

مدينة الملك عبد الله للطاقة  
الذرية والمتجددة K.A.CARE

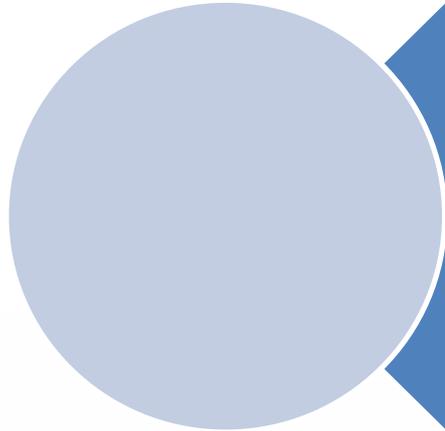


# Sustainable Development Through Energy Diversification in Saudi Arabia

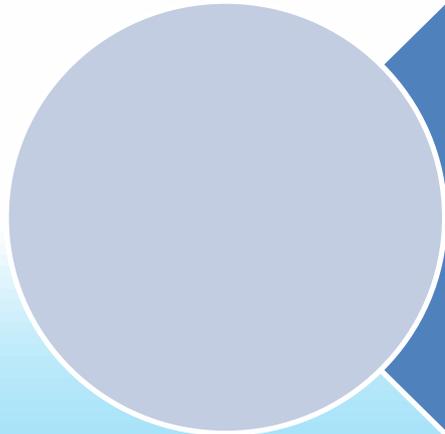




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K.A.CARE Strategy



K.A.CARE Initiatives





# K.A.CARE Strategy

# K.A.CARE Initiatives





# Royal Vision

- ✓ **Sustainability**
- ✓ **Reliability**
- ✓ **Extending the Life of Oil**
- ✓ **Electricity generation & Desalination**

“sources for **sustainable** and **reliable** electricity generation and desalinated water production that **reduces the reliance** on hydrocarbon resources and thus provides an additional guarantee for the production of water and electricity in the future and **prolongs** at the same time hydrocarbon resources to keep them a source of income for a longer period”





## Plausible energy mix criteria:

- Sustainability
- Economic viability
- Technical feasibility
- Enabling of further development

## Optimum energy mix criteria:

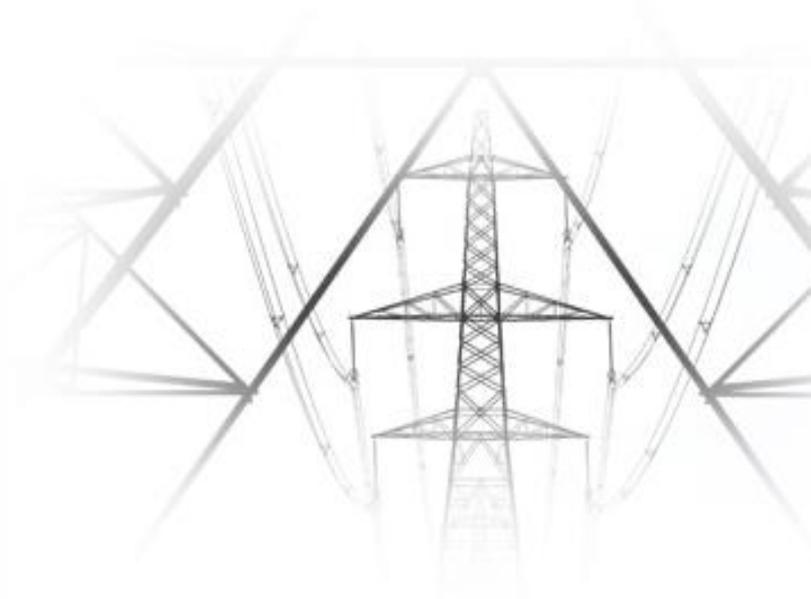
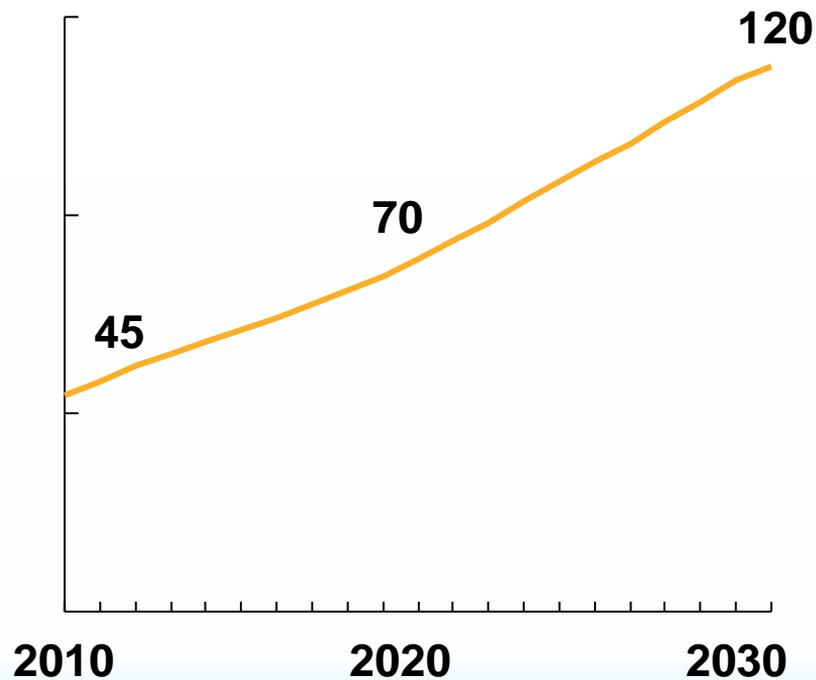
- Must deliver the required capacity both cost-effectively and in a timely fashion



