# All about Allowances: from a power company perspective

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VATTENFALL

# History of Vattenfall

## From a domestic Swedish hydro power generator to an European energy company

**1909**
Founding of The Swedish State Power Board

**1951**
Inauguration of Harsprånget,
A hydro power plant in Sweden

**1999–2009**
Acquisitions in Germany, Poland and the Netherlands

**2010**
Inauguration of UK offshore wind farm Thanet

**1909–1950**
Part of developing the Swedish energy system

**1950–2000**
Organic growth and national market deregulation

**2000–2009**
Major expansion in Europe

**2010–2013**
Consolidation phase

**1909–1916**
First large hydro power plants:
Porjus, Olidan, Älvkarleby, Sweden

**1970–1980**
Construction of 12 nuclear reactors in Sweden

**2011–2012**
Divestments of non-core operations in Belgium, Finland and Poland







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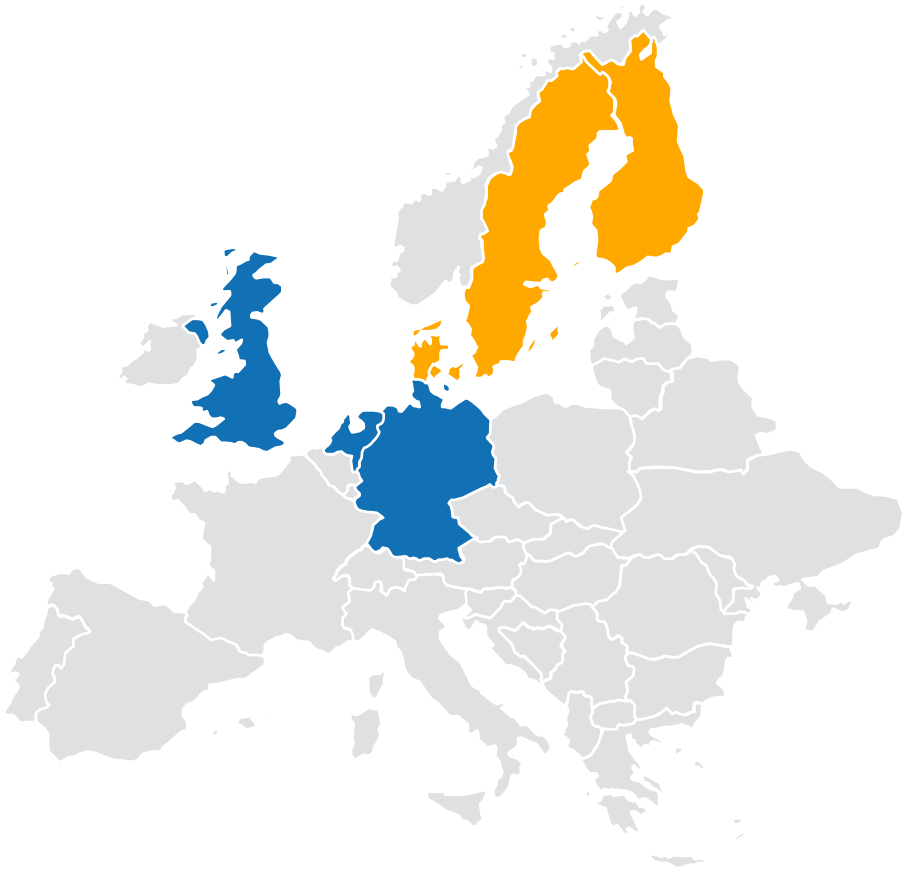
# This is Vattenfall



- One of Europe's largest electricity producers
- 100%-owned by the Swedish state
- Main markets:
  Nordic countries, Germany, Netherlands
- Vattenfall also has operations in:
  UK (mainly within wind power)
- Main products:
  Electricity, Heat, Gas, Emission Allowances
- Operations span the entire energy value chain:
  Production, Distribution, Trading, Sales and Energy Solutions



