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Thematic Session WOC 2-1

Gas Storage Value in Europe

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Agenda

- The value of storage in Europe is like an iceberg
- Today, gas storage in Europe suffers from a structural problem
- How to re-establish the value of gas storage in Europe?
- Conclusions

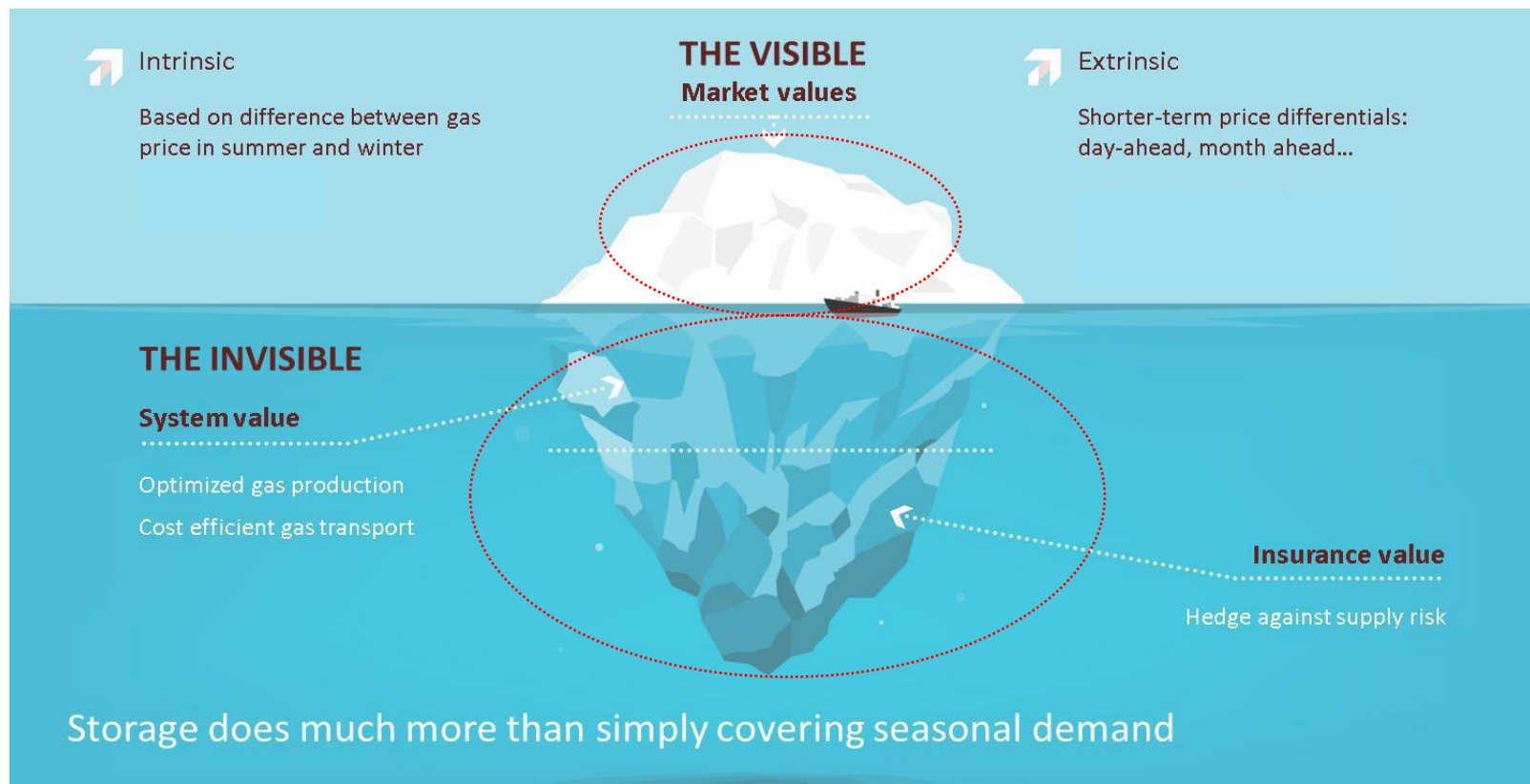
The value of gas storage is like an iceberg...

