

Study on Underground Gas Storage in Europe and Central Asia

**Working Party on Gas
Geneva,
January 22, 2013**

G.-H. Joffre (Storengy) et al.

**United Nations Economic Commission for Europe
Committee on Sustainable Energy**



Study on Underground Gas Storage in Europe and Central Asia

Summary :

- **Introduction**
- **Structure of the UGS Study**
- **Progress**
- **Results**
- **Conclusions**



Study on Underground Gas Storage in Europe and Central Asia

Introduction :

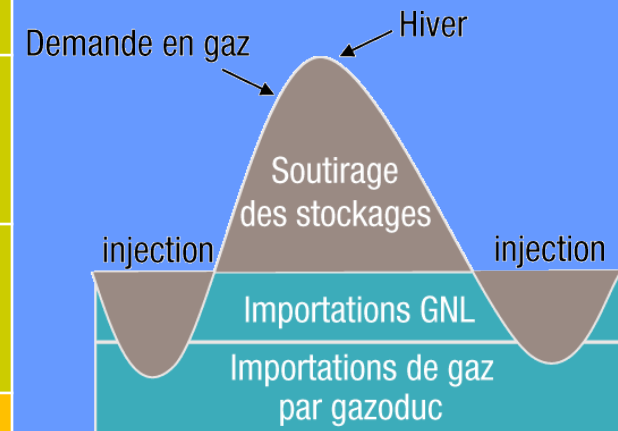
- **The Study on UGS in Europe and Central Asia is an update of a first Study carried out in 90's;**
- **The Study aimed at benchmarking all aspects of underground gas storage in Europe and Central Asia;**
- **The task force, created in 2008, welcomed Members from Gas companies, National Authorities (Mining Authorities, Regulators,...) or International Bodies (IGU, GSE, IEA, ...);**
- **As a principle, an efficient use was made of already available data (IGU, GSE, IEA...) and a co-operation contract was signed with IGU for exchanging data.**



Study on Underground Gas Storage in Europe and Central Asia

Introduction : Status of the UGS market

Main drivers	Trends
CRISIS	All players affected
RENEWABLE ENERGIES	Shut down of gas power plants
GAS DEMAND	No growth
LNG (US SHALE GAS)	Gas available at low cost / Competitor for flexibility
SECURITY OF SUPPLY (climatic risk)	No willing for bearing this responsibility / risk
OPTIMISATION AND BALANCE OF TRANSMISSION NETWORKS	Use other flexibility tools
SPREAD (winter vs summer prices)	Strong decrease (5-6 €/MWh vs 15 a few years ago)



Study on Underground Gas Storage in Europe and Central Asia

Structure of the Study (1) :

- **Chapter 1 : New and emerging technologies :**
 - to identify innovations in UGS business that may lead to a better cost efficiency,
 - to list the technologies that have been put in place or that are planned to be put in place to improve efficiency of the facility, in terms of quality of service, responsiveness to Client or cost.
- **Heads :** *Mr A. Iskhakov (Gazprom) and Mr C. Gomez-Montalvo (Geostock)*



Study on Underground Gas Storage in Europe and Central Asia

Structure of the Study (2) :

- **Chapter 2 : Current UGS status : set up an updated data base for all existing UGS plants in each country,**
- **Heads :** *Mr M. Sandu (Romgaz), and Mr B. Ernecic (PSP) with support of Mr J. Wallbrecht (IGU) and Mr A. Iskhakov (Gazprom)*



Study on Underground Gas Storage in Europe and Central Asia

Structure of the Study (3) :

- Chapter 3 : Market structure and legal framework : describe the legislation and guidelines for UGS market organization (incl. TPA rules) and UGS services,
- **Heads** : *G.-H. Joffre (Storengy) with support of Mr J. Wallbrecht (IGU), Ms A. Brandenburger & A. Ramm (RWE Gasspeicher)*



Study on Underground Gas Storage in Europe and Central Asia

Structure of the Study (4) :

- Chapter 4 : UGS projects : set up a data base for planned projects in each country including criteria for selecting projects,
- **Heads** : *Mr M. Sandu (Romgaz) with support of Mr J. Wallbrecht (IGU), Ms A. Brandenburger (RWE Gasspeicher)*



Study on Underground Gas Storage in Europe and Central Asia

Structure of the Study (5) :

- Chapter 5 : Legal framework for development and operation : provide with all useful information (legislation and procedures) necessary for granting consents and authorizations to SSO,
- **Heads** : *Mr T. Korosi (Hungarian Energy Office), Mr W. Rokosz (PGNiG) and Mr G.-H.Joffre (Storengy) with support of Ms A. Brandenburger (RWE Gasspeicher) and Mr M. Laczko (E.ON Földgaz Storage),*



Study on Underground Gas Storage in Europe and Central Asia

- Progress

	2008	2009	2010	2011	2012	2013
NUMBER OF MEETINGS	3	5	4	4	3	
TERMS OF REFERENCE	100%					
QUESTIONNAIRE	0%	80%	95%	100%		
ON-LINE QUESTIONNAIRE	0%	10%	95%	100%		
LETTERS OF INVITATION	0%	95%	95%	100%		
IGU CONTRACT	0%	10%	100%			
ANSWERS TO QUESTIONNAIRE	0%	0%	0%	0%	20 -30 % (60% of WGV)	
ANALYSIS AND WORDING THE REPORT	0%	0%	0%	0%	90%	100%
HARMONIZATION & FORMATTING	0%	0%	0%	0%	0%	98%

Study on Underground Gas Storage in Europe and Central Asia

Results of the Study

- **The questionnaire was completed by 20% of NRAs and 30% of companies, but representing main gas industries and main Working gas volumes (60%).**
- **A document of 120 pages including 112 figures was drawn up.**
- **All workable information was restored from the questionnaire, analysed and presented in a way to be exploited by all gas industry stakeholders.**
- **In the next slides, some figures have been selected to show the amount and the diversity of information collected and analysed.**



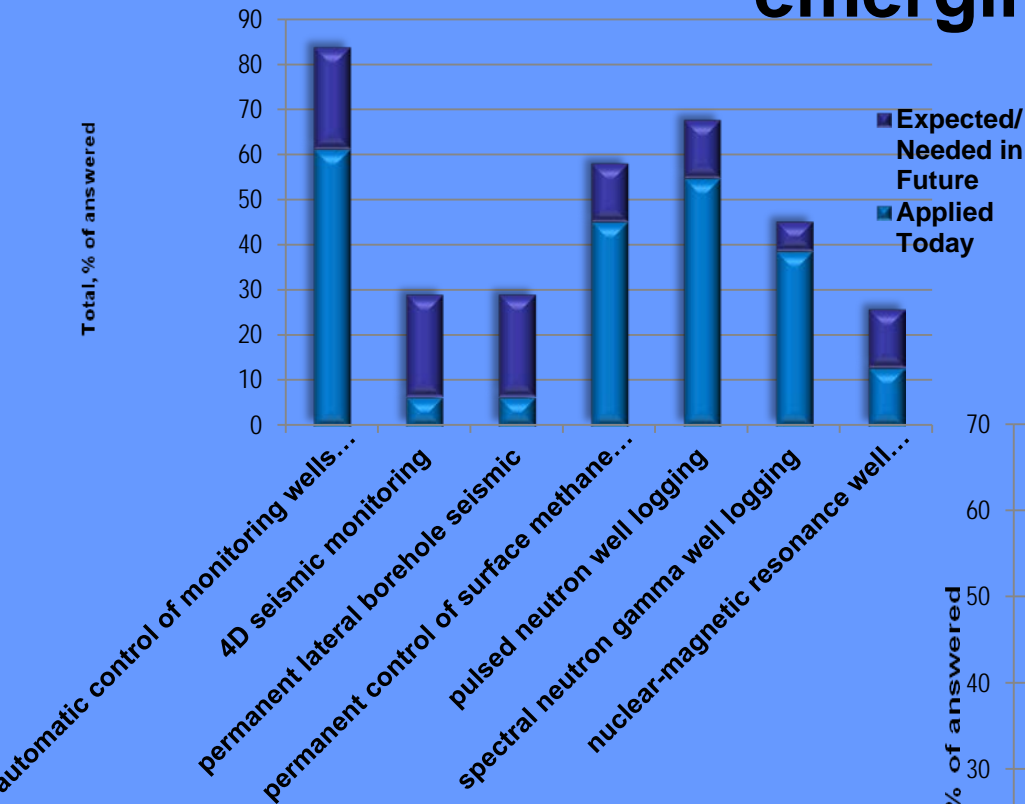
Results of Chapter 1

New and emerging technologies

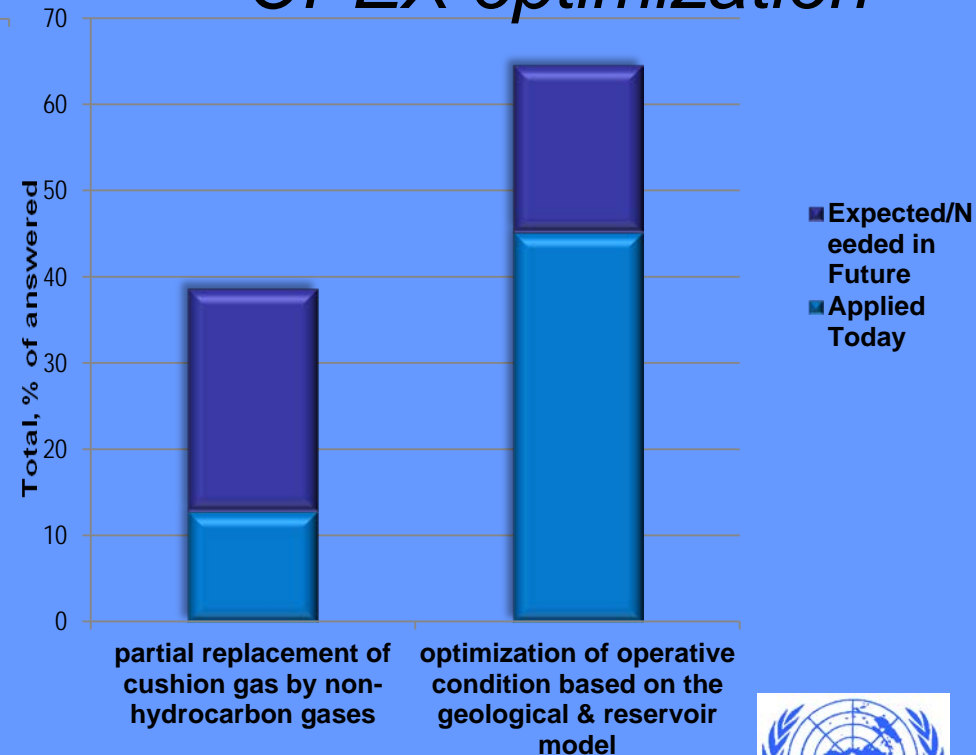
**Questionnaire completed by
Storage companies**



Results of Chapter 1 : New and emerging technologies



Applying of production methods to CAPEX and OPEX optimization



Monitoring of safe UGS exploitation



Results of Chapter 2

Existing Storage facilities

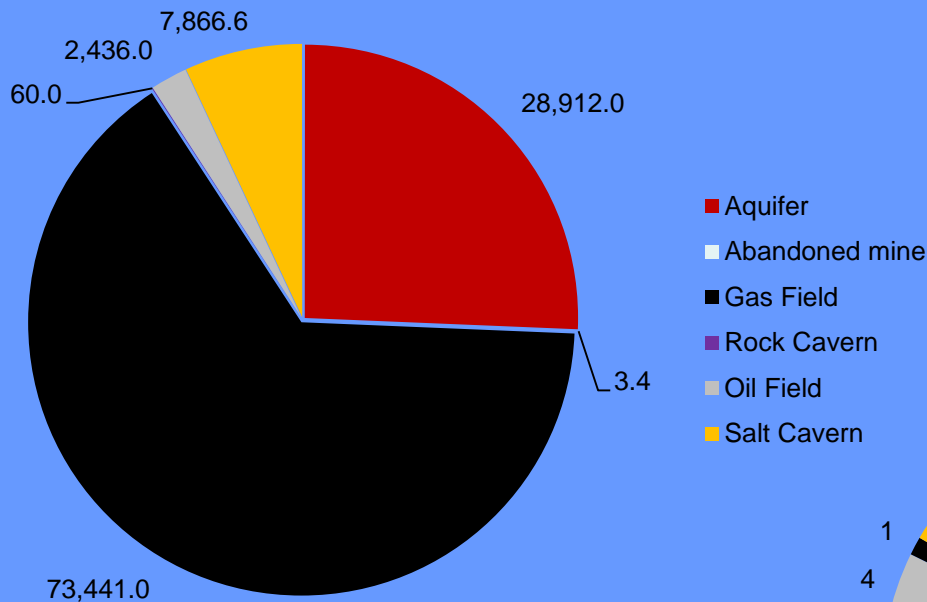
:

**Questionnaire completed by
Storage companies**

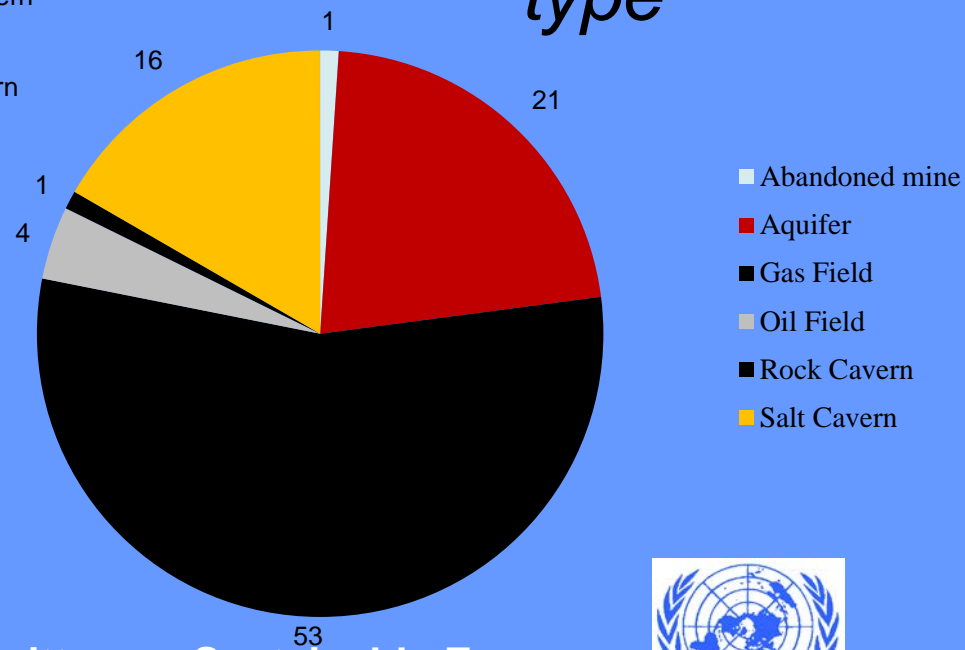


Results of Chapter 2 : Existing Storage facilities

*Working capacities
by UGS type (Bcm)*



*UGS distribution by
type*



Results of Chapter 3

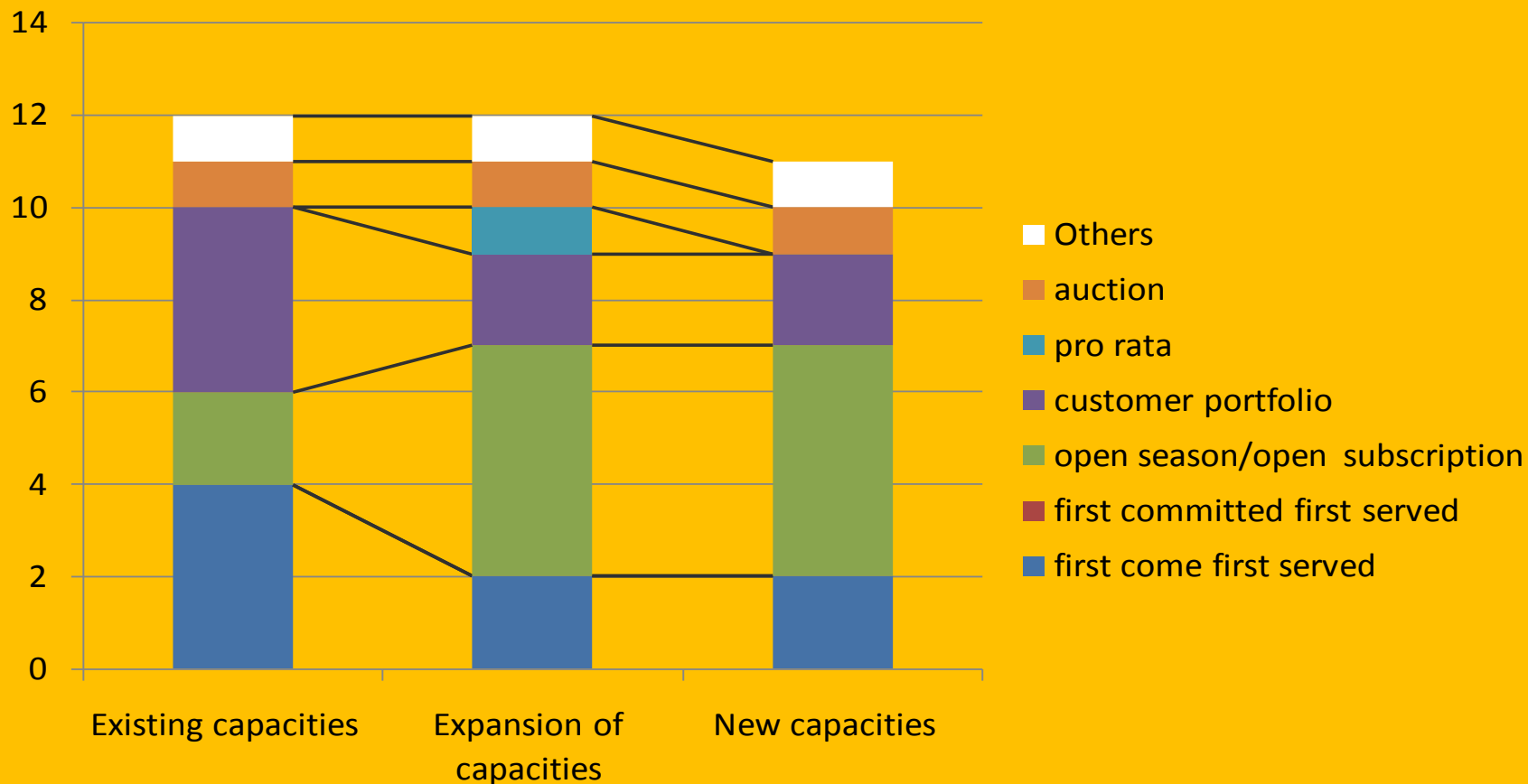
Organization of the market

Part A : Questionnaire completed by National Regulation Authorities



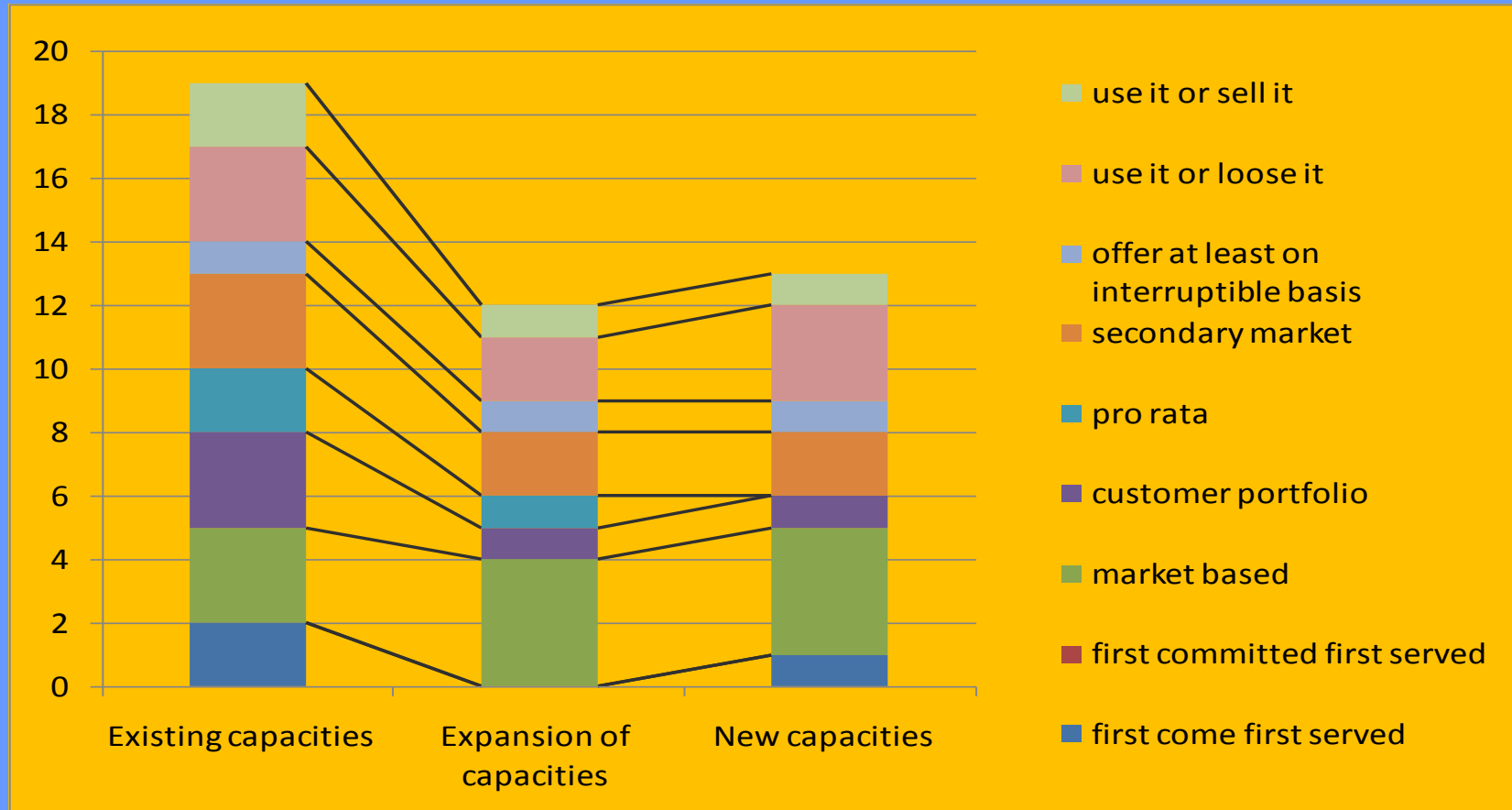
Results of Chapter 3 A: Market Organization

Which legal requirements on Capacity Allocation Management are in place ?