# Projected growth in electricity peak demand



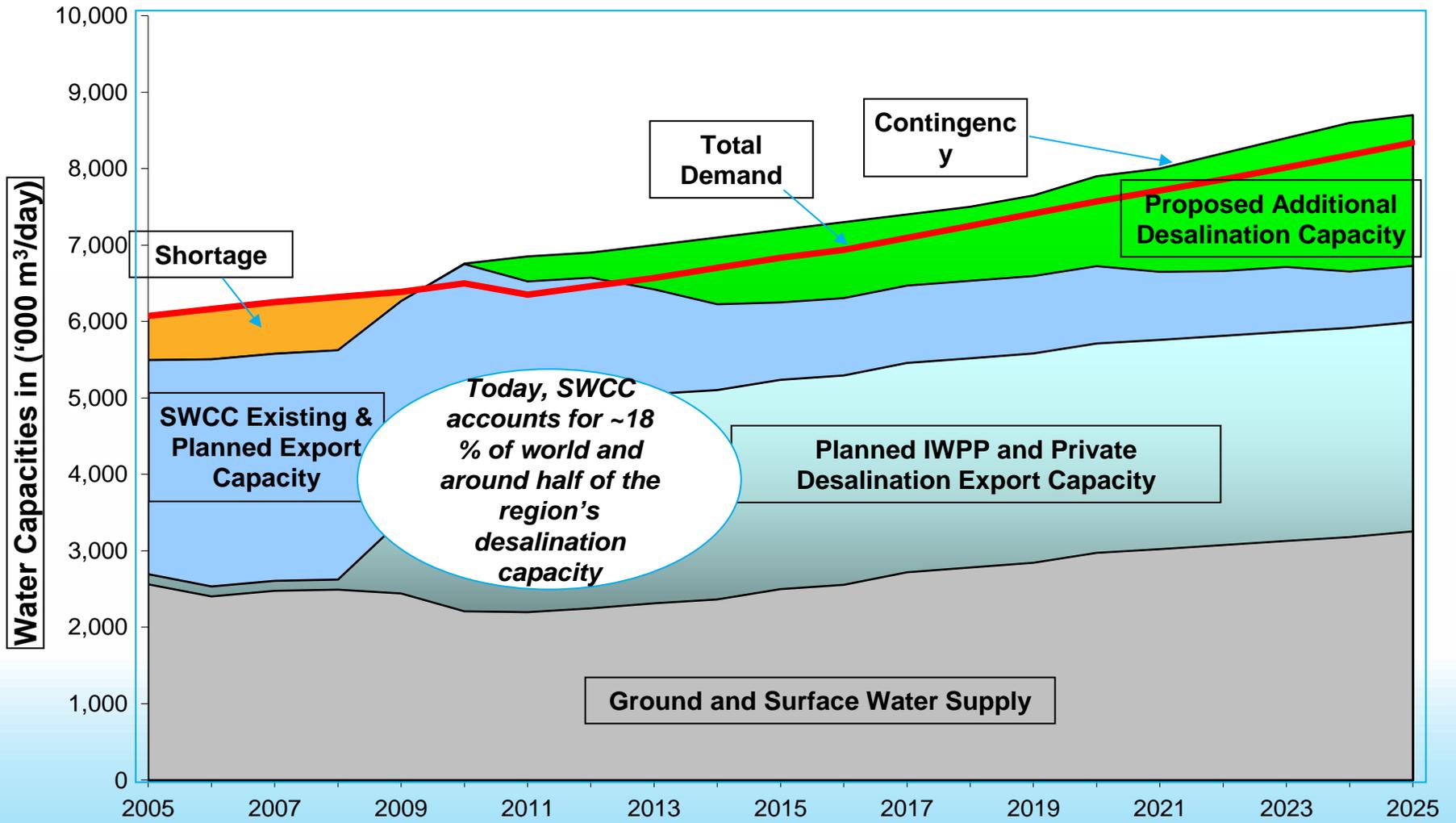
## Electricity peak demand GW



**At current pace, energy peak demand is expected to exceed 120 GW by 2030**



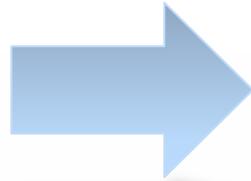
# KSA Total Water Demand Versus Planned Supply Sources





