: JEPCO, IDECO, EDCO, GECOL, ONEE-BE, EEHC Distribution Companies, Sonelgaz and STEG distribution companies

2) Refers to 2014 y/e, last historical data available with y-o-y change 2013-14; 3) Sales exclude government subsidies

Source: GECOL data collection ID12, GECOL data collection ID13, GECOL data collection ID24, GECOL data collection ID37, Corporate Annual Reports, Strategy & analysis

In wave I, REAoL will play a major role in setting the institutional basis for the development of RES



Measures and activities

← Wave **I** 2018-2020 →

Measures	Pilot study and development					
	REDEVCO set up	Concept	Feasibility	Project & site qualification	Financing	Construction and operation
Duration	6 months	2 years				6 months
Owner	REAoL	REDEVCO				SPV/IPP
Activities	<ul style="list-style-type: none"> • REDEVCO set up <ul style="list-style-type: none"> – Appointment of BoD and initial budget allocation – Recruitment – Development of strategic plan • RES permitting and tender documentation <ul style="list-style-type: none"> – Clarify permitting process and documentation – Draft tender documentation 	<ul style="list-style-type: none"> • Concept <ul style="list-style-type: none"> – Resource mapping and site shortlist – Agreement with GECOL about sites and grid capacity – Outline business case • Iterative feasibility study process <ul style="list-style-type: none"> – Red flag and fatal flaw analysis of all relevant project details on high level (pre-feasibility) – Techno-economic concept design and detailed site assessment • Project/site qualification <ul style="list-style-type: none"> – Geotechnical and topographic survey – Environmental impact assessment (EIA) – Permitting process, PPA & other contract negotiations • Financing <ul style="list-style-type: none"> – Equity auctioning process and selection of equity investors into SPVs – Negotiation of debt financing strategy 				<ul style="list-style-type: none"> • Engineering and procurement <ul style="list-style-type: none"> – Design and procurement and installation of PV components • Construction and commercial operation
Milestones	◆ REDEVCO operations start	◆ PV pilot project study completion	◆ Wind pilot project study completion	◆ 3% RES penetration		

Source: Gopa intec and Suntrace Task D Roadmap for Renewable Energy Development, Strategy& analysis

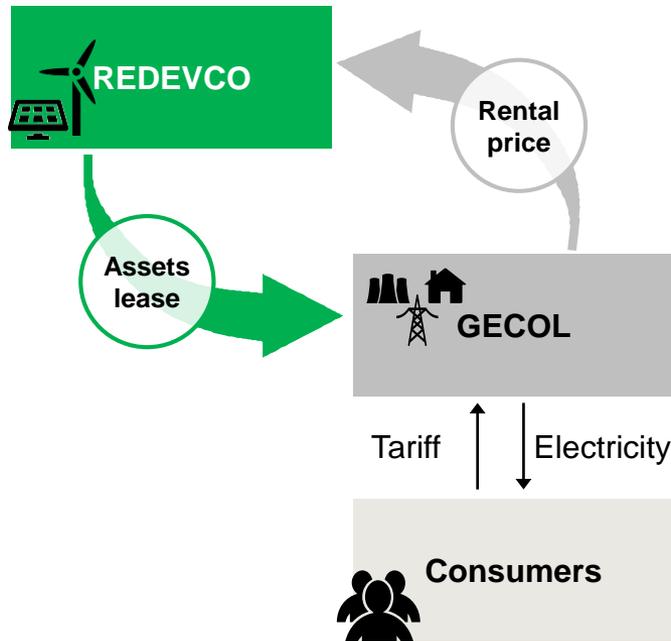
Until the Electricity Law will overrule GECOL's monopoly over generation, 2 options shall be explored for RES pilots

Renewables development options

TO BE FURTHER DUE-DILIGENCED

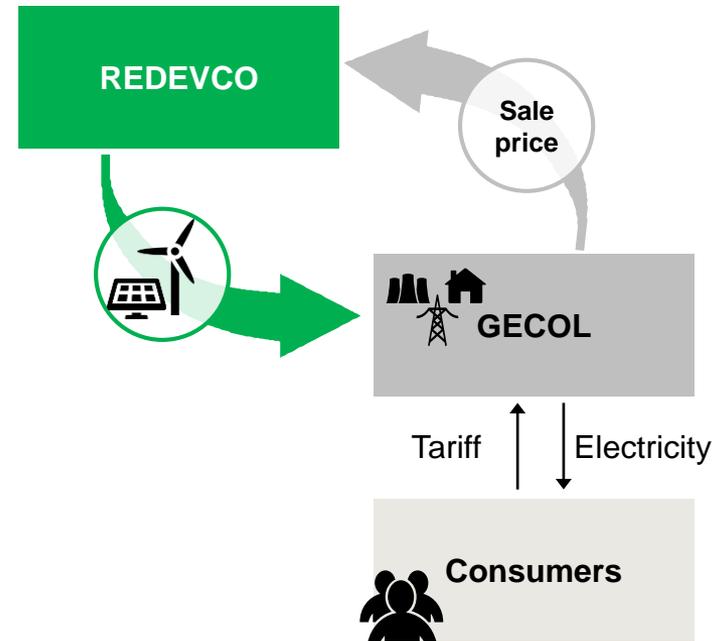
Leasing

REDEVCO will retain assets ownership and will lease assets operations to GECOL for a determined period of time at a contracted rental price



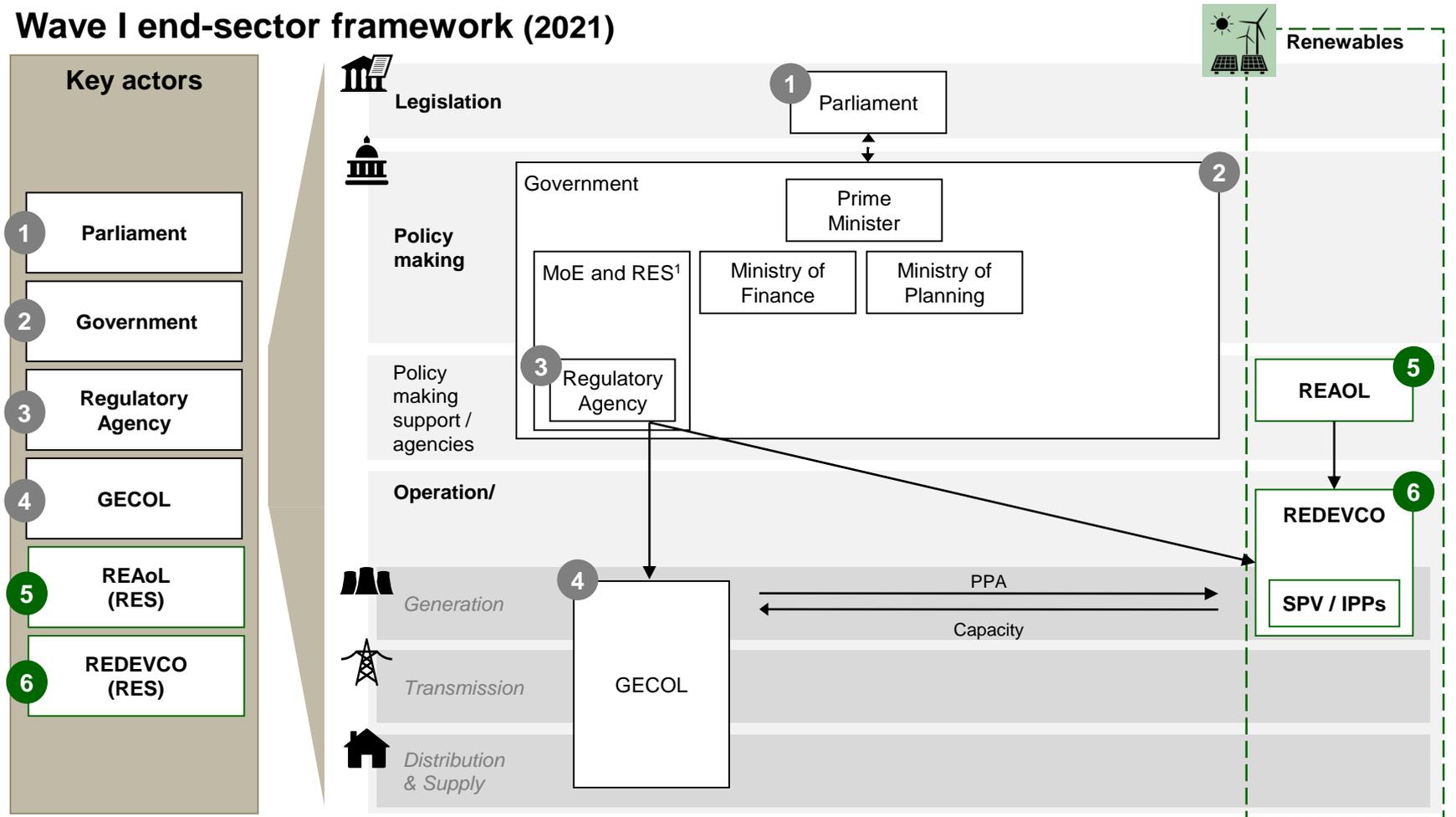
Asset sale

REDEVCO will transfer both asset ownership and operations to GECOL in exchange for a contracted sale price



In summary, with Wave I, the Libyan electricity sector will operate through 6 actors with revised roles & responsibilities

Wave I end-sector framework (2021)



1) Ministry of Electricity and Renewable Energy Sources

Source: Gopa intec and Suntrace Task D Roadmap for Renewable Energy Development, Strategy & analysis

The Parliament will need to approve the national electricity strategy, the budget and (possibly) a first electricity act

Primary responsibilities / tasks

Key actors

- 1 Parliament
- 2.1 Government (e.g. Ministries of Finance & Planning)
- 2.2 Government (e.g. Ministry of Electricity & RES)
- 3 Regulatory Agency
- 4 GECOL
- 5 REAoL (RES)
- 6 REDEVCO (RES)

Area	Primary responsibilities / tasks
National Electricity Strategy	<ul style="list-style-type: none"> Approve the National Electricity Strategy drafted by the MoE and RES through comprehensive consultation process with sector institutional stakeholders (i.e. Regulatory Agency) and industry representatives (i.e. GECOL and NOC) Grant the mandate to Government to implement the National Electricity Strategy
Budget	<ul style="list-style-type: none"> Approve national budget presented by the government, which will include GECOL's opex and capex budget (included in chapters 3 and 4 of national budget)
Legal Framework	<ul style="list-style-type: none"> Sign into law (enact) the Electricity Act¹ from the bill drafted by the MoE and RES

Note: see electricity act content in the appendix to the document

1) If no window of opportunity opens for the endorsement of a first Electricity Act, the Government shall initially proceed with a Decree

Source: Strategy& analysis

The Government will play a major role in GECOL’s budgeting process...

Primary responsibilities / tasks

Key actors

- 1 Parliament
- 2.1 Government**
(e.g. Ministries of Finance & Planning)
- 2.2 Government
(e.g. Ministry of Electricity & RES)
- 3 Regulatory Agency
- 4 GECOL
- 5 REAoL
(RES)
- 6 REDEVCO
(RES)

Area	Primary responsibilities / tasks
Budget	<ul style="list-style-type: none"> Examine, negotiate and approve GECOL’s budget proposals Prepare the national budget to be presented for approval to the Parliament Monitor national spending during the year against budgeted expenditure and report to the Parliament

...helping to draw policies and identify the sector's strategic objectives (while overseeing GECOL's operations)

Primary responsibilities / tasks

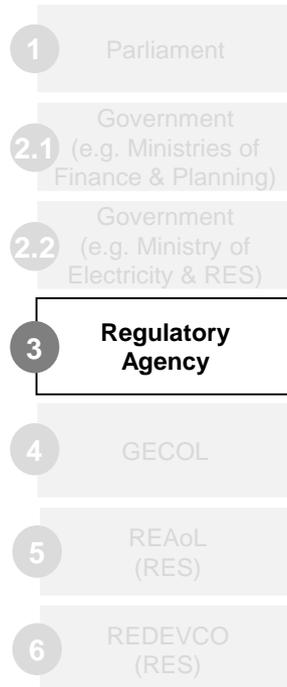
Key actors		Area	Primary responsibilities / tasks
1	Parliament	Policy and legal framework	<ul style="list-style-type: none"> Formulate and develop appropriate power policies for the control, regulation and utilization of power resources Contribute to establish the legal framework for the sector drawing the proposal for the bill that the Parliament will consider for the Electricity Act
2.1	Government (e.g. Ministries of Finance & Planning)		
2.2	Government (e.g. Ministry of Electricity & RES)	Strategic objectives	<ul style="list-style-type: none"> Draft and implement the National Electricity Strategy resulting from a comprehensive public consultation process with sector's institutional stakeholders (i.e. Regulatory Agency, REAoL, Ministry of Oil & Gas) and industry representatives (i.e. GECOL, NOC)
3	Regulatory Agency	Sector structure and actors	<ul style="list-style-type: none"> Supervise institutions listed in under the Ministry of Electricity and Renewable Energy Oversee Regulatory Agency operations Monitor the organization and functioning of the electricity sector Promote accounting unbundling of GECOL
4	GECOL		
5	REAoL (RES)	GECOL	<ul style="list-style-type: none"> Endorse GECOL's budget Negotiate with the Ministries of Finance and Planning for the approval of GECOL's budget Propose GECOL's Board of Directors members to be appointed by the General Assembly
6	REDEVCO (RES)		
		International cooperation agreement	<ul style="list-style-type: none"> Promote the Libyan interests with other countries and regional and international organizations on issues relating to electric power Initiate/establish cooperation agreements with other countries for the purpose of the electrical interconnection and trade of electric power

Source: Strategy & analysis

The “regulatory agency”, built in the Government, will help in the tariff review and sector supervision

Primary responsibilities / tasks

Key actors



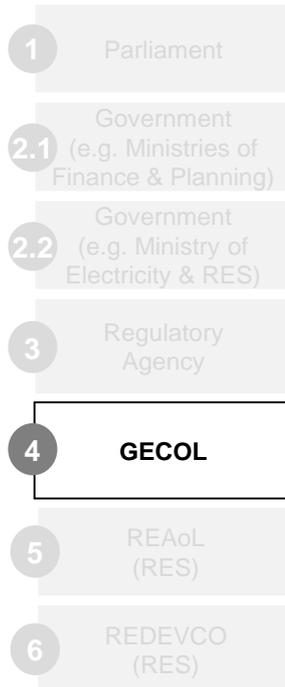
Area	Primary responsibilities / tasks
Tariff	<ul style="list-style-type: none"> • Draft the Tariff Regulation setting the principles governing the examination, modification and approval of the regulated tariffs • States criteria for the preparation of tariff proposals by GECOL
Efficiency and security of supply	<ul style="list-style-type: none"> • Set technical quality principles and other standard measures to monitor GECOL’s perf. • Set minimum safety standards for O&M, construction and installation of power systems • Supervise security and reliability of the power system and propose improv. Measures • Draft the Grid Code/Interconnecting Guidelines (establishes technical guidelines for connection of generating plants to the local G&T system)
Innovation and sector development	<ul style="list-style-type: none"> • Provide information and act as advisor to the ministry on matters related to development installation and operation plans • Help the Ministry in charge in writing the draft of the government decree preceding the electricity act
Accounting unbundling	<ul style="list-style-type: none"> • Draft accounting unbundling regulation • Draft detailed manual with operating guidelines to draft separated annual accounts • Set up timing and procedures for annual accounts submission (e.g. 90 days after auditors approval of consolidated financial statements) • Analyze and review GECOL’s separated annual accounts

Source: Strategy& analysis

GECOL will remain a vertically integrated player with monopoly over generation, transmission and distribution

Primary responsibilities / tasks

Key actors



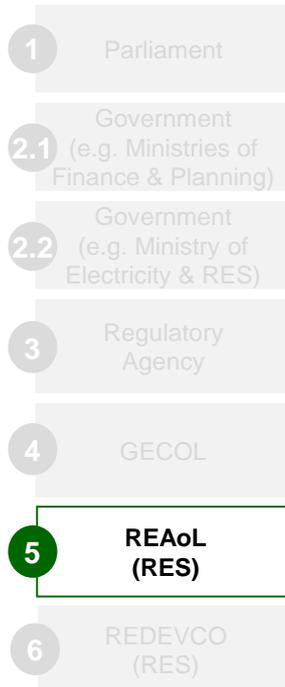
Area	Primary responsibilities / tasks
Generation	<ul style="list-style-type: none"> • Own, control and operate the generating units connected to the T&D network • Plan the development of generation capacity to efficiently meet expected demand • Make decisions on size, type, technology and location of the required capacity made to ensure that future demand is met at the least cost • Generate electricity to meet demand
Transmission	<ul style="list-style-type: none"> • Own, control and operate the transmission network • Engage in real time scheduling and control of the grid system • Dispatch generation in compliance with the guidelines set in the Grid Code/Interconnection Code by Regulatory Agency • Ensure energy demand and supply balance
Distribution & Supply	<ul style="list-style-type: none"> • Own, control and operate the distribution network • Invoice customers and address commercial losses through the electricity police • Address customers complaints • Install, maintain, substitute and operate metering technology across all customer segments
Tariff	<ul style="list-style-type: none"> • Submit proposals for tariff change to Regulatory Agency demonstrating that existing tariff does not allow a reasonable opportunity to recover the cost to serve

Source: Strategy& analysis

REAoL will play a catalytic role in the supervision and kick start of RE development in Libya...