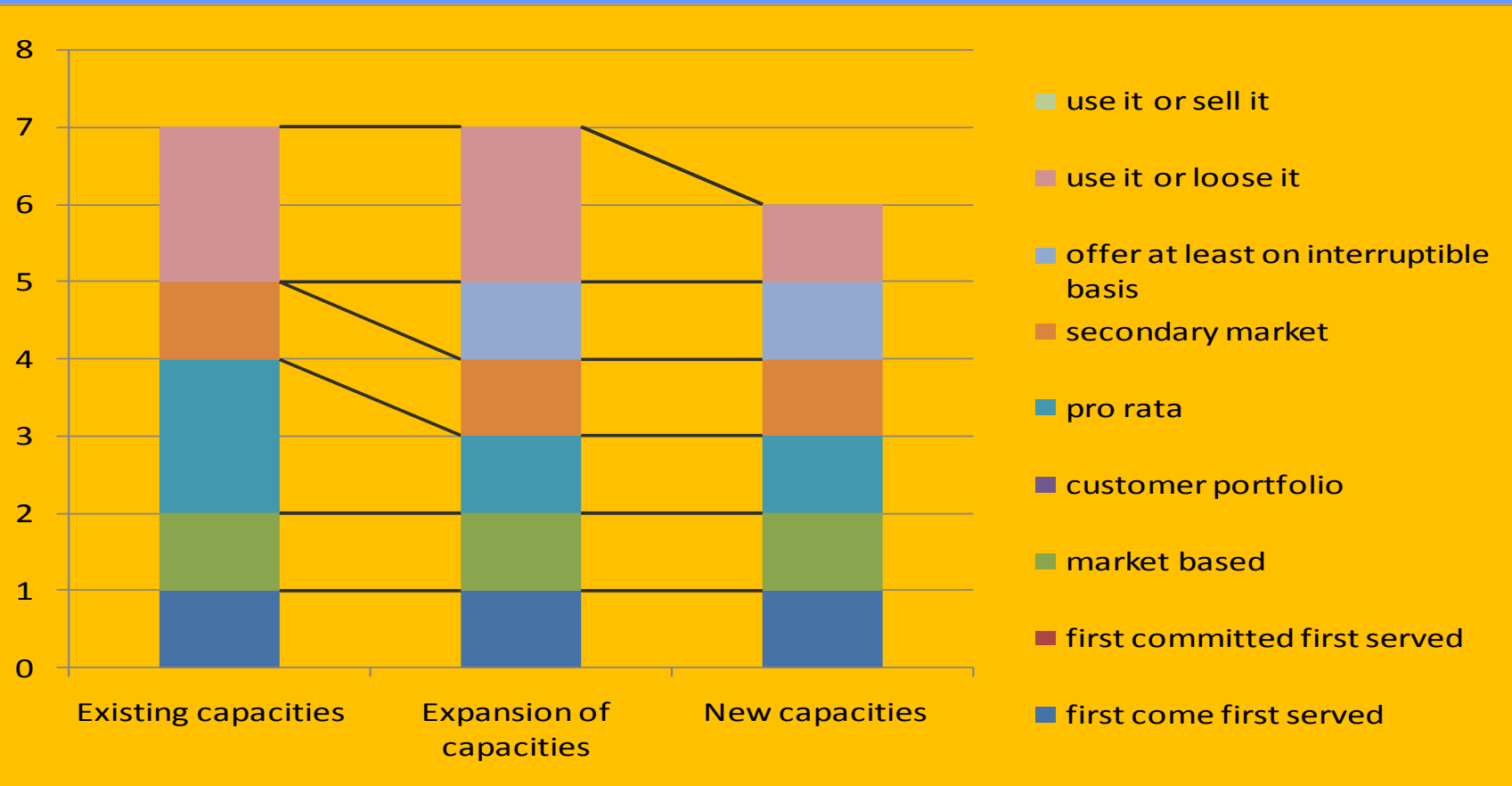
Results of Chapter 3 A: Market Organization

Which legal requirements for Congestion Management are in place ?



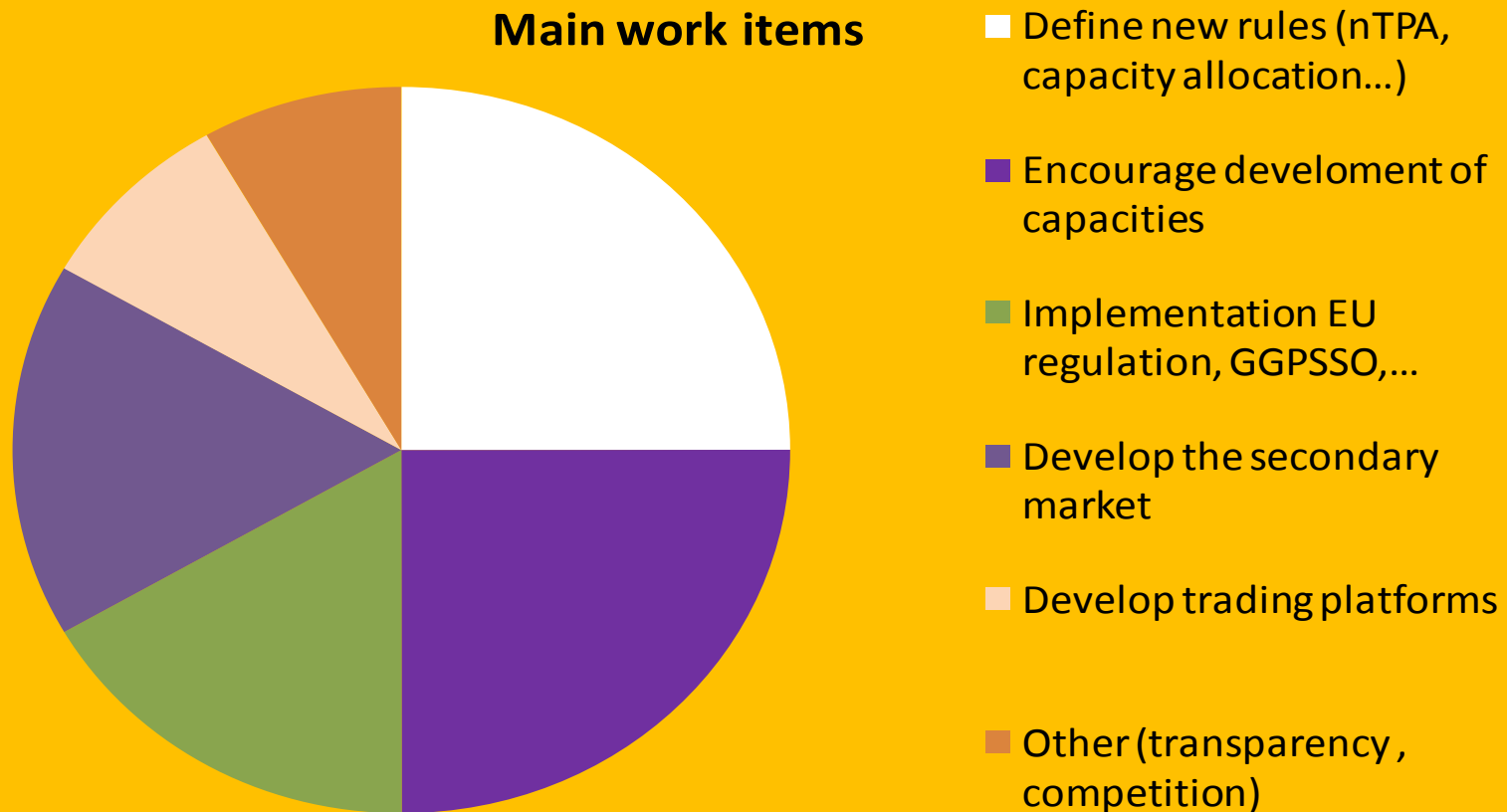
Results of Chapter 3 A: Market Organization

If no legal requirements on CMP, which CMP put in place by SSO ?



Results of Chapter 3 A: Market Organization

What are your main work items regarding storage market arrangements in the next years ?



Result of Chapter 3

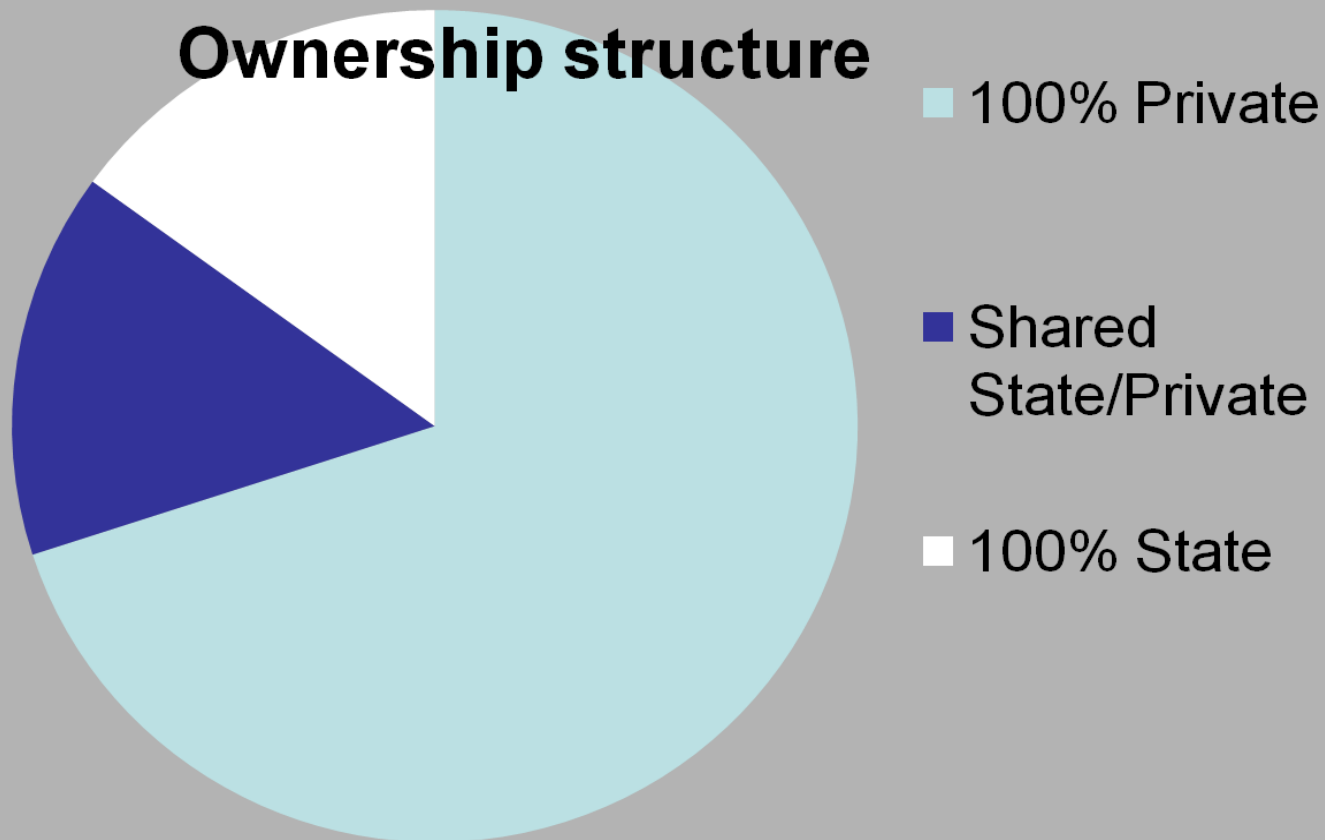
Organization of the market

Part B : Questionnaire completed by SSOs



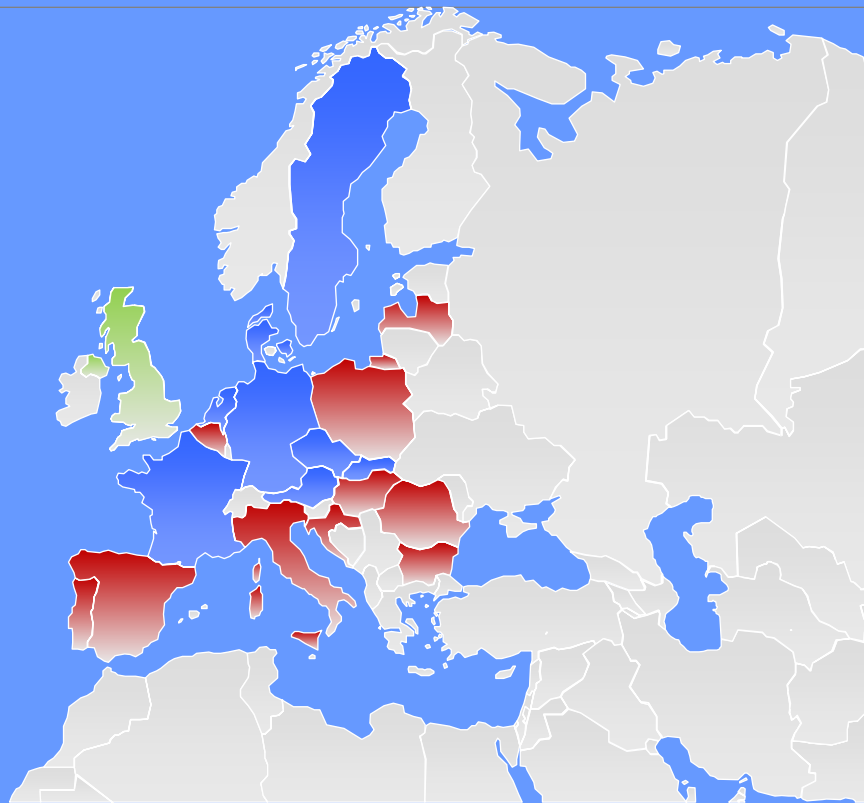
Results of Chapter 3 B: Market Organization

Ownership structure



Results of Chapter 3 B: Market Organization

TPA (Third Party Access) to gas storage



TPA →

Indicates the applicable access regime:

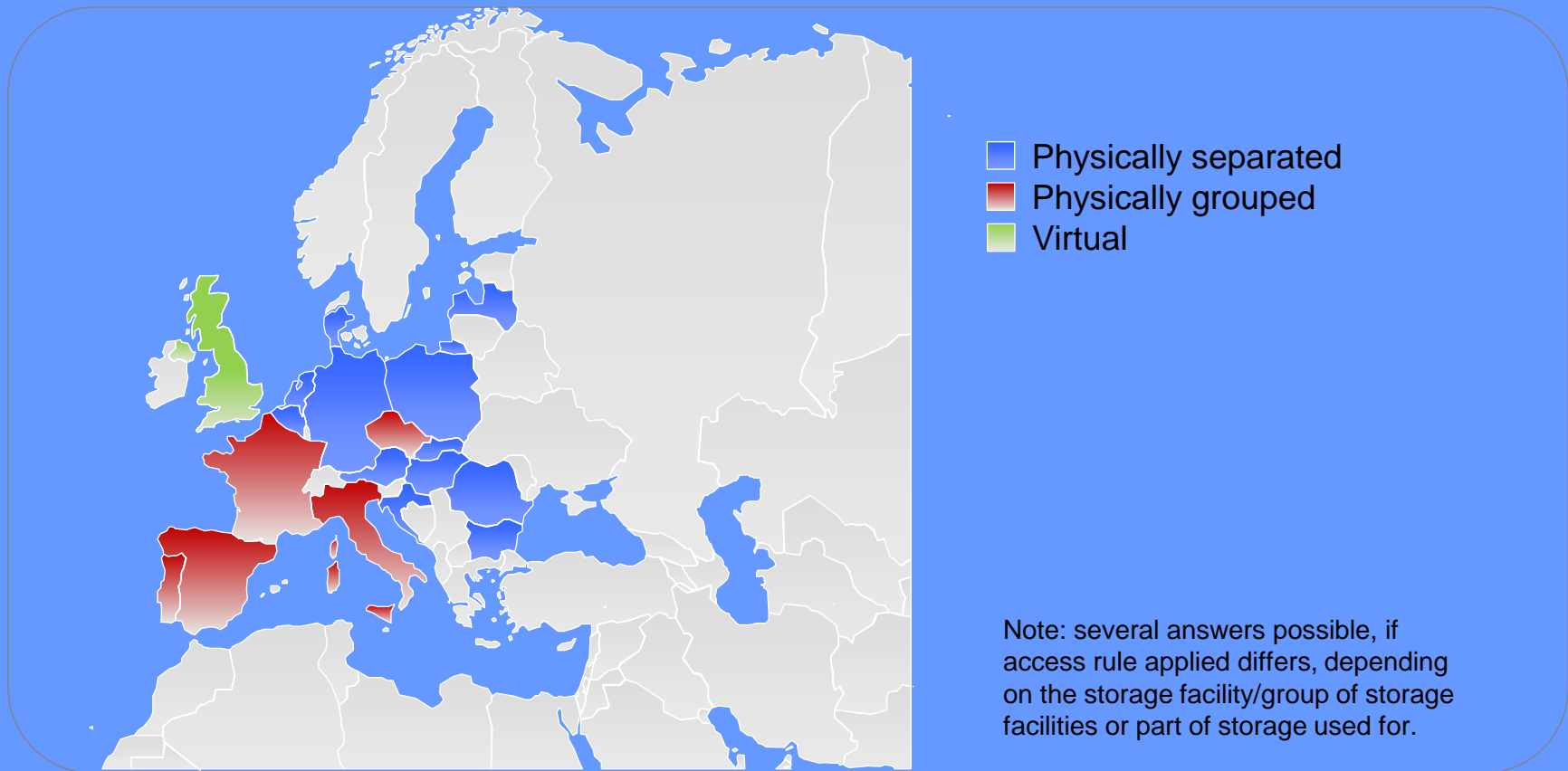
- Negotiated
- Regulated
- Hybrid
- Not Applicable

Note: several answers possible, if access rule applied differs, depending on the storage facility/group of storage facilities or part of storage used for.