# Towards energy sustainability

## The Kingdom of Energy Based on Fossil Fuels



**Towards  
greater  
sustainability**

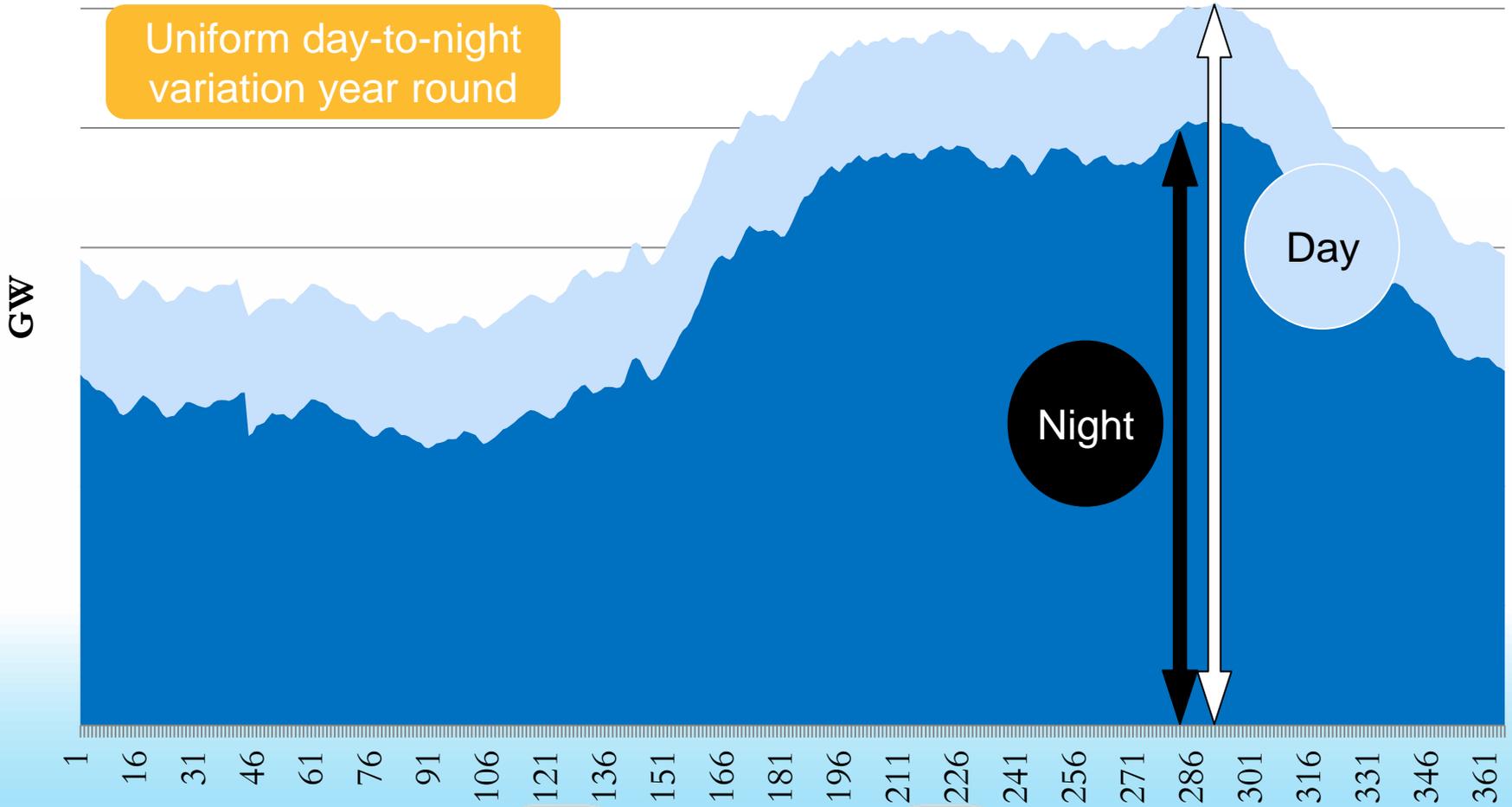
## The Kingdom of Sustainable Energy



**Building Resources for the Future**

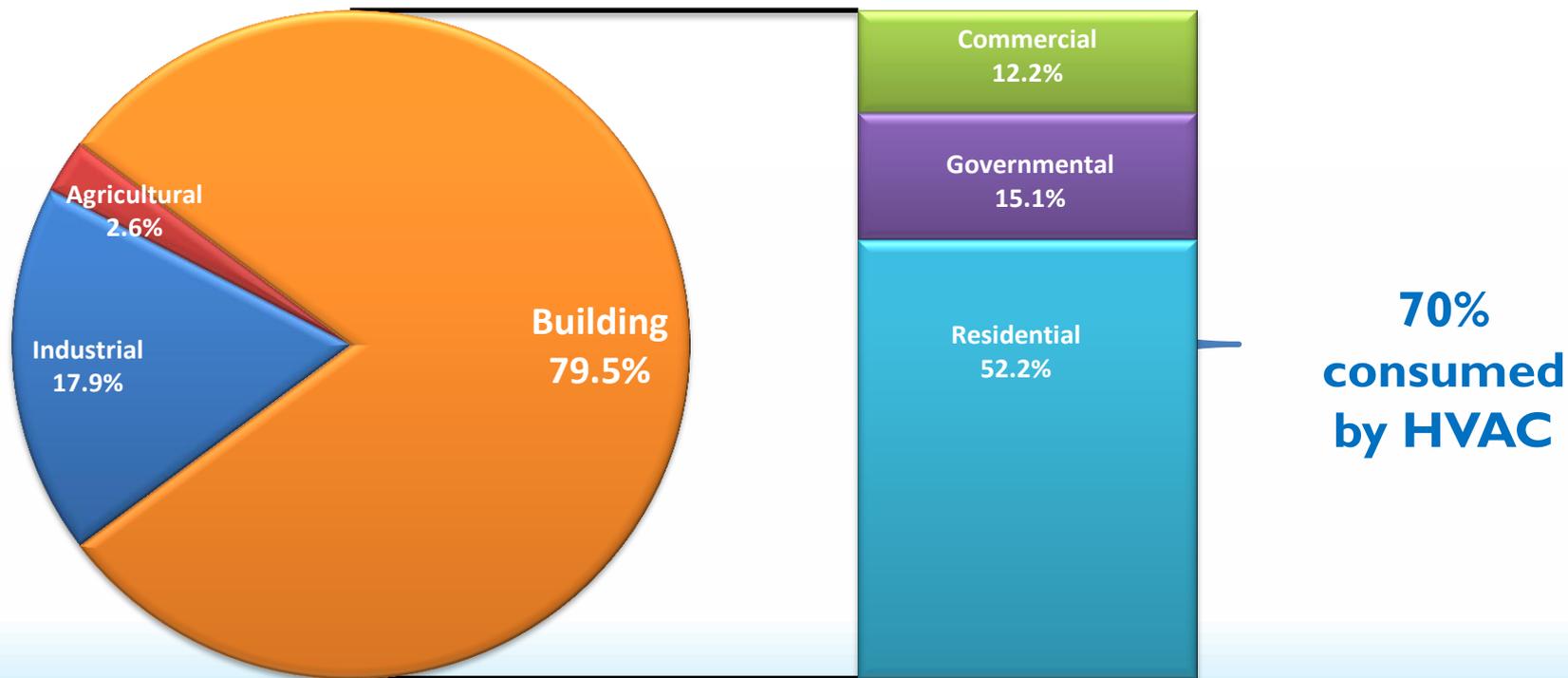


# Day-Night Load Variation for Saudi Arabia

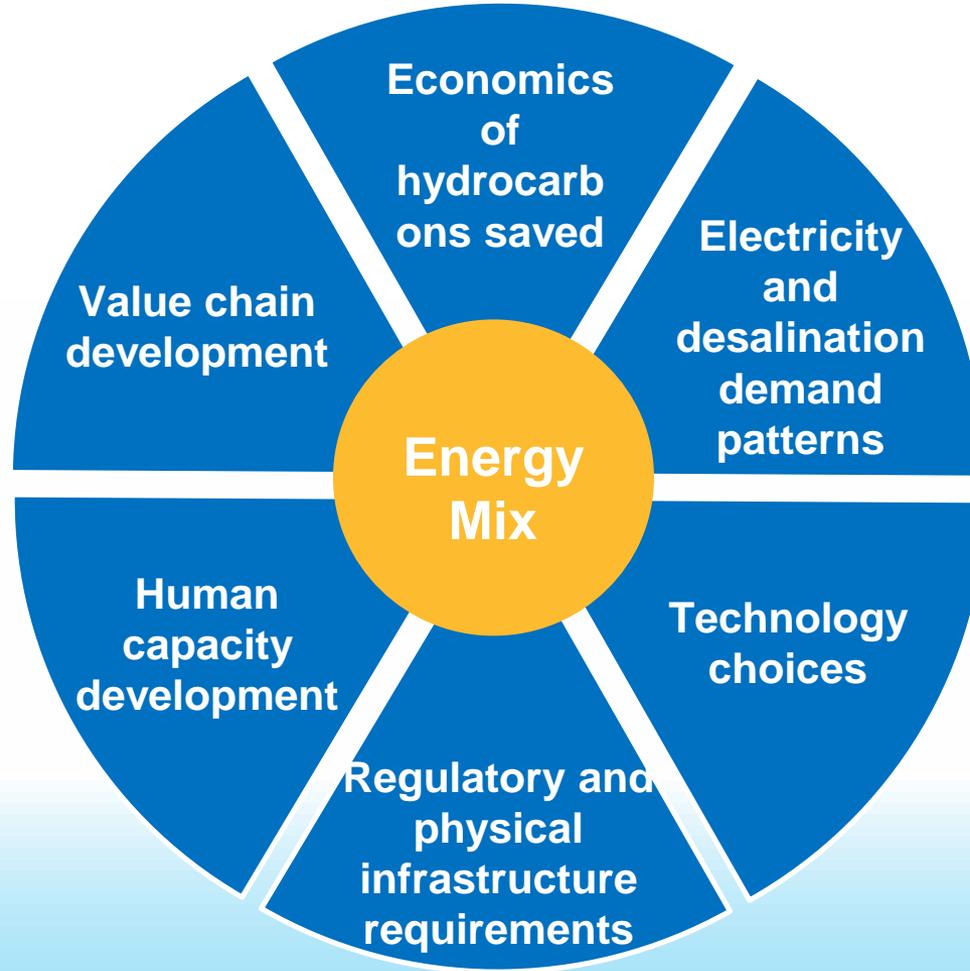