Primary responsibilities / tasks

Key actors



Area	Primary responsibilities / tasks
RES regulatory and legal (i.e. political agent)	<ul style="list-style-type: none"> Provide input for the improvement of renewables regulatory and legal framework including the development of quick and efficient permitting processes Lobby for the implementation of policies to increase penetration of renewables in Libyan power mix Develop the Renewable Energy Development Plan Advise the Ministry in charge of the sector with respect to the role of renewables in the drafting of the National Electricity Strategy Encourage support of related industries in the implementation of renewable projects Design, support, monitor REDEVCO in the development of the first RES projects in the country
Capacity building (i.e. knowledge carrier)	<ul style="list-style-type: none"> Supervise project implementation and coordinate capacity building in the renewables arena of institutions, local industry and developers Coordinate research activities, technical specifications, education and planning for the integration of renewables into the Libyan electricity sector
Financing (i.e. lender)	<ul style="list-style-type: none"> Function as a provider of debt financing to renewables SPV/IPP controlled by REDEVCO either directly or indirectly through the control of the renewables fund

Source: Gopa intec and Suntrace Task D Roadmap for Renewable Energy Development, Strategy& analysis

...through the set-up of REDEVCO (and possibly also an investment vehicle for the RE pilots)

Primary responsibilities / tasks

Key actors



Area	Primary responsibilities / tasks
RES development	<ul style="list-style-type: none"> Act as an investment vehicle for early stage renewable energy project development in Libya Build capacity and knowledge in the renewables sector
Project Concept	<ul style="list-style-type: none"> Identify most promising investment opportunities with a viable business case Preliminary concept design: installed capacity estimation, and preliminary cost-benefit analysis Carry on initial discussions with key parties and stakeholders and principal understanding/agreements with key parties
Project feasibility	<ul style="list-style-type: none"> Pursue first project assessment of: project site, conceptual design (i.e. technology, capacity, etc.), estimated energy yield and revenues, budget estimation for development, construction and operation, grid connection, possible fatal flaws
Project & site qualification	<ul style="list-style-type: none"> Secure solar resource assessment Start contract negotiations (i.e. PPA) Launch scouting of sponsor/main equity investor Achieve permits for construction and operation (i.e. land permits, environmental permits, generation licenses, etc.) Prepare project financial structure (i.e. debt-equity financing, concessional finance, etc.)
Equity financing¹	<ul style="list-style-type: none"> Provide equity financing in either project development phase or construction phase

1) TBD depending on ongoing discussion regarding the alignment of possible funding mechanisms

Source: Gopa intec and Suntrace Task D Roadmap for Renewable Energy Development, Strategy& analysis

Executive Summary

Summary of key issues faced by the electricity sector

Wave I: Fix the basics and prepare for restructuring

Wave II: Restructure and prepare for ambition

Options for Wave III (realize ambition)

Appendix – Inputs for Electricity Act

With Wave II, Libya will focus on more advanced structural changes...

Wave II measures and milestones

Wave I objectives

Clarify sector governance	✓
Establish performance accountability	✓
Restore acceptable service quality / “Zero load shedding”	✓
Rationalize costs	✓
Improve GECOL & sector financial sustainability	✓

Wave II objectives

Strengthen sector governance
Increase competition in generation
Achieve functional separation
Upgrade service quality
Continuous improvement in cost structure
Achieve GECOL & sector financial sustainability

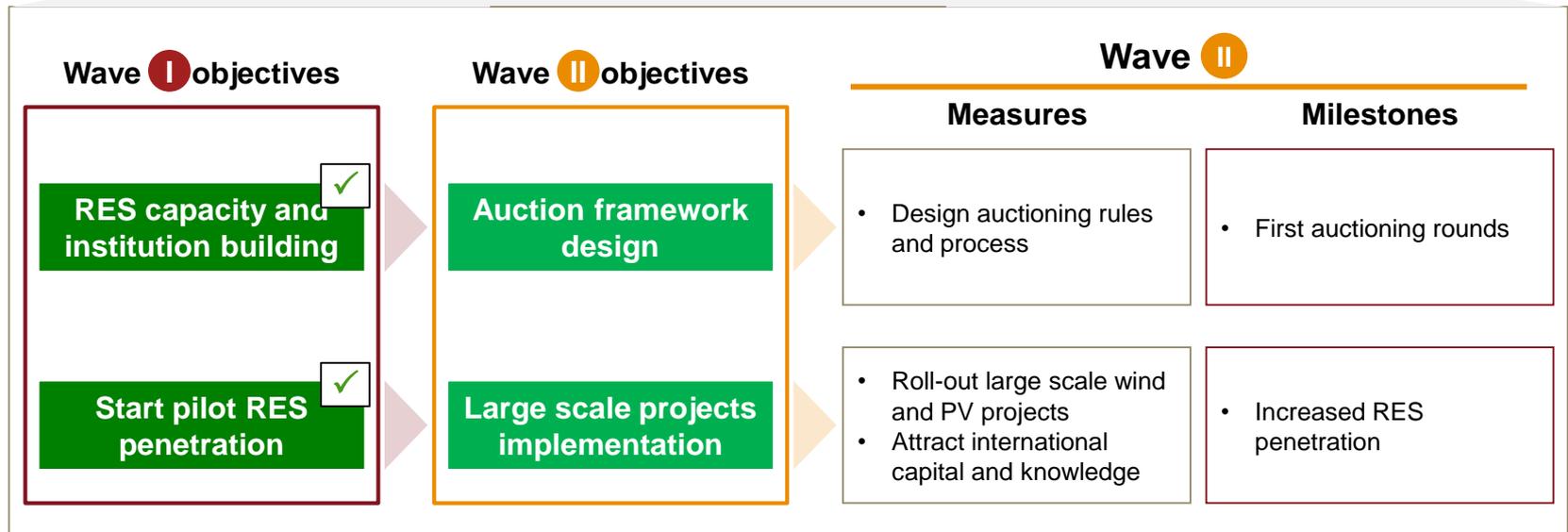
Wave II

Measures	Milestones
<ul style="list-style-type: none"> Set up Regulatory Authority Expand sector legal framework 	<ul style="list-style-type: none"> LEMRA in operation Electricity Act
<ul style="list-style-type: none"> Preparation for private sector investment Establish single buyer Licensing 	<ul style="list-style-type: none"> IPP Commission in operation Single buyer in operation Licensing regime established
<ul style="list-style-type: none"> GECOL reorganization Functional unbundling 	<ul style="list-style-type: none"> Independent managers appointed
<ul style="list-style-type: none"> Continue improving operating performance Introduce demand-side management programs Review customer grievance process 	<ul style="list-style-type: none"> Complete all Gen., Trans., control, MV & distr. action plan milestones EMC in operation Building code published EE household appliances code Energy Efficiency Act
<ul style="list-style-type: none"> Optimize power mix Improve efficiency Salaries and manpower control Outsourcing implementation 	<ul style="list-style-type: none"> Non-core activities outsourced
<ul style="list-style-type: none"> Periodic tariff review and roll-out Metering roll-out Theft addressing 	<ul style="list-style-type: none"> Tariff covering part of P&L costs and cost of fuel subsidies

Source: Strategy& analysis

...introducing in the RES arena an auction framework for the launch of bigger scale projects

RES roadmap: wave II measures and milestones



Source: Gopa intec and Suntrace Task D Roadmap for Renewable Energy Development, Strategy& analysis

Libya will establish an independent Regulatory Authority (LEMRA), strengthening the sector governance

Measures and activities

Measures	Activities	Year	2021	2022	2023	Owner
Set up Regulatory Authority	A Spin-off regulatory authority from Government		■	■		Ministry in charge
	Renewal/termination of key personnel office			■		LEMRA BoD
	Drafting and approval of LEMRA's Charter			■		Senior mgmt. team ¹ & BoD
	Review and approval proposed organizational structure			■		Senior mgmt. team & BoD
	Recruitment to achieve target org. structure			■	■ ■ ■ ■	Senior mgmt. team & HR head
	B Regulatory authority in operation: drafting of Electricity Law implementing regulation					→ LEMRA
Expand sector legal framework	Draft the bill for the Electricity Act		■ ■ ■	■		Ministry in charge
	Sign and endorse the legislative act			■	▲	Parliament

Focus in next slide

▲ Milestone

1) CEO and head of HR; 2) Libyan Electricity Market Regulatory Authority

2) Pending discussion with RES legal framework / IPPs

Source: Strategy& analysis

...and starting from 2023, LEMRA will draft regulations, standards and rules like in other countries (i.e. KSA)

Regulatory authority operations example

B REGULATORY AUTHORITY OPERATION

Selected example



ECRA's area of operation & outputs produced

Levels of regulation	Regulations	Electricity Law Implementing Regulations	Provides greater detail on the duties, functions and obligations of the Authority and industry participants outlined in the Electricity Act (e.g. tariff setting and review procedure, process of licensing process and criteria, disputes mediation procedure, etc.)
		ECRA Charter	Constitution of the Authority outlining its objectives, responsibilities, leadership composition, organizational structure and operating model
		ECRA Charter Implementing Regulations	Provides greater detail on the duties, functions and obligations of the Authority outlined in the Charter
	Codes & Standards	KPI Manual	Details formulas and methodologies for the computation of KPIs in order to provide a base for consistency among licensees' KPIs reporting procedure
		Targets & Incentives Report	Outlines targets for KPIs related to generation, transmission, distribution and customer service determined through international comparisons
		Audit Manual	Describes the audit methodology performed by the Regulator on an annual basis on the underlying processes and data applied by the utility to compute submitted KPI values
	Rules and Manuals	Saudi Arabian Grid Code	Defines obligations, responsibilities, minimum technical requirements of all parties towards ensuring open, transparent, non-discriminatory and economic access and use of the grid while maintaining its safe, reliable and efficient operation
		Saudi Arabian Distribution Code	Indicates procedures for both planning and operational purposes covering both normal and exceptional circumstances for various participants access and use of the distribution system

Source: ECRA website, Strategy & analysis

LEMRA will have the responsibility of licensing new sector operators / actors and enforce the sector rules...

Primary responsibilities / tasks (Wave II)



Responsibilities

Activities

Regulations/Manuals

Supply matters

Licenses

Performance monitoring

Set the **Electricity Sector License Regulation**

Grant (and cancel) **licenses** and collect license fees

Review short term (3 years) **KPI targets**

Review **incentives** to encourage the utility to achieve targets

Supervise system's **security and reliability** and propose improv. measures

License regulation

Technical issues

Standards and rules

Rules enforcement

Information

Establish **quality of service standards**

Impose penalties/sanctions for non compliance with rules

Rules for submission of information to the Authority

Rules for availability of the Authority's information to the public

Start drafting the **National Electricity Registry** containing full text of licenses decisions, codes/standards approved by the BoD, etc.

Service provision manual

Information submission and availability rules

National Electricity Registry

Source: Strategy& analysis

...as well as enacting regulations to foster the electricity industry restructuring

Primary responsibilities / tasks (Wave II)



Responsibilities

Activities

Regulations/Manuals

Consumers issues

Tariff

Consumer protection

Disputes settlement

Review the **Tariff Regulation**

Review criteria for the preparation of tariff proposals by GECOL

Examine consumer's complaints, acting as **consumer advocate** in public proceedings

Arbitrate and adjudicate disputes between licensees and consumers and among licensees through **out-of-court settlements**

Tariff regulation

Disputes resolution rules

Sector development

Competition

Development

Sector structure

Approve/reject/amend **regulations** for IPP procurement submitted by the Commission

Approve/reject **proposals for IPPs** submitted by the IPP Commission after close scrutiny during the tendering process

Grant **concession** to the approved winner of the tendering process

Advise the Ministry

Helps the **Ministry** in drafting the National Electricity Strategy

Promote the development of **renewable energy**

Draft the **Electricity industry restructuring plan**

Electricity industry restructuring plan

Source: Strategy& analysis

Hence, in wave II the Government will delegate many of its current responsibilities to LEMRA

Actors redistribution of responsibilities — Wave II

Actors	As-is		After LEMRA establishment		
	Government	GECOL	Government	Regulator	GECOL
Set performance standards	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Monitor performance	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Define sector vision	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		
Determine prices	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Choose technologies		<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
Determine investments		<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
Establish sector rules	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Receive public input	<input checked="" type="checkbox"/>				
Balance environmental and economic goals	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		
Determine sector structure	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Receive consumer complaints		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Issue licenses	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

Source: Strategy& analysis

Responsibilities transferred to other actor Full responsibility Advisory function

With increasing responsibilities, the Regulator will assume a more decentralized structure

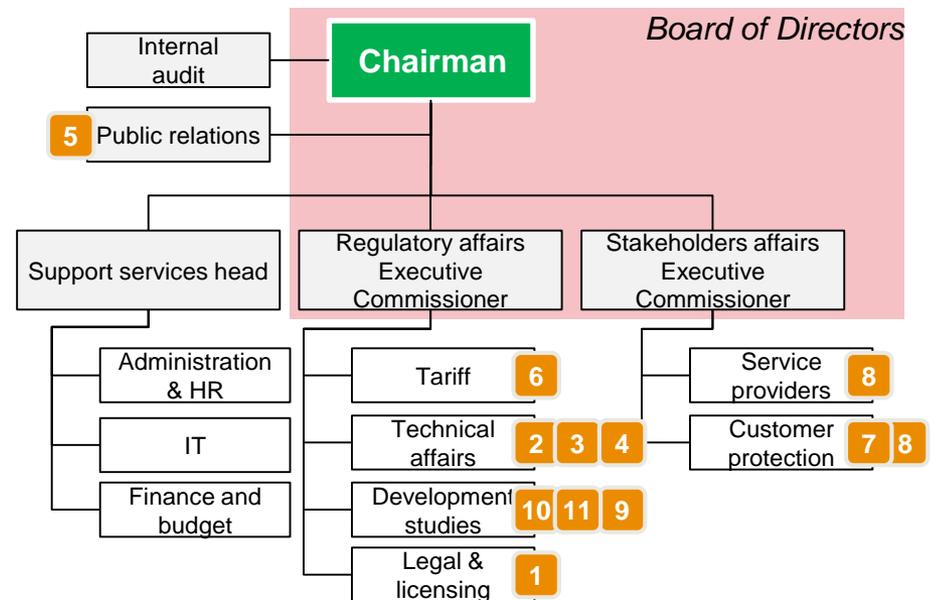
LEMRA Organizational structure

Responsibilities



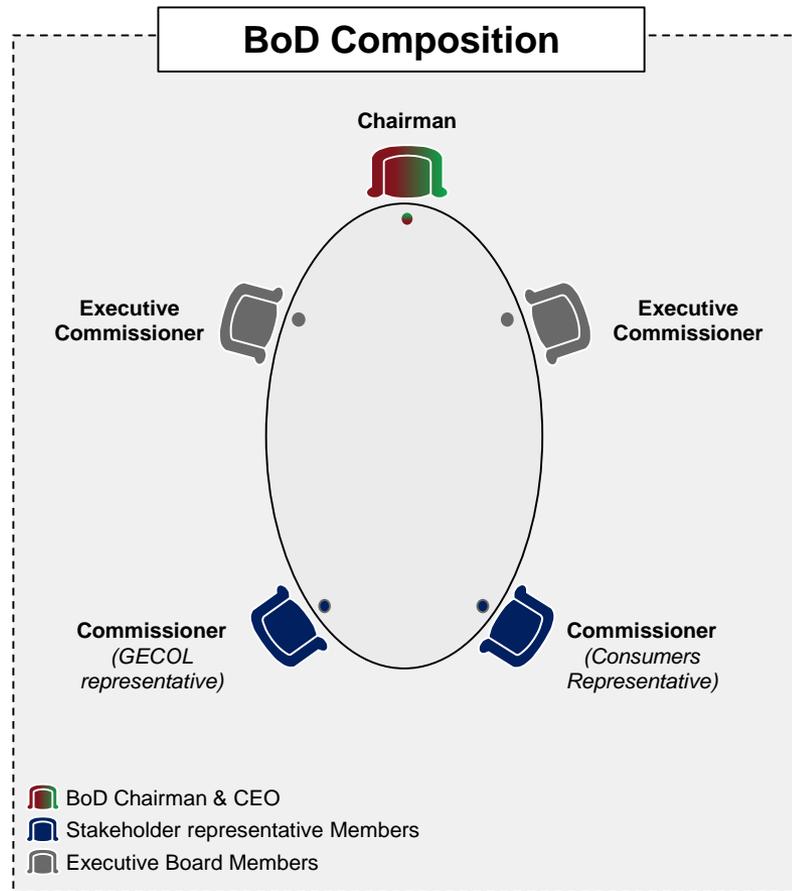
Proposed organizational structure

(Regulatory Authority – Wave II)



LEMRA BoD, in charge of 4-years, may be set-up with 5 members, of which 2 will be non-executive representatives

LEMRA Organizational structure — Board of Directors



Number of members	5	
Appointment	Prime Minister Decree upon proposal by the Ministry in charge of the electricity sector	
Terms of office	Duration	4-years
	Renewal	1 term of equal duration
Meetings	At least 4 times a year and upon demand from Commissioners	
Responsibilities	<ul style="list-style-type: none"> Monitoring of LEMRA management Ratification of the Authority's work plan and its operational plans within the framework of the government overall plan Approval of the Authority's proposed budget, its closing accounts and annual report prior to their submittal to higher authorities Approval of received grants, donations Approval of the Agency's organizational structure and of the financial, technical, administrative and employment regulations that organize the Agency's activities Approval of the regulations/rules/codes/manuals implementing the Electricity Law in matters concerning LEMRA's responsibilities Approval of rules for licenses, authorizations and other services offered by the Authority and determination of the related fees 	