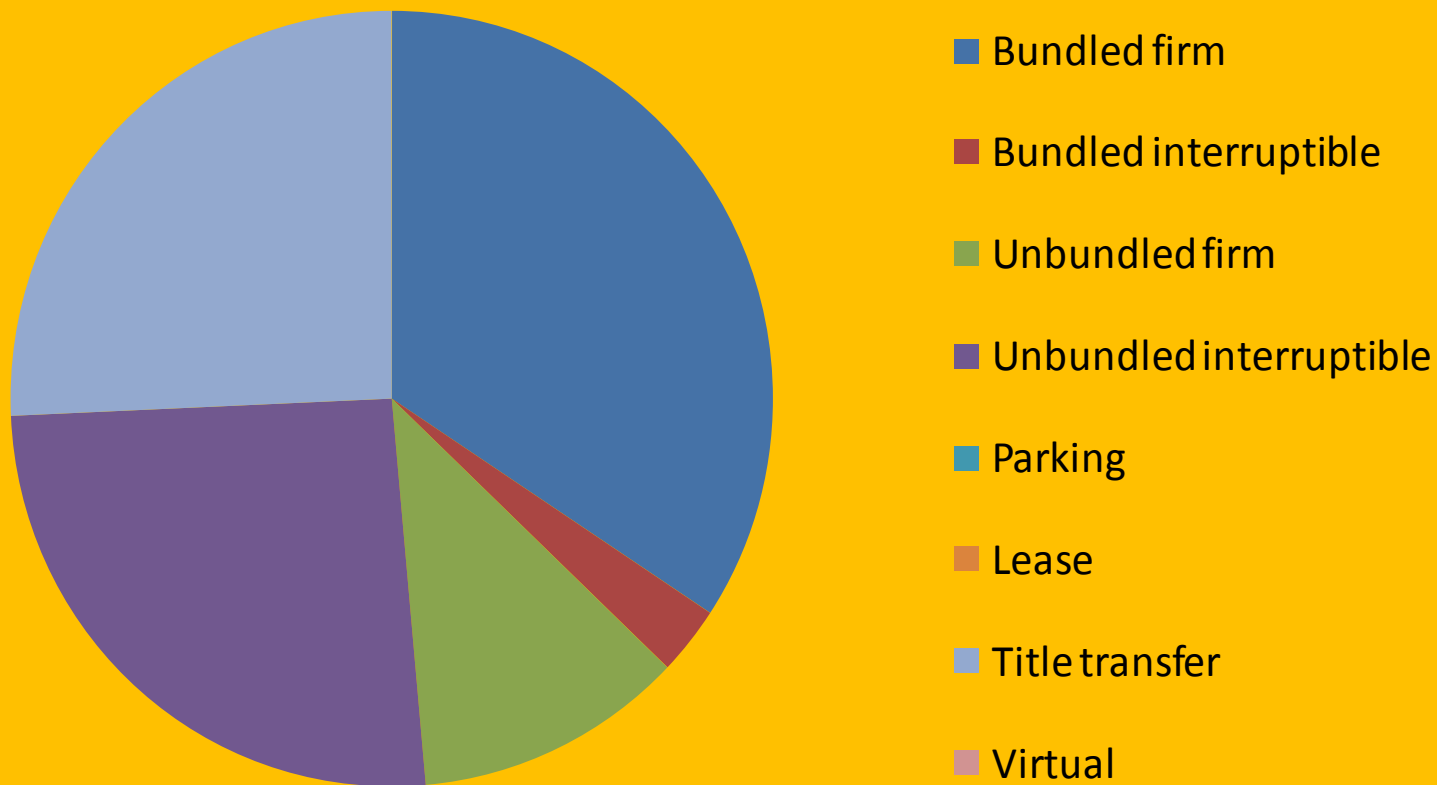
Results of Chapter 3 B: Market Organization

How is your storage service offered ?



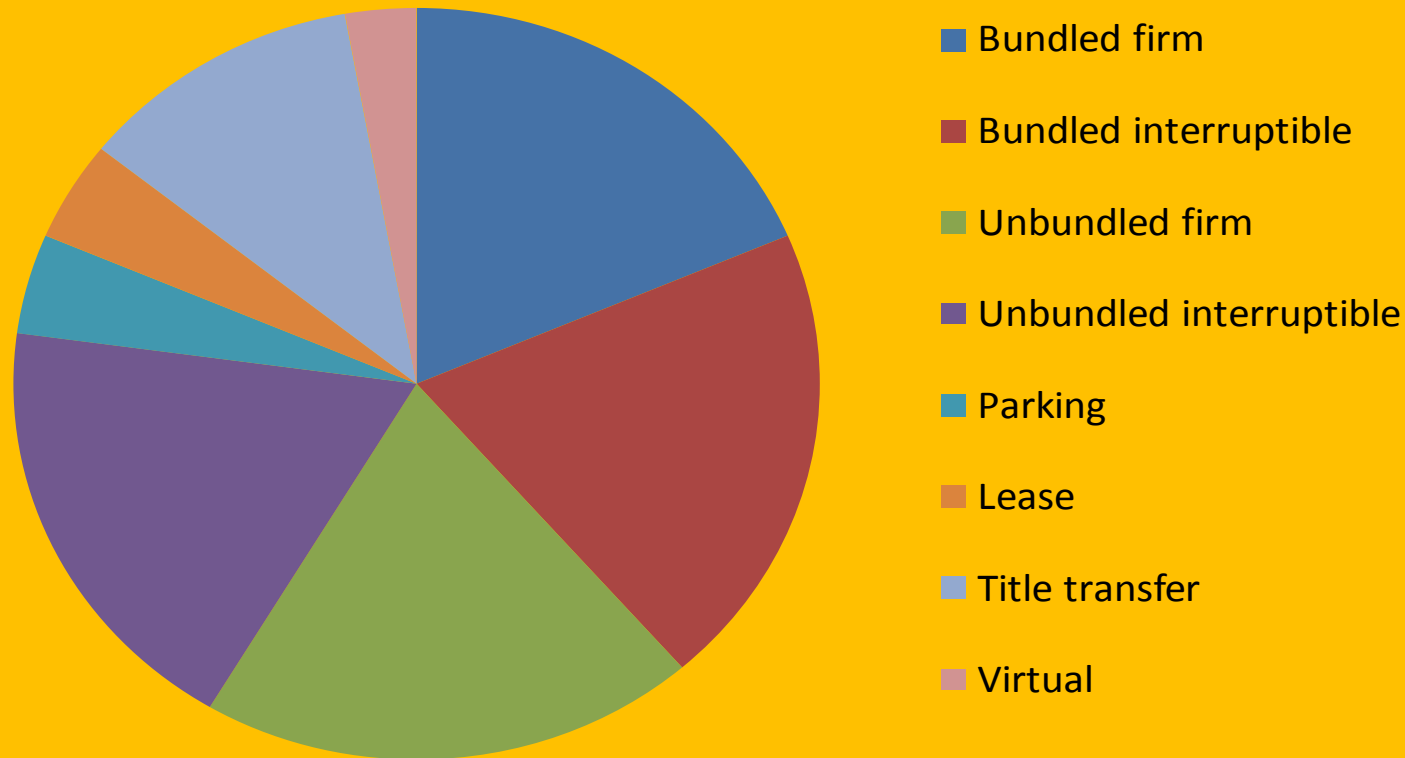
Results of Chapter 3 B: Market Organization

*What kind of services do you offer
For Aquifers*



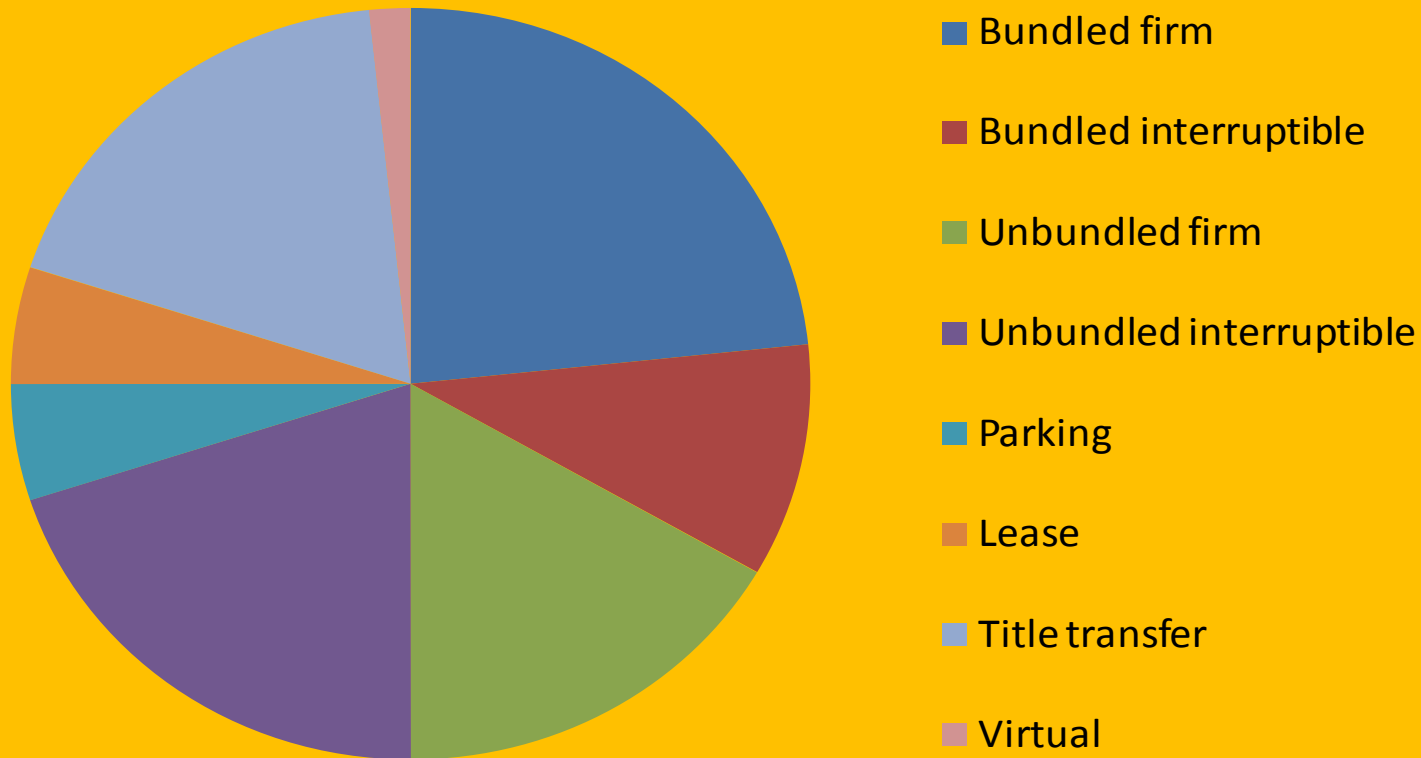
Results of Chapter 3 B: Market Organization

*What kind of services do you offer
For Depleted fields (oil & gas)*



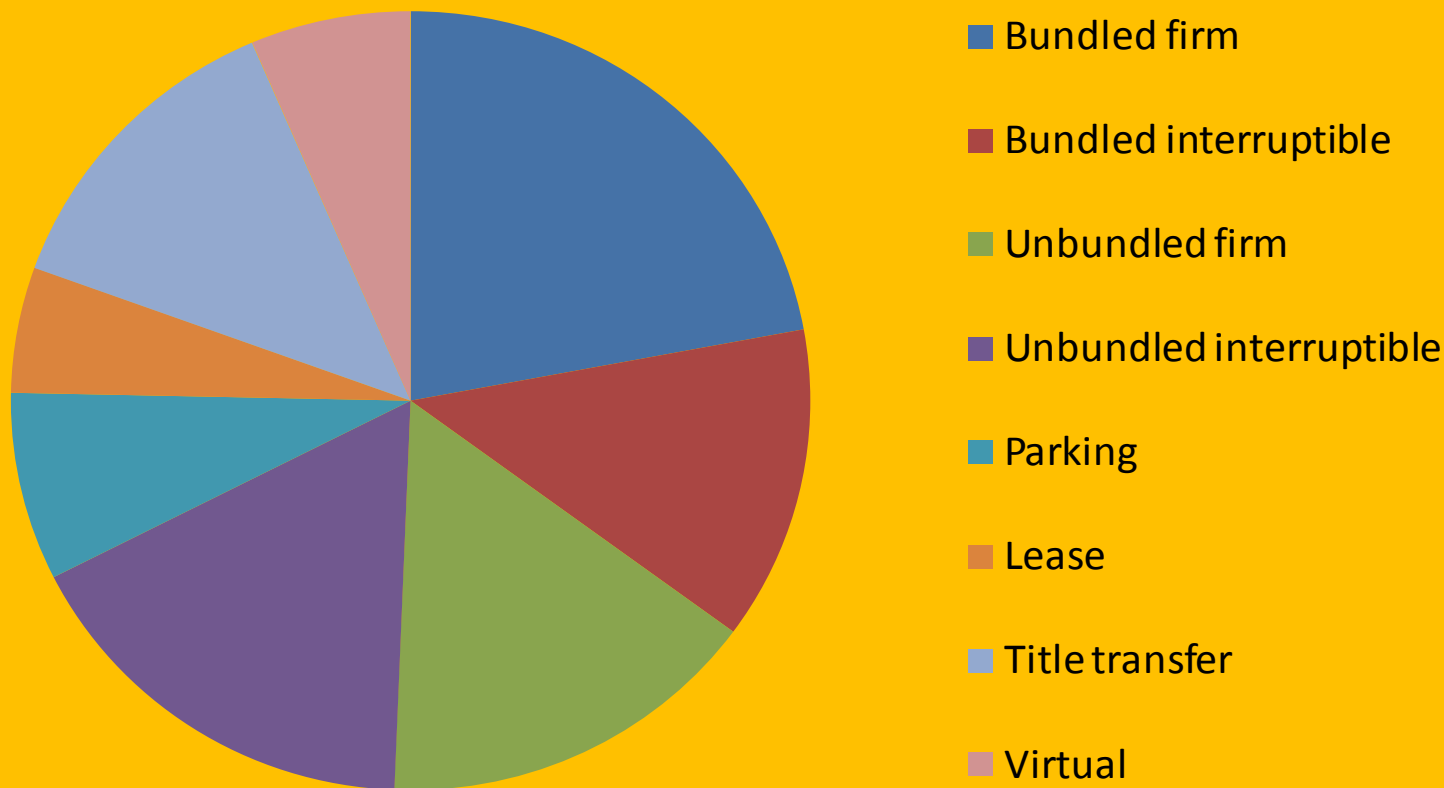
Results of Chapter 3 B: Market Organization

*What kind of services do you offer
For salt caverns*



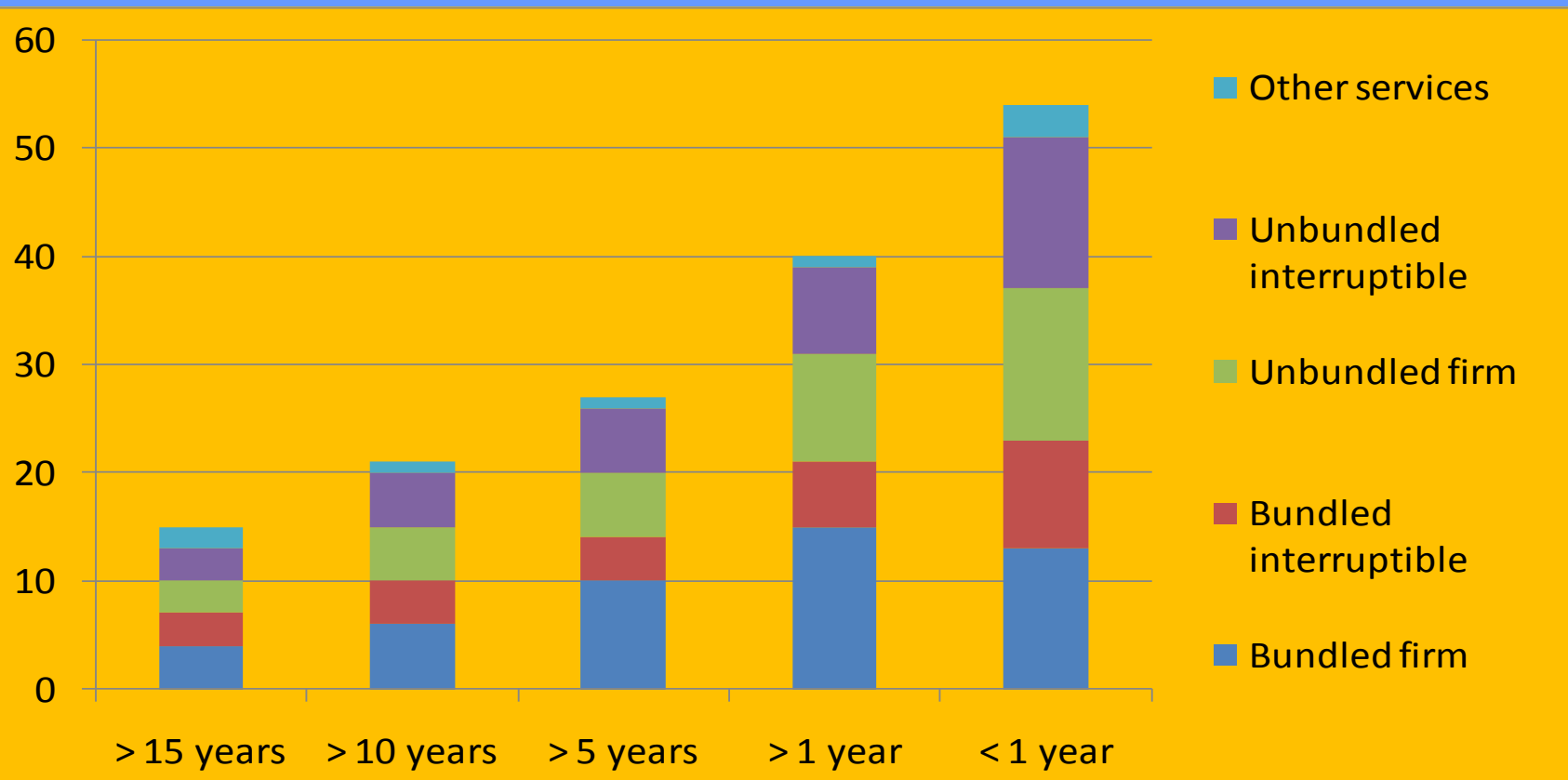
Results of Chapter 3 B: Market Organization

What kind of services have been demanded ?



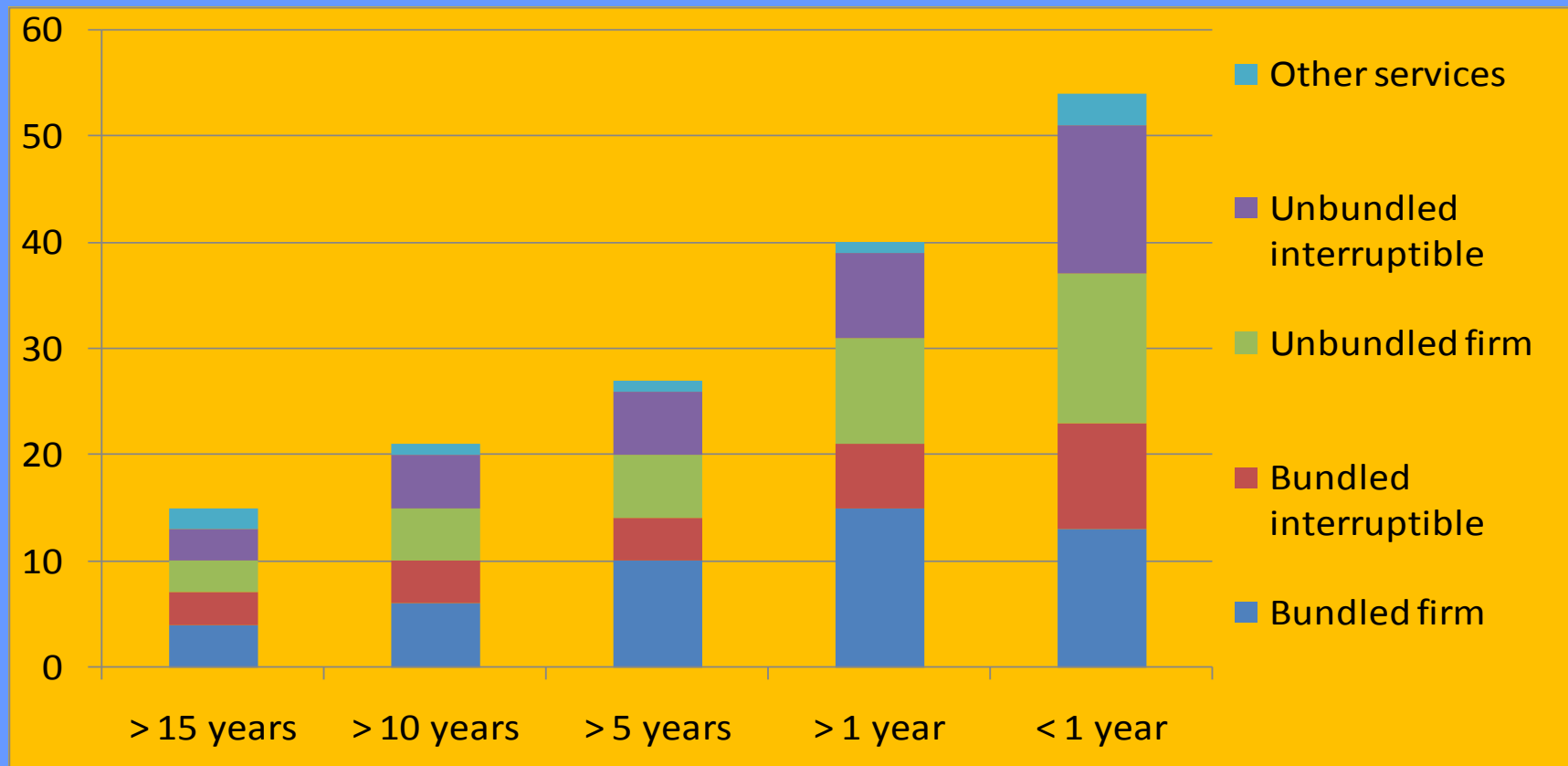
Results of Chapter 3 B: Market Organization

What kind of contract durations do you offer ?