The value of gas storage is like an iceberg

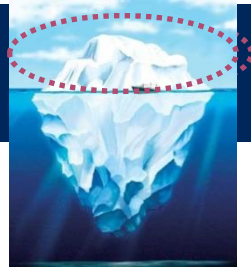
The value of gas storage today is like an iceberg as it is only partially visible.

In fact, only the smallest part of the value that storage offers - the “tip of the storage value iceberg” - can be appreciated by the market.

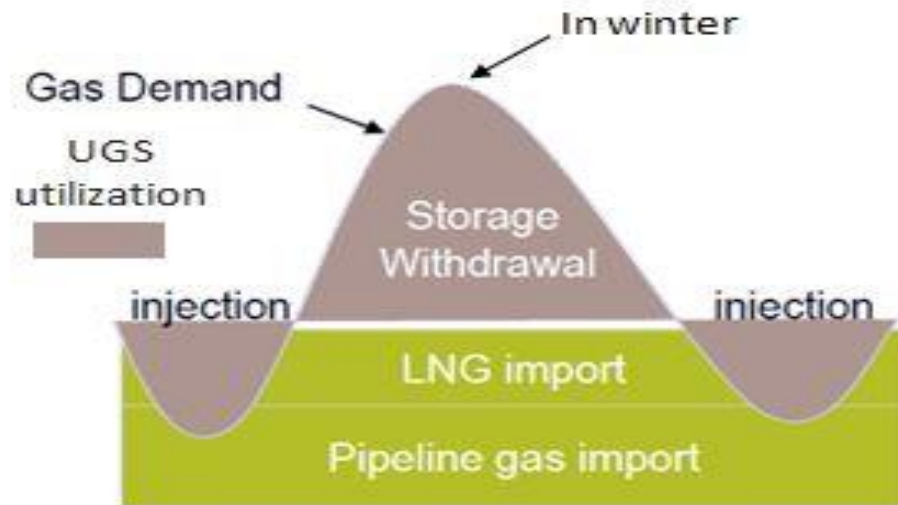
Its biggest chunk remains concealed and is often ignored...to the detriment of gas customers.



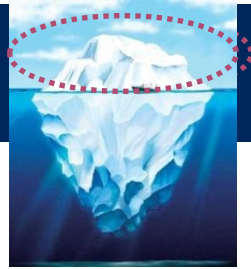
The Visible Value of storage (1/2)



- The “tip of the storage value iceberg” reflects the valuation of storage through commodity price differentials between different points in time quoted on gas exchanges.
- Storage valuation through price spreads is linked to the traditional use of storage which consists in balancing relatively stable annual supply and variable seasonal demand.



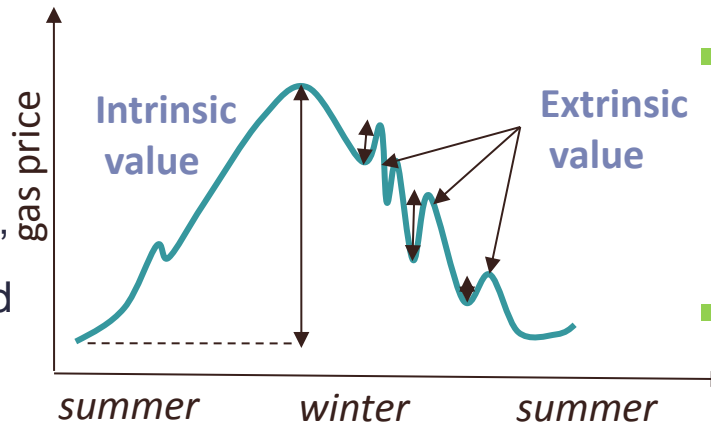
The Visible Value of storage (1/2)



Two types of **Market Values** can be distinguished :

Intrinsic value

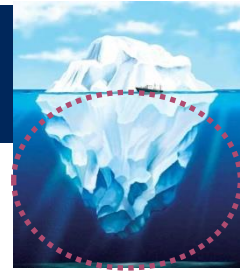
- Is based on difference between gas price in summer (injection) and winter (withdrawal).
- Reflects seasonal demand pattern.
- Provides a “static view” of the seasonal forward price curve.