Source: Strategy& analysis

...provided that the pre-requisites for private participation are met

Private participation features

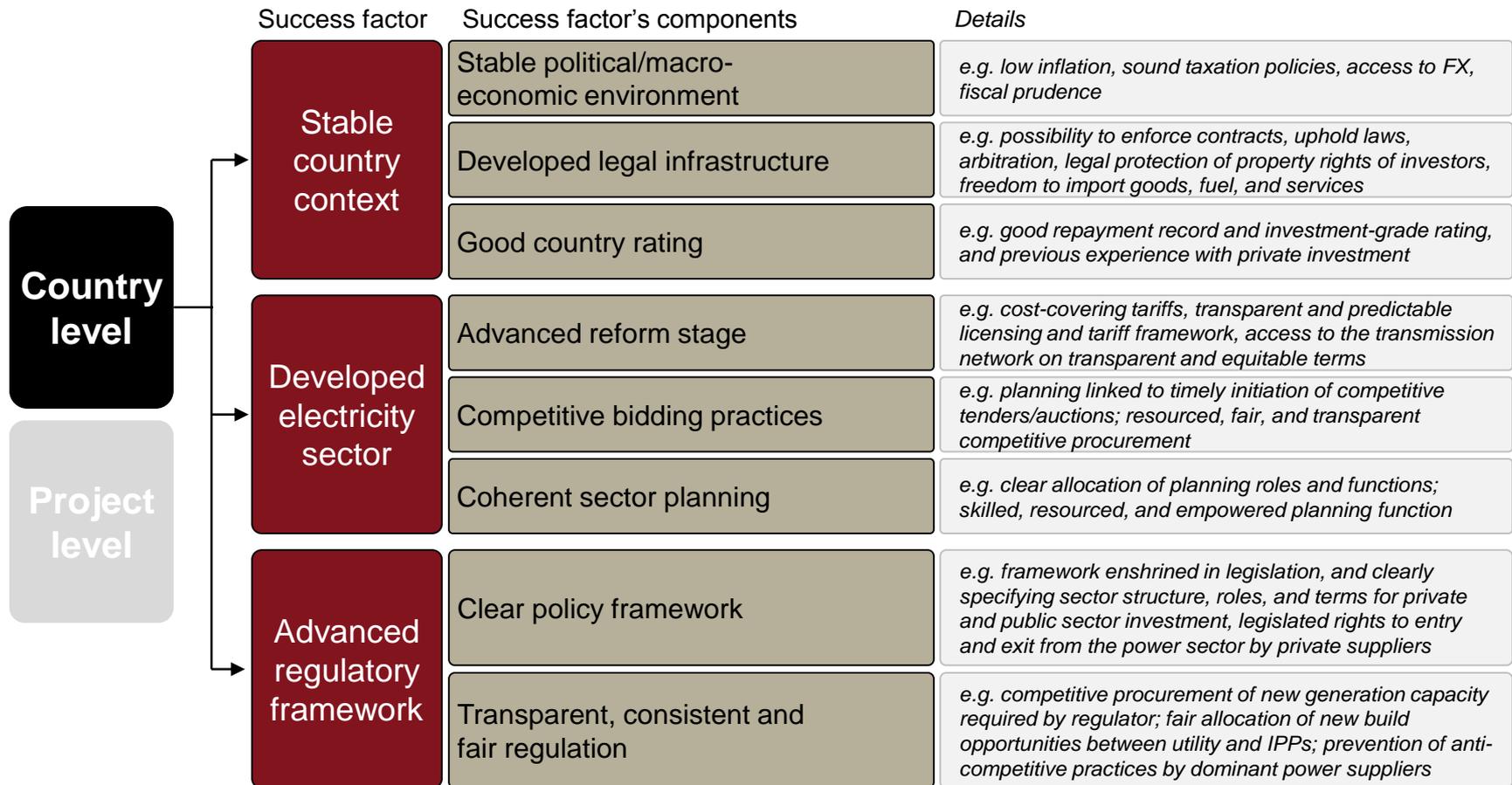
		Management contract	Lease	Concession	Asset divestiture	New assets (i.e. IPPs)
Allocation of responsibilities	O&M	Private	Private	Private	Private	Private
	Commercial risk	Public	Private	Private	Private	Public & private
	Capital investment	Public	Public & private	Private	Private	Private
	Asset ownership	Public	Public	Public	Private	Private
	Duration	3-5 years	8-15 years	25-30 years	Indefinite	25-30 years
Benefits	Operations improvement	✓	✓	✓	✓	✓
	Assets O&M	✓	✓	✓	✓	✓
	Knowledge transfer	✓	✗	✓	✗	✓
	Access to state of the art technology	✗	✗	✗	✗	✓
	EPC	✗	✗	✗	✗	✓
	New finance for investment	✗	✗	✗	✓	✓
	Vehicle for liberalization	✗	✗	✗	✓	✓
Pre-requisites for successful implementation	Cost-covering tariff, no commercial loss	Preferable	Necessary	Necessary	Necessary	Necessary
	Good system information	Sufficient to set incentives	Necessary	Necessary	Necessary	Necessary
	Good country risk rating	Not necessary	Good	High	High	High
	Political support	Low to moderate	Moderate	High	High	High
	Monitoring and regulatory capacity	Moderate	Good	Good	Strong	Strong

Mostly not satisfied within the current Libyan context ✗

Source: WBG, Strategy& analysis

Indeed, a number of country-level factors are required to effectively attract private investment...

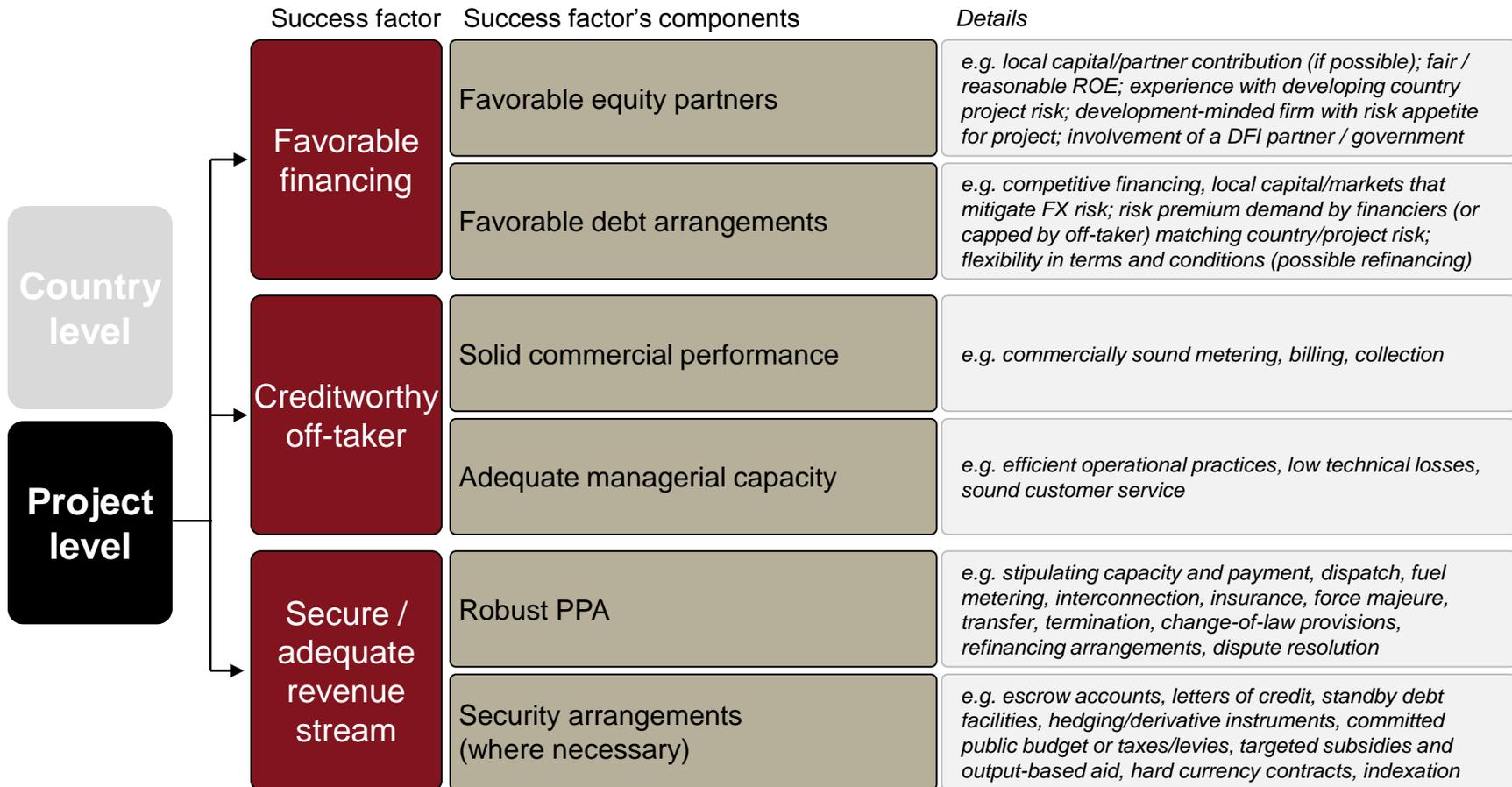
IPPs success factors



Source: WBG, Strategy& analysis

...accompanied by a further set of project-level factors essentially contributing to IPPs investment success

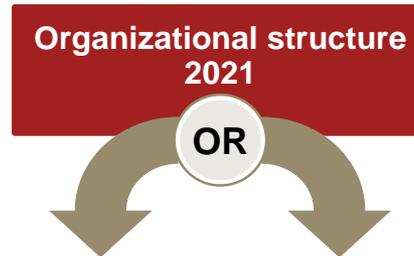
IPPs success factors



Source: WBG, Strategy& analysis

After the first reorganization, GECOL will then decide between embedded or shared support services

Wave II reorganization options



Option 1 Embedded support services

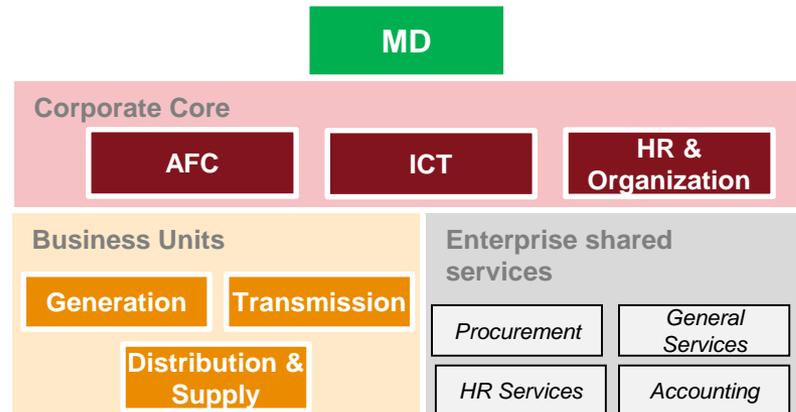
Move shared services units below business units to empower BU managers and prepare for an holding structure

Business Units

Generation	Transmission	Distribution & Supply
Embedded support services		
Generation Procurement	Transmission Procurement	Distribution & Supply Procurement
Generation HR Services	Transmission HR Services	Distribution & Supply HR Services
Generation Accounting	Transmission Accounting	Distribution & Supply Accounting
Generation General Services	Transmission General Services	Distribution & Supply General Services

Option 2 Enterprise shared services

Clustered shared services separated from corporate core and BUs in order to outsource non value added activities in the near future



Source: Strategy& analysis

Regardless of the chosen option, GECOL will separate the E&P division within SBUs and pursue functional unbundling

Measures and activities

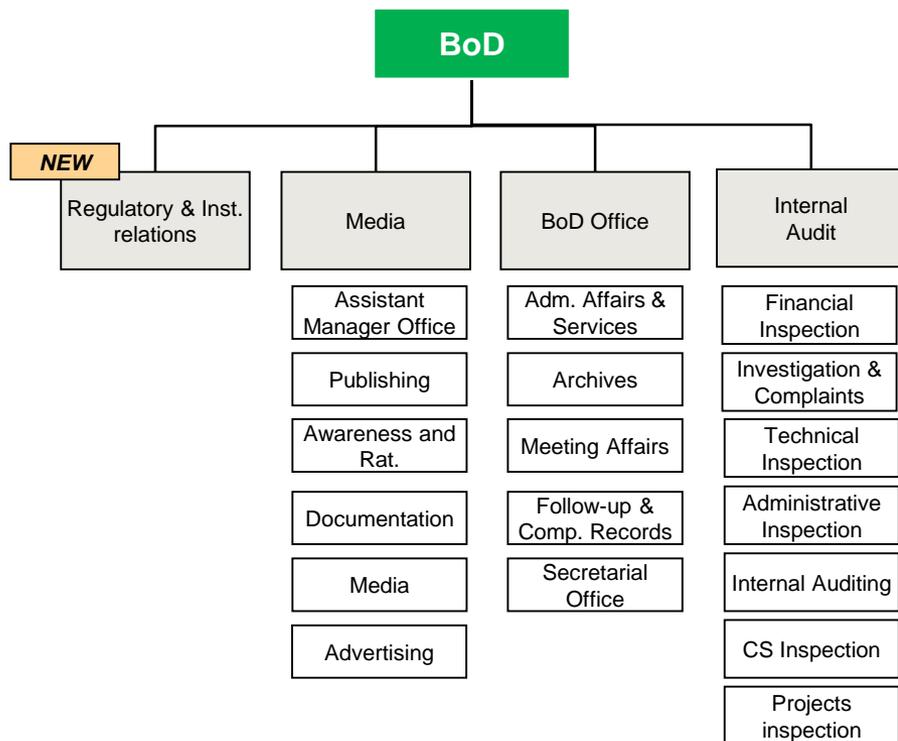
Measures	Activities	Year	2021	2022	2023	Owner
GECOL re-organization	Separate the Engineering and Projects division by Dividing projects within each operational SBU ¹		[Bar spanning 2021-2022]			GECOL
	Assign Projects Accounting unit to SBUs		[Bar spanning 2021-2022]			GECOL
	Create a new regulatory and institutional relations unit in BoD				[Bar spanning 2023-2024]	GECOL
	Create dedicated support services units for each BU			[Bar spanning 2022-2023]		GECOL
<i>Activity to be pursued only if option 1 is selected</i>						
Functional unbundling	Select and appoint independent managers for each SBU			[Bar spanning 2022-2023]		GECOL
	Provide SBUs managers with full authority over financial resources personnel				[Bar spanning 2023-2024]	GECOL

▲ Milestone

1) Strategic Business Unit
Source: Strategy& analysis

BoD shall acquire a leaner and more effective structure, and be equipped with a Regulatory & Institutional relations unit

To be direct reports to BoD



Example of typical activities

Audit (& compliance)	<ul style="list-style-type: none"> • Conduct active auditing on BU (financial, technical, administrative, etc.) • Define policies and procedures
Corporate Governance	<ul style="list-style-type: none"> • Review and approve corporate governance mission and structure • Conduct and approve the assessment of MD performance • Review, validate and monitor level 1 appointment, compensation and development
Strategic Leadership	<ul style="list-style-type: none"> • Formulate strategic objectives • Review and approve corporate strategy and values, and ensure alignment
Identity	<ul style="list-style-type: none"> • Develop corporate image that fits with the company's values and communicate identity to the public and employees
Capital	<ul style="list-style-type: none"> • Agree on / set capital spending criteria and parameters • Approve capital and operating plan and major investments and divestitures

Sources: GECOL (company organization chart 2015), Strategy & analysis

DSM measures deployed by the Government will contribute to reduce demand and achieve higher service quality

Detailed action plan provided in Task C final report

Measures and activities

Measures	Activities	Year	2021	2022	2023	Owner
Continue improving operating performance	Continue with Wave II measures and activities of the Generation action plan		[Progress bar from 2021 to 2023]			GECOL
	Continue with Wave II measures and activities of the Transmission action plan		[Progress bar from 2021 to 2023]			GECOL
	Continue with Wave II measures and activities of the Control action plan		[Progress bar from 2021 to 2023]			GECOL
	Continue with Wave II measures and activities of the MV & distribution action plan		[Progress bar from 2021 to 2023]			GECOL
Introduce demand-side management (DSM) programs	Set up an Energy Management Centre with the aim of developing awareness programs and implementation of energy saving measures		[Progress bar from 2021 to 2022]			Ministry in charge
	Draft energy audits ² regulation		[Progress bar from 2021 to 2022]			LEMRA
	Draft building codes for new buildings		[Progress bar from 2021 to 2022]			LEMRA
	Draft labelling and EE ¹ standards requirements for domestic appliances		[Progress bar from 2021 to 2022]			LEMRA
	Introduce fiscal incentives and subsidy schemes for EE projects		[Progress bar from 2021 to 2022]			Government
	Draft bill outlawing air conditioners, incandescent lights and appliances non compliant with EE standards		[Progress bar from 2021 to 2022]			Ministry in charge
	Sign and endorse the Energy Efficiency Act		[Progress bar from 2021 to 2023]			Parliament
Review customer grievance process	Baseline the existing complaint management process		[Progress bar from 2021 to 2022]			GECOL
	Conduct gap analysis against best practices to identify issues		[Progress bar from 2021 to 2022]			Label
	Modify the existing process to bring it in line with best practices		[Progress bar from 2021 to 2022]			Label
	Institute appropriate KPIs to track service level performance		[Progress bar from 2021 to 2022]			GECOL

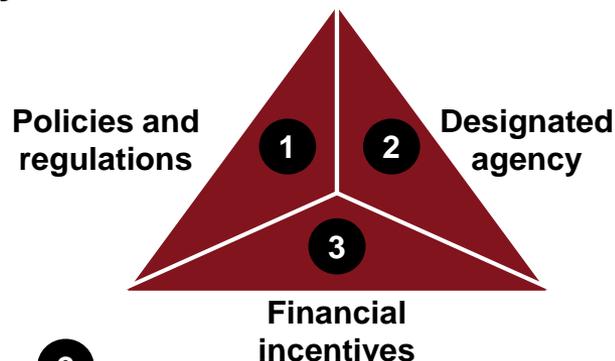
▲ Milestone

1) Energy Efficiency; 2) Refers to the process of inspection and analysis of energy flows of facilities to reduce the amount of energy consumption

Source: Strategy& analysis

In terms of energy efficiency and DSM, Libya may look at some of the regional best practices

Tunisian Energy Efficiency and DSM elements



- 1**
- Energy efficiency law
 - **Energy audits regulation:** establishes mandatory periodical energy audits for large energy consuming facilities
 - **Buildings code:** outlines minimum EE specifications for administrative and residential buildings
 - **EE household appliances code:** specifies minimum energy performance standards with mandatory labeling schemes for air conditioners, refrigerators and freezers
 - **Lighting regulation:** bans the sale of incandescent light bulbs with power superior or equal to 100 Watt and voltage superior to 100 Volt