# Energy Consumption Patterns

Total of 193,472 GWH



# Criteria for Energy Mix Selection



# Maximizing Return

Oil  
Saved

Economic  
Sector

Sustainability

How Much **Can** We Do ?

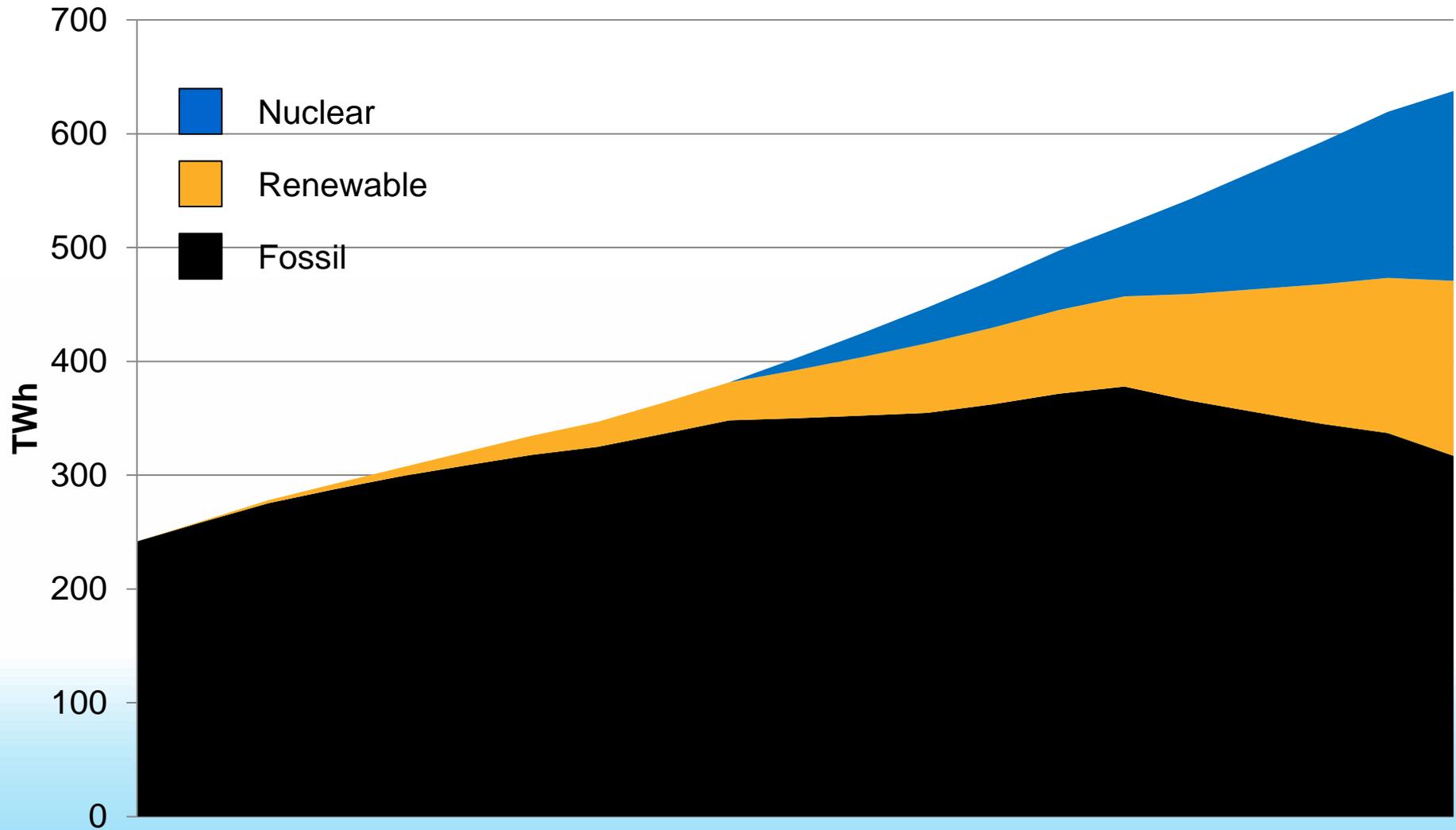
- Demand Growth
- Demand Pattern
- Technology Characteristics