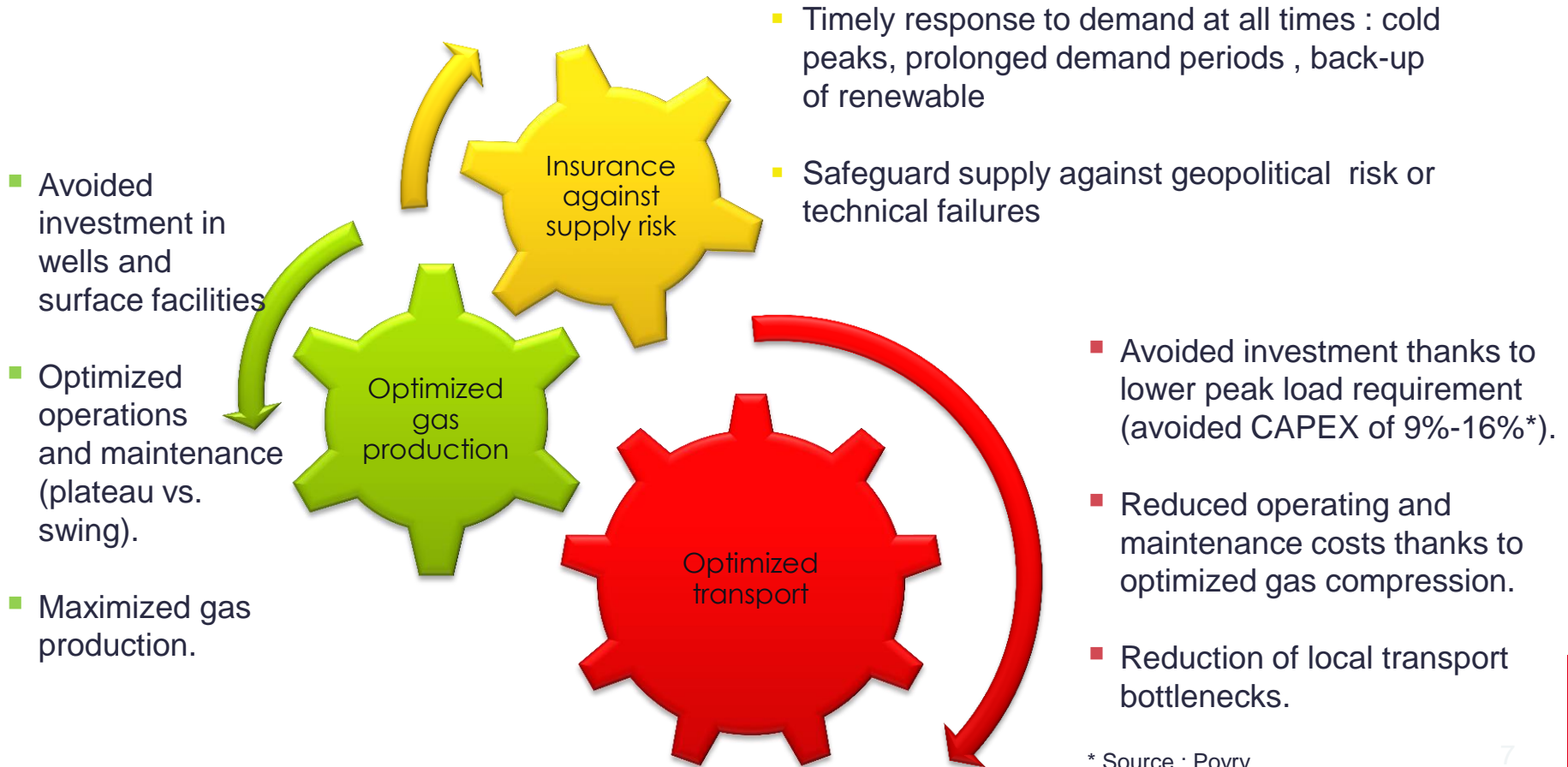
Extrinsic value

- Is based on shorter-term price differentials : day-ahead, weekend, month ahead etc.
- Is a dynamic and complex function of price volatility, asset flexibility, optimization strategies.
- Offers a potentially high value from small price variations but has limited price visibility.

