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# Risk Management of renewable assets

London - 20 September 2022

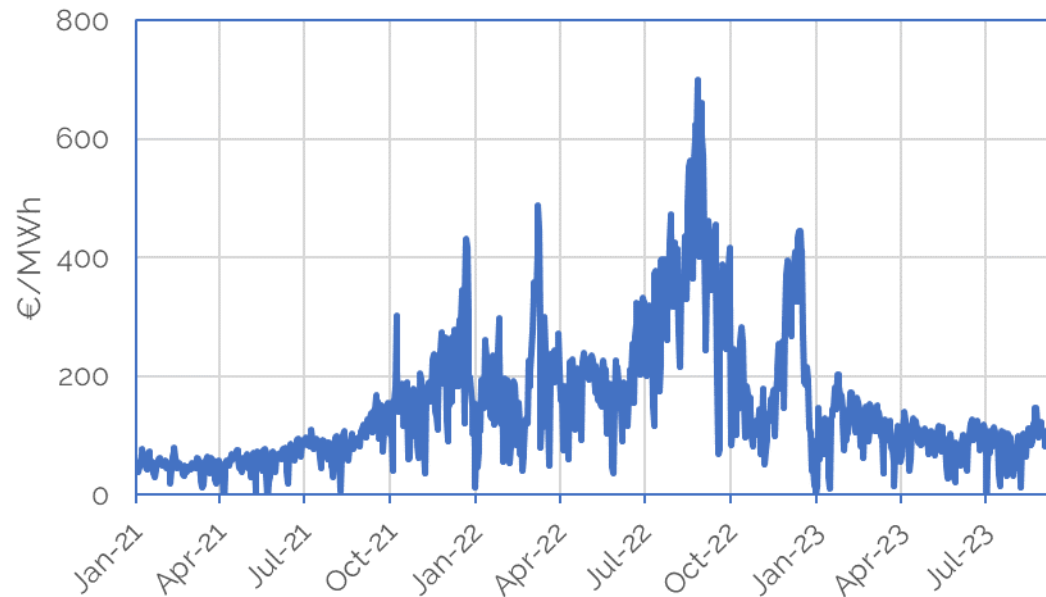
**Ewout Eijkelenboom**  
KYOS Energy Analytics