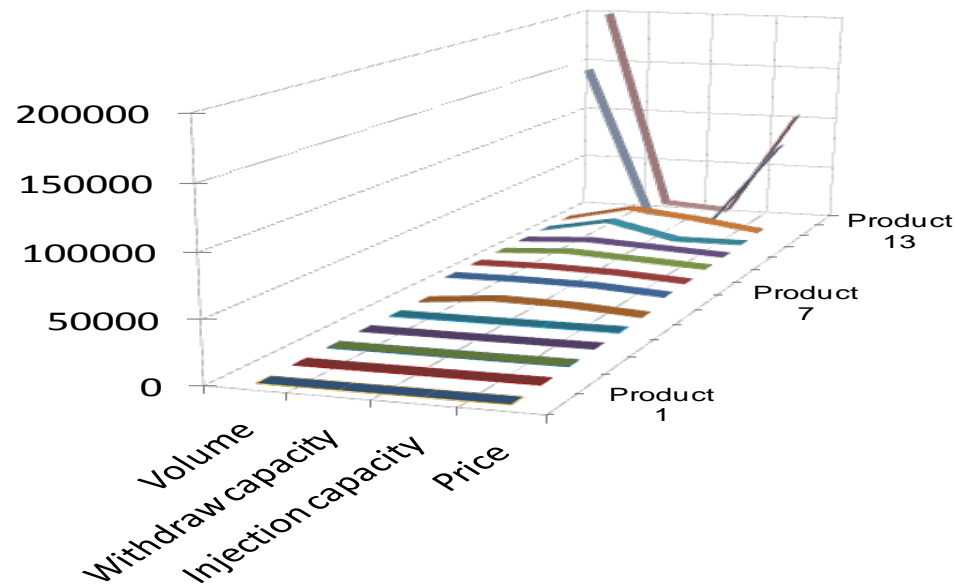
Results of Chapter 3 B: Market Organization

What kind of contract durations have been demanded ?



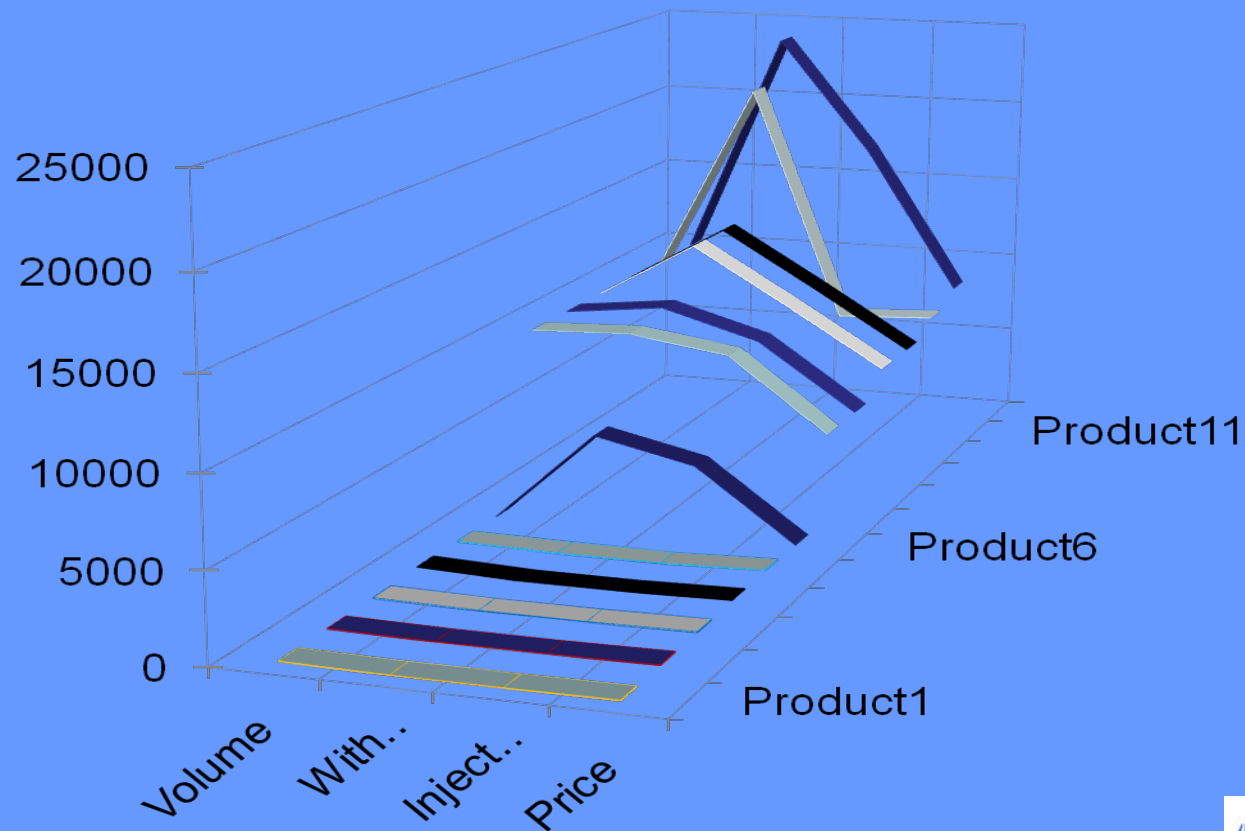
Results of Chapter 3 B: Market Organization

What are the characteristics of your offered service, for porous storage for firm service, no transport fees incl., and incl. withdrawal curve ?



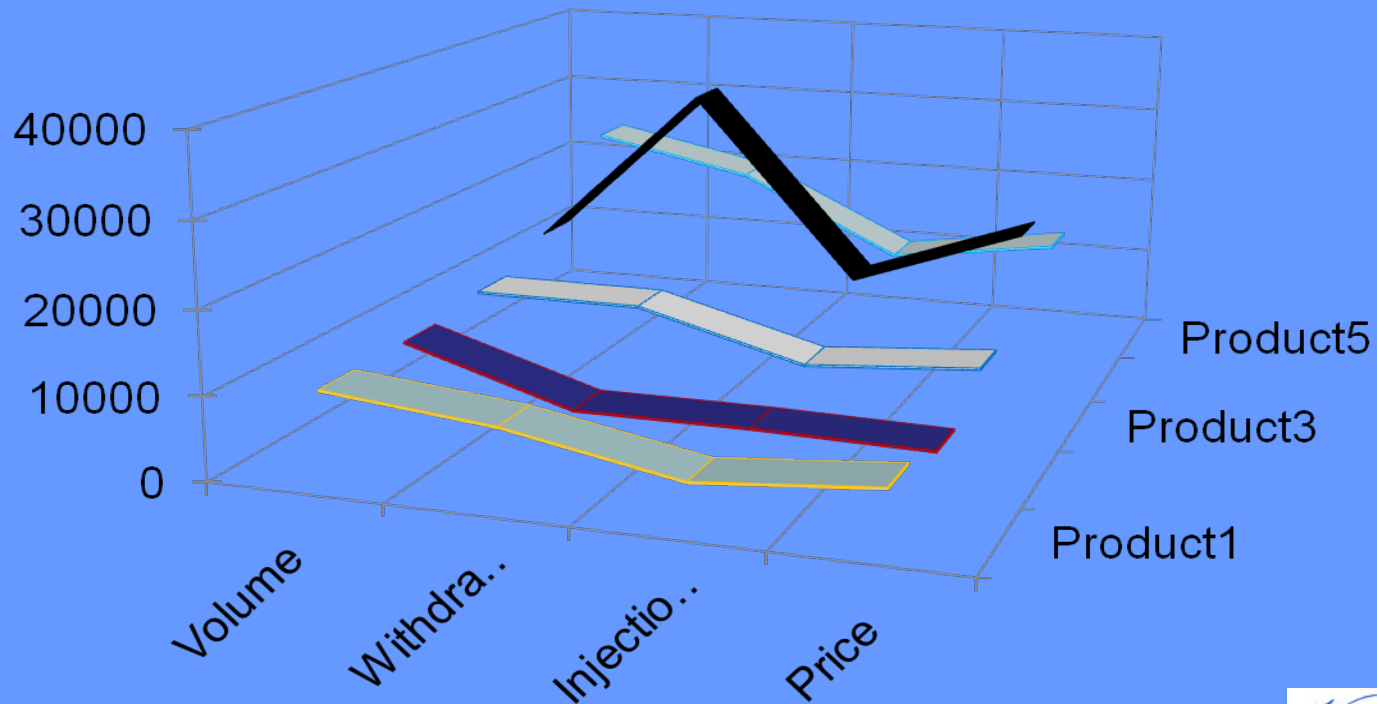
Results of Chapter 3 B: Market Organization

What are the characteristics of your offered service, for porous storage for firm service, no transport fees incl., and incl. withdrawal curve ?



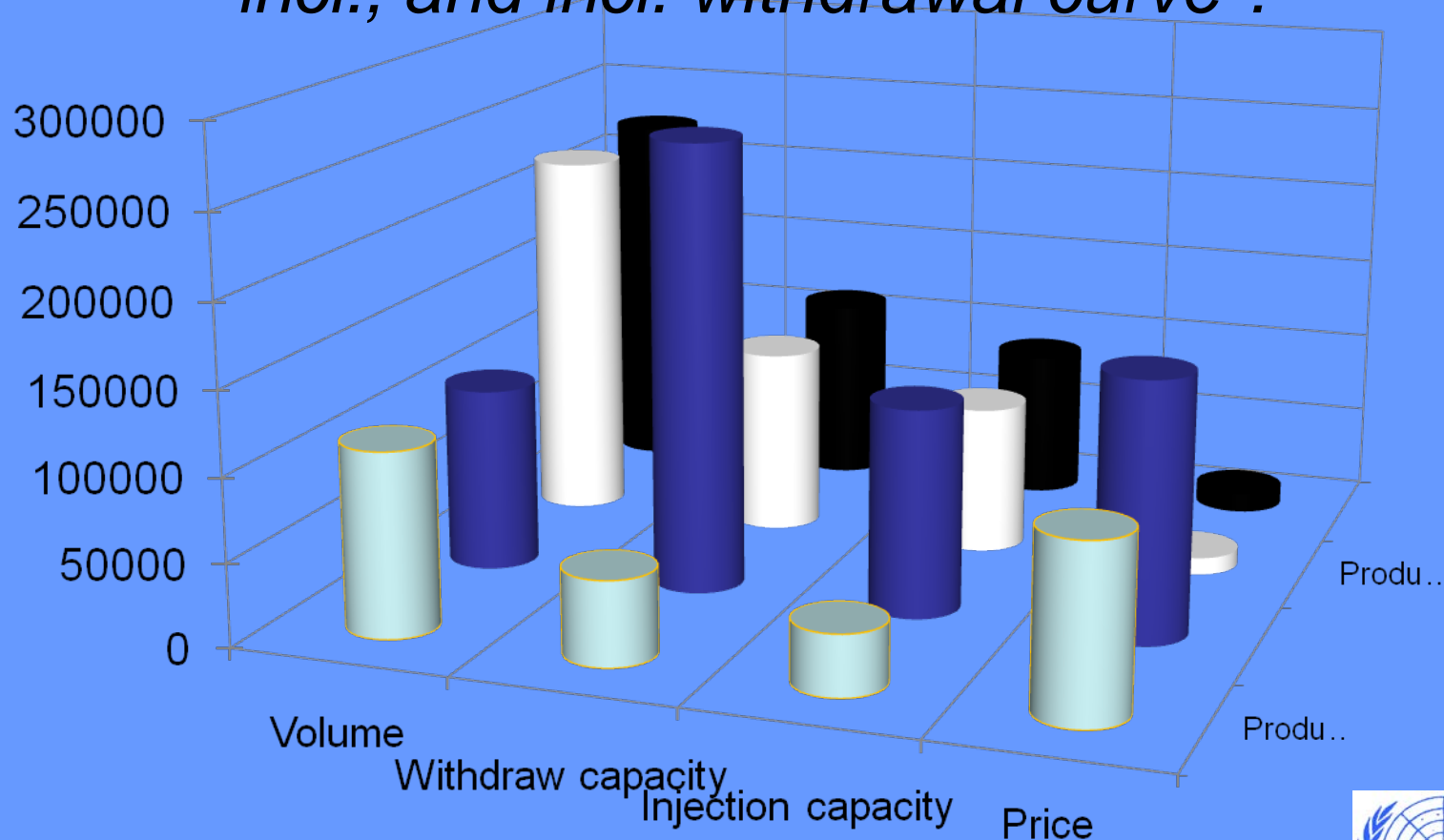
Results of Chapter 3 B: Market Organization

What are the characteristics of your offered service, for porous storage for firm service, no transport fees incl., and incl. withdrawal curve ?



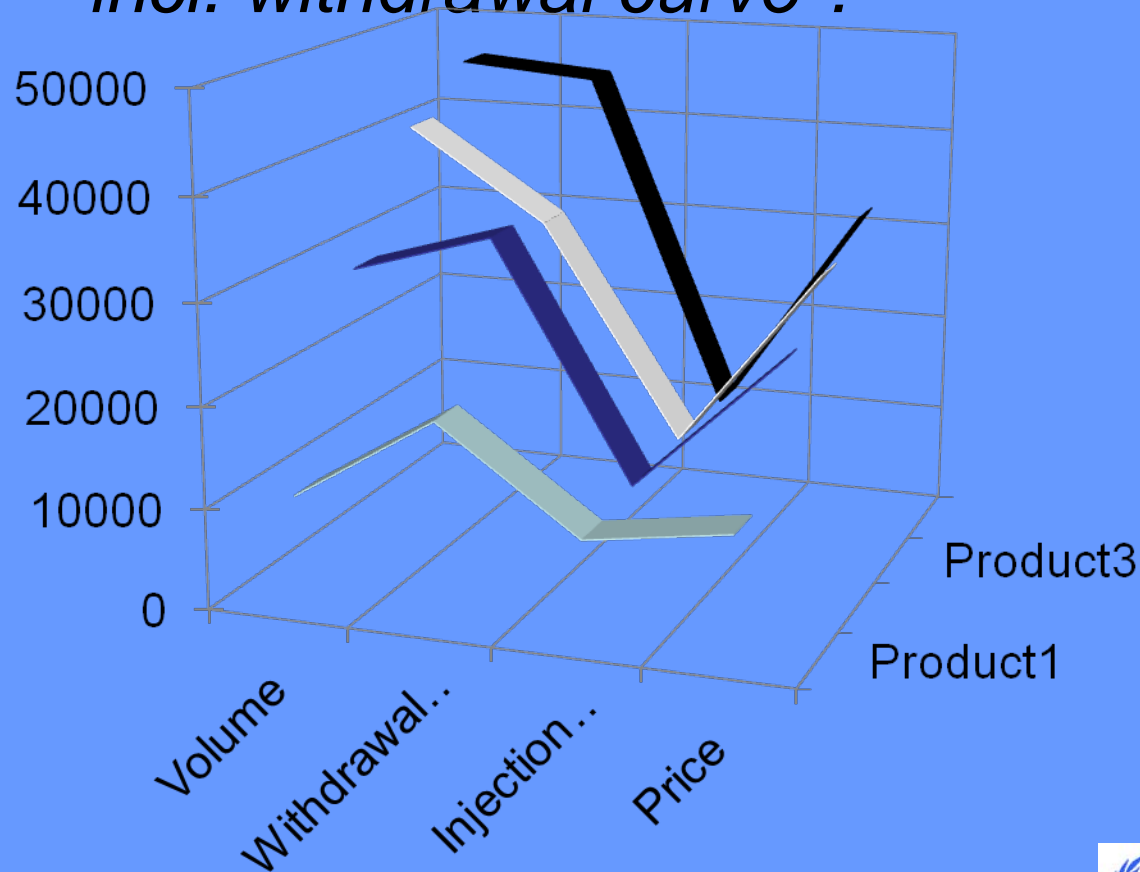
Results of Chapter 3 B: Market Organization

What are the characteristics of your offered service, for porous storage, for non-firm service, no transport fees incl., and incl. withdrawal curve ?



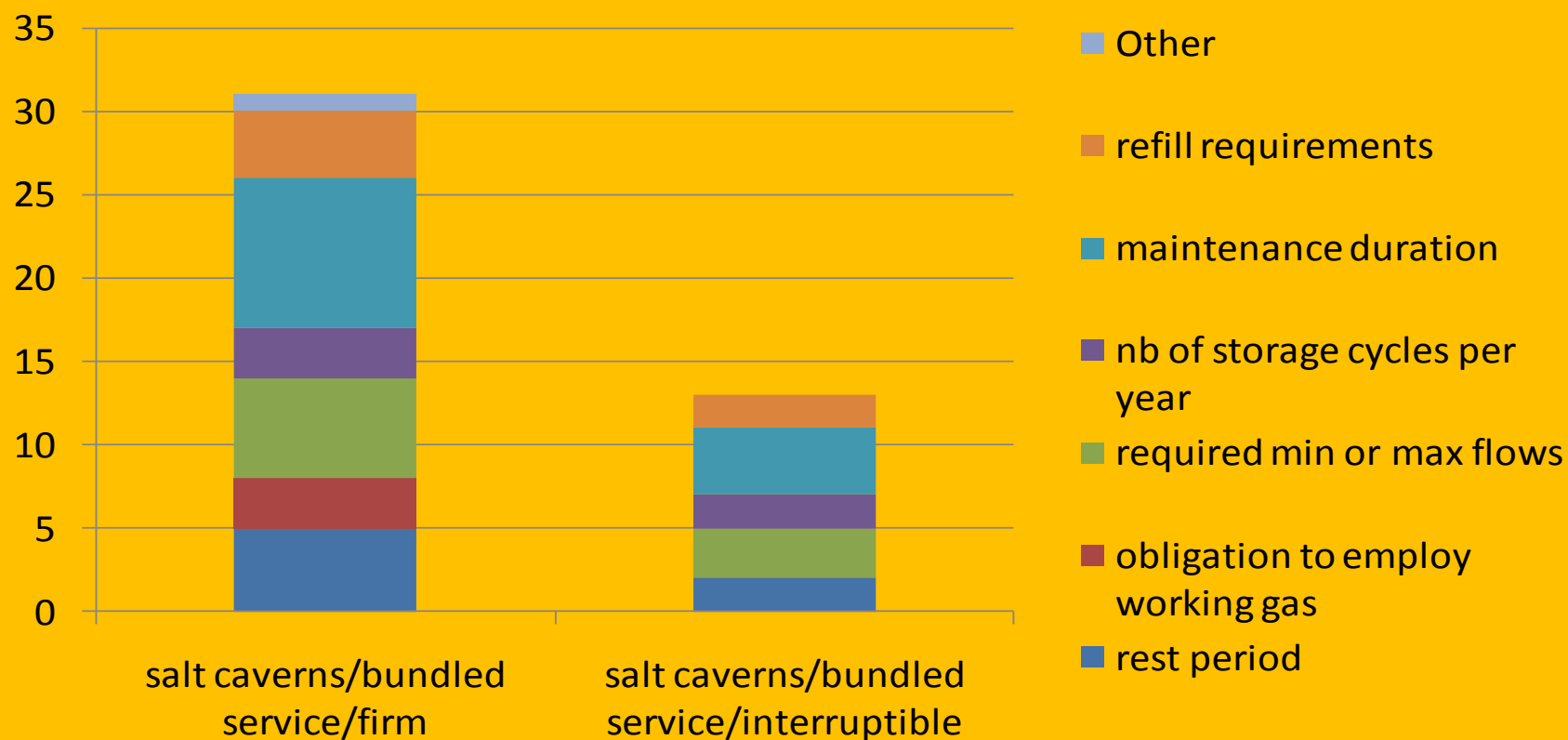
Results of Chapter 3 B: Market Organization

What are the characteristics of your offered service, for salt caverns, for firm service, no transport fees incl., and incl. withdrawal curve ?