The Invisible Value of storage

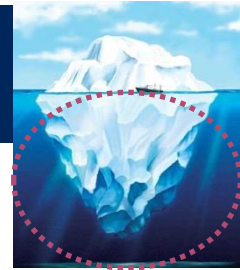


Besides its Market Values, storage offers a number of benefits to end-users in terms of **Insurance against supply risk** and **Optimization of production and transport**:



* Source : Poyry

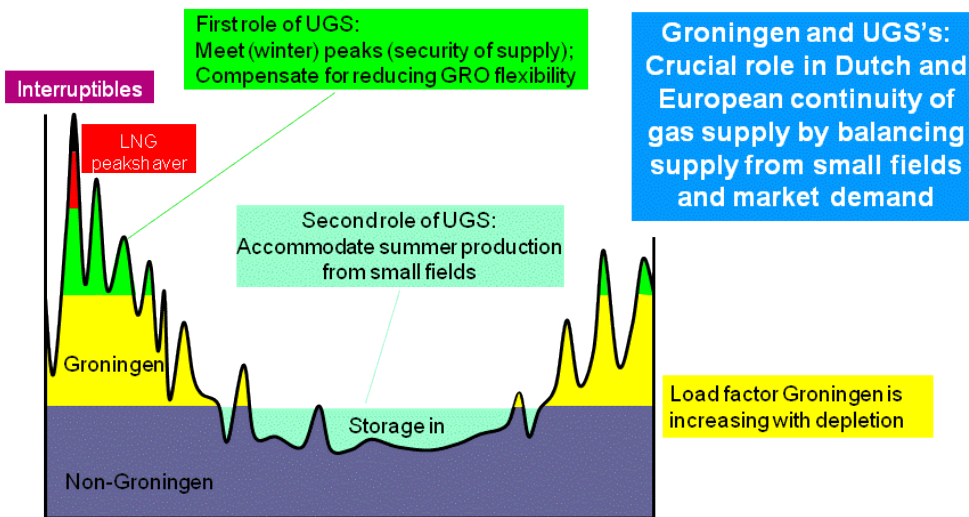
The Invisible Value of storage (2/3)



Optimized gas production: case of production field and storage close to the consumption area and can be used flexibly

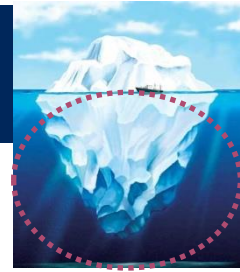
Examples :

- In the UK, the Morecambe dry gas field has provided the bulk of the required flexibility on the UK market.
- In the Netherlands, the Groningen field has been used for the provision of flexibility at a very high level, as a virtual storage of a capacity up to 15 Bcm of working volume. The system had been completed by two additional storage facilities at Norg and Grijpskerk to cover the peak demand.



- Savings on CAPEX by avoiding additional investment in wells and surface facilities (up to 80% avoided costs depending on anticipated swing)
- Better production management and hence optimization of operations and maintenance activities/costs (plateau vs. swing production)
- Overall optimization of reservoir management and hence enhanced ultimate recovery (avoided loss of reserves in the order of 10-15% depending on reservoir characteristics)

The Invisible Value of storage (3/3)



Optimized gas infrastructure development: important role of UGS in an infrastructure system when the consumption is affected by cycles (gas usage in space heating or air conditioning)

Role of optimization of infrastructure => satisfaction of variable demand at the best cost

Case study :

- Example of a 4000 km distance (comparable to the distance between the Siberian fields and central Europe) and a supply of 30 Bcm/year.
- Transport infrastructures costs is proportional to the distance
- The average storage need to cover the seasonality is 20%, or 6 Bcm.
 - *load factor of 0,5* : additional cost = **~6 bn\$**.
vs. developing large capacities in depleted field = **~4 bn\$** (0,7 \$/m³). *50 days storage capacity*
 - *load factor of 0,33* (meeting the peak day) : additional cost = **~12 bn\$**
vs. developing 6 Bcm of salt cavern storages = **~7 bn\$** (1,2 \$/m³),
or a mix 80% reservoir + 20% caverns = **~ 4,8 bn\$**. *min. duration of 7 days for salt caverns storage*