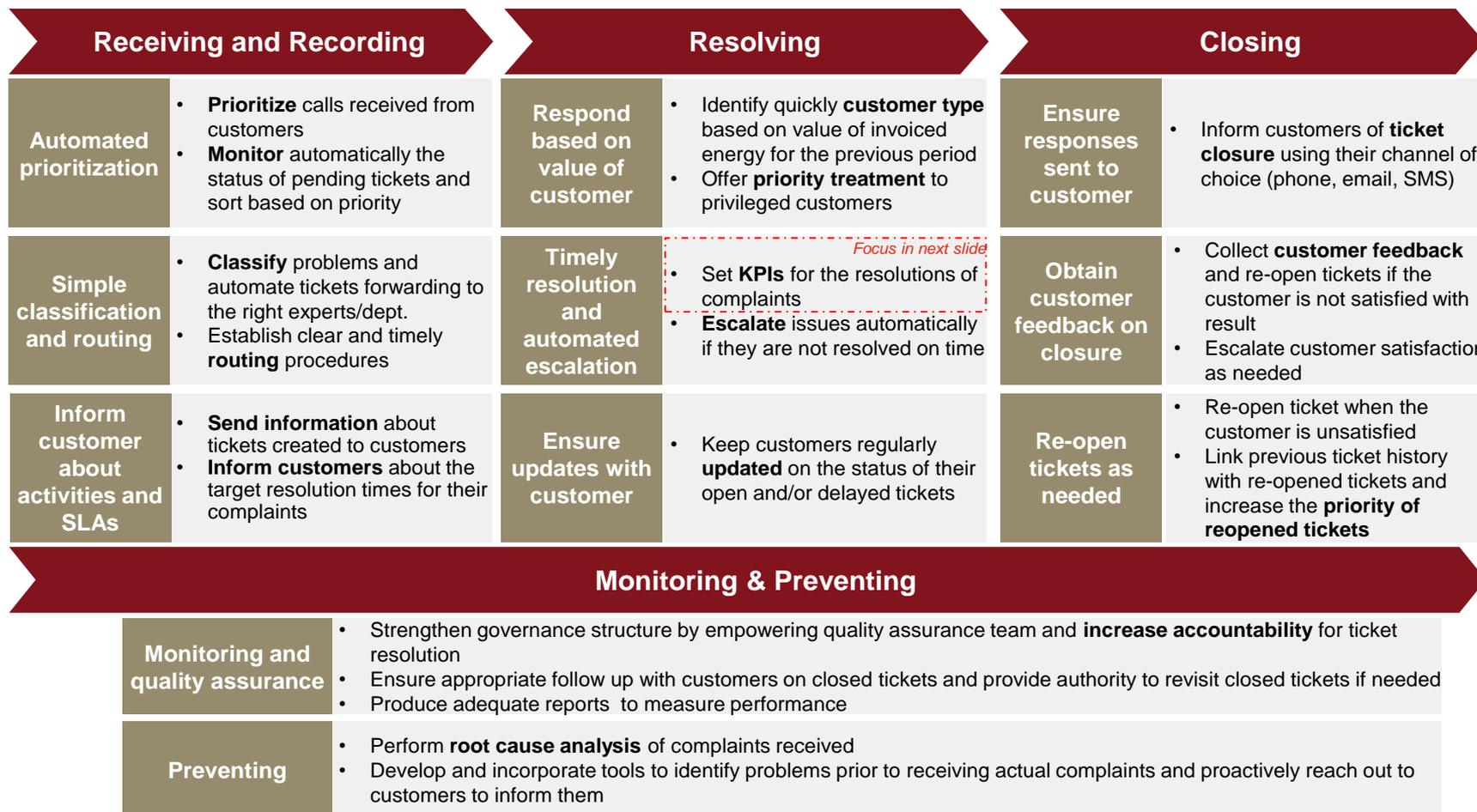
- 2**
- The **National Agency for Energy Conservation (ANME)** is the designated agency for formulating, promoting, and implementing energy efficiency measures and policies
 - The agency in **charged with:**
 - Energy audit management
 - Utilization of energy efficient equipment and technologies promotion
 - National information and education programs
 - Scientific research contribution

- 3**
- The **National Fund for Energy Savings (FNME)** subsidizes investments in EE projects. Sources for financing include revenues from taxes on first registration of cars, imports or manufacturing of air conditioners, financial savings as a result of EE activities and private donations
 - **VAT exemptions:**
 - for all domestically produced EE equipment
 - for imported EE equipment that do not have a locally manufactured equivalent
 - **Subsidy scheme** for EE projects

Sources: Regional Center for Renewable Energy and Energy Efficiency, Strategy& analysis

To upgrade its service quality GECOL shall establish a clear complaint valuation, resolution and monitoring process...

Complaint valuation, resolution and monitoring framework



Sources: Strategy& analysis

...tracking its service quality performance and progresses with a series of ad-hoc KPIs

Complaints resolutions KPIs

KPIs	Description	By customer	By complaint
First time resolution rate	Proportion of calls that are resolved in the first instance	To be computed as an average	
Average customer satisfaction	Proportion of customers that have satisfactory had their complaint resolved	✓	✓
Call handling quality	Quality of conversations between agent and customer	✓	
Service level	Percentage of calls answered on the targeted time	✓	
Average speed of answer	Time taken by agent to answer an upcoming call from the customer	✓	
Call abandonment rate	Proportion of total calls that are abandoned by the customer before the agent reply	✓	
Call duration	Average length of calls between agent and customer	✓	
Financial complaint resolution time	Proportion of financial customers complaints that are resolved in the stated time	✓	
Technical complaint resolution time	Proportion of financial customer complaints that are resolved in the stated time	✓	
Reopened tickets rate	Proportion of tickets that have previously been closed but now reopened due to non-resolution of complaint		✓
Repeated calls rate	Total number of calls received from the same customer during a predetermined time period	✓	

Operational KPIs Customer KPIs

To further reduce burden on state, GECOL shall focus on cost control measures and outsourcing of non-core activities

Measures and activities

Measures	Activities	Year	2021	2022	2023	Owner
Optimize power mix	Optimize generation mix, assessing gas vs. other fuel feasibility	←	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	▶ GECOL
	Ensure on schedule maintenance to rise plant thermal efficiency	←	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	▶ GECOL
Salaries and manpower control	Keep compensation and benefits under control		■ ■ ■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	▶ GECOL
	Keep hiring under control		■ ■ ■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	▶ GECOL
Outsourcing implementation	Identify activities to be outsourced		■ ■ ■ ■ ■ ■ ■ ■ ■ ■			GECOL
	Redeploy or right-size manpower performing outsourced activities			■ ■ ■ ■ ■ ■ ■ ■ ■ ■		GECOL
	Implement outsourcing plan				■ ■ ■ ■ ■ ■ ■ ■ ■ ■	▶ GECOL

▲ Milestone

Source: Strategy& analysis

Periodic tariff reviews and meters substitution will help to reach a balanced tariff and to reduce commercial losses

Measures and activities

Measures	Activities	Year	2021	2022	2023	Owner
Periodic tariff review	Data collection related to year n-1		■	■	■	GECOL
	Data projections for year n+1		■	■	■	GECOL
	Review of projections		■	■	■	LEMRA
	Preliminary rate design for year n+1		■	■	■	LEMRA
	Preliminary tariff submission to stakeholders for negotiations		◆	◆	◆	LEMRA
	Review and finalize ultimate designed rate		■	■	■	LEMRA
Tariff roll-out	Launch new tariff framework across all customer classes		◆	◆	◆	LEMRA
Metering roll-out	Metering substitution/installation strategy roll-out		←————→			GECOL
Theft addressing	Monitor theft areas		←■■→			GECOL

Tariff covering part of P&L costs¹ and cost of fuel subsidies

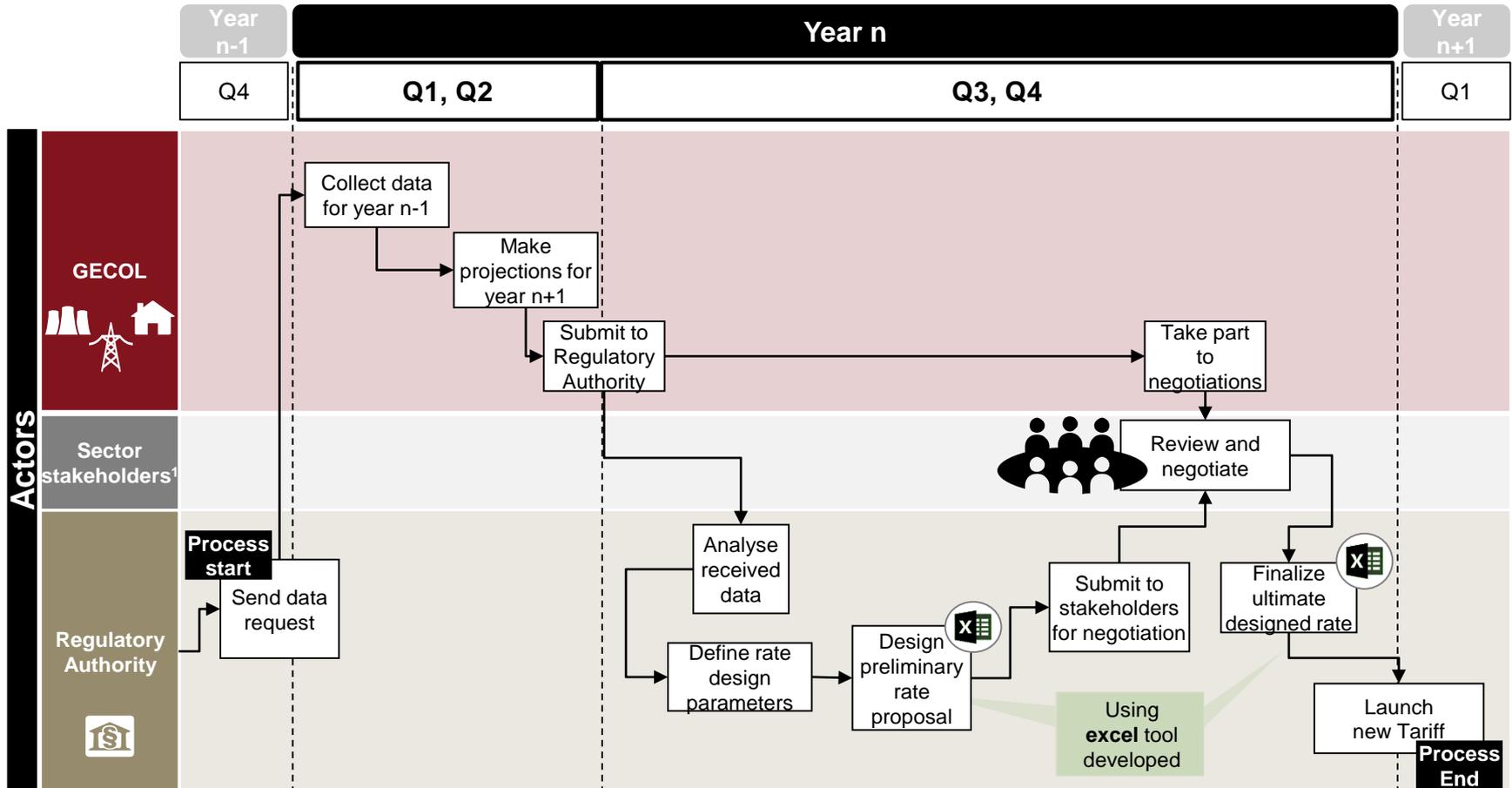
- ▲ Milestone
- ◆ One shot activity

1) e.g. 100% of P&L costs include subsidized fuel pricing charge on GECOL+ 20% of cost of fuel subsidies+ Lifeline tariff

Source: Strategy& analysis

The tariff review process will become a standard practice with LEMRA playing a larger role in the process...

Tariff review and negotiation process (2021 onwards)

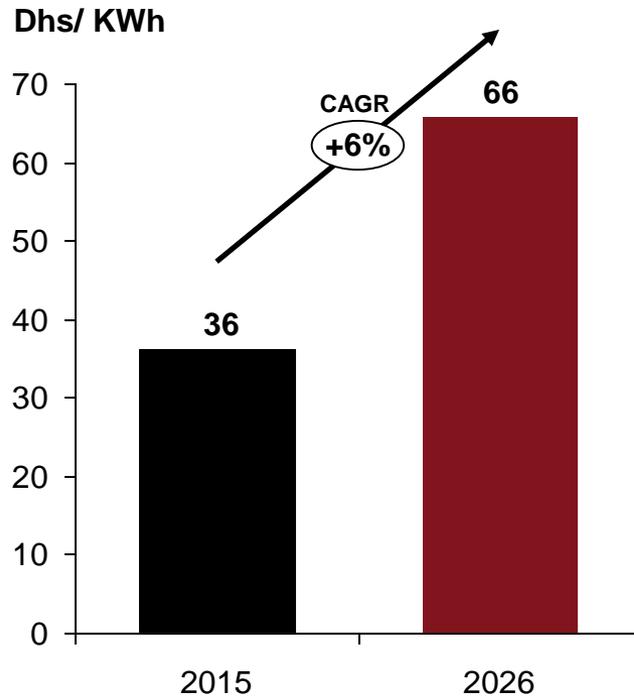


1) Stakeholders might include representatives from GECOL, Government, consumers and other organizations involved in the electricity sector operations (e.g. NOC)

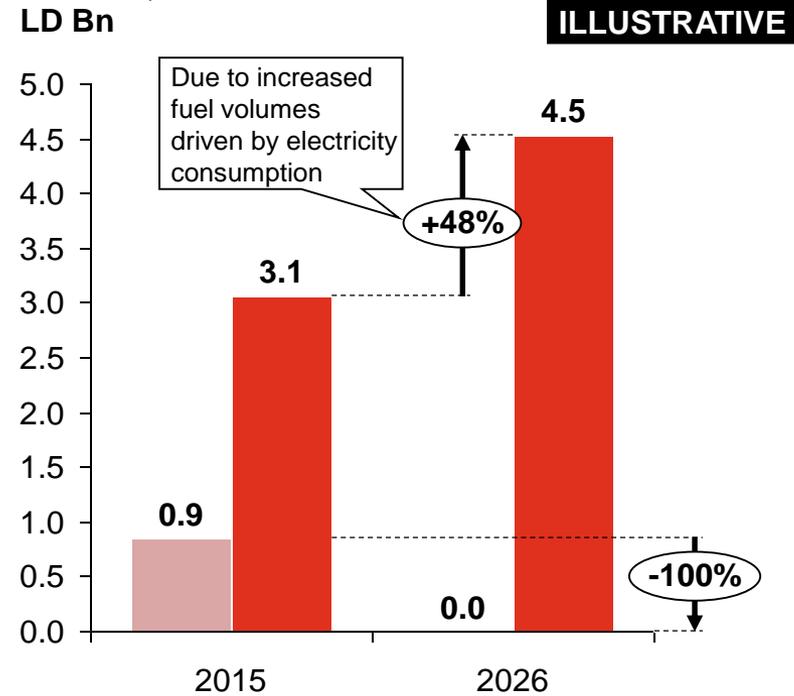
Source: Strategy& analysis

...with the tariff possibly leading towards full P&L costs coverage and a partial reduction in fuel subsidies

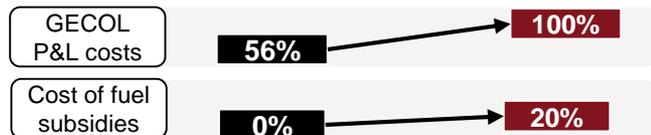
Projected avg. tariff (2015-2026)



Potential change in government subsidies (2015 vs. 2026)



Avg. tariff covering:



Sources: GECOL data collection ID7, GECOL data collection ID20, Strategy & analysis

In the RES arena, several actors will play specific roles in the development of large scale RES projects...