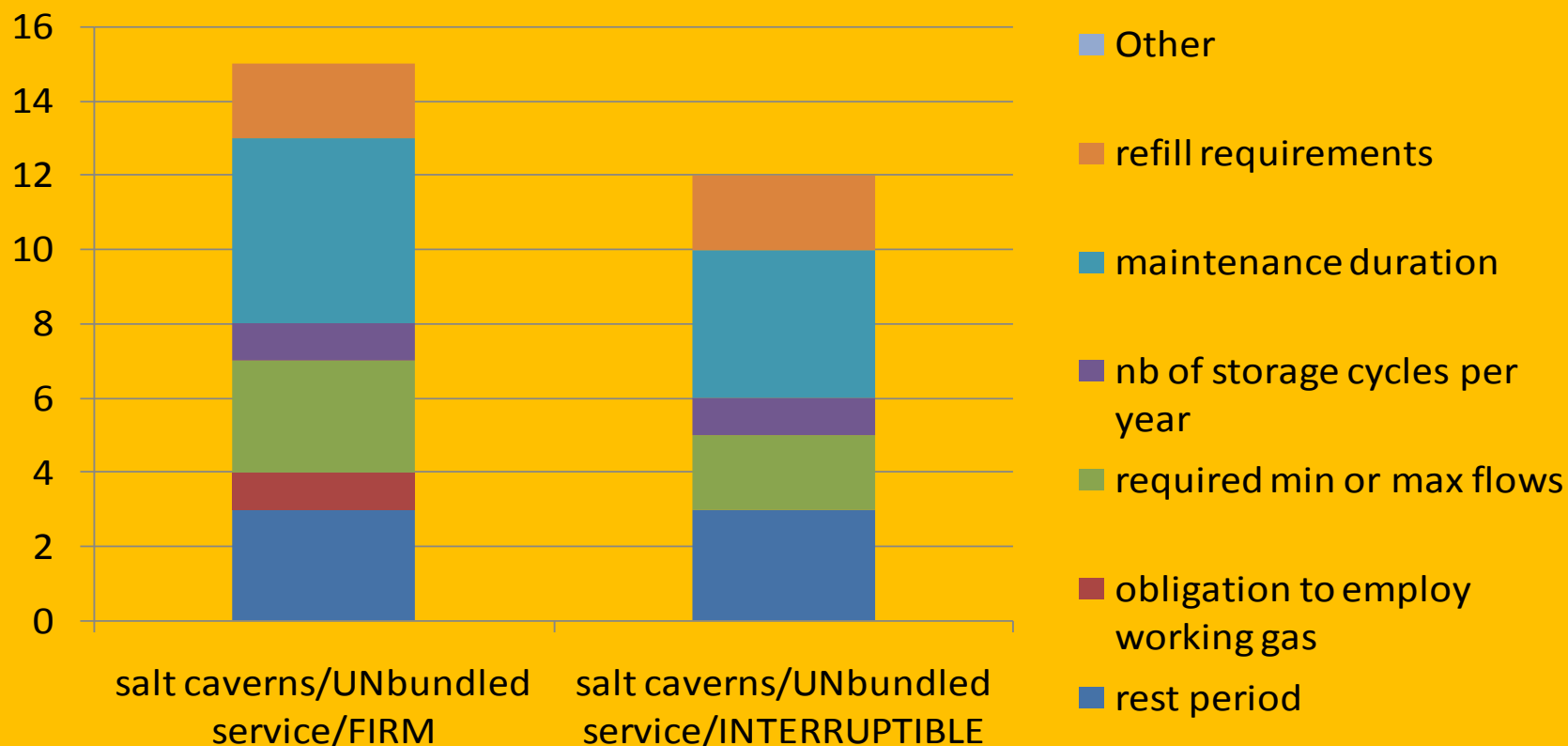
Results of Chapter 3 B: Market Organization

Essential physical restrictions of your storage service offered



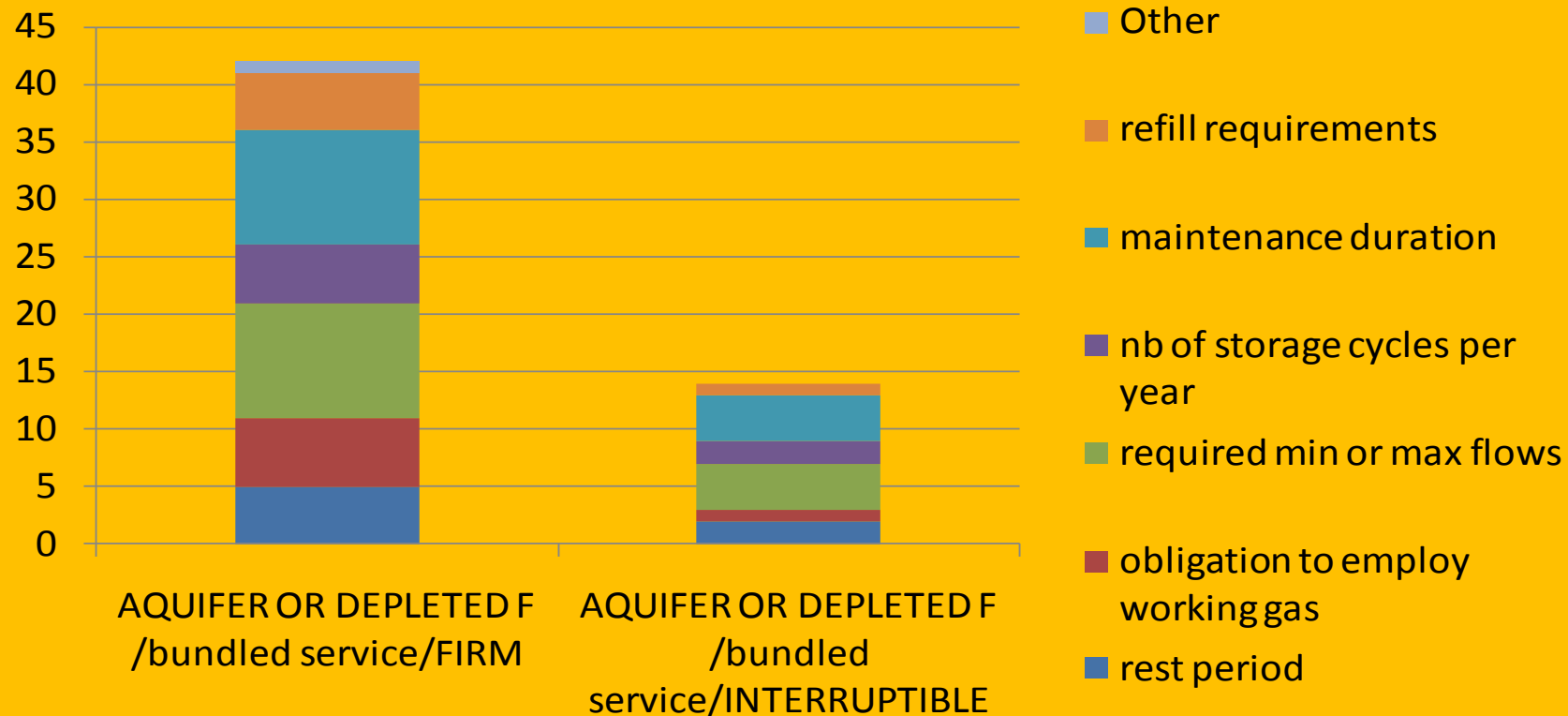
Results of Chapter 3 B: Market Organization

Essential physical restrictions of your storage service offered



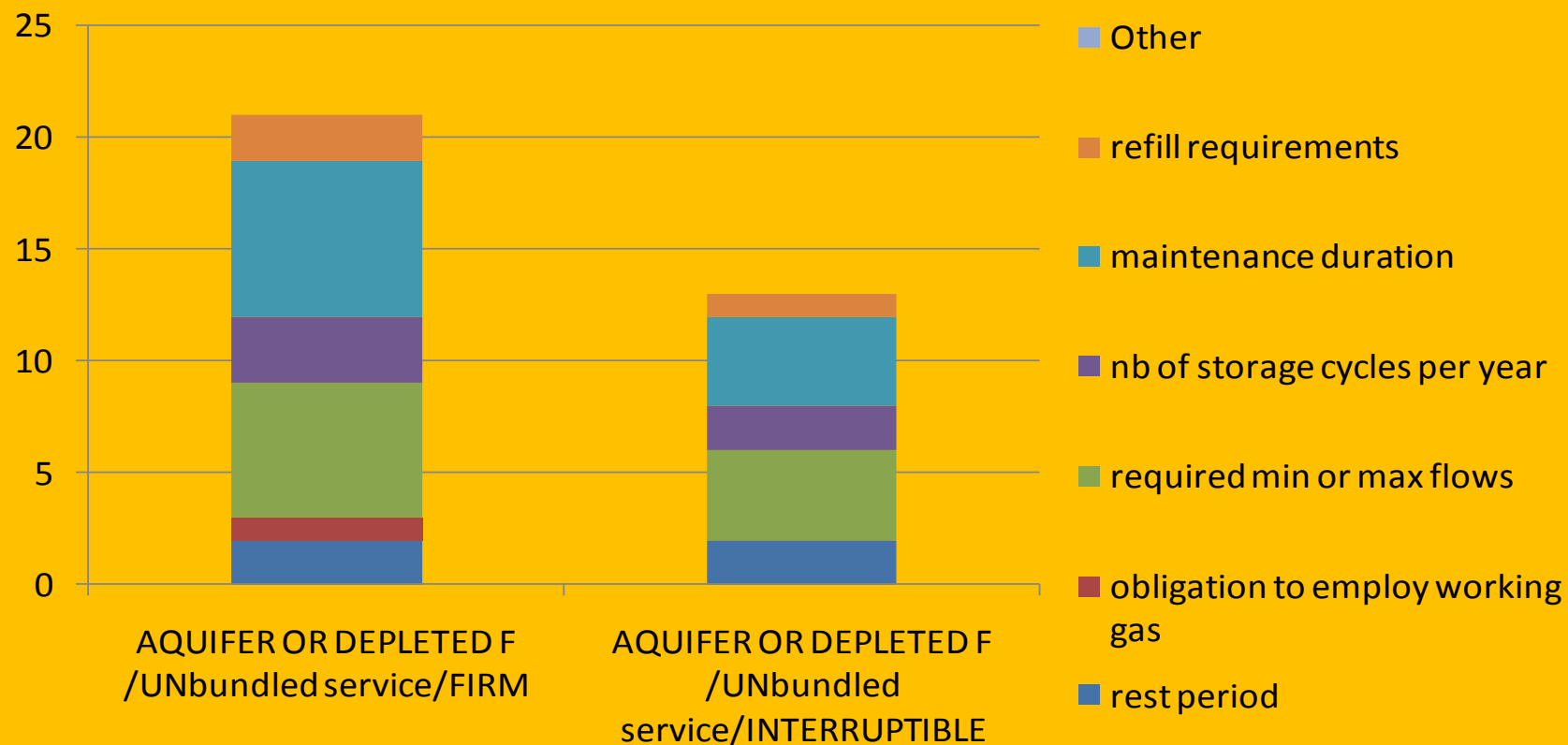
Results of Chapter 3 B: Market Organization

Essential physical restrictions of your storage service offered



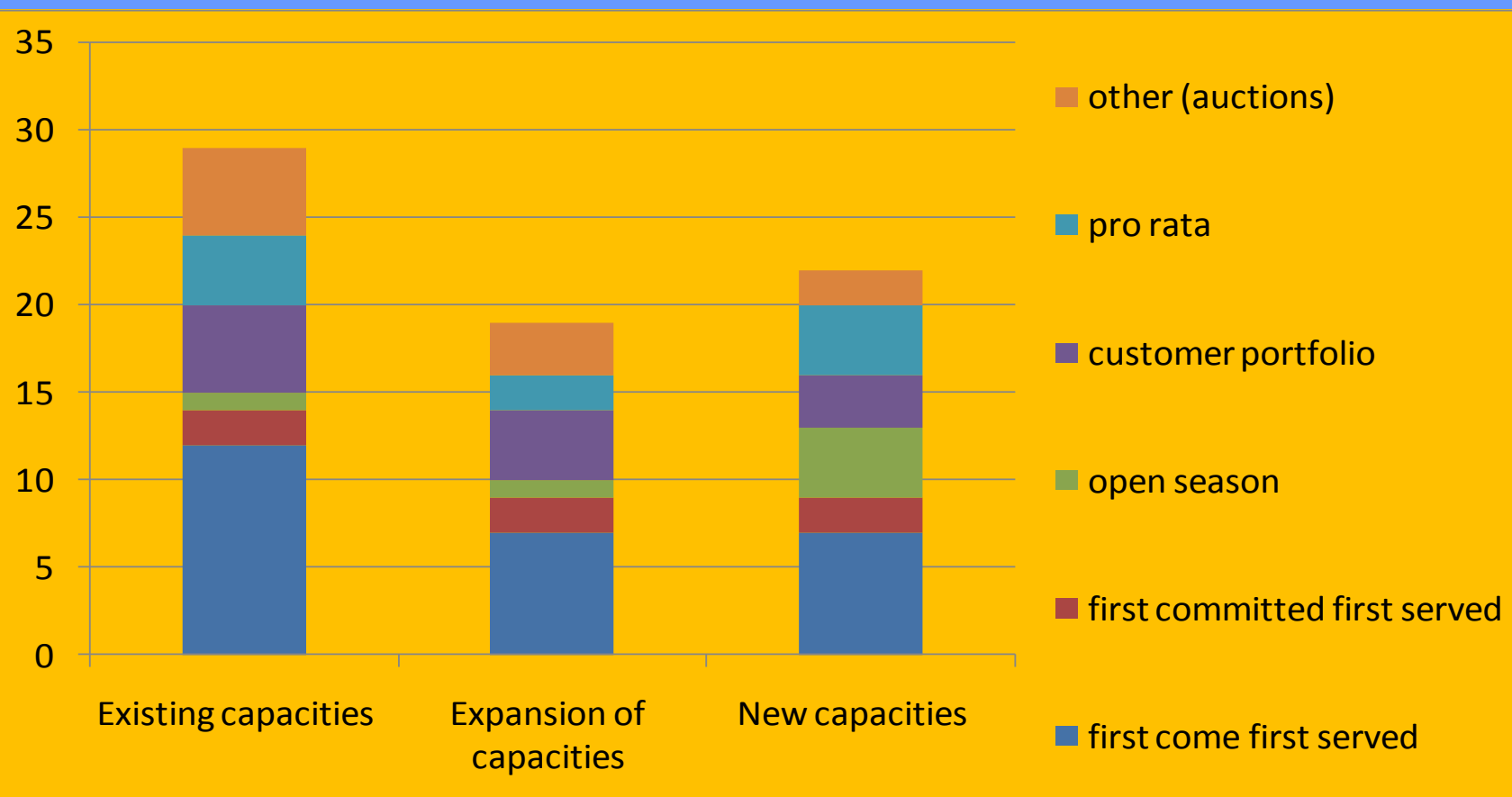
Results of Chapter 3 B: Market Organization

Essential physical restrictions of your storage service offered



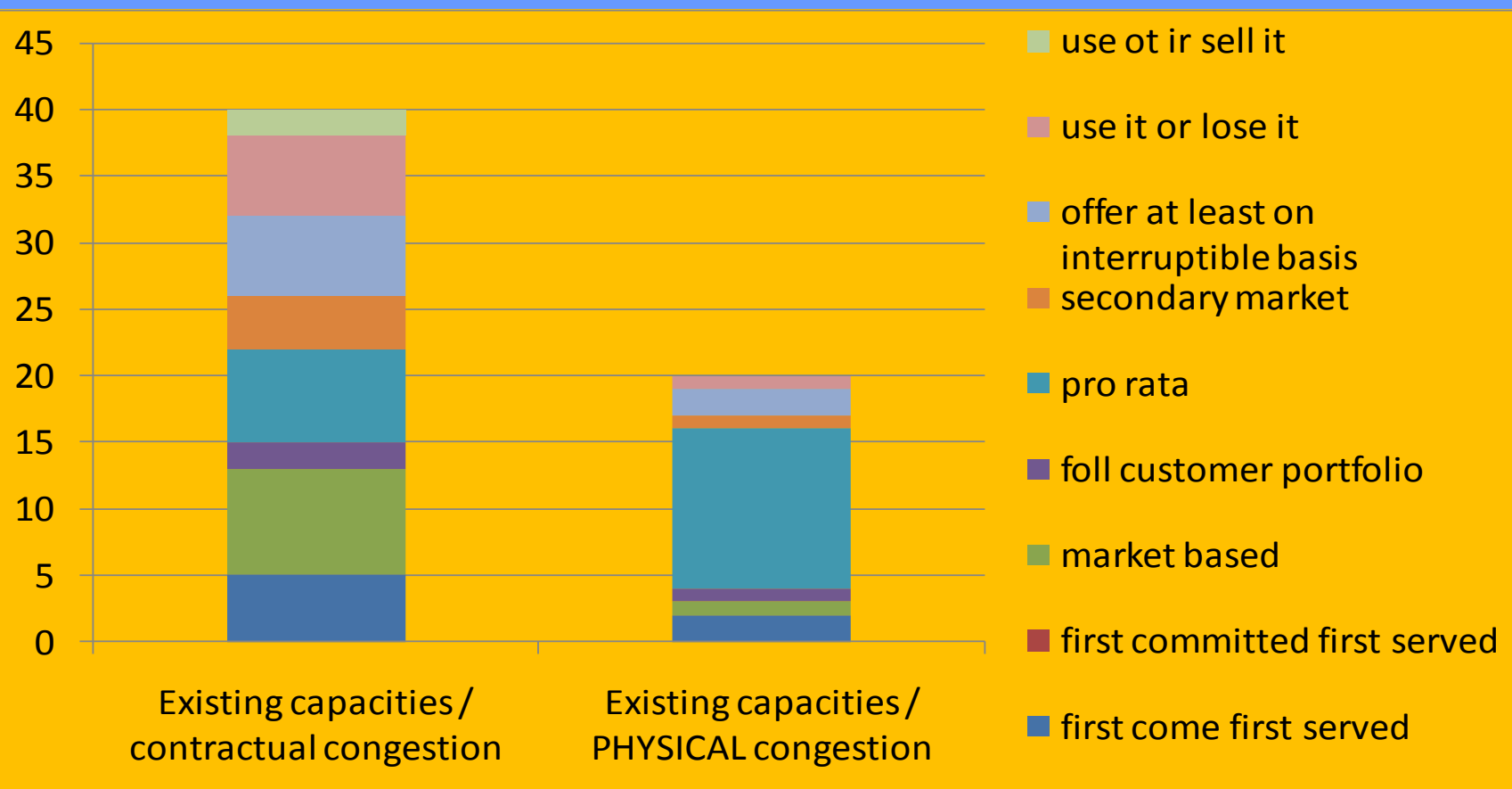
Results of Chapter 3 B: Market Organization

Capacity allocation mechanism applied for existing capacities ?



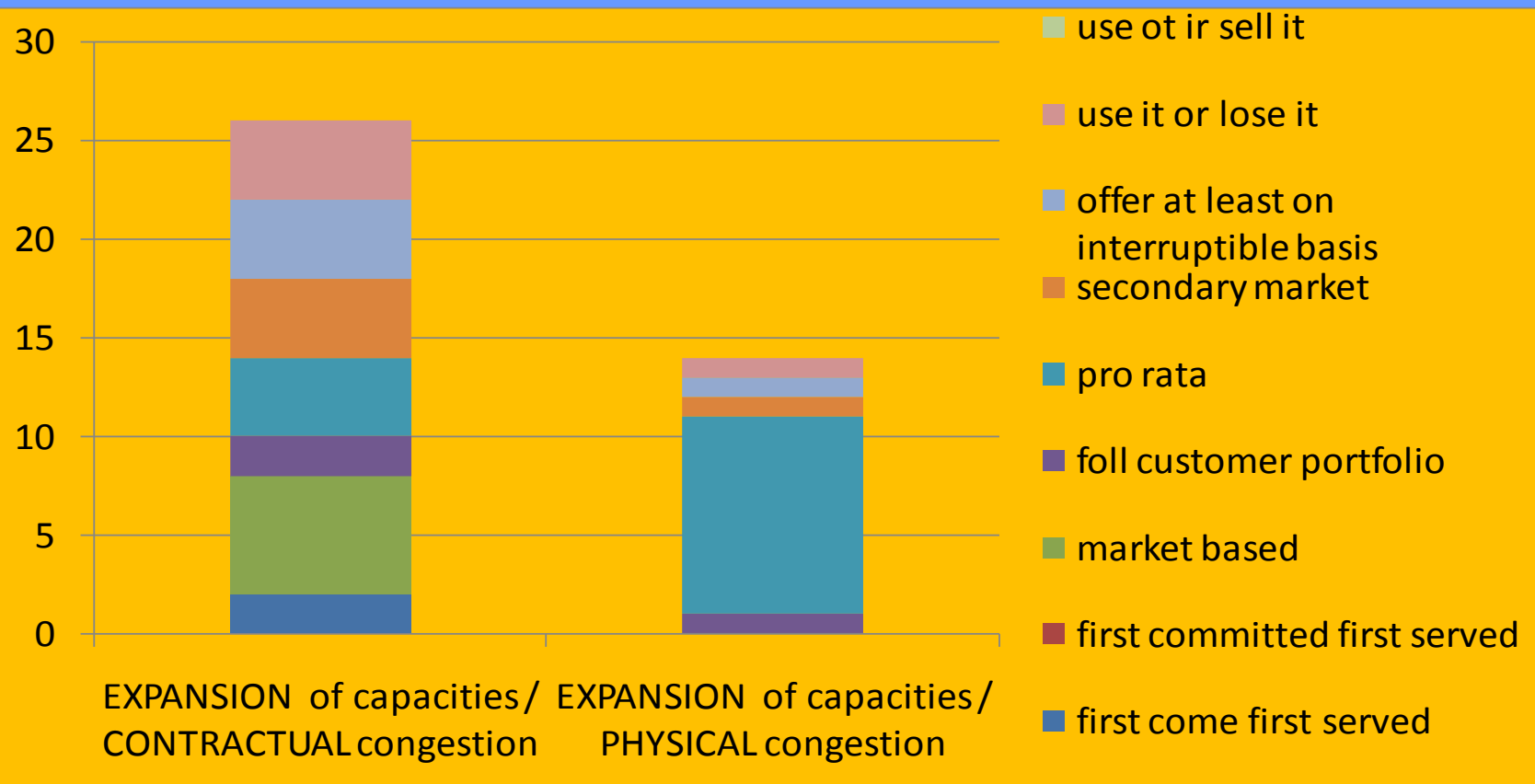
Results of Chapter 3 B: Market Organization

In case of congestion, what kind of principles are applied ?