=> “efficiency distance” of *seasonal storage* : ~ 2500 km

=> “efficiency distance” of *salt caverns* : ~ 700 km



**Today, gas storage in Europe
suffers from a structural problem**

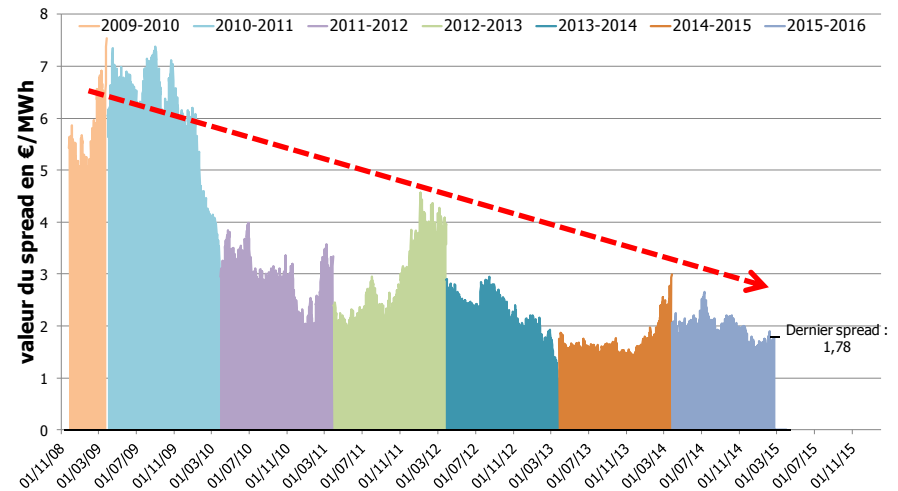
Shifting market structure has altered the way storage is valued

- The liberalization of the European market has gradually led to unbundling of activities along the gas value chain, from production, through transport to supply.
- As a result, global welfare maximisation has given way to maximisation of benefits by individual stakeholders. This has brought about a structural change in the storage market.
- Commodity price differentials - which can be easily appreciated - have become the principal point of reference for the valuation of storage by shippers and determine the appetite for storage capacity.

Low seasonal spreads have a significant impact on storage in Europe

- Over the past couple of years, seasonal spreads have decreased significantly discouraging shippers from booking storage capacity and generating increased price pressure for storage operators.
- A number of factors account for the tightening price spreads, in particular:

- energy market globalisation
- US shale gas production
- decline in gas demand in Europe
- design of EU CO₂ market
- political decisions on energy mix
- development of EU flexibility market
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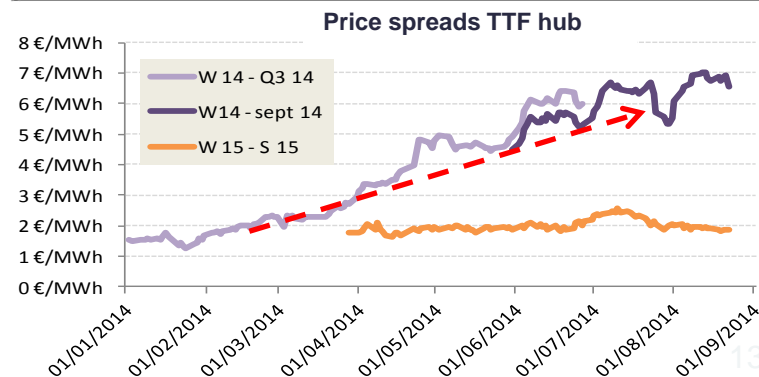
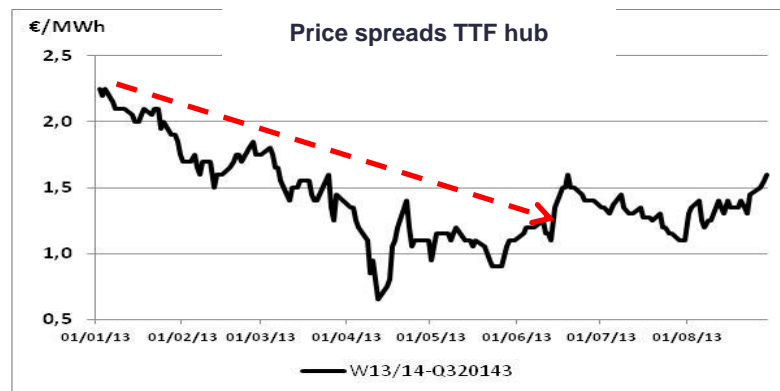