RES project development steps, actors and activities

NON EXHAUSTIVE

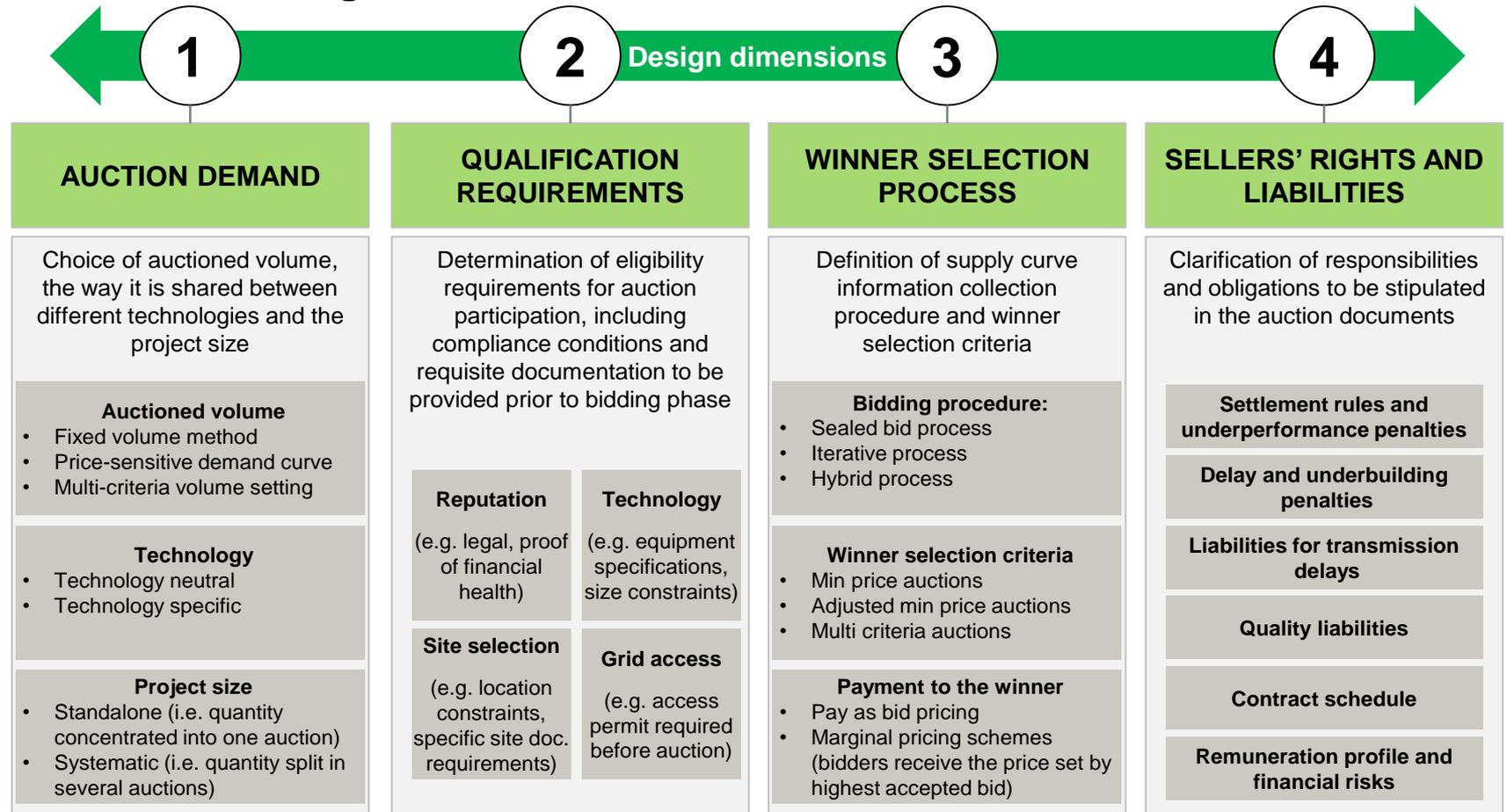
Steps	Actors					
	Ministry in charge	IPP Commission	REAoL	REDEVCO	GECOL	SVP/IPP
1 Objective definition	Discuss and negotiate objective for RES penetration and specify in the National Energy strategy the agreed target level to be achieved					
2 Project study				Develop project concept, pre-feasibility and feasibility studies		
				Agree on project selection according to master plan		
3 Permitting and contracting	Grants permits and licenses	Oversees contracting process including negotiation (i.e. PPA negotiation)		Prepares/negotiates and signs all contracts & agreements		
				Negotiate/sign PPA		
4 Competitive auction		Sets the auction design				
		Administer auction process				
5 Construction and electricity sale					Buy electricity from the SPV/IPP at the PPA conditions	<ul style="list-style-type: none"> Construction of the project Sell electricity to GECOL

Note: Refer to Task D Roadmap for Renewable Energy Development for more detail on RES project development;

Source: Gopa intec and Suntrace Task D Roadmap for Renewable Energy Development; Strategy& analysis

...with the IPP Commission choosing among several options (along 4 dimensions) to set a competitive auction processes

RES auctions design choices



Source: International Renewables Energy Agency, Gopa intec and Suntrace Task D Roadmap for Renewable Energy Development, Strategy& analysis

The Parliament will have as additional responsibilities, granting the legal mandate to the regulatory authority

Primary responsibilities / tasks

Key actors

- 1 Parliament
- Government
- 2.1 (e.g. Ministries of Finance & Planning)
- Government
- 2.2 (e.g. Ministry of Electricity & RES)
- 3 IPPs Commission
- Libyan Electricity Market Reg. Authority (LEMRA)
- 4
- 5 GECOL
- 6 IPPs (Non-RES)
- 7 REAoL (RES)
- 8 REDEVCO (RES)
- 9 IPPs (RES)

Area	Primary responsibilities / tasks
National Electricity Strategy	<ul style="list-style-type: none"> Approve the National Electricity Strategy drafted by the MoE and RES through comprehensive consultation process with sector institutional stakeholders (i.e. Regulatory Agency) and industry representatives (i.e. GECOL, NOC, REAoL) Grant the mandate to Government to implement the National Electricity Strategy
Budget	<ul style="list-style-type: none"> Approve national budget presented by the government, which will include GECOL's opex and capex budget
Legal Framework	<ul style="list-style-type: none"> Sign into law (enact) the Electricity Act from the bill drafted by the MoE and RES Grant mandate to LEMRA through the approval of the Electricity Act <div style="border: 2px solid red; padding: 5px; margin-top: 10px; color: red; font-weight: bold;"> <i>New responsibility</i> </div>

Source: Strategy& analysis

Once opened generation to IPPs, the Government will take part in the PPA negotiation process...

Primary responsibilities / tasks

Key actors

- 1 Parliament
- 2.1 **Government**
(e.g. Ministries of Finance & Planning)
- 2.2 Government
(e.g. Ministry of Electricity & RES)
- 3 IPPs Commission
- 4 Libyan Electricity Market Reg. Authority (LEMRA)
- 5 GECOL
- 6 IPPs (Non-RES)
- 7 REAoL (RES)
- 8 REDEVCO (RES)
- 9 IPPs (RES)

Area	Primary responsibilities / tasks
Budget	<ul style="list-style-type: none"> Examine, negotiate and approve GECOL's budget proposals Prepare the national budget to be presented for approval to the Parliament Monitor national spending during the year against budgeted expenditure and report to the Parliament
PPA	<ul style="list-style-type: none"> Issue best practice guidelines in relation to financial guarantees related to public private partnership projects Provide / negotiate guarantees for all financial obligations related to PPAs entered into by Government, GECOL and potential IPPs

New responsibilities

Source: Strategy & analysis

Government will also draw the sector’s objectives & policies and will oversee GECOL and the IPP process

Primary responsibilities / tasks Key actors

- 1 Parliament
- Government
- 2.1 (e.g. Ministries of Finance & Planning)
- 2.2 Government**
(e.g. Ministry of Electricity & RES)
- 3 IPPs Commission
- 4 Libyan Electricity Market Reg. Authority (LEMRA)
- 5 GECOL
- 6 IPPs (Non-RES)
- 7 REAoL (RES)
- 8 REDEVCO (RES)
- 9 IPPs (RES)

Area	Primary responsibilities / tasks
Policy and legal framework	<ul style="list-style-type: none"> Formulate and develop appropriate power policies for the control, regulation and utilization of power resources Contribute to establish the legal framework for the sector drawing the proposal for the bill that the Parliament will consider for the Electricity Act
Strategic objectives	<ul style="list-style-type: none"> Draft and implement the National Electricity Strategy resulting from a comprehensive public consultation process with sector’s institutional stakeholders (i.e. LEMRA, REAoL, Ministry of Oil & Gas) and industry representatives (i.e. GECOL, NOC)
Sector structure and actors	<ul style="list-style-type: none"> Supervise institutions listed in under the Ministry of Electricity and Renewable Energy Oversee LEMRA operations Monitor the organization and functioning of the electricity market Promote accounting and legal unbundling of GECOL
GECOL	<ul style="list-style-type: none"> Endorse GECOL’s budget Negotiate with the Ministries of Finance and Planning for the approval of GECOL’s budget Propose GECOL’s Board of Directors members to be appointed by the General Assembly
IPP	<ul style="list-style-type: none"> Approve the concessionaire selected by the IPP commission at the conclusion of the tendering process Take part to negotiations for the PPA between GECOL and the selected concessionaire clarifying conditions related to government financial guarantees
International co-operation/agreement	<ul style="list-style-type: none"> Promote the Libyan interests with other countries and regional and international organizations on issues relating to electric power Initiate/establish cooperation agreements with other countries for the purpose of the electrical interconnection and trade of electric power

Source: Strategy& analysis

Within the Government (or as a supporting agency), an IPP Commission will design and implement the IPP process

Primary responsibilities / tasks Key actors

- 1 Parliament
- Government
- 2.1 (e.g. Ministries of Finance & Planning)
- Government
- 2.2 (e.g. Ministry of Electricity & RES)
- 3 IPPs Commission**
- Libyan Electricity Market Reg. Authority (LEMRA)
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- 5 GECOL
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- 8 REDEVCO (RES)
- 9 IPPs (RES)

Area	Primary responsibilities / tasks
Rules and conditions for IPPs	<ul style="list-style-type: none"> Draft regulations for independent power procurement to be submitted for approval to LEMRA Set procedure and conditions for selection of IPPs
Identification	<ul style="list-style-type: none"> Analyze, research and identify the need for power, the potential sources and the budget for the entry of an independent power producer
Auctioning process	<ul style="list-style-type: none"> Solicit bids through a competitive procurement process Draft technical and financial requirements to analyze tendering producers' qualification (e.g. type of power generation, related generation standards, required amount of power supply and minimum financial requirements) Set deadlines and the manner in which potential candidates must respond Oversee the competitive bidding process, monitor compliance with rules and regulation Monitor negotiations with the selected independent producer to achieve the final signing of the PPA Maintain, promote and document integrity throughout the whole selection process
IPPs monitoring	<ul style="list-style-type: none"> Monitor and report compliance with rules and regulation Assess performance of independent power producer against PPA conditions Take timely corrective action if necessary

Source: Strategy& analysis

A regulatory authority (LEMRA) will overtake the role of tariff set-up and sector functioning supervision

Primary responsibilities / tasks

Key actors

- 1 Parliament
- Government
- 2.1 (e.g. Ministries of Finance & Planning)
- Government
- 2.2 (e.g. Ministry of Electricity & RES)
- 3 IPPs Commission
- 4 **Libyan Electricity Market Reg. Authority (LEMRA)**
- 5 GECOL
- 6 IPPs (Non-RES)
- 7 REAoL (RES)
- 8 REDEVCO (RES)
- 9 IPPs (RES)

Area	Primary responsibilities / tasks
Private investment and competition	<ul style="list-style-type: none"> Set the Electricity Market License Regulation¹ Grant (and cancel) licenses to generation IPPs and collect license fees Approve/reject/amend regulations for IPP procurement submitted by the commission Impose penalties/sanctions for non compliance with rules of competition, transparency of information and equal opportunity principles
Tariff	<ul style="list-style-type: none"> Draft the Tariff Regulation setting the principles governing the examination, modification and approval of the regulated tariffs States criteria for the preparation of tariff proposals by GECOL
Service quality	<ul style="list-style-type: none"> Establish service quality standards related to: <ul style="list-style-type: none"> - terms and conditions of contracts (i.e. response time to calls or complaints) - technical aspects of the service (i.e. service continuity and safety) Examine consumer’s complaints, acting as consumer advocate in public proceedings Arbitrate and adjudicate any dispute that may arise between GECOL and consumers through out-of-court settlements
Efficiency and security of supply	<ul style="list-style-type: none"> Set technical quality principles and other standard measures to monitor GECOL’s perf. Set minimum safety standards for O&M, construction and installation of power systems Supervise security and reliability of the power system and propose improv. measures
IPP	<ul style="list-style-type: none"> Approve/reject proposals for IPPs submitted by the IPP Commission after close scrutiny during the tendering process Grant concession to the approved winner of the tendering process
Innovation and sector development	<ul style="list-style-type: none"> Provide information and act as advisor to the MoE and RES on matters related to development installation and operation plans Helps the Ministry of Electricity and RES in drafting the National Electricity Strategy Support the development of the industry through guidelines and information sharing Promote the development of renewable energy

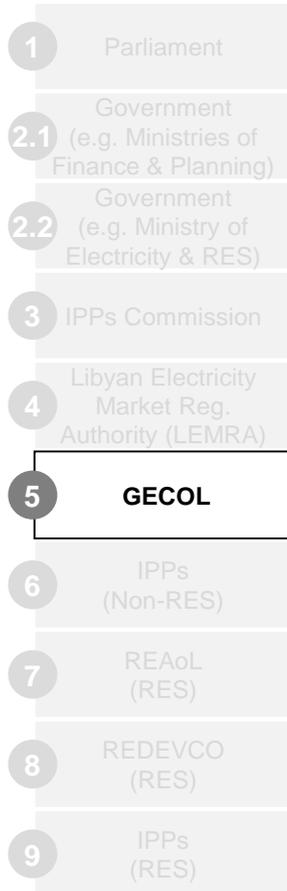
1) Sets the principles and procedures, applicable to grant, modify, renew, terminate and cancel licenses to legal entities and the rights and obligations of such licenses

Source: Strategy& analysis

GECOL will remain a vertically integrated player, holding T&D monopoly and acting as single buyer for the IPP(s)

Primary responsibilities / tasks

Key actors



Area	Primary responsibilities / tasks
Generation	<ul style="list-style-type: none"> Own, control and operate the generating units connected to the T&D network Plan the development of generation capacity to efficiently meet expected demand Make decisions on size, type, technology and location of the required capacity made to ensure that future demand is met at the least cost Generate electricity to meet demand
Transmission	<ul style="list-style-type: none"> Own, control and operate the transmission network Engage in real time scheduling and control of the grid system Dispatch generation in compliance with the guidelines set in the Grid Code/Interconnection Code by LEMRA Ensure energy demand and supply balance
Distribution & Supply	<ul style="list-style-type: none"> Own, control and operate the distribution network Invoice customers and address commercial losses through the electricity police Address customers complaints Install, maintain and operate metering technology across all customer segments
Single buyer	<ul style="list-style-type: none"> Buy electricity from IPPs as contracted through the PPA Purchase electricity from generators on a least cost basis in accordance with the terms and conditions of the generators contracts Ensure that service quality level standards are respected
Tariff	<ul style="list-style-type: none"> Submit proposals for tariff change to LEMRA demonstrating that existing tariff does not allow a reasonable opportunity to recover the cost to serve
PPA	<ul style="list-style-type: none"> Negotiate conditions of PPA with the concessionaire specifying the obligations relating to the purchase of available capacity and electrical output and the required O&M specifications Sign the PPA and abide to its conditions

Source: Strategy& analysis

The IPP(s), will complement the Libyan power generation sector, increasing competition and efficiency

Primary responsibilities / tasks

Key actors

- 1 Parliament
- Government
- 2.1 (e.g. Ministries of Finance & Planning)
- Government (e.g. Ministry of Electricity & RES)
- 2.2
- 3 IPPs Commission
- Libyan Electricity Market Reg. Authority (LEMRA)
- 4
- 5 GECOL
- 6 **IPPs (Non-RES)**
- 7 REAoL (RES)
- 8 REDEVCO (RES)
- 9 IPPs (RES)

Area	Primary responsibilities / tasks
PPA	<ul style="list-style-type: none"> • Negotiate the PPA with key Libyan stakeholders
Build power generation asset	<ul style="list-style-type: none"> • Develop, build and commission the power generation asset in accordance with the IPP specifications and tender released by the Libyan Government / Commission
Power generation	<ul style="list-style-type: none"> • Operate the generating asset under the PPA framework • Deliver to GECOL the energy contracted in accordance with the PPA (GECOL acting as single buyer for the electricity) and charge GECOL for the capacity made available

Source: Strategy& analysis

REAoL will continue to foster the development of renewables and to closely monitor REDEVCO's (and other IPPs)

Primary responsibilities / tasks

Key actors

- 1 Parliament
- Government
- 2.1 (e.g. Ministries of Finance & Planning)
- Government
- 2.2 (e.g. Ministry of Electricity & RES)
- 3 IPPs Commission
- 4 Libyan Electricity Market Reg. Authority (LEMRA)
- 5 GECOL
- 6 IPPs (Non-RES)
- 7 REAoL (RES)**
- 8 REDEVCO (RES)
- 9 IPPs (RES)

Area	Primary responsibilities / tasks
RES regulatory and legal (i.e. political agent)	<ul style="list-style-type: none"> Provide input for the improvement of renewables regulatory and legal framework including the development of quick and efficient permitting processes Lobby for the implementation of policies to increase penetration of renewables in Libyan power mix Advise the Ministry in charge of the sector with respect to the role of renewables in the drafting of the National Electricity Strategy Encourage support of related industries in the implementation of renewable projects Together with REDEVCO, support the IPP Commission in the design and implementation of the first competitive bidding process for the development of large scale RES projects New responsibility
Capacity building (i.e. knowledge carrier)	<ul style="list-style-type: none"> Supervise project implementation and coordinate capacity building in the renewables arena of institutions, local industry and developers Coordinate research activities, technical specifications, education and planning for the integration of renewables into the Libyan electricity sector
Financing (i.e. lender)	<ul style="list-style-type: none"> Function as a provider of debt financing to renewables SPV/IPP's controlled by REDEVCO either directly or indirectly through the control of the renewables fund

Source: Strategy& analysis

REDEVCO will play a key role in signing all contracts which will be the basis of the auction for new RES projects

Primary responsibilities / tasks

Key actors

- 1 Parliament
- Government
- 2.1 (e.g. Ministries of Finance & Planning)
- Government (e.g. Ministry of Electricity & RES)
- 2.2
- 3 IPPs Commission
- 4 Libyan Electricity Market Reg. Authority (LEMRA)
- 5 GECOL
- 6 IPPs (Non-RES)
- 7 REAoL (RES)
- 8 REDEVCO (RES)**
- 9 IPPs (RES)

Area	Primary responsibilities / tasks
RES development	<ul style="list-style-type: none"> Act as an investment vehicle for early stage renewable energy project development in Libya Build capacity and knowledge in the renewables sector
Project Concept	<ul style="list-style-type: none"> Identify most promising investment opportunities with a viable business case Preliminary concept design: installed capacity estimation, and preliminary cost-benefit analysis Carry on initial discussions with key parties and stakeholders and principal understanding/agreements with key parties
Project feasibility	<ul style="list-style-type: none"> Pursue first project assessment of: project site, conceptual design (i.e. technology, capacity, etc.), estimated energy yield and revenues, budget estimation for development, construction and operation, grid connection, possible fatal flaws
Project & site qualification	<ul style="list-style-type: none"> Secure solar resource assessment Start contract negotiations (i.e. PPA) on behalf of SPVs Launch scouting of sponsor/main equity investor Achieve permits for construction and operation (i.e. land permits, environmental permits, generation licenses, etc.) Prepare project financial structure (i.e. debt-equity financing, concessional finance, etc.)
Equity financing¹	<ul style="list-style-type: none"> Provide equity financing in either project development phase or construction phase
Auctioning process	<ul style="list-style-type: none"> Help REAoL and IPP Commission in the design the competitive bidding process for the procurement of capacity or generation of electricity from renewable energy <p style="text-align: right;"><i>New responsibilities</i></p>

1) TBD depending on ongoing discussion regarding the alignment of possible funding mechanisms; Source: Strategy & analysis