# Why risk management?

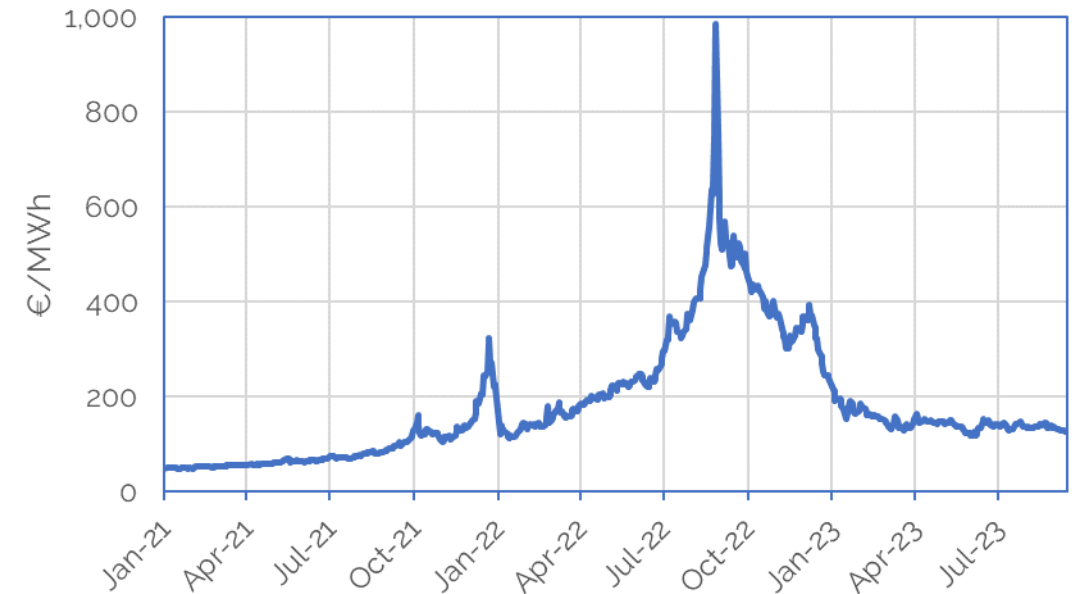


## Electricity prices are extremely volatile!

German daily spot price



German baseload Y+1 contract



And players are more and more affected by it!

- Reduced role subsidy schemes
- Merchant exposure



# Risk Management



Players in renewable sector need to develop skills and tools already used by utilities/traders!

# KYOS Energy Analytics







# KYOS renewable energy services



KYOS supports all players in the renewable energy sector

	Project developer	Bank or investor	Utility or Aggregator	Corporate off-taker
Software	<ul style="list-style-type: none"><li>• KYOS Analytical Platform - complete software system to price and manage renewable assets and PPAs</li><li>• Make long-term power price projections and perform what-if analysis</li><li>• Monitor and manage a complete portfolio of assets, PPAs and hedges</li><li>• Analyse different hedging strategies before entering in new deals</li><li>• Obtain detailed risk reports for managers, investors and analysts</li></ul>			
Advisory	<ul style="list-style-type: none"><li>• Get valuation support during PPA negotiation and M&amp;A activities</li><li>• Get regular PPA valuations for accounting and trading purposes</li><li>• Get support with arbitration cases, re-financing and re-powering</li><li>• Get advice on PPA hedging strategies</li></ul>			