However, seasonal spreads do not reflect the full value of storage

- Price spreads are based merely on market sentiment about the availability of gas at given points in time. They are guided by expectations as to the evolution of price curves due to e.g. weather, geopolitical situations, technical events...
- Moreover, seasonal spreads may generate signals that are contrary to the actual contribution of storage to demand coverage, for instance :

The prolonged 2013 winter end left Europe with particularly low storage levels. This generated a bullish signal for 2013 summer prices while winter 2013/2014 prices remained relatively stable. As a result the seasonal spread decreased thus dampening the market signal for storage.

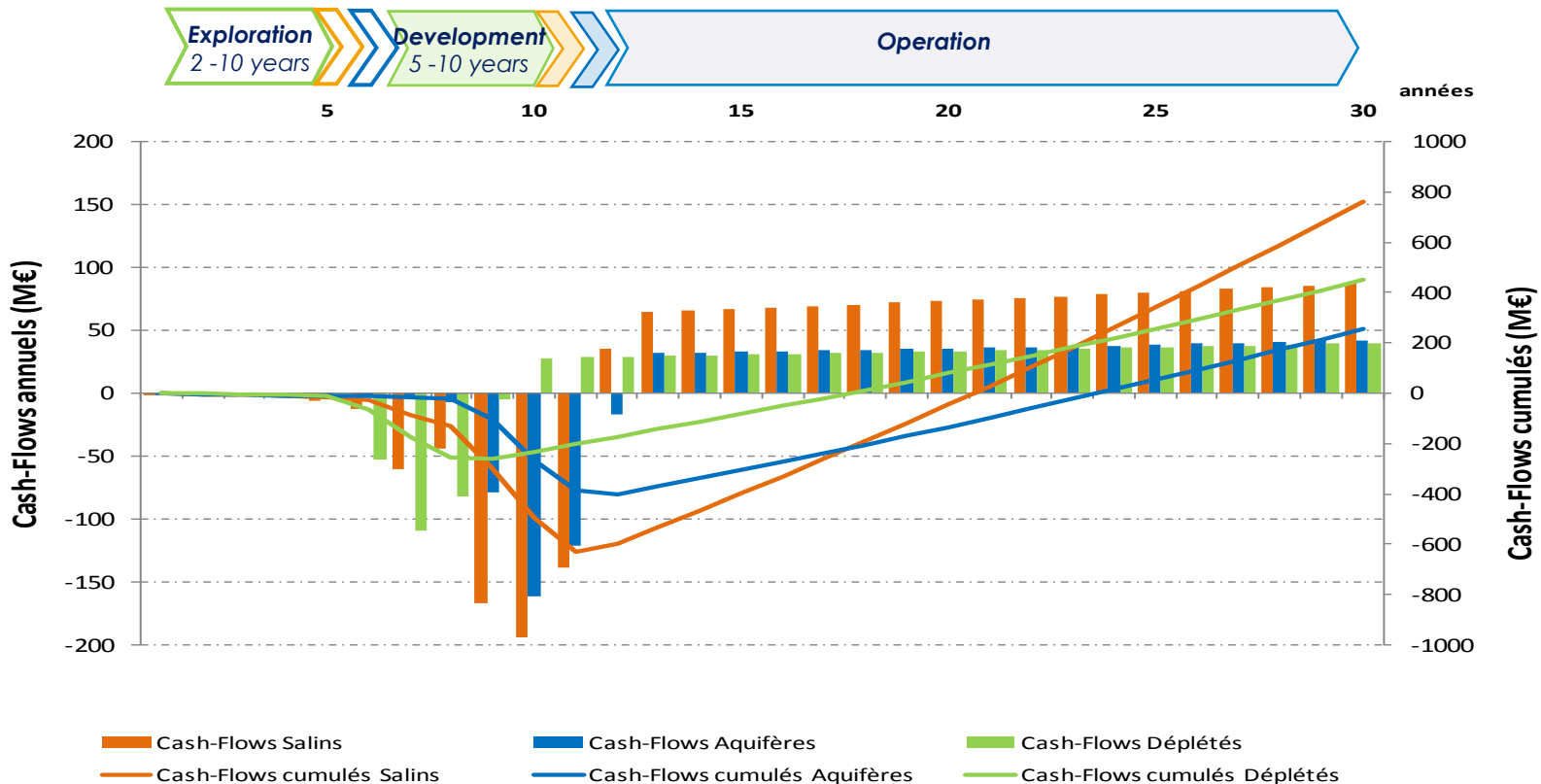
The opposite was the case at 2013/2014 winter end : mild winter has left Europe with higher than usual level of gas stocks. The resulting decrease of summer prices and relatively stable winter prices have, on the contrary, generated a price signal for storage.