... thanks to which new RES IPPs will enter the Libyan electricity sector

Primary responsibilities / tasks

Key actors

- 1 Parliament
- Government
- 2.1 (e.g. Ministries of Finance & Planning)
- Government
- 2.2 (e.g. Ministry of Electricity & RES)
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- 6 IPPs (Non-RES)
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- 8 REDEVCO (RES)
- 9 IPPs (RES)**

Area	Primary responsibilities / tasks
PPA	<ul style="list-style-type: none"> • Negotiate the PPA with key Libyan stakeholders
Build RES generation facilities	<ul style="list-style-type: none"> • Develop, build and commission the power generation asset in accordance with the IPP specifications and tender released by REDEVCO
Power generation	<ul style="list-style-type: none"> • Operate the generating asset under the PPA framework • Deliver to GECOL the energy contracted in accordance with the PPA (GECOL acting as single buyer for the electricity) and charge GECOL for the capacity made available

Source: Strategy& analysis

Executive Summary

Summary of key issues faced by the electricity sector

Wave I: Fix the basics and prepare for restructuring

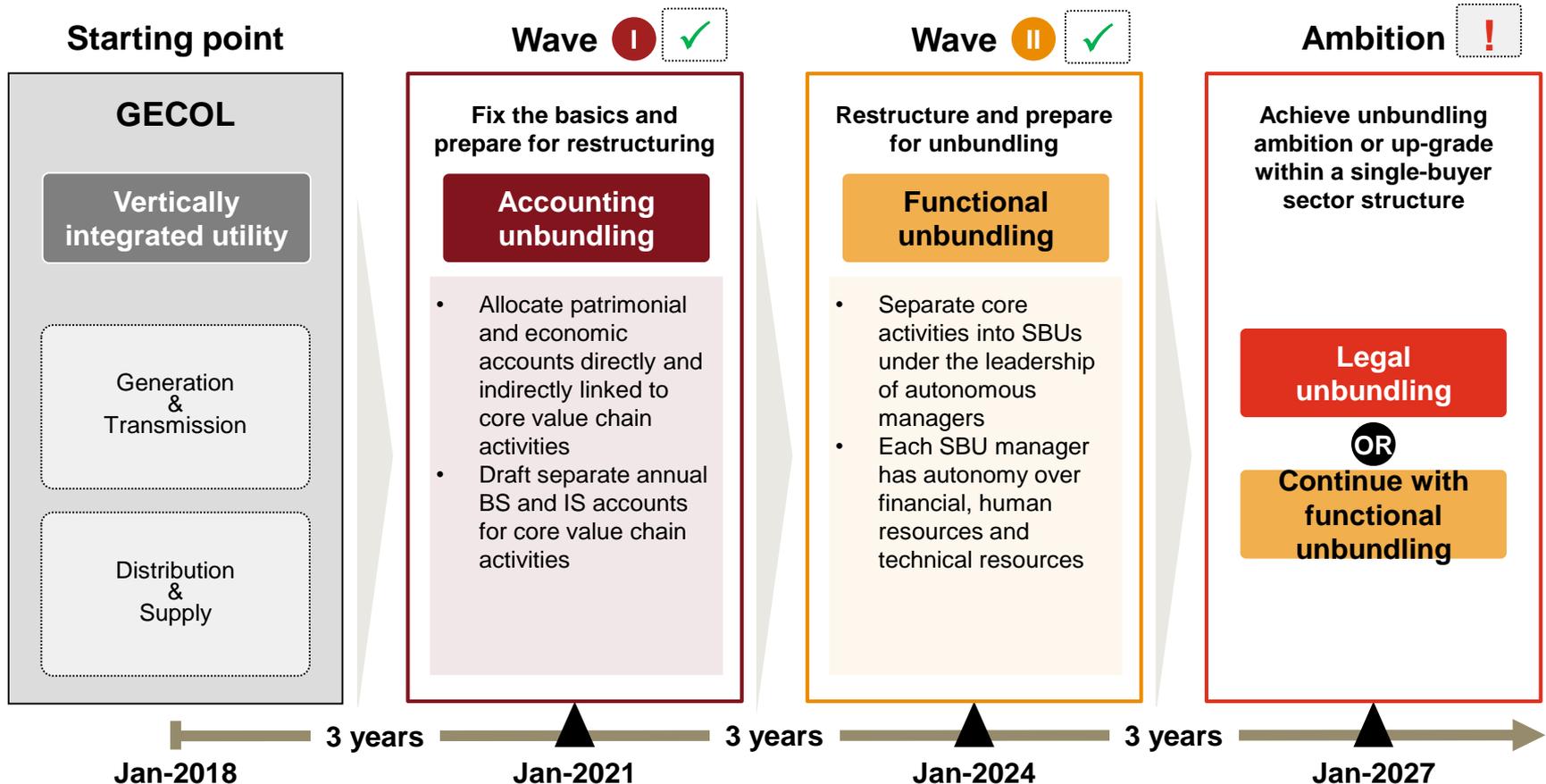
Wave II: Restructure and prepare for ambition

Options for Wave III (realize ambition)

Appendix – Inputs for Electricity Act

Once the functional unbundling of GECOL is achieved, Libya will need to choose what end-state ambition to pursue

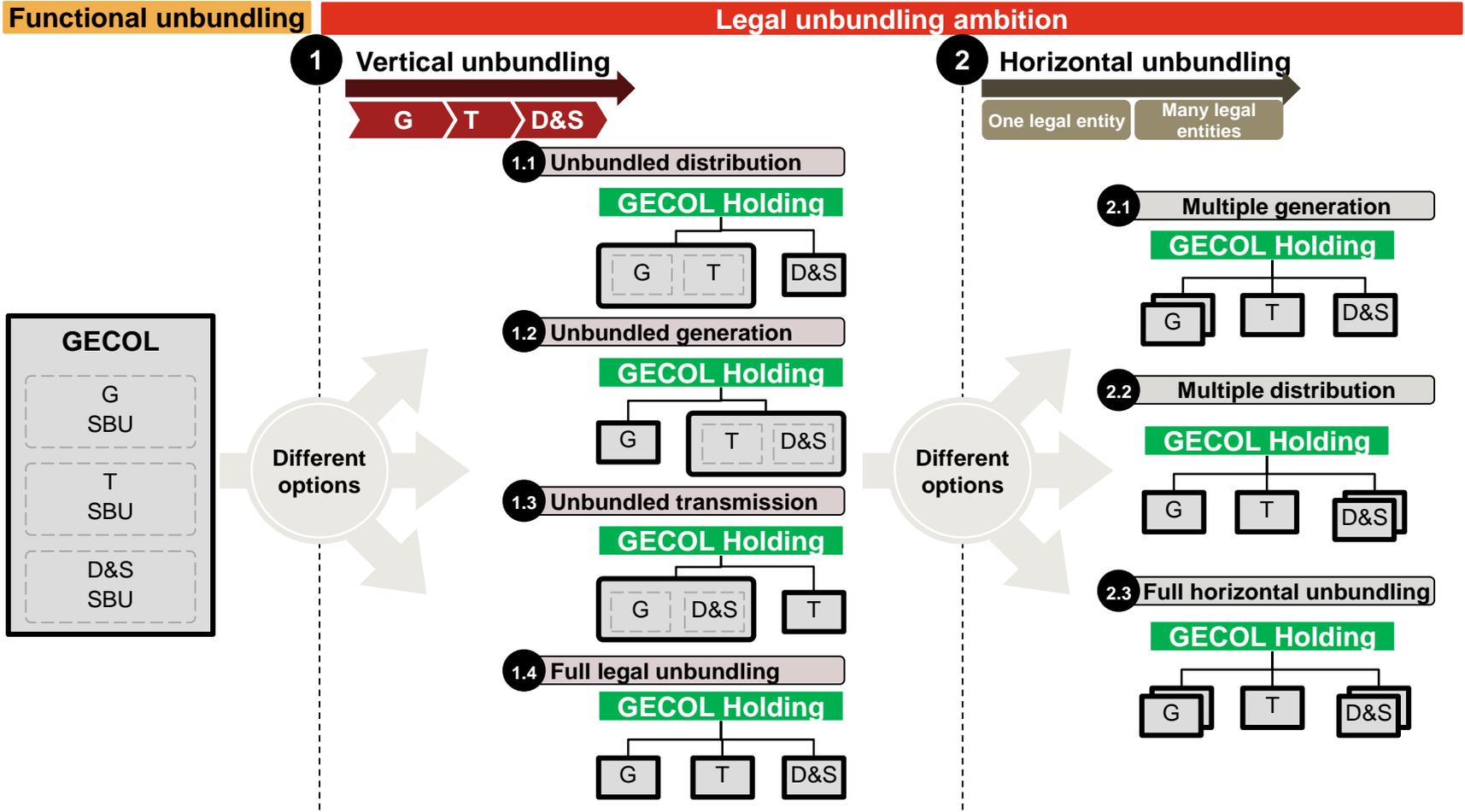
GECOL unbundling path



Source: Strategy& analysis

...or pursue an unbundling ambition, deciding on its vertical set-up first and then choosing for the horizontal structure

Vertical and horizontal unbundling options



Source: Strategy& analysis

If unbundling will be the ambition, Libya could target a full legal unbundling in terms of vertical...

Vertical unbundling options pros and cons

		Transparency	Competition	Autonomy	
		Accountability over performance	Flexibility for private sector investment	Decision making independence	
<p>1.1 Unbundled distribution</p> <p>GECOL Holding</p> <p>1.2 Unbundled generation</p> <p>GECOL Holding</p> <p>1.3 Unbundled transmission</p> <p>GECOL Holding</p> <p>1.4 Full legal unbundling</p> <p>GECOL Holding</p> <p><i>Recommended option</i></p>	<p>+ PROS</p> <ul style="list-style-type: none"> Increased motivation for distribution service providers to perform Potential for improved service quality and reduced costs in distribution Potential sale of under-development plants to private investors Level playing field is established between GENCO and IPPs Increased transparency in transmission Potential for lower costs and greater efficiency through competition in G&D Reduced risk of corruption Highest flexibility for private sector investment 	<p>- CONS</p> <ul style="list-style-type: none"> Potential conflict of interest vis-à-vis IPPs due to G&T integration Limited private sector investment potential in generation assets Lack of transparency due to the integration of G&T Limited potential improvements in terms of service quality and cost reduction in distribution Limited private sector participation in distribution No operational benefits from combining G&D, two different businesses with limited economies of scope Unconventional combination of assets unlikely to attract private investors Loss of synergies (economies of scale and scope) 	<p>Accountability over performance</p> <p>Flexibility for private sector investment</p> <p>Decision making independence</p>	<p>Accountability over performance</p> <p>Flexibility for private sector investment</p> <p>Decision making independence</p>	<p>Accountability over performance</p> <p>Flexibility for private sector investment</p> <p>Decision making independence</p>

Source: Strategy& analysis

... while for horizontal it may not be efficient to create multiple G&D entities ...

Horizontal unbundling options' rationale

	One 	Many 	Rationale
Suitability to small systems	●	○	Country's system must be large enough to accommodate all unbundled companies
Simplicity	●	◐	Horizontal unbundling involves high complexity and transaction costs
Economies of scale and scope	●	○	Integration entails economies of scale from operating a unified workforce with standardized processes and shared systems
Accountability and transparency	◐	●	Separation provides additional incentives to improve performance and to provide higher service quality to customers
Competition	◐	●	Unbundling introduces competition among players increasing drive to reduce costs and losses and improve collection and service
Carve-out opportunities	○	●	Allows to opportunistically sell plants to new IPPs (brownfield projects ¹) or local distribution companies to private investors

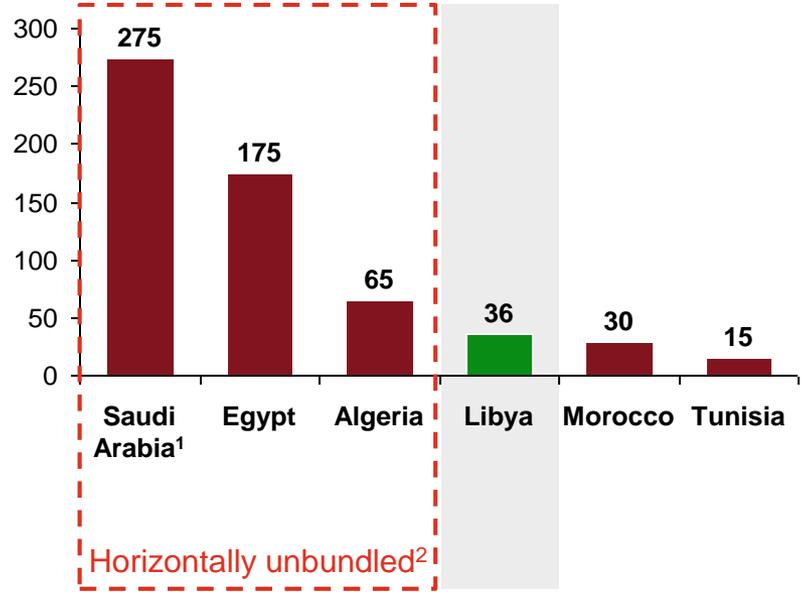
1) Under brownfield projects private players invest in existing assets which are combined with an expansion or upgrade opportunity

Source: Strategy& analysis

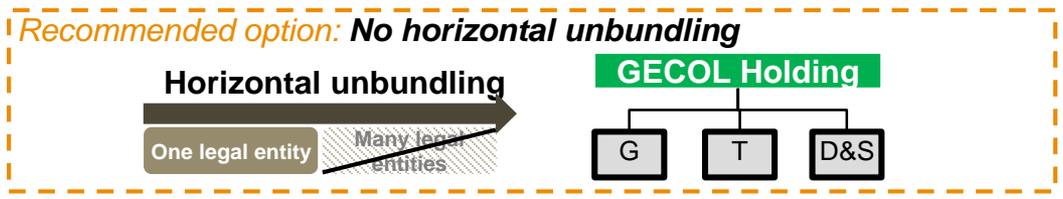
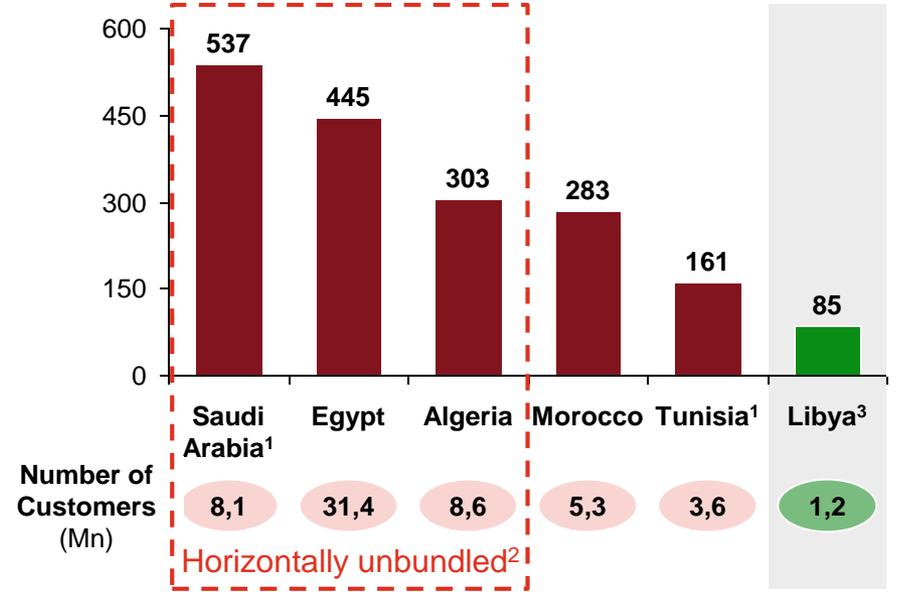
● High ○ Low

... especially because the size of the Libyan sector does not suggest the need for multiple companies

Generation⁴ (2015)
TWh



Distribution network length (2015)
'000 km



Note: includes Sonelgaz, STEG, ONEE-BE, SEC and EEHC Distribution Companies
 1) Data refers to 2014 y/e, last historical data available; 2) Horizontal and vertical legally unbundled country examples; 3) Includes GECOL 66kV and 30kV lines (25453km) and low voltage 11kV and 0.4kV lines (~60000km); 4) Considers all national energy generated (Libyan generation includes energy generated by Misurata Steel and Sarir MMRA plants)
 Sources: GECOL data collection ID1, GECOL data collection ID24, GECOL data collection ID37, Corporate Annual Reports, BMI Research Database, Strategy& analysis

Legal unbundling could be pursued with different levels of independence from the holding company

Legal unbundling options review

G, T, D legal entities have the power to:	LEGAL UNBUNDLING			Independence from Holding Co.
	Lean	Fat	Fat plus	
Draft separated annual accounts				Legal unbundling prerequisites
Appoint independent management				
Retain asset economic ownership	 Assets are owned and financed by Holding Co.			
Execute strategic functions¹				
Hold financial independence		 Cash flows handled centrally at Holding Co. level		

1) Strategic functions include investment decisions regarding extensions and maintenance, contracting for outsourced activities/services

Source: Strategy& analysis

If legal unbundling is to be pursued, GECOL will embark in a process taking at least 3 years with a series of activities ...