# KYOS Energy Analytics

- Some useful (free) publications



See: <https://www.kyos.com/knowledge-center/>

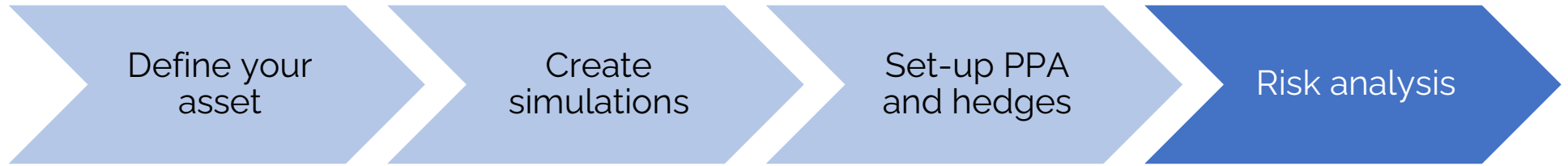


# An analytical approach to manage market risks





# Systematic risk assessment framework

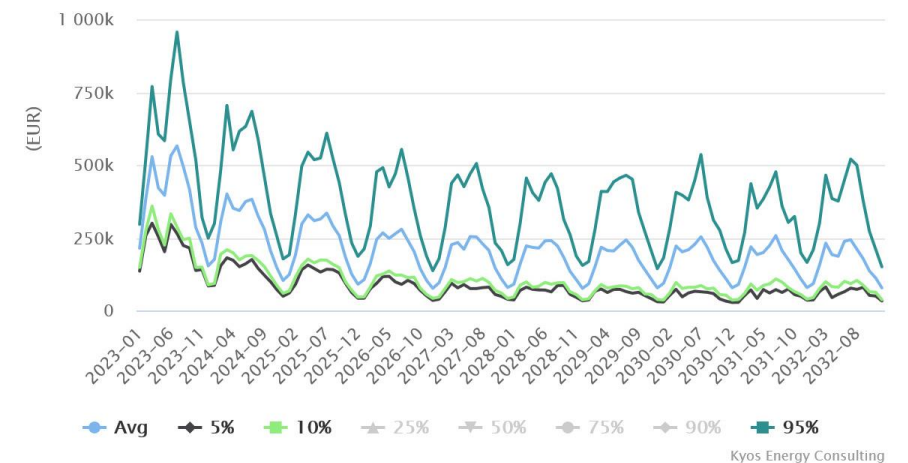
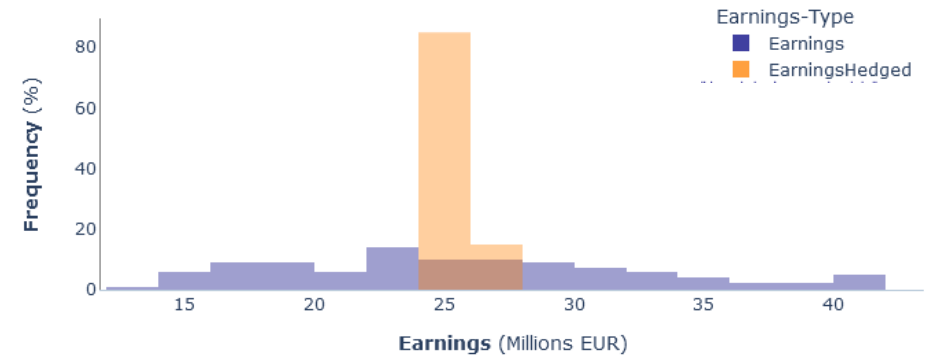


- Historical data
- Expected P50
  - Given
  - Estimated by model
- Capture rate development
  - Estimated by model
  - Own views to test sensitivities
- Forward curve
- Accurate model
- Calibration
- Multiple commodities to portfolio view
- Simulate price and volumes!!
- Capture PPA details
- Standard contracts
- Flexible!

# Risk analysis



- Cashflow/earnings distribution
  - Aggregated over longer time horizon
  - On monthly level
- Unhedged asset
- Hedged asset
- Portfolio effect
  - Assets in different locations/countries and technologies
- Clear metrics, e.g. EaR



Earnings at Risk Summary			
Commodity	Commodity	Currency	95% at Risk
	Total	EUR	54 419 254



# How does this help you?



## Pre-deal/FID

- Financing:
  - Monthly cashflow distribution gives view on worse case project cashflows
  - Help to assess DSCR
- Structure your PPA:
  - Change PPA parameters and see impact on risk distribution
- Holistic portfolio view
  - How does this asset change overall portfolio risk? (technology/location diversification)

## Asset in operation

- Risk reporting
  - Continuous monitoring of expected revenues in changing markets
- Test portfolio adjustments
  - Assess effect of additional hedges on risk profile
- Implement portfolio adjustments