How Much **Should** We Do ?

- Economics
- Sustainability
- Technology maturity



# Gradual offsetting of fossil energy reaching 50% by 2040





# K.A.CARE Strategy

# K.A.CARE Initiatives



# K.A.CARE's Initiatives

Value Chain Studies

Human Capacity Building

**Sustainability Initiatives**

Research & Development

Sustainable Grid  
Integration

Infrastructure Self  
Assessment

Site Survey Study

**Atomic Energy Initiatives**

Establishing an  
Independent Regulatory  
Body

International Framework



# K.A.CARE's Initiatives

- **Sustainability Initiatives:**
  - ✓ **Value Chain Studies**
  - ✓ **Human Capacity Building**
  - ✓ **Research & Development**
  - ✓ **Sustainable Grid Integration**



# The Atomic Energy Sector

- **Safety First**
- **Transparency**
- **Civil Applications Only**
- **Involve Saudi Stakeholders**
- **World-Wide Cooperation and Coordination**
- **Highest Standards and Best Practices**
- **Independent, Credible Regulator**
- **Role of Atomic Energy in Improving the Environment and Sustaining the Economy**
- **Nuclear Value Chain Development**



# Atomic Energy Initiatives

- ✓ **Infrastructure Self Assessment**
- ✓ **Site Survey Study**
- ✓ **Establishing an Independent Regulatory Body**
- ✓ **International Framework**