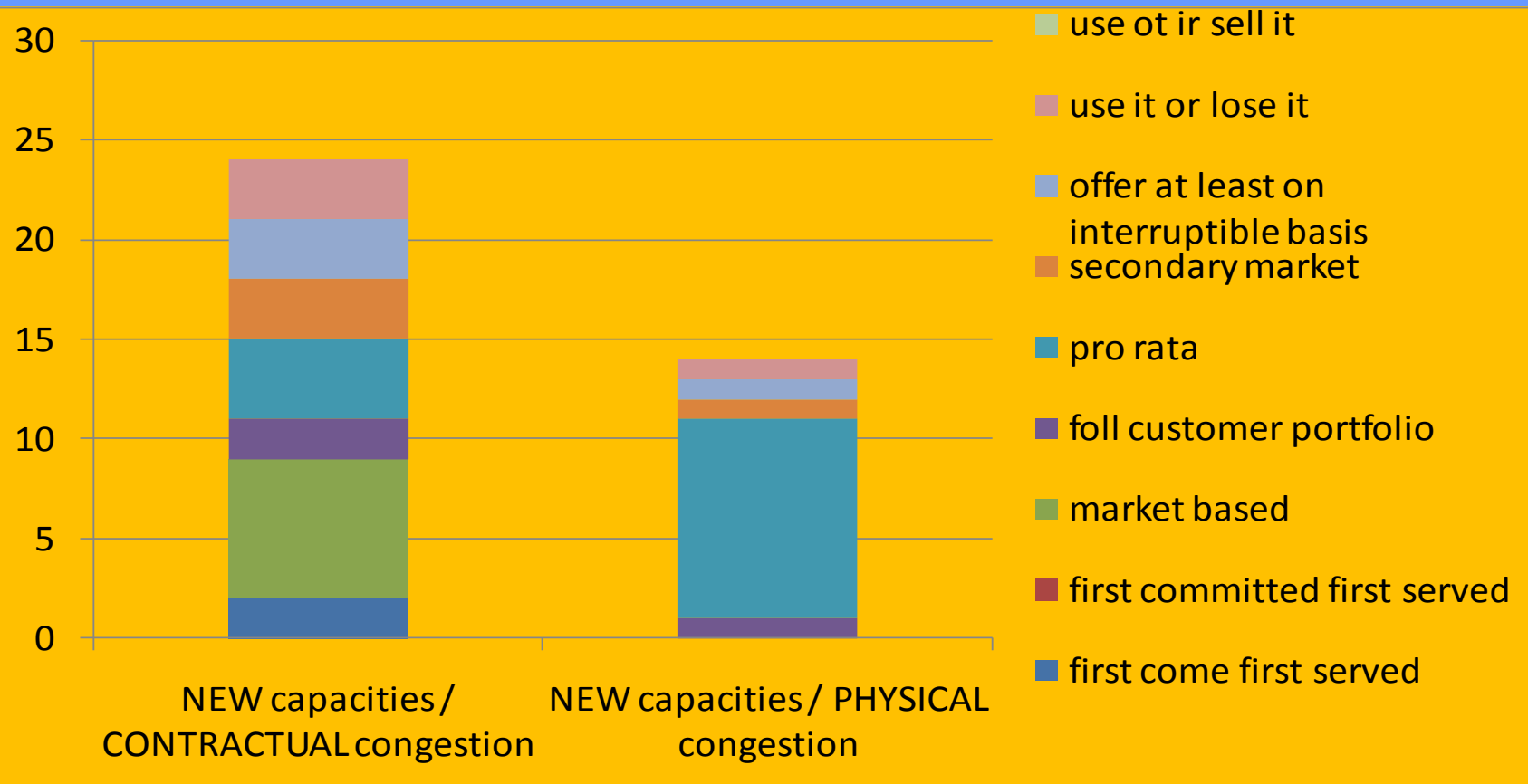
Results of Chapter 3 B: Market Organization

In case of congestion, what kind of principles are applied ?



Results of Chapter 3 B: Market Organization

In case of congestion, what kind of principles are applied ?



Results of Chapter 4

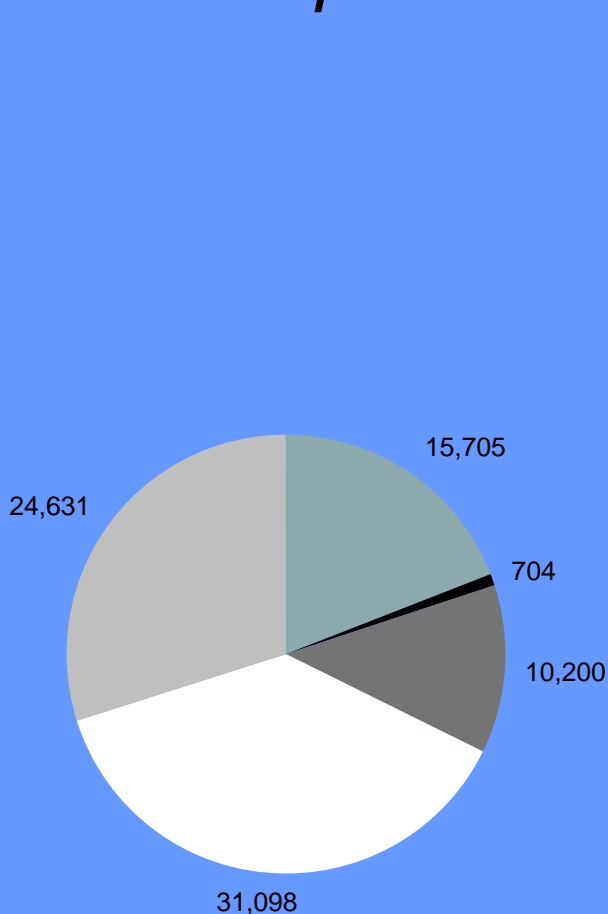
Existing storage facilities

Questionnaire completed by Storage companies

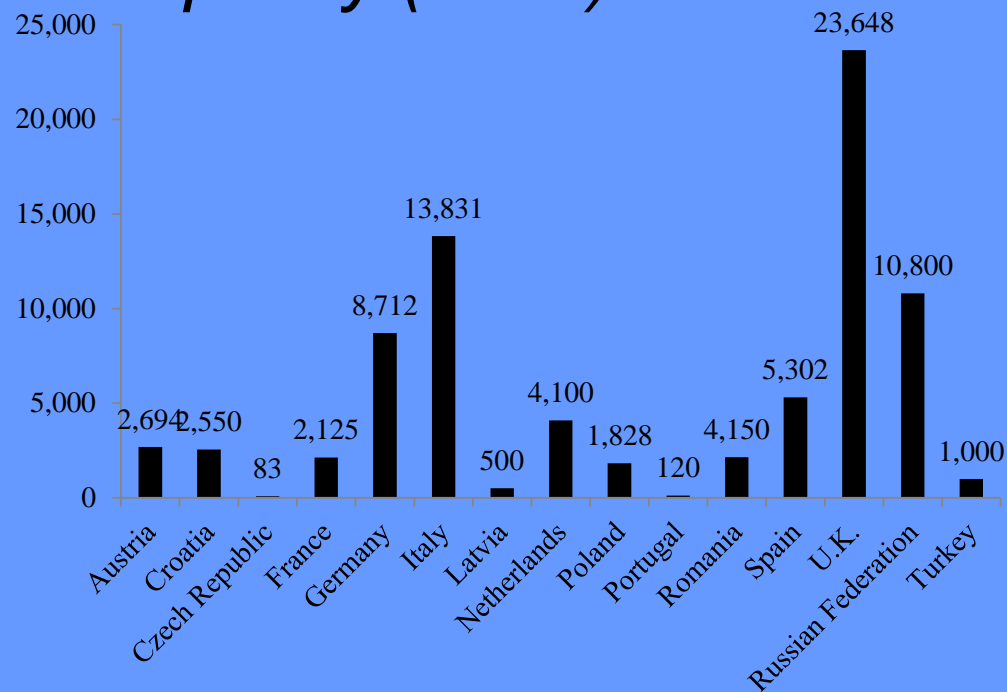


Results of Chapter 4: UGS projects

Expected total capacity (Mcm)



■ Aquifer ■ LNG Peak Shaving ■ Offshore Reservoir ■ Reservoirs ■ Salt cavity



Results of Chapter 5

Legal requirements

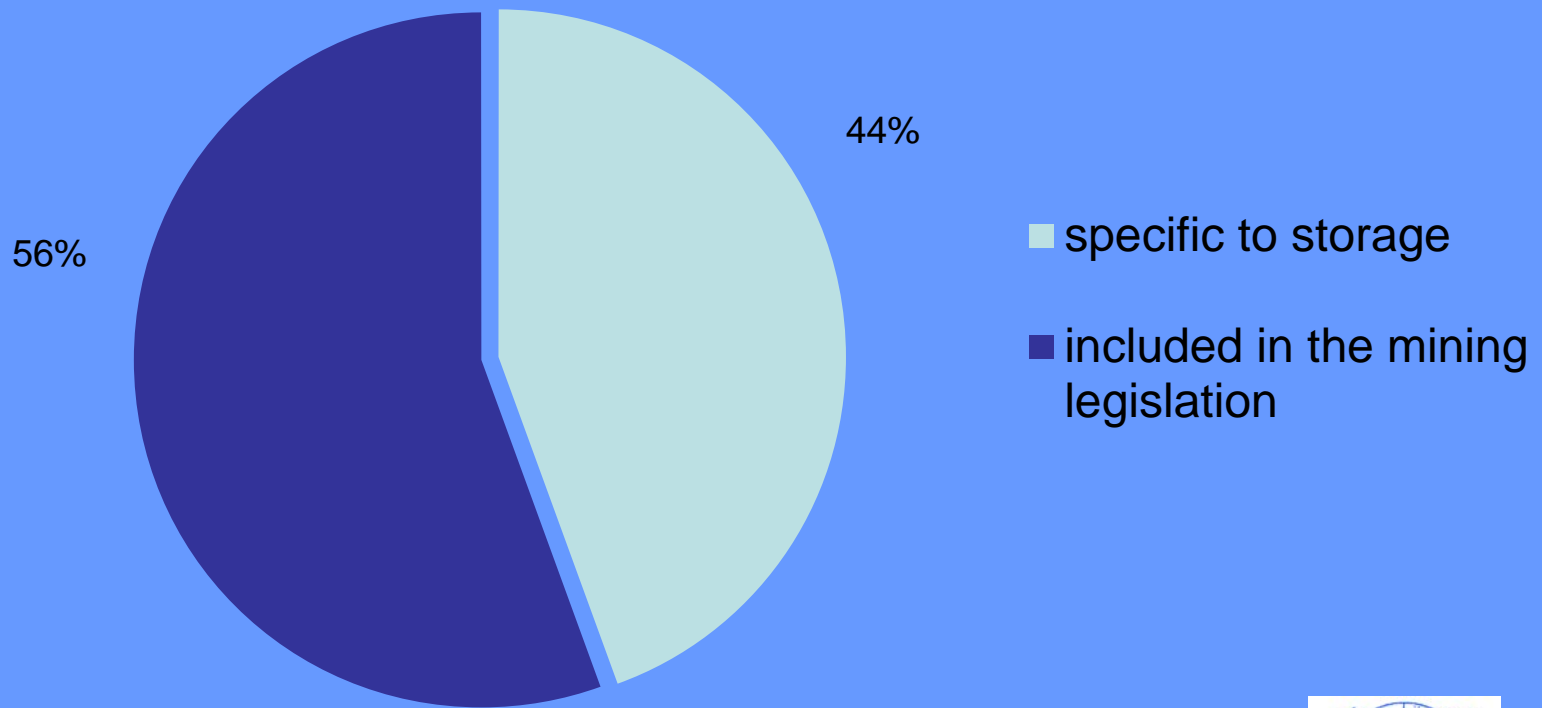
Part A :

**Questionnaire completed by
National Mining Authorities**



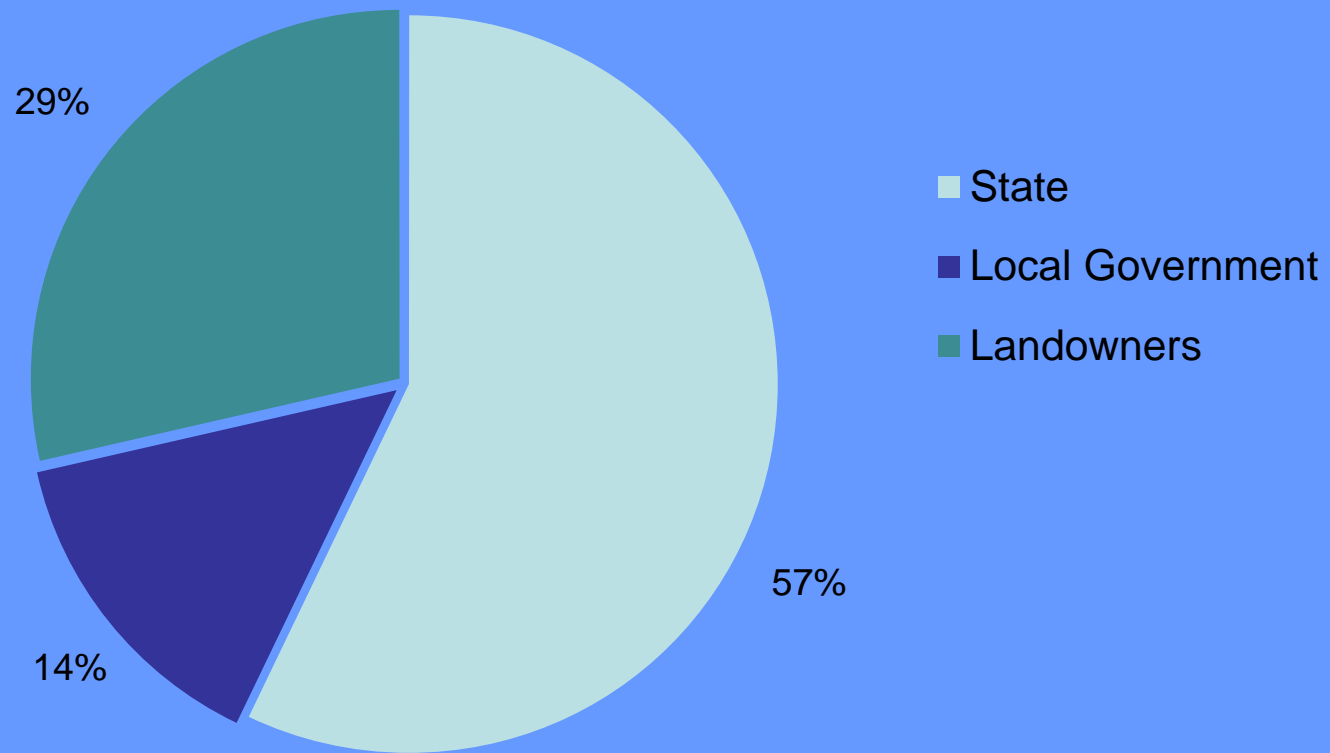
Results of Chapter 5 :

Is the storage-related legislation specific to storage or included in the mining and/or other legislation?



Results of Chapter 5 :

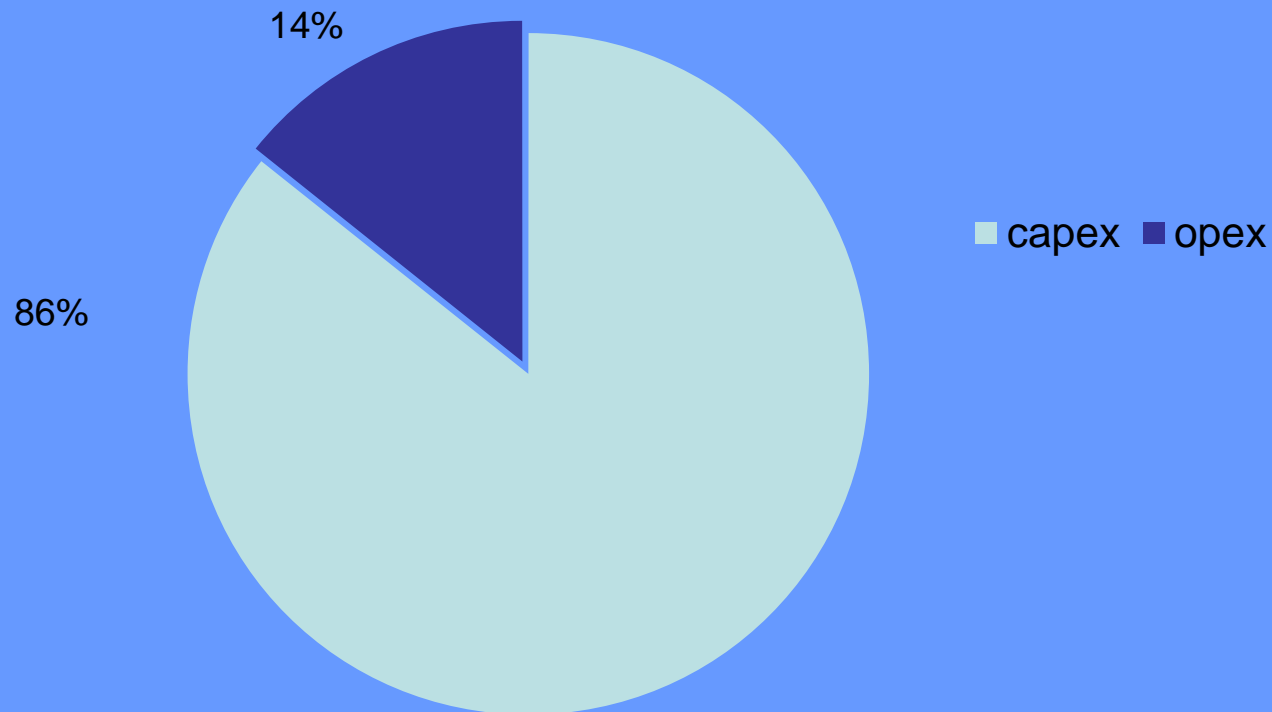
Who is the owner of the underground oil and gas reserves/mineral resources?



Results of Chapter 5

:

Is cushion gas considered as capex or as opex ?