Current market signals impact storage business case (1/2)

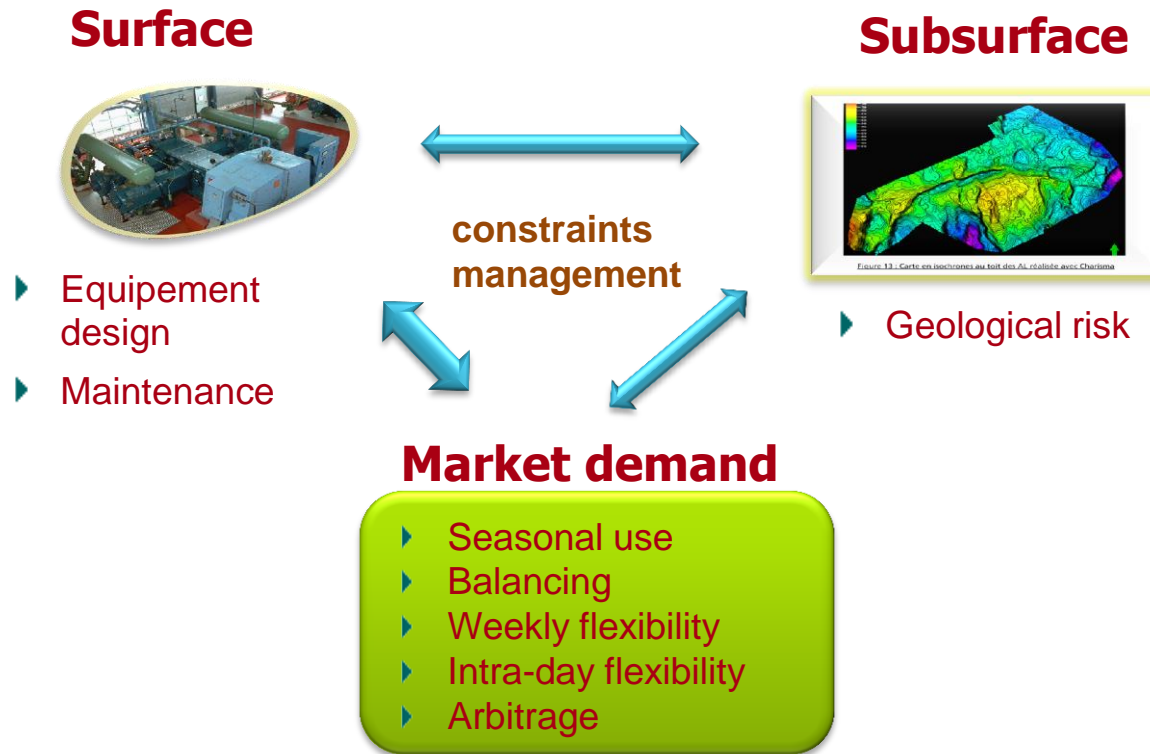
- Insufficient or contradictory market signals render volatile the storage activity and increase the risk exposure of storage operators. Whereas :

➤ Storage is a capital-intensive long-lead time business



Current market signals impact storage business case (2/2)

- Storage operators deal with physical assets which are characterized by complex physical and operational constraints.