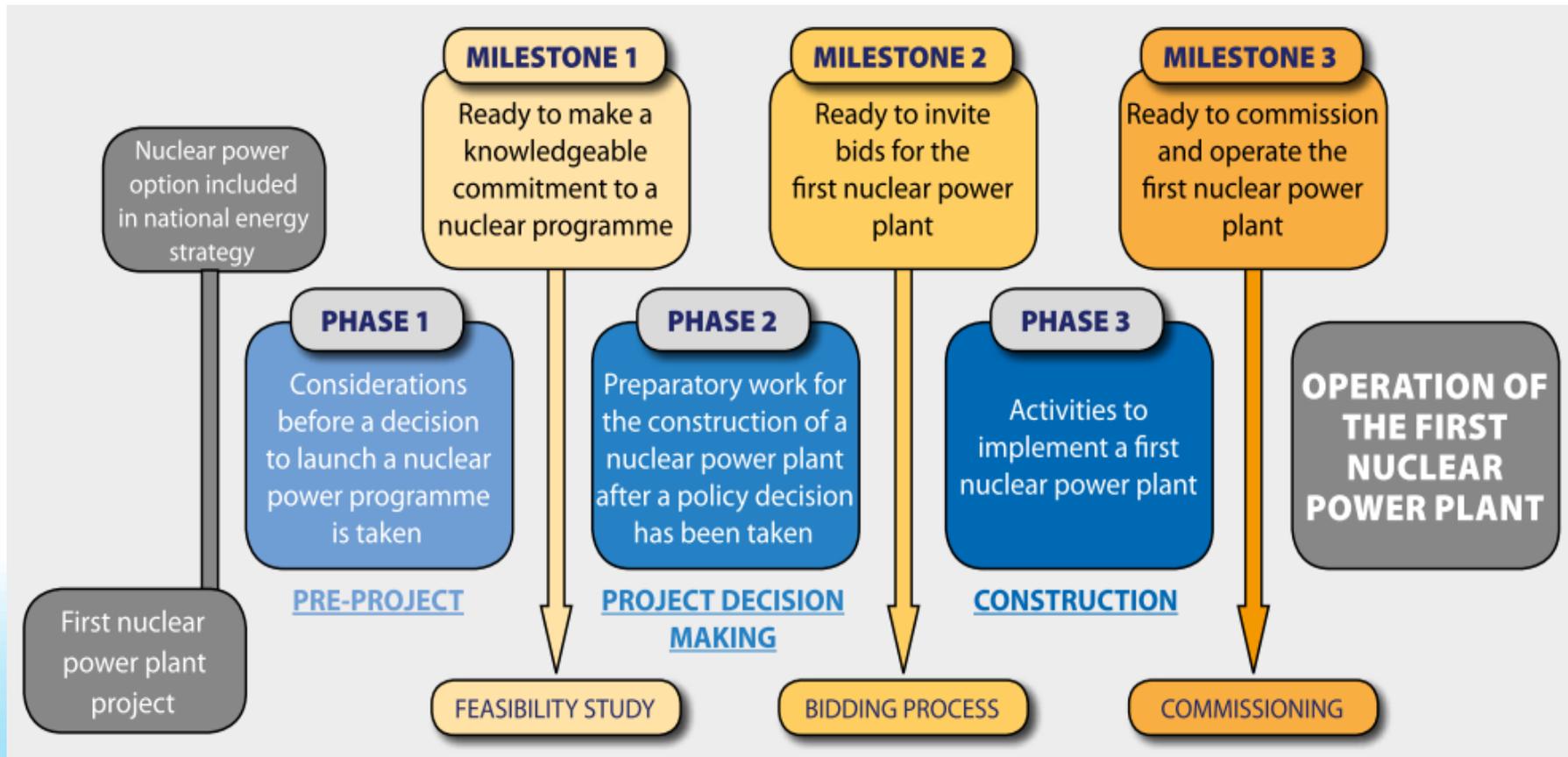
# Atomic Energy Initiatives

- ✓ **Infrastructure Self Assessment**
- ✓ **Site Survey Study**
- ✓ **Establishing an Independent Regulatory Body**
- ✓ **International Framework**



# Infrastructure Self-Assessment

## Self Assessment Criteria



# Infrastructure Self-Assessment

## Self Assessment Criteria

19. Procurement 18. Industrial Involvement 17. Radioactive Waste Management 16. Nuclear Fuel Cycle 15. Security & Physical Protection 14. Emergency Planning	Implementation
13. Environmental Protection 12. Site & Supporting Facilities 11. Stakeholder Involvement 10. Human Resources 9. Electrical Grid	Infrastructure
8. Radiation Protection 7. Regulatory Framework 6. Safeguards 5. Legislative Framework	Laws, Regulations, Standards
4. Funding & Financing 2. Nuclear Safety 3. Management	National Organisation & Control
1. National Position	Strategy



# Atomic Energy Initiatives

- ✓ Infrastructure Self Assessment
- ✓ **Site Survey Study**
- ✓ Establishing an Independent Regulatory Body
- ✓ International Framework



# Stages 1 & 2 : Screening Potential Sites

## Potential Site Descriptions Prepared:

- Conceptual Development Schemes
- Site Development Characteristics (documenting key site attributes based on discipline literature reviews and site inspections).

## Potential Site Screening to identify Candidate Sites based on assessments using Methodology / Criteria Groupings:

- Health and Safety
- Engineering/Economics
- Environmental/Sociological



# Atomic Energy Initiatives

- ✓ Infrastructure Self Assessment
- ✓ Site Survey Study
- ✓ **Establishing an Independent Regulatory Body**
- ✓ International Framework



# Regulatory Body Organization

- KACARE is the Competent Authority.

Royal Decree establishing KACARE:

## *Article 4*

*The City shall be the **competent authority** to meet the **national obligations with regard to all agreements signed or to be signed by the Kingdom regarding atomic and renewable energy. The City shall take the responsibility for supervising and controlling all works related to the use of atomic energy and the resultant radioactive waste.***



# Regulatory Body Organization

- KACARE is the Competent Authority.
- Independent Regulatory body is in a development stage and is incubated in K.A.CARE.
- On an interim basis the competent authority is a unit within AES in KACARE
  - Mission Oriented Structuring
  - Parallel Functionality
  - Prioritization
  - Learn & Develop While Doing (Manpower)
  - Others (Partnership, TSO, ISO, ...etc.)



# Regulatory Body Organization

- The regulatory body is responsible for the following:
  - Fulfilment of national regulatory functions
  - Setting up and enforcing rules and regulations
  - Fulfilment of national and international obligations in terms of 3 Ss of relevant nuclear installations
  - Overseeing Export/Import controls

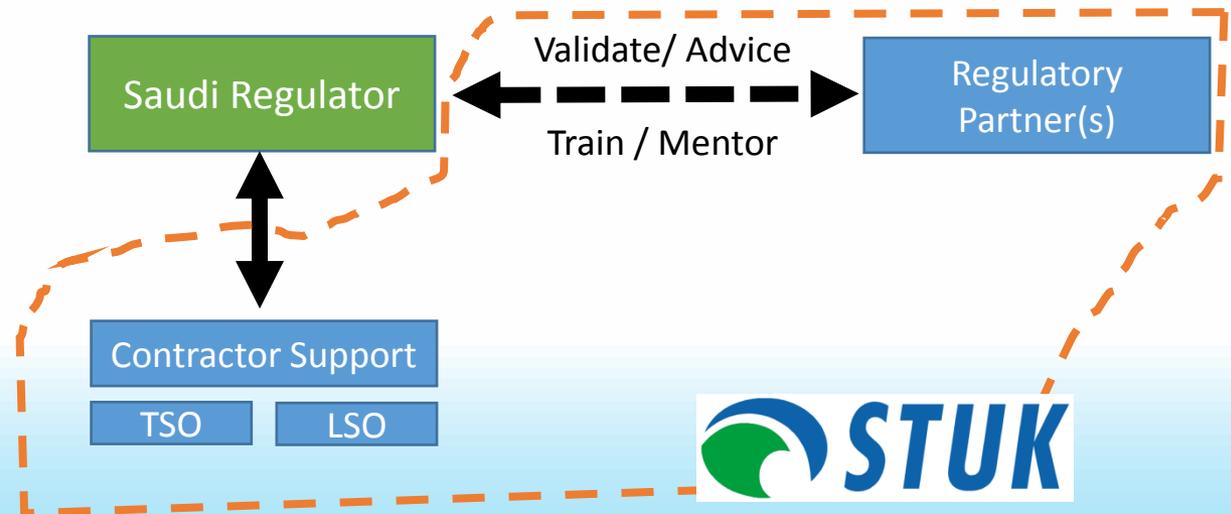


# Technical Regulatory Support Partnership

- Technical Partner :



- Support Areas to the LPRR Licensing:
  - Evaluation of license application
  - Safety case evaluation
  - Safeguards and security
  - Inspection
  - Training