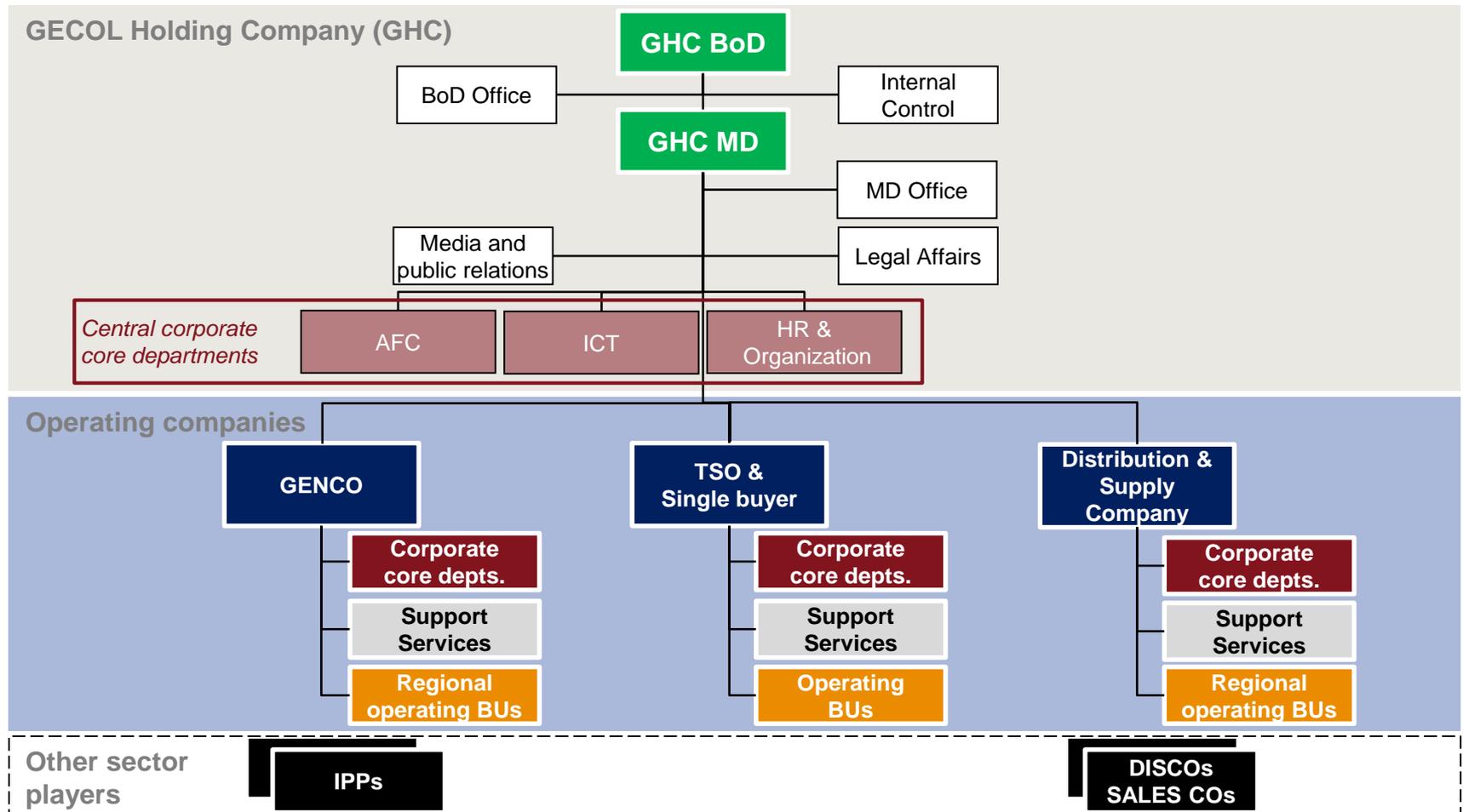
Measures and activities

Measures	Activities	Year	2024	2025	2026	Owner
Preparation	Draft detailed roadmap of activities and accountabilities					GECOL
	Onboard accounting, legal & strategy advisors					GECOL
	Set up PMO team leading and monitoring the process					GECOL
Corporatize the new companies	Perform legal due diligence					Legal advisors
	Define corporate bylaws and legal status of both holding and subsidiaries (e.g. LLC or corporation)					Legal advisors
	Appoint CEO and BoD for both holding and subsidiaries					GECOL
Transfer assets & liabilities	Identify and value GECOL's assets & liabilities					Accounting advisors
	Establish starting capital and opening equity balances					Accounting advisors
	Transfer assets and liabilities from GECOL to newly incorporated legal entities					Accounting advisors
Pricing and SLAs	Draft and enforce external agreements					GECOL
	Develop and enforce transfer pricing schemes and SLAs					Accounting advisors /GECOL
Organization structure & governance	Detail and rollout the new organization structure					Strategy advisors /GECOL
	Design a compensation and benefits structure					GECOL
	Redeploy employees within newly created subsidiaries					GECOL
IT strategy	Define IT strategy and key enablers					GECOL
	Implement new systems and required infrastructure and platform					GECOL
Communication and change	Develop a change management approach					Strategy advisors
	Manage internal change					GECOL
	Implement culture change initiatives					GECOL
	Develop and execute external communication and branding initiatives					GECOL

Source: Strategy& analysis

...and may end-up in GECOL being structured as a holding with 3 separate operating entities

GECOL organization after legal unbundling



Source: Strategy& analysis

Executive Summary

Summary of key issues faced by the electricity sector

Wave I: Fix the basics and prepare for restructuring

Wave II: Restructure and prepare for ambition

Options for Wave III (realize ambition)

Appendix – Inputs for Electricity Act

Electricity Acts typically have some common content

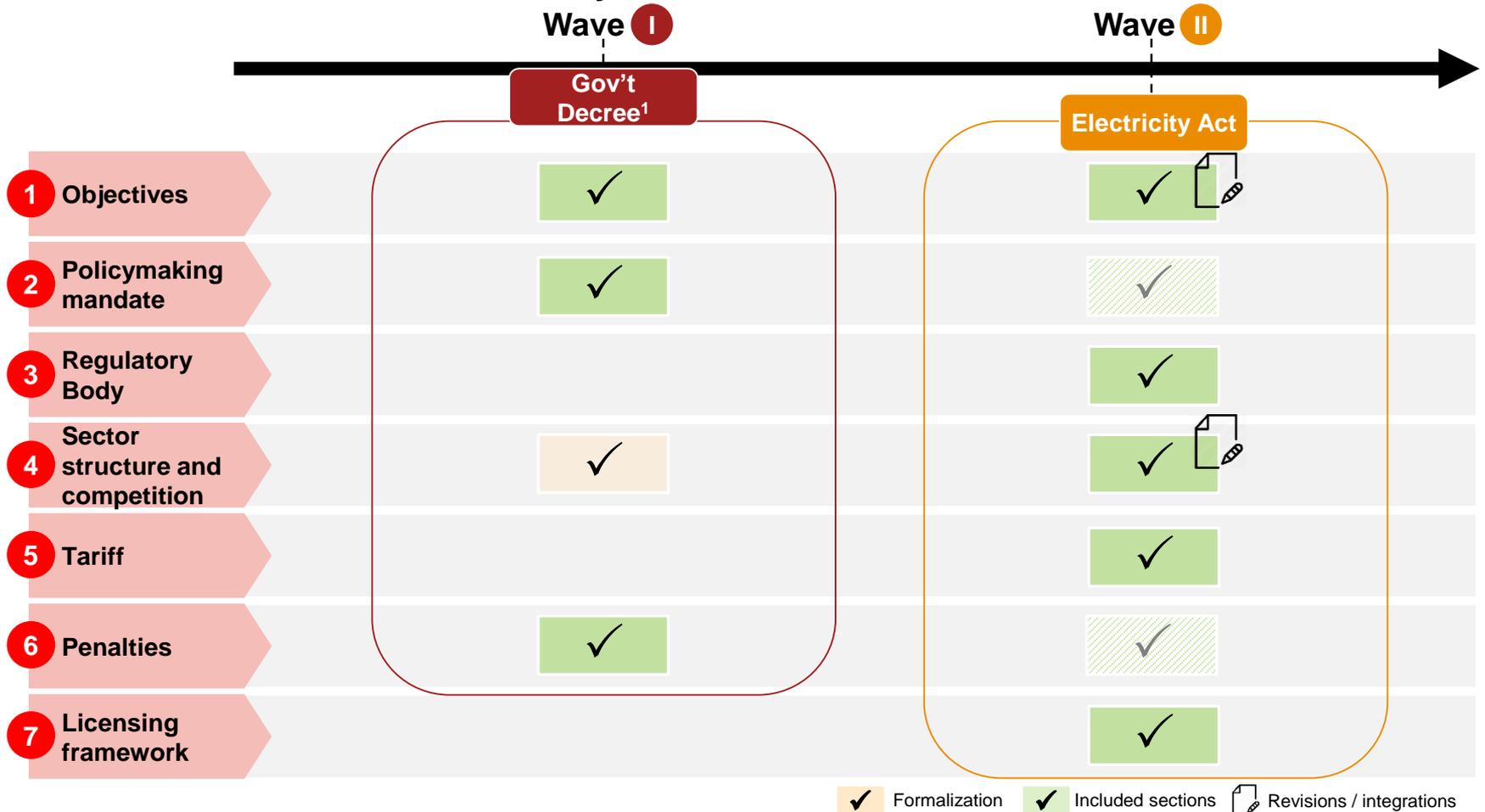
Typical sections and content of electricity acts

Sections	Content description
1 Objectives	<ul style="list-style-type: none">• Glossary and general interpretation of the terms used within the electricity act• High-level description of the objectives and focus of the act (e.g. strategic priorities)
2 Policymaking mandate	<ul style="list-style-type: none">• Mandate and powers for sector's policymaking responsibilities to ministry or government body
3 Regulatory Body	<ul style="list-style-type: none">• Regulation mandate to regulatory body specifying its objectives and activities• Composition and powers of the board of directors of the regulatory body• Financing matters
4 Sector structure and competition	<ul style="list-style-type: none">• Overview of the electricity actors and functions divided between generation, transmission and distribution & supply• Institutional governance of state owned entities• Development structure of the market towards stepwise liberalization and competition
5 Tariff	<ul style="list-style-type: none">• Provision of tariff setting and review responsibility to the regulatory authority• Principles for tariff setting methodology
6 Licensing framework	<ul style="list-style-type: none">• License obligation for any entities building, operating or managing facilities for generation, transmission, distribution and supply of electricity and criteria for exemption• Application procedure and period of validity
7 Penalties	<ul style="list-style-type: none">• Sanctions for exercise of activities without holding a license• Fees for illegal connections and theft• Sanctions for sabotaging electrical installations and meters

Sources: A.R.E Presidential Decree Law of 2015 Promulgating the Egyptian Electricity Act, Jordan General Electricity Law No. 64 of 2003, Saudi Arabia Electricity Law No. M/56 of 2005, Strategy & analysis

The suggested sector reform foresees the introduction of a first Government decree followed by an Electricity Act

Government decree and electricity act sections

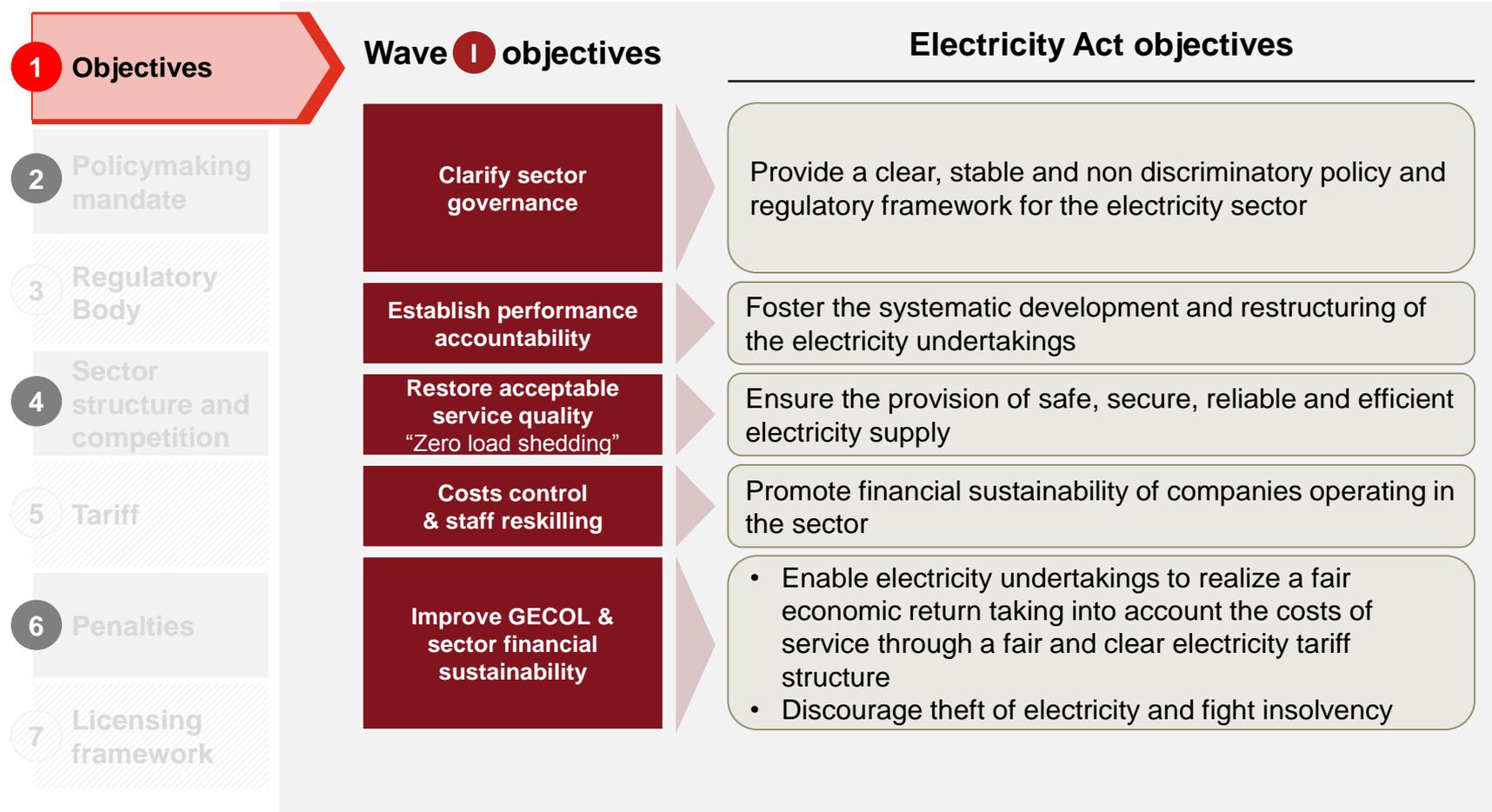


1) Government Decree will substitute the release of the Electricity Act, since the sector structure, roles & responsibilities will not be changed; Source: Strategy& analysis

The objectives of the first reform wave shall be translated directly into the Government decree objectives

Government decree objectives

Libya illustrative



Source: Strategy& analysis

The Decree will need to clarify the sector policymaking mandate to the Government

Main topics and inputs by section

	Topics	Inputs
1 Objectives		
2 Policymaking mandate	Policymaker goals	States the objectives/mandate of the Ministry or Government body in charge: <ul style="list-style-type: none"> • Sector strategic planning and development objectives • Security of supply objectives (e.g. availability of acceptable generation reserve margin, adequate transmission and distribution capacities)
3 Regulatory Body	Policymaker Responsibilities	States the responsibilities/powers of the Ministry or Government body in charge: <ul style="list-style-type: none"> • Sector policymaking responsibilities • Sector strategic planning functions (e.g. integrated resource planning, collection of data from the electricity participants, consultation with market participants and forecasts to draft the National Electricity Plan) • International cooperation and import supply securement responsibilities • Promotion of sector related country interests at the international level
4 Sector structure and competition		
5 Tariff		
6 Penalties		
7 Licensing framework		

Sources: A.R.E Presidential Decree Law of 2015 Promulgating the Egyptian Electricity Act, Jordan General Electricity Law No. 64 of 2003, Saudi Arabia Electricity Law No. M/56 of 2005, Strategy & analysis

Jordan Electricity Law clarifies the mandate and powers of the Ministry of Energy and Mineral Resources for example

Electricity act extract

EXAMPLE NOT EXHAUSTIVE

1 Objectives

2 **Policymaking mandate**

3 Regulatory Body

4 Sector structure and competition

5 Tariff

6 Penalties

7 Licensing framework

GENERAL ELECTRICITY LAW No. 64 of 2003

Art. 4: *The Ministry shall assume the following **mandate and powers**:*

- *To set and prepare the **general policies** of the sector and submit them to the Council of Ministers for approval in accordance with the needs of economic and social development in the Kingdom [...]*
- *To **cooperate with other countries** for the purpose of the electrical interconnection and trade of electric power, as well as to conclude the agreements necessary to that effect with the consent of the Council of Ministers, and to follow up performance of the contractual obligations with those countries*
- *To **promote the interests** of the Kingdom with other countries and regional and international organizations on issues relating to electric power and to represent the Kingdom before such organizations*
- *To adopt the necessary measures for the **provision of supplemental sources of generation** of electric power in case of prolonged shortfalls in electric power, if no alternative means are available*
- *To promote the use of **renewable energy** for generation*
- *To recommend to the Council of Ministers to switch to a **competitive electricity market** [...]*

The decree shall than formalize the sector activities and reinforce the institutional guidelines for state owned entities

Main topics and inputs by section

	Topics	Inputs
1 Objectives		
2 Policymaking mandate		
3 Regulatory Body		
4 Sector structure and competition	Sector Activities	<p>Specifies sector's activities in terms of:</p> <ul style="list-style-type: none"> • Company in charge • Ownership structure and legal status (e.g. joint stock company fully owned by the state) • Licensed activities, e.g. <ul style="list-style-type: none"> – Generation: build, manage and operate electricity production plants – Transmission: manage, maintain and operate the transmission system, power balancing functions – Distribution: establish and implement electricity distribution projects on medium and low voltage, manage operate and maintain the distribution networks – System operator: merit order dispatch
5 Tariff	State owned entities	<p>Specifies institutional leadership structure for state owned entities in terms of:</p> <ul style="list-style-type: none"> • Members of the General Assembly (e.g. Ministry of Electricity, Ministry of Finance, etc.) • Chairman of the General Assembly (e.g. Ministry of Electricity or Prime minister) • Members of the Board of Directors • BoD terms of office (e.g. 3 years) • BoD activities (e.g. approval rights on Authority plan, organization, budget)
6 Penalties		
7 Licensing framework		

Sources: A.R.E Presidential Decree Law of 2015 Promulgating the Egyptian Electricity Act, Jordan General Electricity Law No. 64 of 2003, Saudi Arabia Electricity Law No. M/56 of 2005, Strategy & analysis

Egypt state owned transmission company institutional structure for example is detailed in the Electricity Act