Results of Chapter 5

Legal requirements

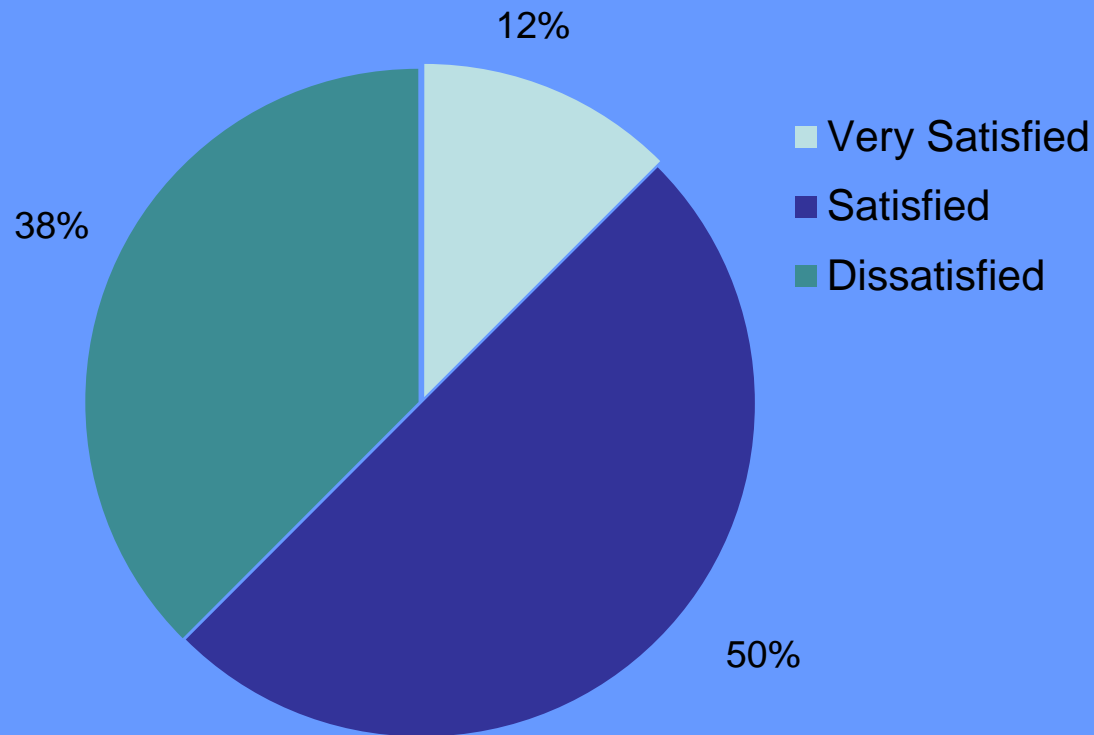
Part B :

Questionnaire completed by SSOs



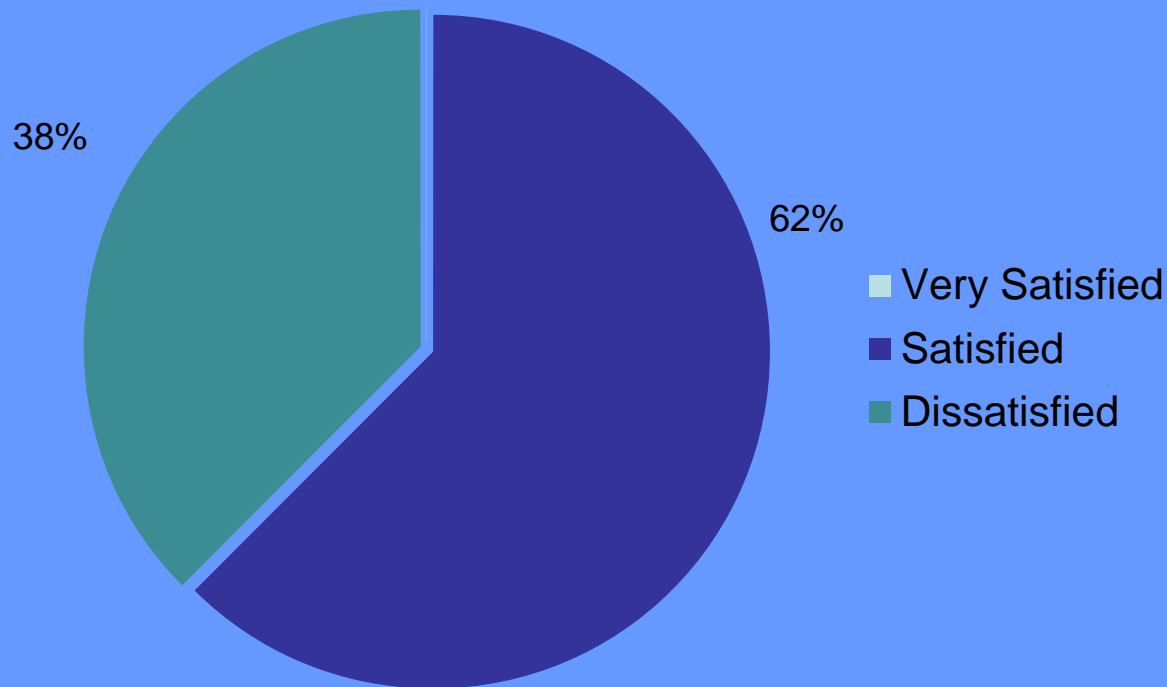
Results of Chapter 5

Are you satisfied about the Number of authorities involved ?



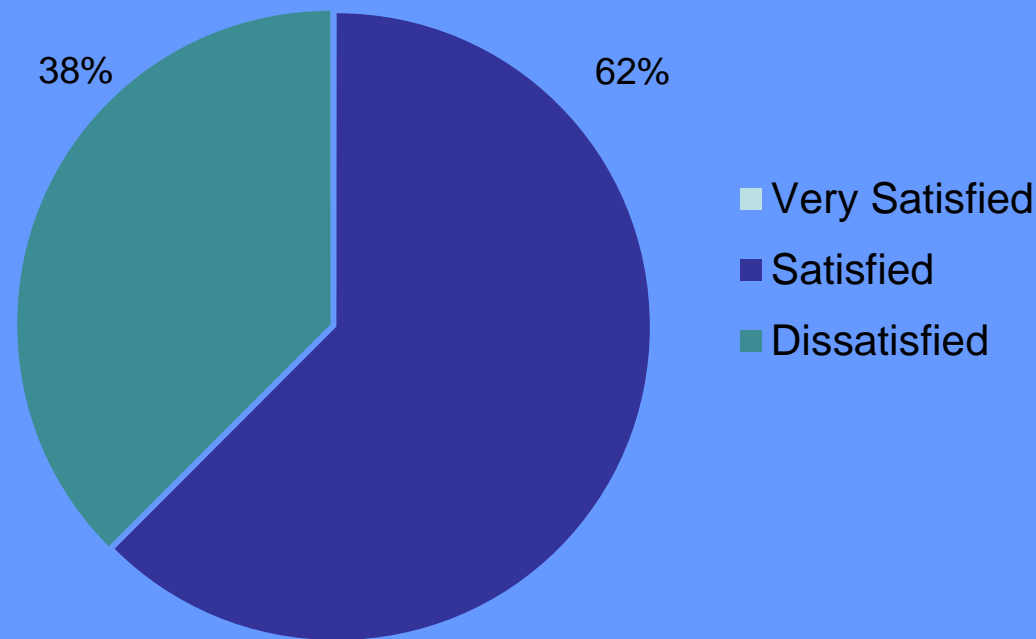
Results of Chapter 5

Are you satisfied about the Transparency of regulation ?



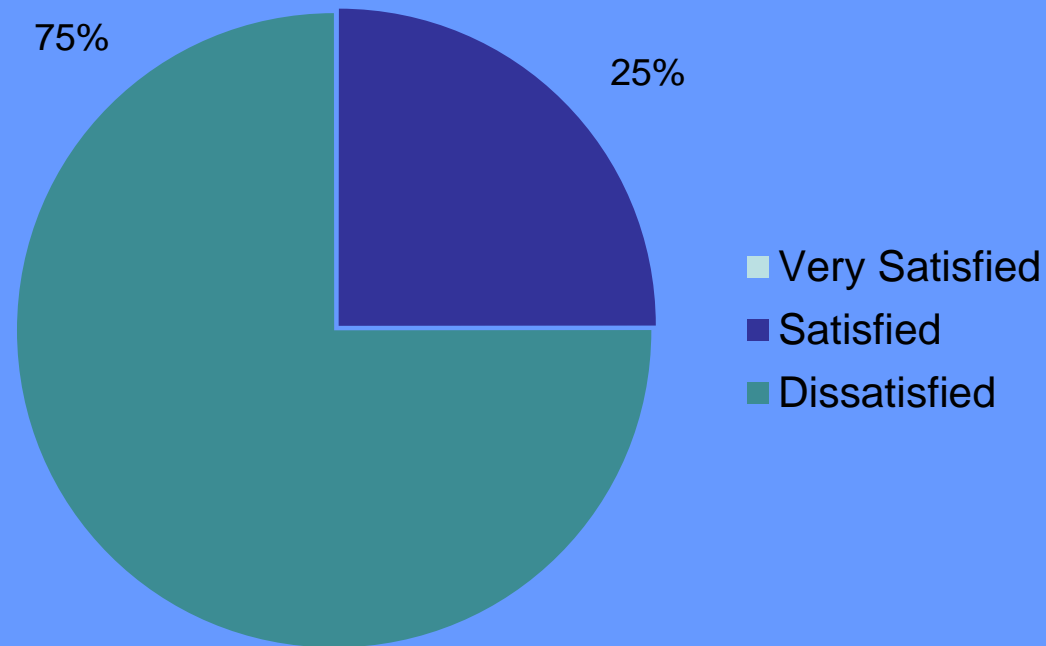
Results of Chapter 5

Are you satisfied about the Applicability of regulation ?



Results of Chapter 5

Are you satisfied about the Real length of authorization procedure



Study on Underground Gas Storage in Europe and Central Asia

Conclusion :

- The Study progress was satisfactory in 2012, however,
- Company representatives were less and less available for co-operative works : 3 Heads of Chapters (4, 6 & 7) resigned;
- The relatively low level of interest of gas companies for contributing actively to the completion of the questionnaire and to participate in the UGS Study --> Lack of data for Chapters 6 & 7;
- The delay is due to choices made in 2010 (no support of external service for data management and drafting) and from the lack of IT extraction/data management tool) → **analysis of data was a huge work for experts**



Study on Underground Gas Storage in Europe and Central Asia

Conclusion and future:

- 1. To finalise formatting and harmonizing the final draft
(end of January 2013)**
- 2. To send the Study to WPG members for approval
(mid February 2013)**
- 3. To publish the Study by the end of February**
- 4. To prepare the Study update (2016)**



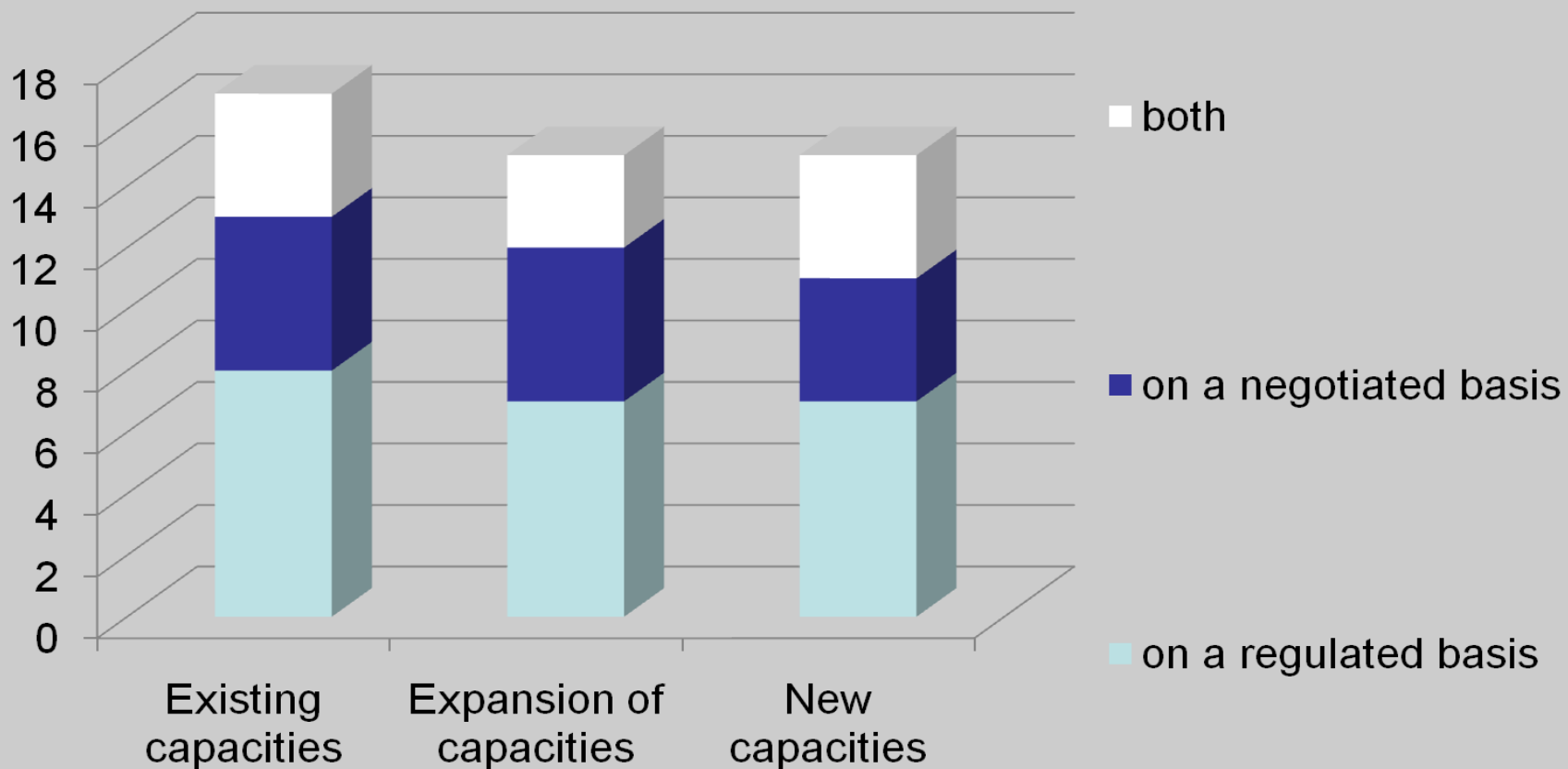
Study on Underground Gas Storage in Europe and Central Asia

Thanks for your attention



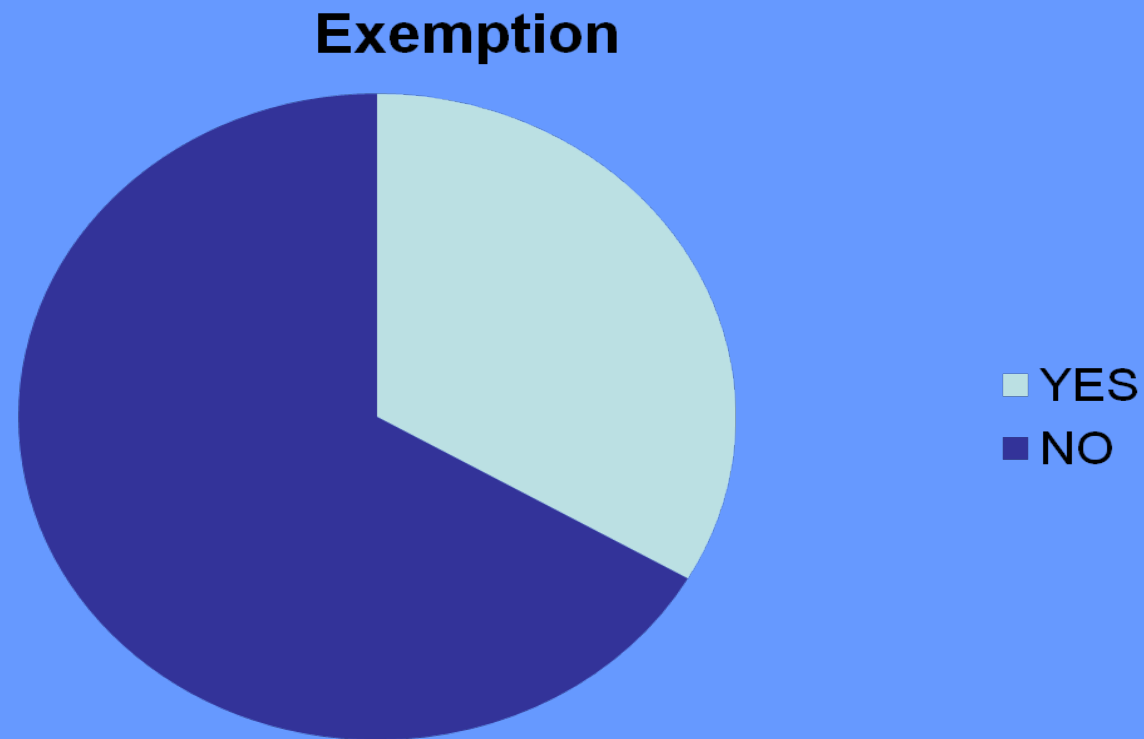
Results of Chapter 3 A: Market Organization

On which basis TPA to storage capacities is provided ?



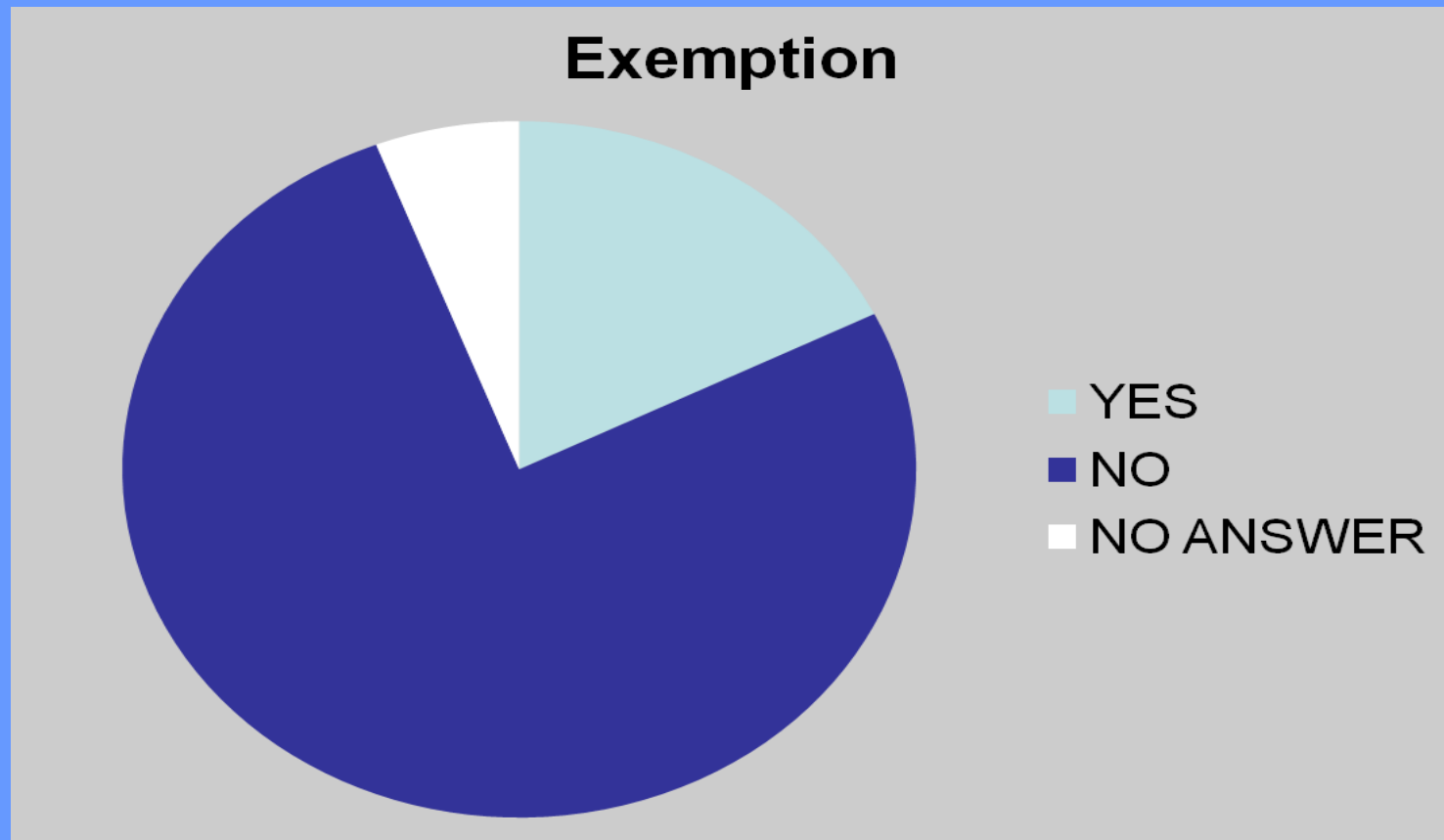
Results of Chapter 3 A: Market Organization

Are capacities in existing storage or expansion of existing storage fully or partially exempted from TPA?