# Phase I

**#1:** On-Site Support Services

**#2:** Setting up the Master Plan

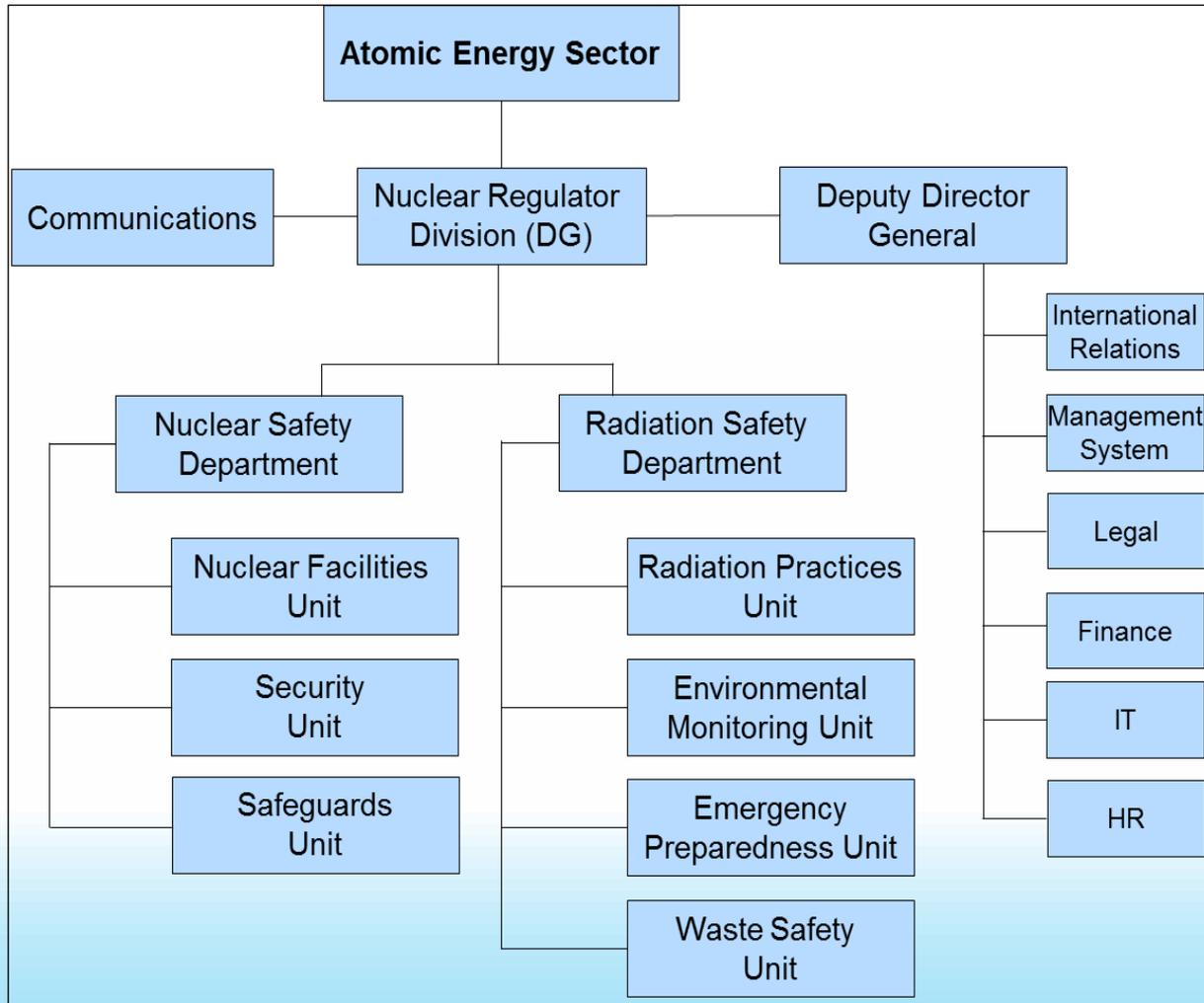
**#3:** The Regulator Establishment: Near-term measures, strategy, and roadmap