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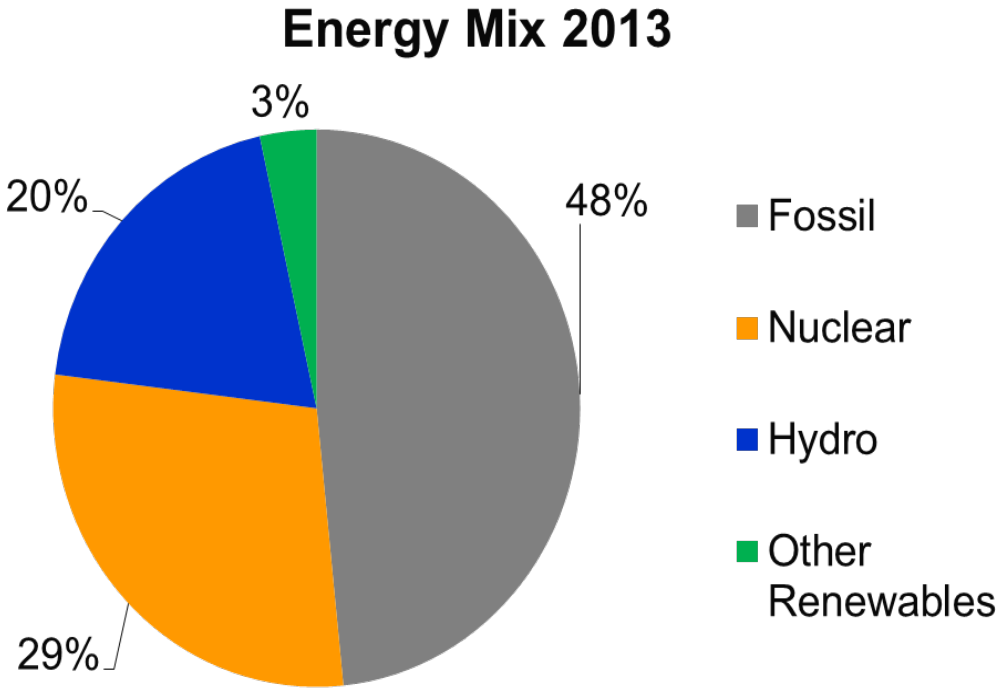
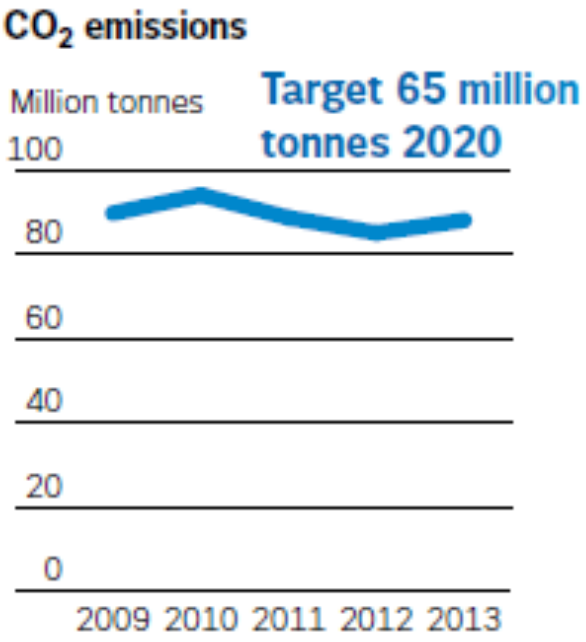
# Vattenfall Energy Mix and $CO_2$ emissions