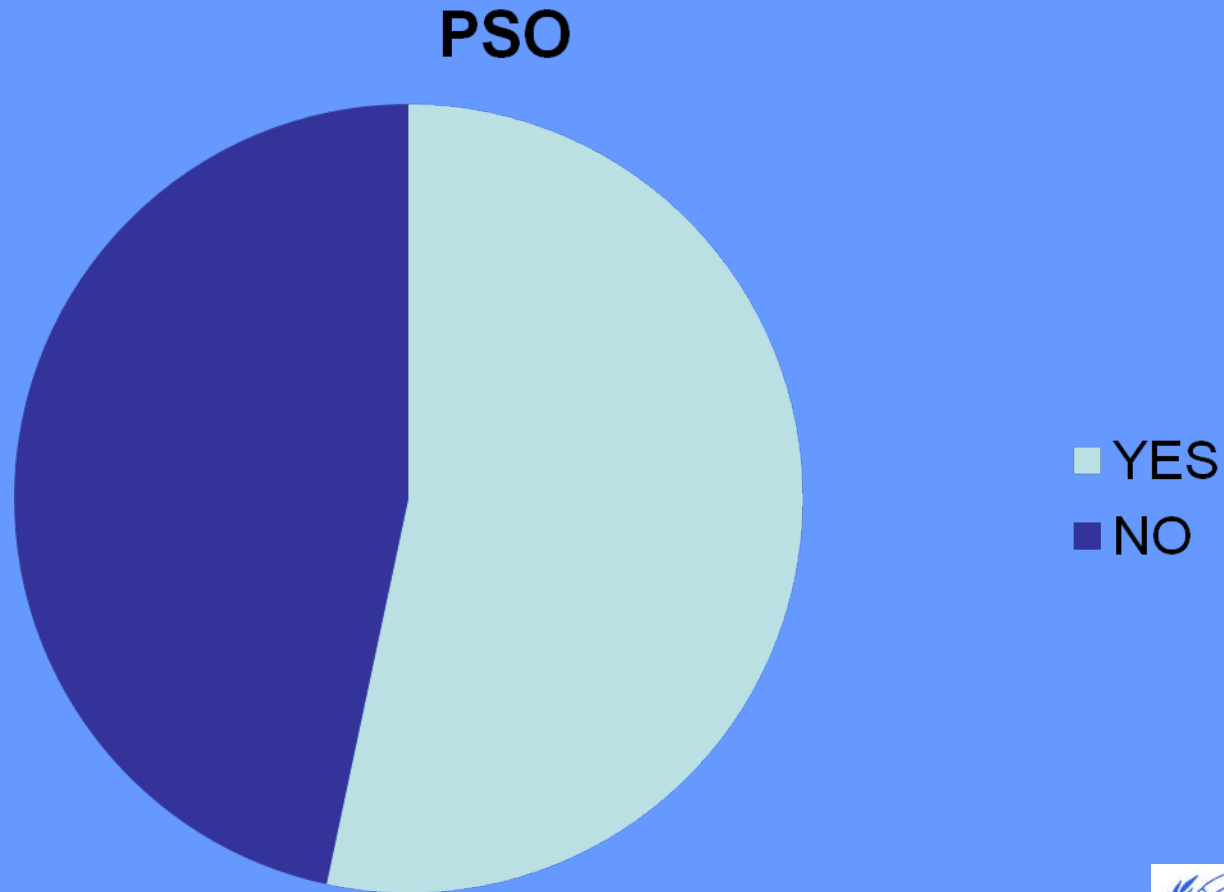
Results of Chapter 3 A: Market Organization

Are capacities in new facilities fully or partially exempted from TPA?



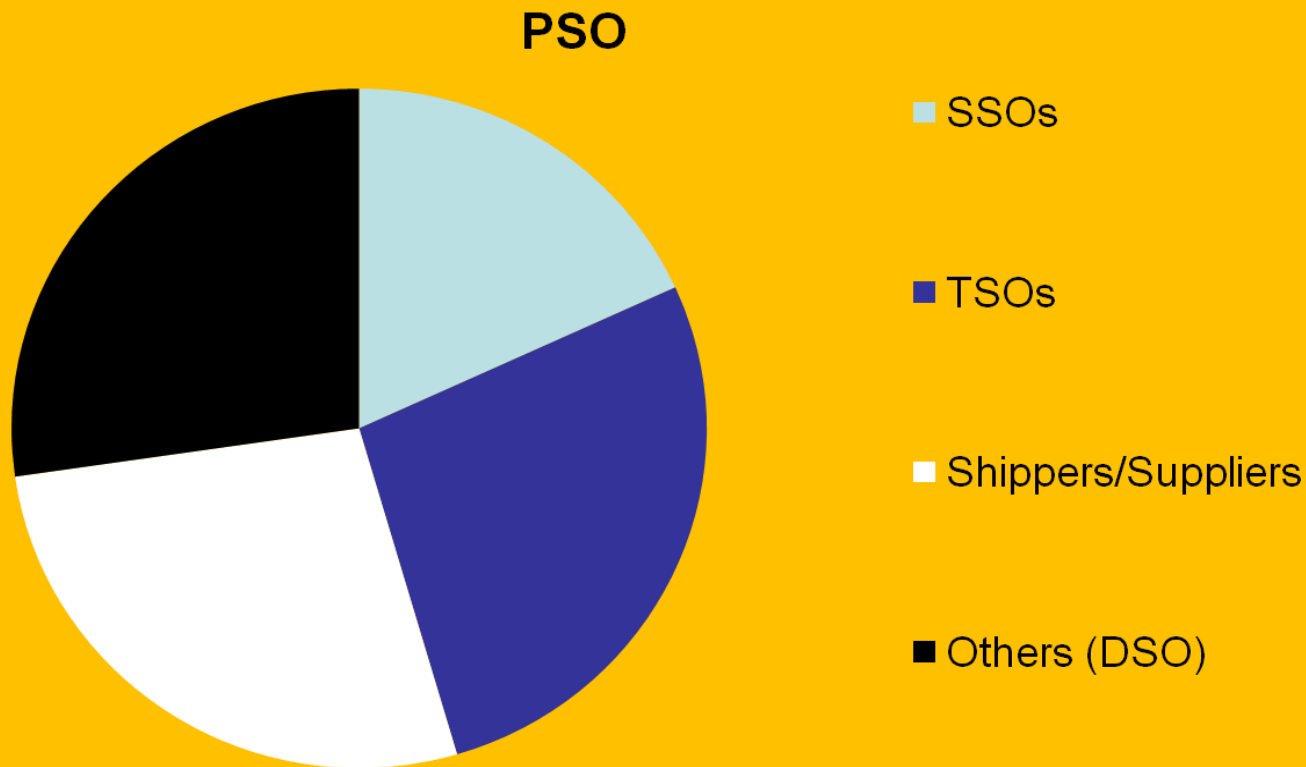
Results of Chapter 3 A: Market Organization

Are there PSO (Public Service Obligation) in place ?



Results of Chapter 3 A: Market Organization

*Are there PSO (Public Service Obligation) in place ?
If yes, indicate to which Party these obligations are
assigned to ?*



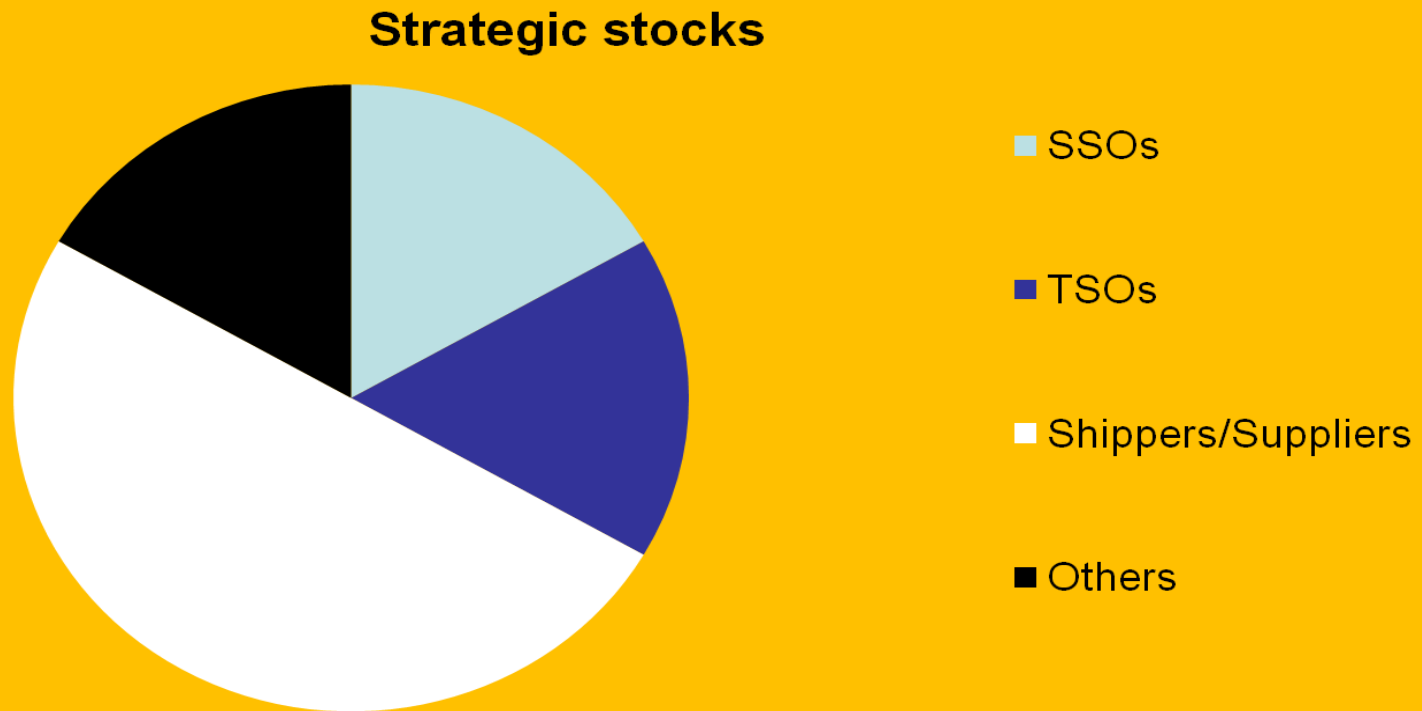
Results of Chapter 3 A: Market Organization

Are there legal obligation to provide Strategic Stocks ?



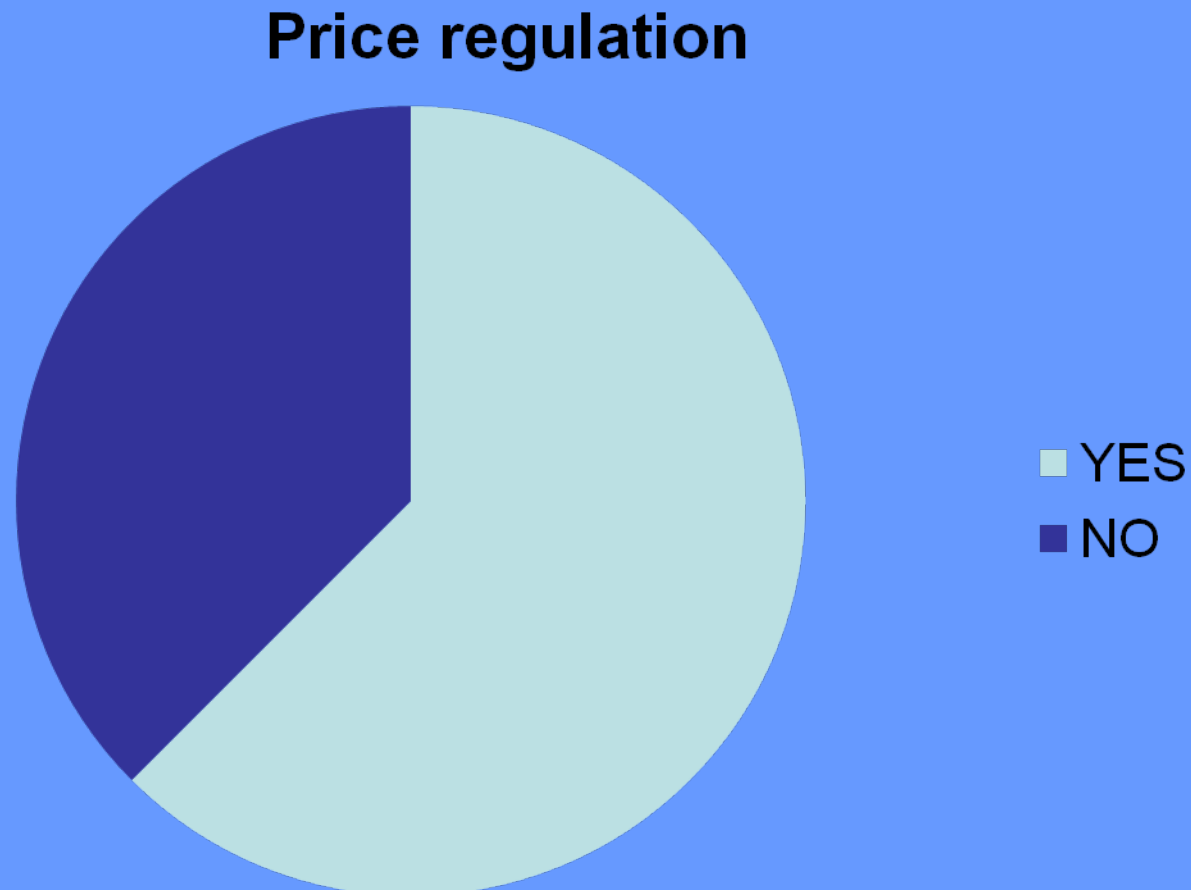
Results of Chapter 3 A: Market Organization

If there are legal obligations for Strategic Stocks, indicate which Party is responsible for implementing the mandatory stock level ?



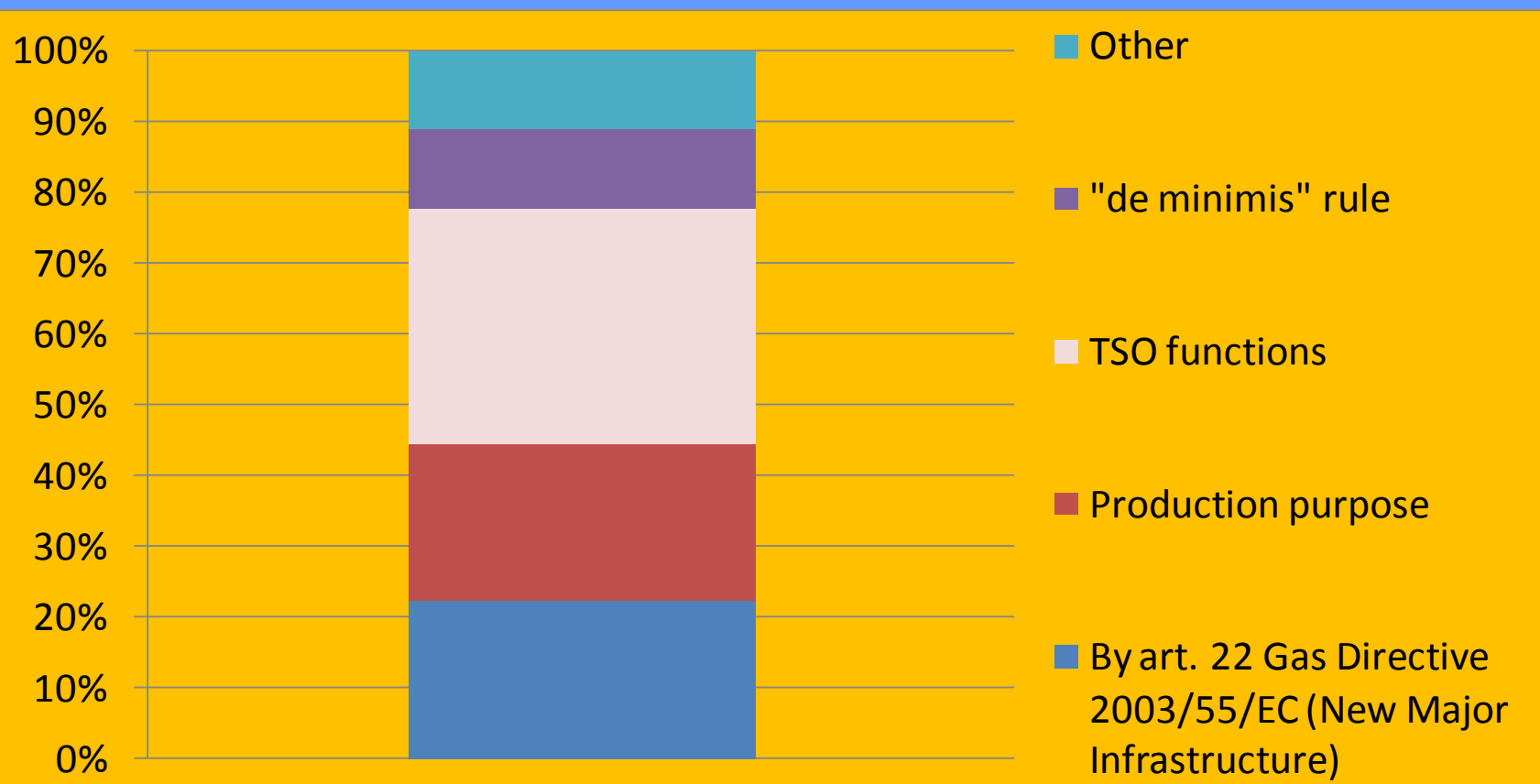
Results of Chapter 3 A: Market Organization

Are there any kind of price regulation in place?



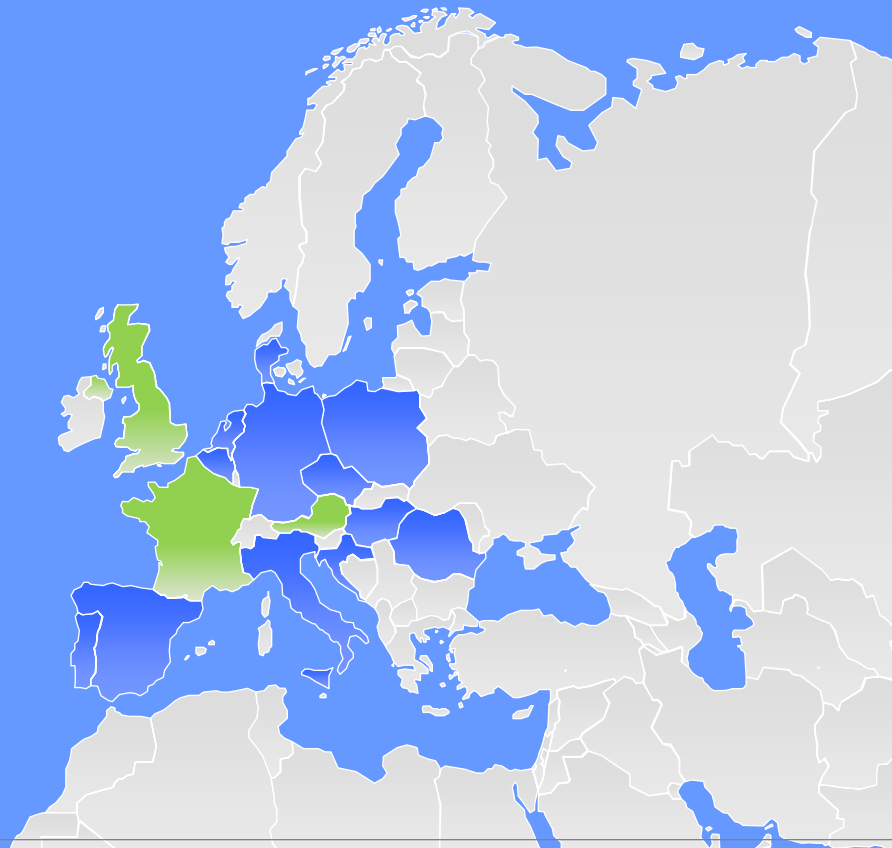
Results of Chapter 3 B: Market Organization

For which reason your capacities are exempted from TPA ?



Results of Chapter 3 A: Market Organization

Where is the delivery point of storage services ?



■ Entry/Exit storage site
■ Virtual Point

Note: several answers possible, if access rule applied differs, depending on the storage facility/group of storage facilities or part of storage used for.

Study on Underground Gas Storage in Europe and Central Asia

Progress : Answers to questionnaire:

Chapter	1	2	3A	3B	3C	4	5A	5B	6	7
Fully & partially completed by SSO	31	28	1	27	24	21	10	7	9	13
TOTAL SSOs	83									
% of working gas volume (TSSO)	60 % (representing 112 bcm vs 200 bcm Working Gas Volume)									
Fully or partially completed by NRAs			12		10		3	1		4
TOTAL NRAs	53									



Study on Underground Gas Storage in Europe and Central Asia

Structure of the Study (13) :

- Chapter 6 : Tariffs of UGS : provide with information (if available and taking into account confidentiality issues) about construction costs and operation costs,
- **Heads** : *Mr G. Martinus (Gas Terra) with support of Mr W. Rokosz (PGNiG)*
- Chapter deleted



Study on Underground Gas Storage in Europe and Central Asia

Structure of the Study (15) :

- Chapter 7 : Outlook and main expected trends of UGS markets : describe the gas market (supply and demand) evolution and define the UGS needs subject to this evolution.
- **Heads** : *Mr G. Martinus (Gas Terra) with support of Mr J. Wallbrecht (IGU), Ms A. Brandenburger (RWE Gasspeicher)*
- Chapter deleted