**#4:** Initiating Nuclear Safeguards & Security Activities in the Regulator

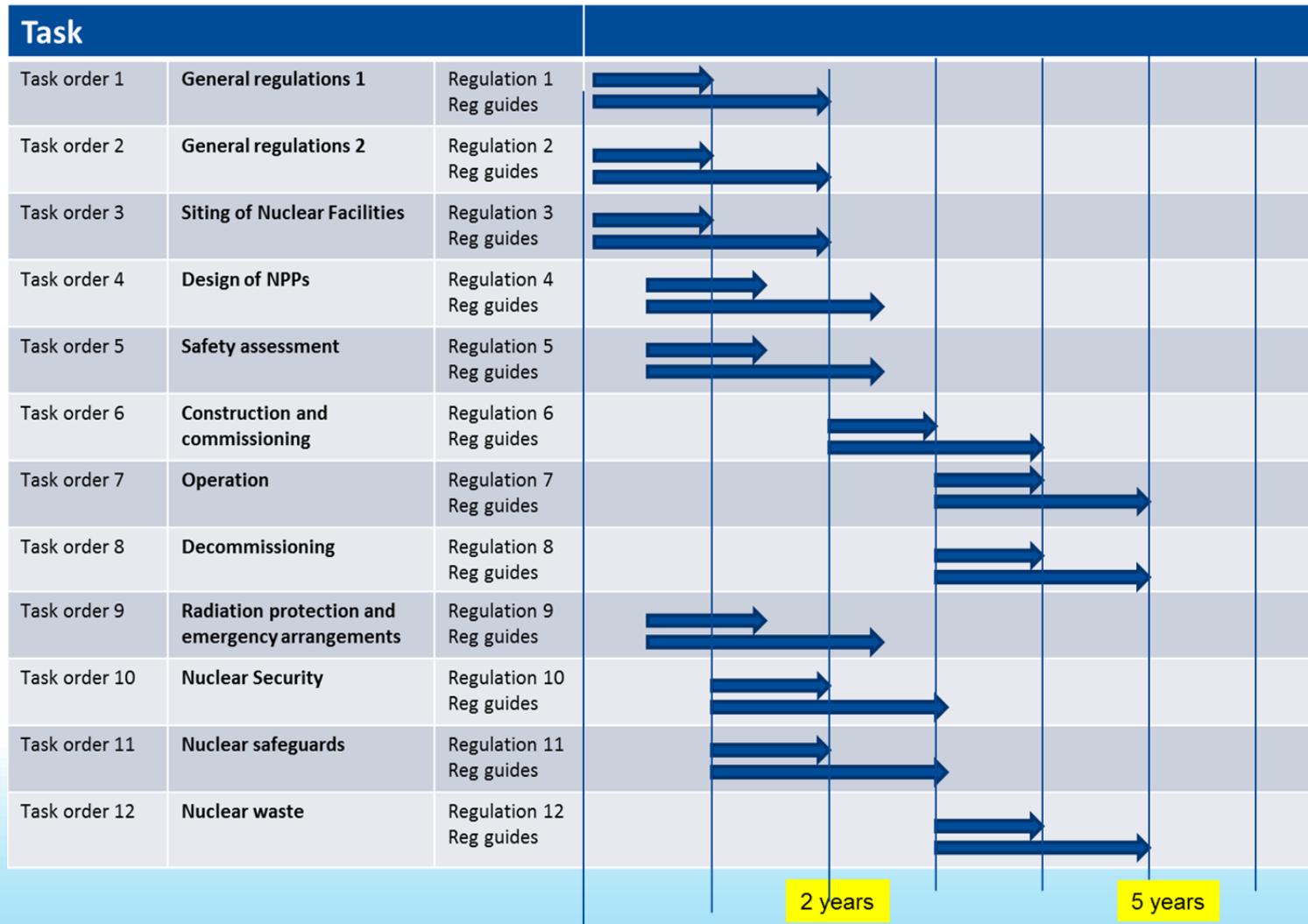
**#5:** Integration of Radiation Protection Activities to the Regulator



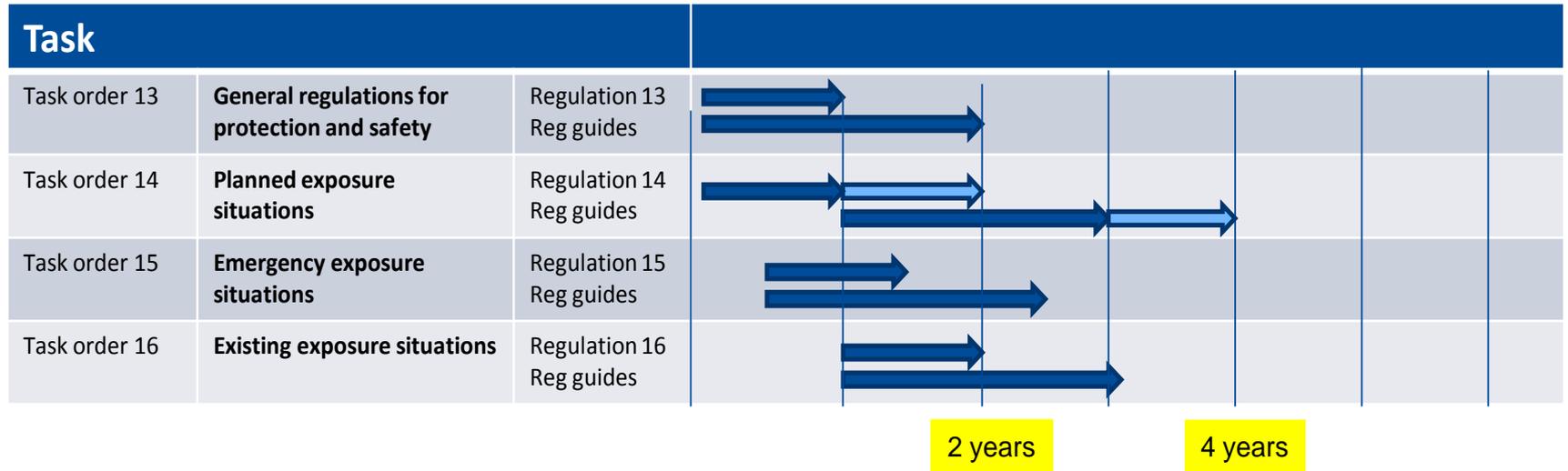
# Regulator's Interim Organizational Structure



# Development of Regulatory Framework



# Development of Regulatory Framework



# Licensing lifecycle of the LPRR



# Regulatory Body Building Approach

- “Modular/Scalable” (in size)
- In Stages (in time)
- Evolutionary (depending on future decisions)
- Tailored to KSA culture, needs (not copy/paste)
- Joint “Design” and “Implementation” of the Regulatory Body
- Bridging past “legacy” activities to the nuclear “future”
- Filling existing gaps for immediate needs and State obligations
- Availability of fully fledged functions as the NPP Program needs develop.





# Atomic Energy Initiatives

- ✓ **Infrastructure Self Assessment**
- ✓ **Site Survey Study**
- ✓ **Establishing an Independent Regulatory Body**
- ✓ **International Framework**



# Multilateral Activities

<b>IAEA</b>	<b>other</b>
<b>Board of Governors</b>	<b>Nuclear Security Summit</b>
<b>Capacity Building</b>	<b>Other Treaties and Conventions</b>
<b>Technical Cooperation</b>	
<b>Safe Guards</b>	
<b>Nuclear Security</b>	
<b>Nuclear Applications</b>	



# Bilateral Nuclear Cooperation Agreements

Signed	Under Discussion
France	USA
Korea	Egypt
Argentina	UK
China	Hungary
Russia	Canada
Finland	South Africa
Jordan	Spain
	Japan
	Belgium



شكراً جزيلاً  
Thank you