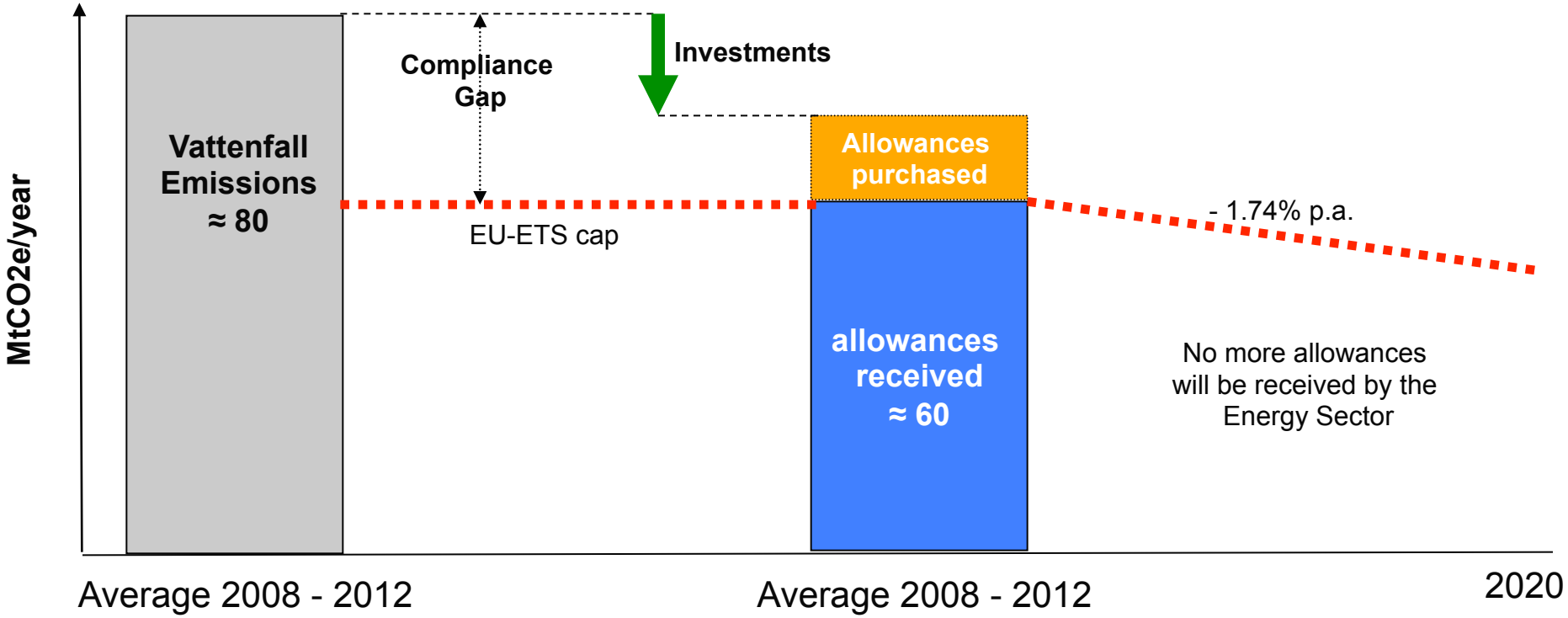


# Compliance under a Cap and Trade System

**Strategic options for compliance**:

- Increase share of clean technologies in generation mix (decrease emissions)
- Acquire more EUAs (increase allowances)
- Participate in Project Offset activities (increase allowances)



# Carbon Allowances Management

- Types of allowances:
  - Inherent to a cap and trade system (EUA's for the EU-ETS)
  - From project offsets (CERs and ERUs in EU-ETS, CCERs in China)
- Access to allowances can be achieved through:
  - Government handouts (EUAs)
  - Government auctions (EUAs)
  - Carbon exchanges (EUAs and CERs)
  - Bilateral purchases (EUAs and CERs)
- The main objectives of managing allowances properly are:
  - Minimizing compliance costs
  - Efficient hedging of power sales
  - Revenue source