Electricity act extract

EXAMPLE NOT EXHAUSTIVE

1 Objectives

2 Policymaking mandate

3 Regulatory Body

4 **Sector structure and competition**

5 Tariff

6 Penalties

7 Licensing framework

ELECTRICITY ACT 2015

Chapter 3: Electricity Activities

Art. 24: *Electricity Utility is a public utility operating within the framework of the duly approved electric power strategies and policies. [...]*

Section 2: Electricity Transmission and Network Operations

Art. 26: *The Egyptian Electricity Transmission Company is a joint stock company, fully owned by the State. [...] The Company shall solely be assigned to transmit electricity and operate electricity networks.*

Art. 27: *The General Assembly of the Egyptian Electricity Transmission Company shall be chaired by the Competent Minister and shall have a number of members of not less than seven and no more than fourteen. The members shall be appointed for a three-year term by the Premier's Decree to be issued on the recommendation of the Competent Minister. The general assembly members shall include a representative of the Ministry of Finance and another representative of the Company's employees to be nominated by the General Federation of Laborers Unions. [...]*

Art. 28: *The Egyptian Electricity Transmission Company shall be managed by a board of directors to be formed by a resolution of the General Assembly. [...]*

The final section of the decree will then specify penalties for theft, sabotage, harm to employees and insolvency

Main topics and inputs by section

	Topics	Inputs
1 Objectives	Illegal activities	States penalties for carrying out activities without a license (e.g. imprisonment for a term of one to three years, payment of fines, or both)
2 Policymaking mandate	Theft	States penalties for: <ul style="list-style-type: none"> • Illegal connections (e.g. imprisonment for a period from 6 months to 2 years, payment of a fine, or both) • Breaking the seals of an electrical meter for the purpose of stealing electrical power or assisting a person in committing such activities (e.g. Imprisonment for a period of one month to one year, payment of a fine, or both)
3 Regulatory Body	Sabotage	States penalties for: <ul style="list-style-type: none"> • Intentional sabotage and damages to electrical installations • Unintended damage to electrical installation due to negligence or mistake
4 Sector structure and competition	Harm against utility employees	States applicable code in case of crimes committed against the employees of generation, transmission, distribution and supply license holders or system operators during the performance of their duties (e.g. Penal Code penalties)
5 Tariff	Customer insolvency	States penalties for non payment of electricity (e.g. discontinuation of the supply of power)
6 Penalties		
7 Licensing framework		

Sources: A.R.E Presidential Decree Law of 2015 Promulgating the Egyptian Electricity Act, Jordan General Electricity Law No. 64 of 2003, Saudi Arabia Electricity Law No. M/56 of 2005, Strategy & analysis

Imprisonment or fee sanctions (or both) are the most common measures established in Jordan to address theft

Electricity act extract

EXAMPLE NOT EXHAUSTIVE

1 Objectives

2 Policymaking mandate

3 Regulatory Body

4 Sector structure and competition

5 Tariff

6 Penalties

7 Licensing framework

GENERAL ELECTRICITY LAW No. 64 of 2003

Art. 49: [...] Whoever carries out the activity of generation, transmission, distribution, supply or system operation without obtaining a license [...], shall be liable to be sentenced to imprisonment for a term of 1 to 3 years, or be liable to pay to a fine of not less than 50.000 Dinars but not exceeding 100.000 Dinars, or both.

Art. 50: Whoever illegally uses the electric system or unlawfully connects to it or steals electric power, or assists a person in such activities, shall be liable to an imprisonment for a period from 6 months to 2 years, or a fine that shall not be less than 2.000 Dinars, but no more than 10.000 Dinars, or both imprisonment and a fine.

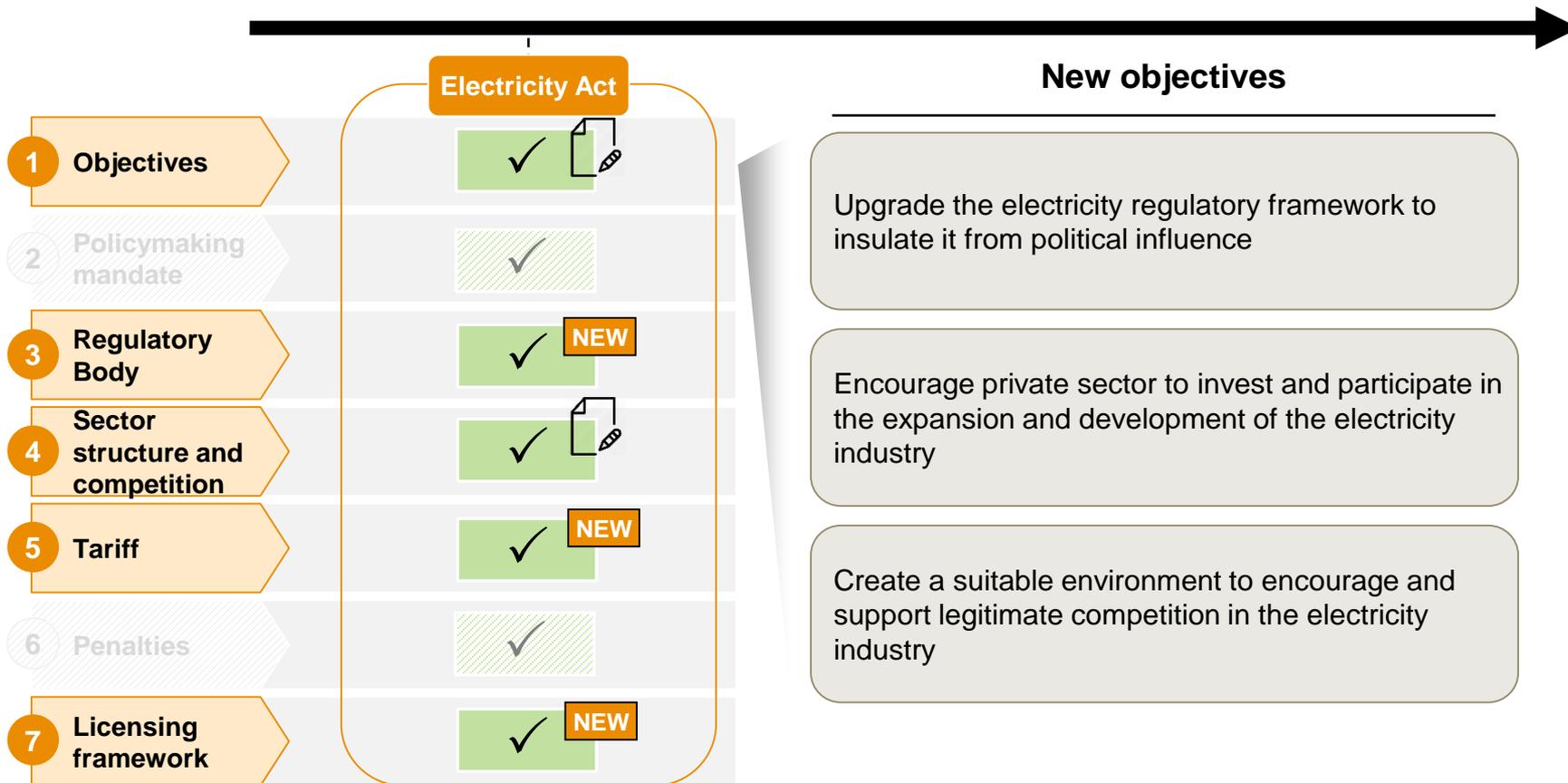
Art. 51: Whoever deliberately tampers with or otherwise breaks the seals of an electric meter [...], for the purpose of stealing electric power, or assists a person in committing such activities, shall be liable to imprisonment for a period of 1 month to 1 year or a fine that shall not be less than 500 Dinars but not more than 2.000 Dinars or both [...].

Art. 54: The penalties prescribed by the Penal Code in force for crimes against civil servants shall apply to crimes committed against the employees of electricity companies during the performance of their duties. [...]

The 2023 the Electricity Act will then include further elements within the Libyan electricity framework

Electricity Act objectives

Wave II



Source: Strategy& analysis

Strategy& | PwC

✓ Included sections 📄 Revisions / integrations

To insulate the electricity sector from political influence the Act will provide legal mandate to the Regulatory Authority

Main topics and inputs by section

	Topics	Inputs
1 Objectives		
2 Policymaking mandate		
3 Regulatory Body	Regulator legal mandate	States the legal mandate of the Regulatory Authority in terms of: <ul style="list-style-type: none"> • Name • Institutional/juridical nature (e.g. government agency) • Financial and administrative status • Head office location and ownership of immovable properties
	Regulator objectives	States the Regulatory Authority's main objectives in terms of: <ul style="list-style-type: none"> • Sector financial sustainability (e.g. tariff, competition) • Operational efficiency and security of supply • Competition and attraction of private investment
	Regulator responsibilities ¹	States the main responsibilities of the regulatory authority (e.g. tariff setting, licensing, etc.)
4 Sector structure and competition		
5 Tariff	Institutional arrangement	<ul style="list-style-type: none"> • Clarifies Board of Directors: <ul style="list-style-type: none"> – Members (e.g. CEO, members representing consumers, representatives of the state utility, persons with technical, financial and legal expertise) – Appointment terms (e.g. nationality, education, financial interests in utilities) – Terms of office, renewal and termination of office before end-of-term (e.g. 4 yrs.) – Activities (e.g. approval rights on Authority plan, organization, activities and budget) • Clarifies Chief Executive Officer: <ul style="list-style-type: none"> – Appointment (e.g. by the Prime Minister's decree) – Terms of office, renewal and termination of office before end-of-term (e.g. 3 yrs.) – Tasks (e.g. Manage the Authority, raise issues to BoD, implement BoD resolutions)
6 Penalties		
7 Licensing framework	Financial resources	States Regulatory Authority financial status specifying: <ul style="list-style-type: none"> • Nature of funds (e.g. funds allocated from the state budget, proceeds from fees, licenses and sanctions, considerations for work, services rendered, donations)

1) For a more detailed list of responsibilities/tasks of the Regulatory Authority see sector restructuring roadmap-wave 2 section

Sources: A.R.E Presidential Decree Law of 2015, Jordan General Electricity Law No. 64 of 2003, Saudi Arabia Electricity Law No. M/56 of 2005, Strategy & analysis

Egypt Electricity Act for example, sets the Authority's legal status, objectives, composition and financing structure

Electricity act extract

EXAMPLE NOT EXHAUSTIVE

1 Objectives

2 Policymaking mandate

3 **Regulatory Body**

4 Sector structure and competition

5 Tariff

6 Penalties

7 Licensing framework

ELECTRICITY ACT 2015

Chapter 2: Regulation of Electricity Utility

Section 1: The Electricity Utility and Consumer Protection Regulatory Agency

Art. 2: *The Electricity Utility and Consumer Protection Regulatory Agency is a public authority acting independently from the Electricity Utility Stakeholders.*

Art. 3: *The agency aims to **organize, follow up, monitor** and **develop** all the electricity activities. This is to ensure availability, efficiency and quality of electricity and the electricity needs in the various uses thereof are all met at **suitable prices**. [...]*

Art. 5: *The Agency shall be managed by a board of directors to be formed under the chairmanship of the Competent Minister. The Board members shall be: the CEO, 4 members representing the consumers, 3 representatives from the Electricity Utility, 4 persons of expertise in the technical, financial and legal arenas. [...]*

Art. 8: *The Agency shall have a CEO whose appointment shall take effect by a Premier's Decree to be issued after the matter is raised by the Competent Minister. [...]*

Art. 10: *The financial resources of the Agency shall be comprised of:*

- *The funds allocated to the Agency in the public budget of State*
- *The proceeds of the fees paid for the permissions and licenses issued*
- *The considerations for works and services rendered*
- *The donations, contributions and grants that are accepted by the Agency BoD and do not contradict with its objectives [...]*

As Wave II foresees the opening of generation to IPPs, a revision of the formalized sector structure will be needed

Main topics and inputs by section

	Topics	Inputs	
1 Objectives	Sector Activities	Eliminates GECOL monopoly over generation	
2 Policymaking mandate	State owned entities	No change	
3 Regulatory Body	Competition	Specifies terms of competition and market opening: <ul style="list-style-type: none"> • Generation opened to IPPs under proper licensing terms • IPPs entitlement to sell electricity to the Single Buyer under conditions specified in Power Purchase Agreements 	
4 Sector structure and competition	Single buyer	Specifies Single Buyer: <ul style="list-style-type: none"> • Role and objectives (e.g. provide adequate, safe and efficient service) • Impartiality obligations (e.g. Single buyer shall not show any undue preference or discriminate against any entity with respect to purchase and sale of electricity) 	
5 Tariff			
6 Penalties			
7 Licensing framework			

Added topics/inputs Revisions / integrations

Sources: Supplement to the Sierra Leone Gazette Vol. CXLIII, No. 6 dated 9th February 2012, A.R.E Presidential Decree Law of 2015 Promulgating the Egyptian Electricity Act, Jordan General Electricity Law No. 64 of 2003, Saudi Arabia Electricity Law No. M/56 of 2005, Strategy & analysis



For example, the role of IPPs and the activities they are allowed to pursue should be clearly specified

Electricity act extract

EXAMPLE NOT EXHAUSTIVE

1 Objectives

2 Policymaking mandate

3 Regulatory Body

4 **Sector structure and competition**

5 Tariff

6 Penalties

7 Licensing framework

NATIONAL ELECTRICITY ACT, 2011

Part VIII: Independent Power Producers

Art. 52: *An independent power producer:*

- a) *Shall sell electricity to the Authority (i.e. Single Buyer) subject to a power purchase agreement approved by the Commission (Regulatory Authority);*
- b) *Shall construct generating stations, including hydro-electric schemes;*
- c) *Shall keep itself informed of the development relating to the generation of electricity from natural resources available within the State, with particular reference to the implications for the State of such developments [...]*

The Electricity Act will give tariff setting and revision mandate to the Regulatory Authority

Main topics and inputs by section

	Topics	Inputs
1 Objectives		
2 Policymaking mandate		
3 Regulatory Body		
4 Sector structure and competition		
5 Tariff	<p>Tariff determination</p> <p>Tariff review</p>	<ul style="list-style-type: none"> Provides Tariff setting responsibility to the Regulatory Authority Establishes principles to be considered when selecting the tariff setting and approval methodology (e.g. cost-reflective, economical signal to consumers, avoid discrimination) Provides Tariff review responsibility of the Regulatory Authority States timing of review (e.g. every five years or less if required by the sector Ministry)
6 Penalties		
7 Licensing framework		

Sources: A.R.E Presidential Decree Law of 2015 Promulgating the Egyptian Electricity Act, Jordan General Electricity Law No. 64 of 2003, Saudi Arabia Electricity Law No. M/56 of 2005, Strategy & analysis

Saudi Arabian Act gives tariff review powers to the regulator and outlines principles to be considered when setting tariffs

Electricity act extract

EXAMPLE NOT EXHAUSTIVE

1 Objectives

2 Policymaking mandate

3 Regulatory Body

4 Sector structure and competition

5 Tariff

6 Penalties

7 Licensing framework

ELECTRICITY LAW

Art. 9:

1. *The (Regulatory) Authority shall periodically review the Tariff structure and submit recommendations to the Council of Ministers. To this end, the Authority may seek expert advice and require operating companies to provide such information as it considers necessary for such review*
2. *In determining the Tariff and its structures, the Authority shall consider:*
 - a. *Enabling companies to operate efficiently to fully recover their expenses [...]*
 - b. *Providing the incentives for the continuous improvement of technical efficiency and quality of services [...]*
 - c. *Avoiding discrimination between consumers of the same category and between consumers categories*

The opening of generation to IPPs will require the introduction of a clear licensing framework

Main topics and inputs by section

	Topics	Inputs
1 Objectives		
2 Policymaking mandate		
3 Regulatory Body		
4 Sector structure and competition		
5 Tariff		
6 Penalties		
7 Licensing framework	<p>Licensed activities</p> <p>Application & approval</p> <p>Transfer and revocation</p>	<p>States:</p> <ul style="list-style-type: none"> • Activities subject to licensing obligations (e.g. construction, ownership and management of undertakings for the generation, transmission, distribution and supply of electricity) • Exceptions (e.g. undertakings for generation not exceeding 1MW in aggregate at the same site, distribution undertakings not exceeding 100 KWh in aggregate at the same site, auto-generation) • Activities allowed under licenses for: <ul style="list-style-type: none"> • Generation • Transmission • Distribution and supply <p>Clarifies:</p> <ul style="list-style-type: none"> • Submission to office/commission for approval (e.g. Regulatory Authority licenses department) • Documentation and information prescribed by the Regulatory Authority for reviewing the application • Approval upon satisfaction of terms required by the Regulatory Authority and payment of prescribed fees <p>Specifies:</p> <ul style="list-style-type: none"> • Prohibition to transfer licenses and/or assets • Circumstances for revocation and suspension (e.g. breach of terms or conditions, bankruptcy)

Sources: A.R.E Presidential Decree Law of 2015 Promulgating the Egyptian Electricity Act, Jordan General Electricity Law No. 64 of 2003, Saudi Arabia Electricity Law No. M/56 of 2005, Strategy & analysis

The licensing section would specify terms, types of services, fees, geographic span and licensees' service level obligations

Electricity act extract

EXAMPLE NOT EXHAUSTIVE

1 Objectives

2 Policymaking mandate

3 Regulatory Body

4 Sector structure and competition

5 Tariff

6 Penalties

7 Licensing framework

ELECTRICITY ACT 2015

Chapter 2: Permissions and Licenses for Electricity Activities

Art. 13: No electricity production, distribution, or sale activities shall be exercised unless and until the related licenses are obtained from the (Regulatory) Agency in accordance with the provisions of the law. [...]

Art. 14: The applications to obtain the permissions and licenses, [...] shall be submitted in the forms prepared by the (Regulatory) Agency. Applications shall include the data and be accompanied by the documents required for adjudication, as set forth in the Executive Regulations. Applications for permissions or licenses shall be adjudicated thereupon within a maximum period of sixty days starting from the date of completion by the permission or license applicant of all the data and documents required under the established rules. [...]

Art. 17: Licenses include the following:

1. The term of the license
2. The type of service (production, distribution, sale)
3. The license fee
4. The geographic limits of the licensee's activities
5. The licensee obligation to abide by quality standards [...]