Storage has to be used - i.e. “cycled”- (gas must be injected and withdrawn) otherwise storage performance may deteriorate: e.g. the gas bubble may move away, reservoir pressure may decrease, working volume may decrease etc...

Low spreads may determine storage availability in the future

- If low spreads persist, SSOs may be unable to cover their costs.
- Possible options :

Mothballing?

Decommissioning?



Both require financial outlays...

...only decommissioning could generate some cash but destroys value

- Decommissioned capacity may be missing in the future when demand picks up :
 - increasing import dependency
 - development of new technologies : power-to-gas...
 - growth of renewables requiring gas back-up
- New storage would need to be built but it takes 5-8 years to construct storage, while only 2-3 years to build a CCGT.



How to re-establish the full value of storage in Europe?

How to re-establish the full value of storage in Europe?

- The current situation of storage in Europe illustrates the limits of the market and calls for specific action to be taken.
- Otherwise Europe may risk losing some of the existing capacity. This would, in turn, reduce the benefits that storage brings, in particular terms of the Insurance and System optimization value of storage.

How to re-establish the full value of storage in Europe?

- Specific regulatory signals that should be considered include :

Removal of transmission tariffs at storage interconnection points

- The cost of storage is not limited to the cost of the storage service but includes the cost of the transmission tariff that is levied by transmission system operators. This cost is often non-negligible or even prohibitive.
- The removal of transmission tariffs at storage points would help to reestablish the value that storage brings to the gas system, namely in terms of avoided investment and reduced operating expenditure.
- It would also incentivize market participants to book storage capacity thereby enhancing security of supply.
- This would be fully in line with the way the network access is organized today in Europe (i.e. entry-exit system).

How to re-establish the full value of storage in Europe?

- Specific regulatory signals that should be considered include :

Introduction of specific security of supply arrangements for storage

- Insurance against exceptional supply-demand situations is becoming increasingly important in Europe given its ever more uncertain geopolitical situation and the growing dependency on external suppliers.
- Security of supply arrangements for storage should be non-discriminatory yet recognize the mutual benefits that storage represents for network users in terms of continuity of supply.

How to re-establish the full value of storage in Europe?

- Specific regulatory signals that should be considered include :

Adaptation of the regulatory framework

- The currently applicable rules for gas storage in Europe were established at the time when storage demand exceeded the offer. The situation has changed since then and the shift in the gas market paradigm has created a new environment for storage activity forcing storage operators to revisit their business models.
- The regulatory framework should become flexible enough to provide room for commercial and operational innovation by storage operators allowing them to adapt to the new context and to :
 - respond to the ever more specific market needs
 - optimize and preserve assets
 - provide support to efficient network operations
 - capitalize on their unique know-how

Conclusions

Conclusions (1/2)

- Today's situation for gas storage in Europe exerts a significant impact on storage economics and longer-term perspectives for storage operators.
- The volatility and unpredictability of the market renders it ever more difficult for to define sustainable adaptation strategies.
- This is particularly challenging considering the long payback periods of the storage business.
- It is therefore necessary to re-establish the full value of storage in Europe.
- This requires first of all a recognition of the current market limits and deployment of adequate regulatory signals by policy markets, such as
 - removal of transmission tariffs at storage points,
 - specific security of supply arrangements for storage
 - relaxation of the regulatory framework for storage operations.

Conclusions (2/2)

- These signals should emerge without delay at both the European Union level - through the European Commission and the agency of regulators - as well as at national level, through government authorities and national regulatory bodies.
- Storage operators stand ready to cooperate with policy makers and all other stakeholders in order to elaborate the regulatory solutions that the storage market needs today.
- There is no doubt that these regulatory signals must provide a long-term visibility and predictability for both storage operators and market players alike so that they can regain confidence in the storage market. Only then European customers will be able to enjoy the ample benefits that storage offers.

Thank you