# Carbon Allowances Management

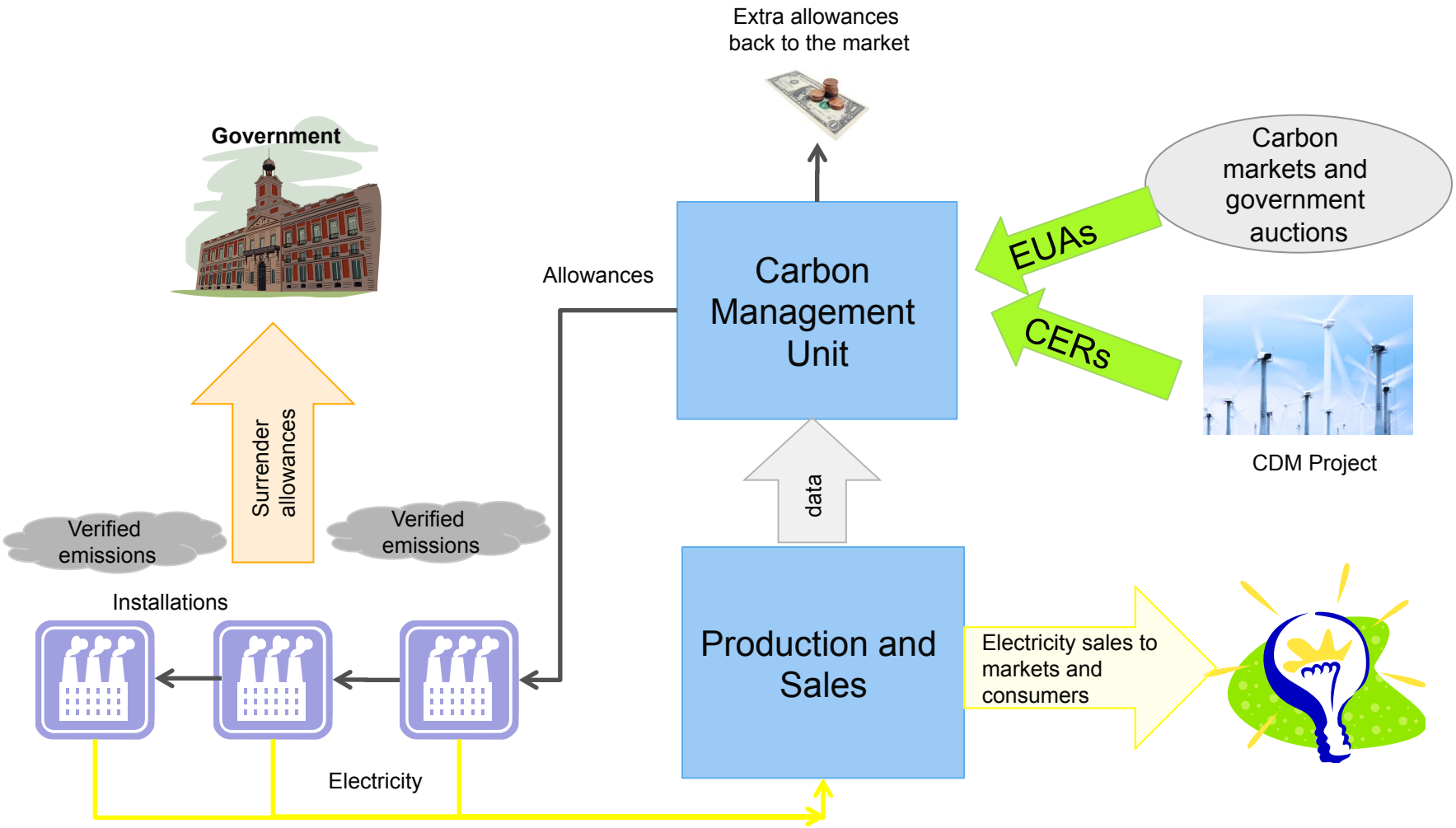
- Each individual installation monitors and reports GHG emissions on a yearly basis

- … but allowances are managed centrally / optimization

- Central management of allowances is done nearly on a daily basis (particular case of a large power company with several plants)

- Compliance is done again at the installation level (surrendering)

# Carbon Allowances Management



# Carbon Allowances Management

- The optimal mix of allowances for compliance/hedging is determined by several factors
  - Cost
  - Availability
  - Time
  - ETS restrictions i.e. EU allows only x% of CERs to be used for compliance
- In the case of the EU-ETS compliance has to be achieved by April each year

# Lessons learned

- Trading of allowances helps companies reduce exposure to price volatility thus reducing the long term cost of compliance.
- Nobody can exactly predict the direction of prices in the future.
- The best trading strategy is the one that will keep the cost of buying allowances close to an average yearly price (cost averaging)
- Very important to spread out buying/selling over a period of time.
- Do not wait until the last day for compliance! It will be expensive
- Several trading products are available to spread risk, minimize cost or maximize profit.
- Proper and reliable counterparty is very important, always conduct KYC checks.