# Example





# Example: risk management to grow portfolio

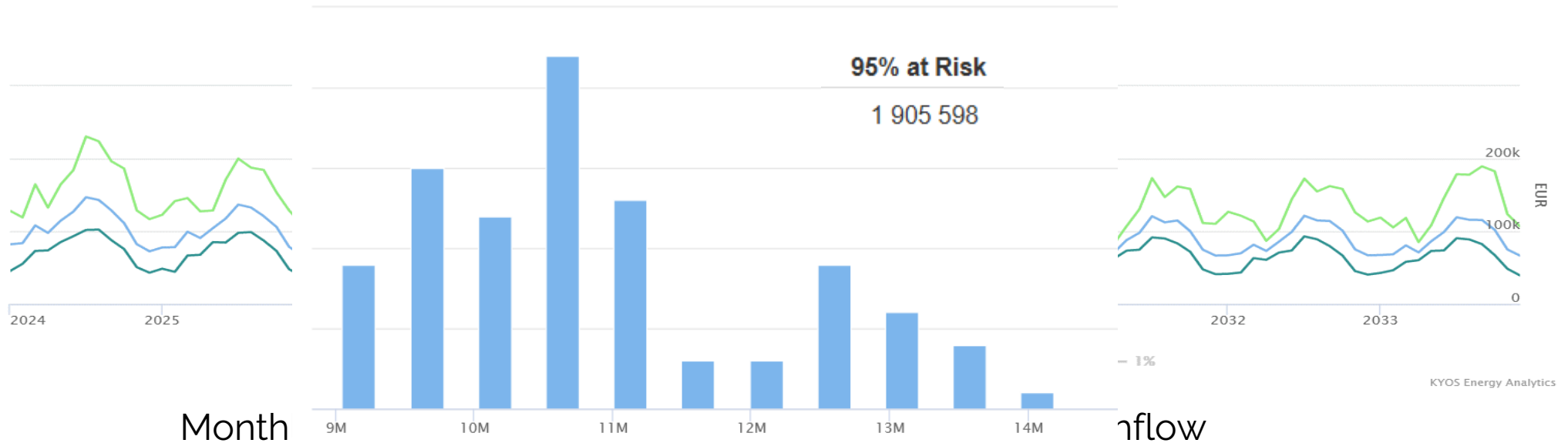


- IPP with asset in Spain. Looking to expand into Italy
- Question to answer: what is effect on my overall risk profile?
  
- To consider:
  - Current risk profile
  - Risk of new asset
  - Combined risk profile
  
- Challenges:
  - Incorporate correlations: locations, technologies.
  - Requires robust and accurate simulation engine!!

# Current portfolio

- Step 1 – look at current risk profile.
  - Spanish wind asset hedged with 75% PaP PPA at fixed price

## Total earnings distribution



Month

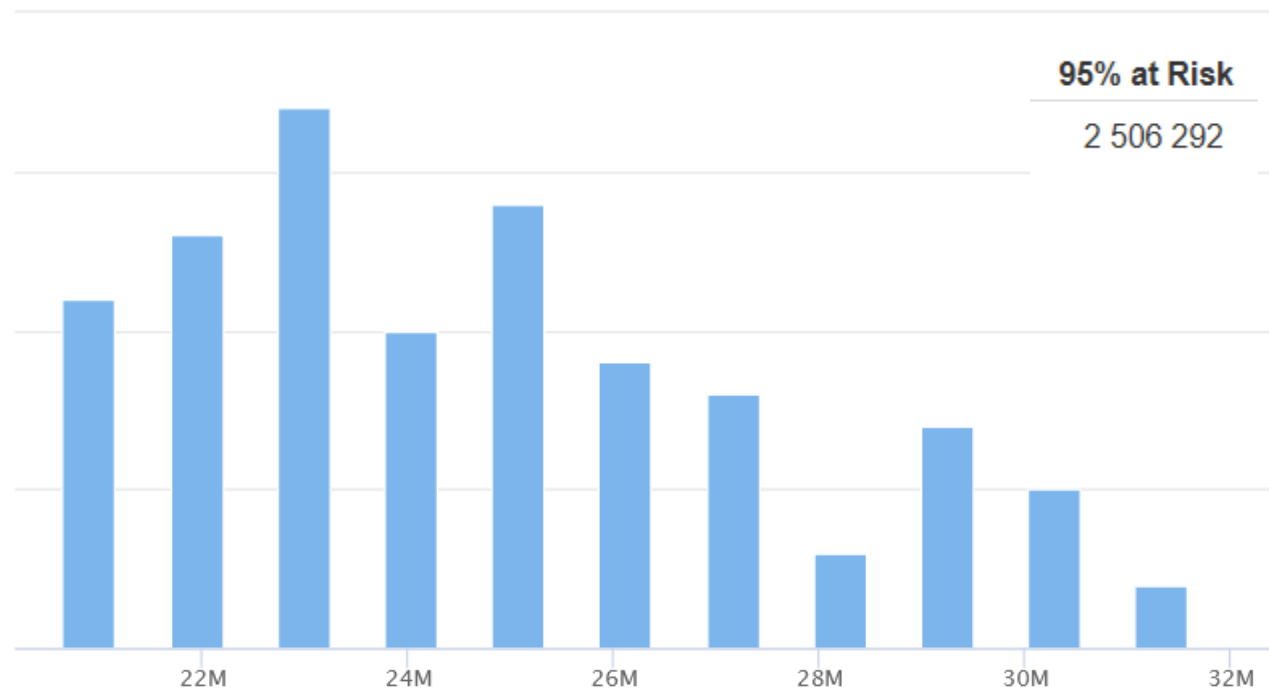
planning and debt sizing  
Translation:

There is a 5% probability that your realized earnings will be more than €1.9mln below current expected earnings



# Analyse new asset

- Step 2 – look at risk profile of planned Italian wind asset.
  - For simplicity also with 75% PaP PPA at fixed price
  - Same valuation logic
  - Take care of Italian zones...



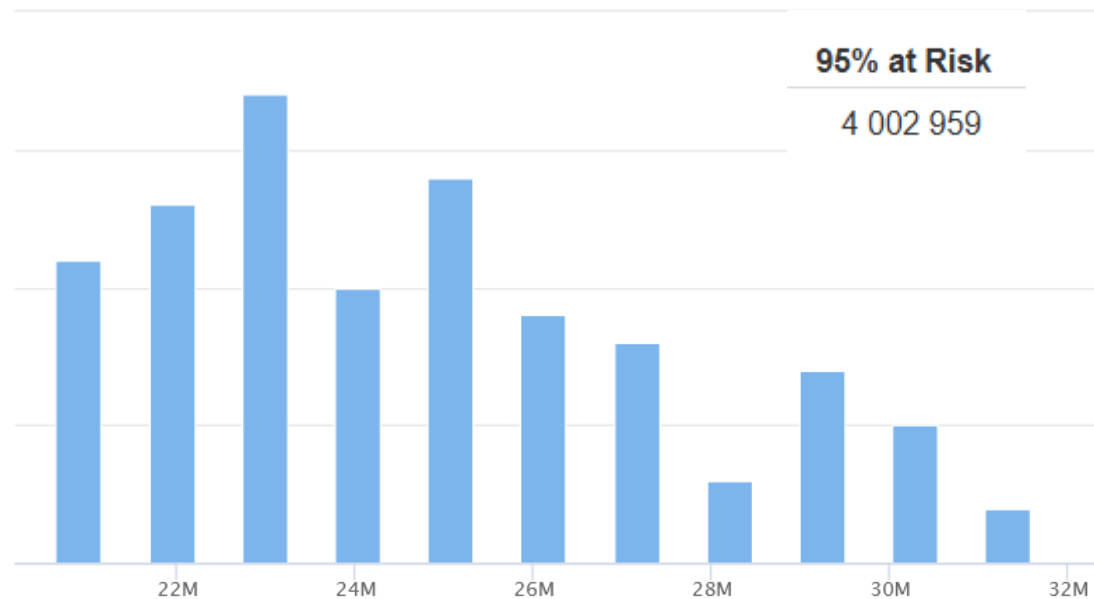
EaR Spain: €1.9mln

EaR Italy: €2.5mln

**Total EaR: €4.4mln?**

# Portfolio analysis

- Step 3 – Portfolio view
  - Combine both geographies in one risk assessment
  - Requires correlated set of price and volume simulations of both countries!
  - Assess combined earnings distribution



EaR Spain: €1.9mln

EaR Italy: €2.5mln

**Total EaR: €4.0mln**

**-> 10% portfolio effect!**

In other words: actual risk of adding Italian PV asset is less than expected.

Allows for more investments!



# Summary

- Understanding market exposure more and more important
- To understand the market, offtakers
- To be able to grow more with same capital
- Renewable players need to be ready for this -> “think and act like a trader”
- **Requires resources and systems!**

We look forward to supporting you with the right tools and advice!



Ewout Eijkelenboom  
[ewout@kyos.com](mailto:ewout@kyos.com)

KYOS Energy Analytics  
Nieuwe Gracht 49  
2011ND Haarlem  
The Netherlands

