Portfolio Management Game

Portfolio presentation

You will own 4 power plants

PV:
- Capacity: 290 MW
- Production: 1 TWh/yr
- Built in 2014
- Thin film panels (CdS/CdTe)

Wind:
- Capacity: 630 MW
- Production: 4 TWh/yr
- Built in 2012
- Offshore (R2)

Coal:
- Capacity: 500MW
- Production: 5 TWh/yr
- Built in 1994
- efficiency 38%, consuming 2 Mton coal

Gas:
- Capacity: 500MW
- Production: 5 TWh/yr
- Built in 2011
- CGGT, efficiency 50%, consuming 10 TWh gas

The different steps

Step 1: Evaluate market input

Step 2: Forecast the production

Step3: Evaluate market view

Step 4: Define hedging strategy

Forecasting

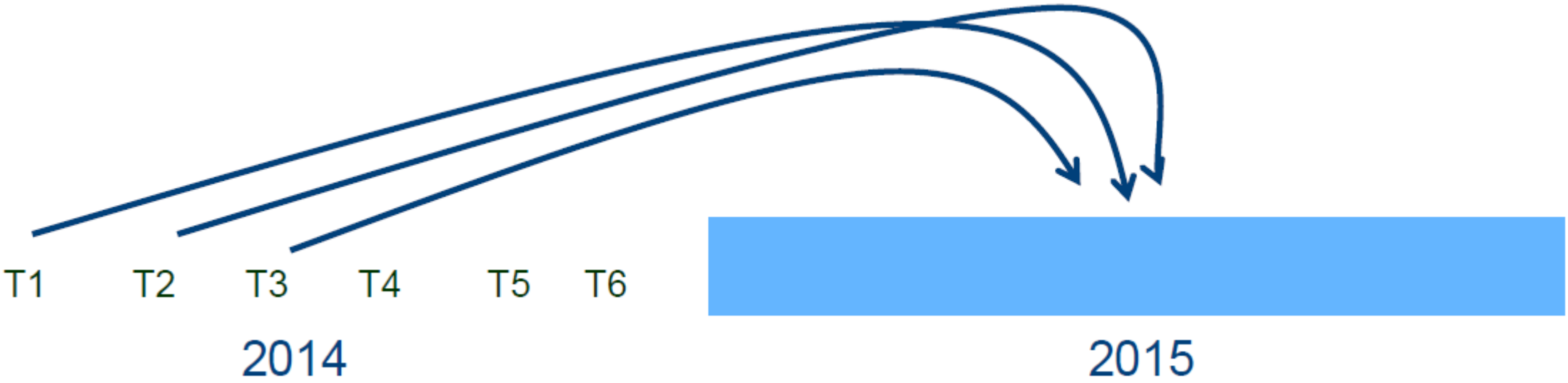
Each period (T1 to T6), you will need to forecast how much power your assets will generate and how much fuel they will consume based on the current market prices

- Evaluate the market input
- Forecast the production. The plant is on/off!

FORECASTING				T0	T1	T2	T3	T4	T5	T6
Plant A		power	MWh	10.000.000	10.000.000					
Plant B		power	MWh	5.000.000	5.000.000					
		coal	ton	-2.000.000	-2.000.000	0	0	0	0	0
Plant C		power	MWh	5.000.000	5.000.000					
		gas	MWh	-10.000.000	-10.000.000	0	0	0	0	0
ASSETS	TOTAL	power	MWh	20.000.000	20.000.000	0	0	0	0	0
		coal	ton	-2.000.000	-2.000.000	0	0	0	0	0
		gas	MWh	-10.000.000	-10.000.000	0	0	0	0	0
Market		power	€/MWh	72	70					
		coal	€/ton	52	52					
		gas	€/MWh	30	31					
Spark Spread = power - 2 * gas			€/MWh	12,0	8,0					
Dark Spread = power - 0,4 * coal			€/MWh	51,2	49,2					

Hedging

- **You will need to hedge the 2015 risks**
- **At 6 different times in 2014 (T1 -> T6)**
- **At T6 at the latest, total exposures need to be hedged**
- **Hedging volumes per T (for buys and sells) (= Clip sizes)**
  - Power: maximally 5 TWh
  - COAL: maximally 1 Mton
  - GAS: maximally 5 TWh



Hedging

Forecast				T0	T1	T2	T3	T4	T5	T6
Plant A		power	MWh	10.000.000	10.000.000					
Plant B		power	MWh	5.000.000	5.000.000					
		coal	ton	-2.000.000	-2.000.000					
Plant C		power	MWh	5.000.000	5.000.000					
		gas	MWh	-10.000.000	-10.000.000					
ASSETS	TOTAL	power	MWh	20.000.000	20.000.000	0	0	0	0	0
		coal	ton	-2.000.000	-2.000.000	0	0	0	0	0
		gas	MWh	-10.000.000	-10.000.000	0	0	0	0	0

Hedging										
	Plant A	power	MWh	0	-3.000.000					
	Plant B	power	MWh	0	-2.000.000					
		coal	ton	0	800.000					
	Plant C	power	MWh	0	-1.000.000					
		gas	MWh	0	2.000.000					
	TOTAL	power	MWh	0	-6.000.000	0	0	0	0	0

When you want to sell: -

When you want to buy: +

Positions

cumm hedges	Plant A	power	MWh	0	-3.000.000
	Plant B	power	MWh	0	-2.000.000
		coal	ton	0	800.000
	Plant C	power	MWh	0	-1.000.000
		gas	MWh	0	2.000.000
	TOTAL	power	MWh	0	-6.000.000
		coal	ton	0	800.000
		gas	MWh	0	2.000.000
Net position	Plant A	power	MW	10.000.000	7.000.000
	Plant B	power	MW	5.000.000	3.000.000
		coal	ton	-2.000.000	-1.200.000
	Plant C	power	MW	5.000.000	4.000.000
		gas	MWh	-10.000.000	-8.000.000
	TOTAL	power	MW	20.000.000	14.000.000
		coal	ton	-2.000.000	-1.200.000
		gas	MWh	-10.000.000	-8.000.000

0

- Cumulative hedges show the sum of all hedges executed
- Net position show the remaining positions per plant for power and fuels
- At T6 your remaining position should be 0!

MtM impact

MtM	Plant A	Asset	M€	720	680
		hedges	M€	0	0
		TOTAL	M€	720	680
	Plant B	Asset	M€	256	230
		hedges	M€	0	0
		TOTAL	M€	256	230
	Plant C	Asset	M€	60	20
		hedges	M€	0	0
		TOTAL	M€	60	20
	TOTAL	Asset	M€	1.036	930
		hedges	M€	0	0
		TOTAL	M€	1.036	930

- After every step you can see the impact of your actions on the MtM!
- The team with the highest MtM at T6 will be the winner

Market outlook