# Trading of Allowances

| | |
|---|---|
| **Spot** | ▪ Selling in an exchange/market or to a counterparty for immediate delivery. The allowance has to be already issued. |
| **Futures** | ▪ Selling on an exchange/market or to a counterparty for guaranteed delivery in the future<br>▪ In the EU-ETS the most common future delivery is December of each year<br>▪ The allowance doesn't need necessarily to be issued at the moment of selling a futures contract.<br>▪ Allows for the Buyer to lock the price of carbon without the need to use cash now |
| **Options** | ▪ Is a contract that gives the owner the right but not the obligation to buy or sell an allowance at a specific price. It is mainly used for hedging purposes. Right to buy is a call, right to sell is a put.<br>▪ Options have expiry dates |
| **Swaps** | ▪ Physical swap is the exchange of different types of allowances by two different parties. For example EUAs for CERs or vice versa with or without cash transfers. |
| **Spreads** | ▪ A contract which reflects the price differential between allowances of different delivery dates.<br>▪ Useful in cases when a company is overallocated today but expects to need the allowances in the future again and needs cash. Can raise money by selling now and buying back in the future in a single transaction, the spread would then be the actual interest on the money raised. Could be cheaper than a bank loan. |

# THANK YOU!

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# Example – Main Assumptions

| | |
|---|---|
| Each December Government allocates 200 EUAs at no cost | Maximum use of offsets: 20% of emissions in compliance year |
| Compliance deadline by 1Q of every year | Original emissions factor: 0.400 tCO2/MWh |
| New wind park enters operation in January 2014 | 500 CERs coming from an offset project are expected in January 2015 |
| Initial CER, EUA position: 0 | EUA prices are higher than CER prices |
| | |

# EXAMPLE - 2013

- On 2Q, 2013 sales data are:
  - 1,000 MWh sold forward into 2Q 2014
  - 1,000 MWh sold spot
- Total emissions in 2013: 400 tCO2
- Up to 80 CERs can be used for 2013 compliance

| | 1Q 2013 | 2Q 2013 | 3Q 2013 | 4Q 2013 |
|---|---|---|---|---|
| Sales future (MWh) | | | | |
| Sales spot (MWh) | | 1,000 | | |
| EF (tCO2/MWh) | | 0.400 | 0.400 | 0.400 |
| Emissions (tCO2) | | 400 | | |
| Hedging needs (allowances) | | 400 | | |
| **Total need of allowances** | **-** | **800** | **-** | **-** |

| **MANAGEMENT OF ALLOWANCES** | | | | |
|---|---|---|---|---|
| Free EUA allocation | - | - | - | 200 |
| Compliance EUAs | - | - | - | - |
| Compliance CERs | - | - | - | - |
| Purchase EUAs | - | 520 | - | - |
| Purchase CERs | | 80 | - | - |
| Sales EUAs | - | - | - | - |
| Sales CERs | - | - | - | - |
| Offset CERs | | | | |
| **EUA account** | **-** | **520** | **520** | **720** |
| **CER account** | **-** | **80** | **80** | **80** |

# Example - 2014

- The emissions factor is affected and reduced to 0.300 tCO2/ MWh
- On 2Q, 2014 sales data are:
  - 2,000 MWh sold forward into 2Q 2015
  - 1,000 MWh sold spot
- Total emissions in 2014: 600 tCO2
- Up to 120 CERs can be used for 2014 compliance

| | 1Q 2014 | 2Q 2014 | 3Q 2014 | 4Q 2014 |
|---|---|---|---|---|
| Sales future (MWh) | | 1,000 | | |
| Sales spot (MWh) | | 1,000 | | |
| EF (tCO2/MWh) | 0.300 | 0.300 | 0.300 | 0.300 |
| Emissions (tCO2) | | 600 | | |
| Hedging needs (allowances) | | 600 | | |
| **Total need of allowances** | | **1,200** | | |

| | **MANAGEMENT OF ALLOWANCES** | | | | |
|---|---|---|---|---|---|
| 200 | Free EUA allocation | - | - | - | 200 |
| - | Compliance EUAs | -320 | - | - | - |
| - | Compliance CERs | -80 | - | - | - |
| - | Purchase EUAs | - | 480 | - | - |
| - | Purchase CERs | - | 120 | - | - |
| - | Sales EUAs | - | - | - | - |
| - | Sales CERs | - | - | - | - |
| | Offset CERs | - | - | - | - |
| **720** | **EUA account** | **400** | **880** | **880** | **1,080** |
| **80** | **CER account** | **-** | **120** | **120** | **120** |

# Example - 2015

- On 2Q, 2015 sales data are:
  - 0 MWh sold forward into 2016
  - 3,000 MWh sold spot
- Total emissions in 2015: 1500 tCO2
- Up to 300 CERs can be used for 2015 compliance
- Since the company holds a substantial excess of CERs, 180 CERs are sold in December 2015.

| | 1Q 2015 | 2Q 2015 | 3Q 2015 | 4Q 2015 |
|---|---|---|---|---|
| Sales future (MWh) | | 2,000 | | |
| Sales spot (MWh) | | 3,000 | | |
| EF (tCO2/MWh) | 0.300 | 0.300 | 0.300 | 0.300 |
| Emissions (tCO2) | | 1,500 | | |
| Hedging needs (allowances) | | - | | |
| **Total need of allowances** | | **1,500** | | |

| | **MANAGEMENT OF ALLOWANCES** | | | | |
|---|---|---|---|---|---|
| 200 | Free EUA allocation | - | - | - | 200 |
| - | Compliance EUAs | -480 | - | - | - |
| - | Compliance CERs | -120 | - | - | - |
| - | Purchase EUAs | - | 400 | - | - |
| - | Purchase CERs | - | - | - | - |
| - | Sales EUAs | - | - | - | - |
| - | Sales CERs | - | - | - | -180 |
| - | Offset CERs | 500 | - | - | - |
| **1,080** | **EUA account** | **600** | **1,000** | **1,000** | **1,200** |
| **120** | **CER account** | **500** | **500** | **500** | **320** |

# Example - 2016

- On 2Q, 2016 sales data are:
  - 0 MWh sold forward into July 2016
  - 500 MWh sold spot
- Total emissions in 2016: 150 tCO2
- Up to 30 CERs can be used for compliance in 2016, so 10 CERs are bought
- Since the company holds a substantial excess of EUAs, 50 EUAs are sold in 3Q 2015.

| | 1Q 2016 | 2Q 2016 | 3Q 2016 | 4Q 2016 |
|---|---|---|---|---|
| Sales future (MWh) | | - | | |
| Sales spot (MWh) | | 500 | | |
| EF (tCO2/MWh) | 0.300 | 0.300 | 0.300 | 0.300 |
| Emissions (tCO2) | | 150 | | |
| Hedging needs (allowances) | | - | | |
| **Total need of allowances** | | **150** | | |

| | **MANAGEMENT OF ALLOWANCES** | | | | |
|---|---|---|---|---|---|
| 200 | Free EUA allocation | - | - | - | 200 |
| - | Compliance EUAs | -1,200 | - | - | - |
| - | Compliance CERs | -300 | - | - | - |
| - | Purchase EUAs | - | - | - | - |
| - | Purchase CERs | - | 10 | - | - |
| - | Sales EUAs | - | - | -50 | - |
| -180 | Sales CERs | - | - | - | - |
| - | Offset CERs | - | - | - | - |
| **1,200** | **EUA account** | **-** | **-** | **- 50** | **150** |
| **320** | **CER account** | **20** | **30** | **30** | **30** |