

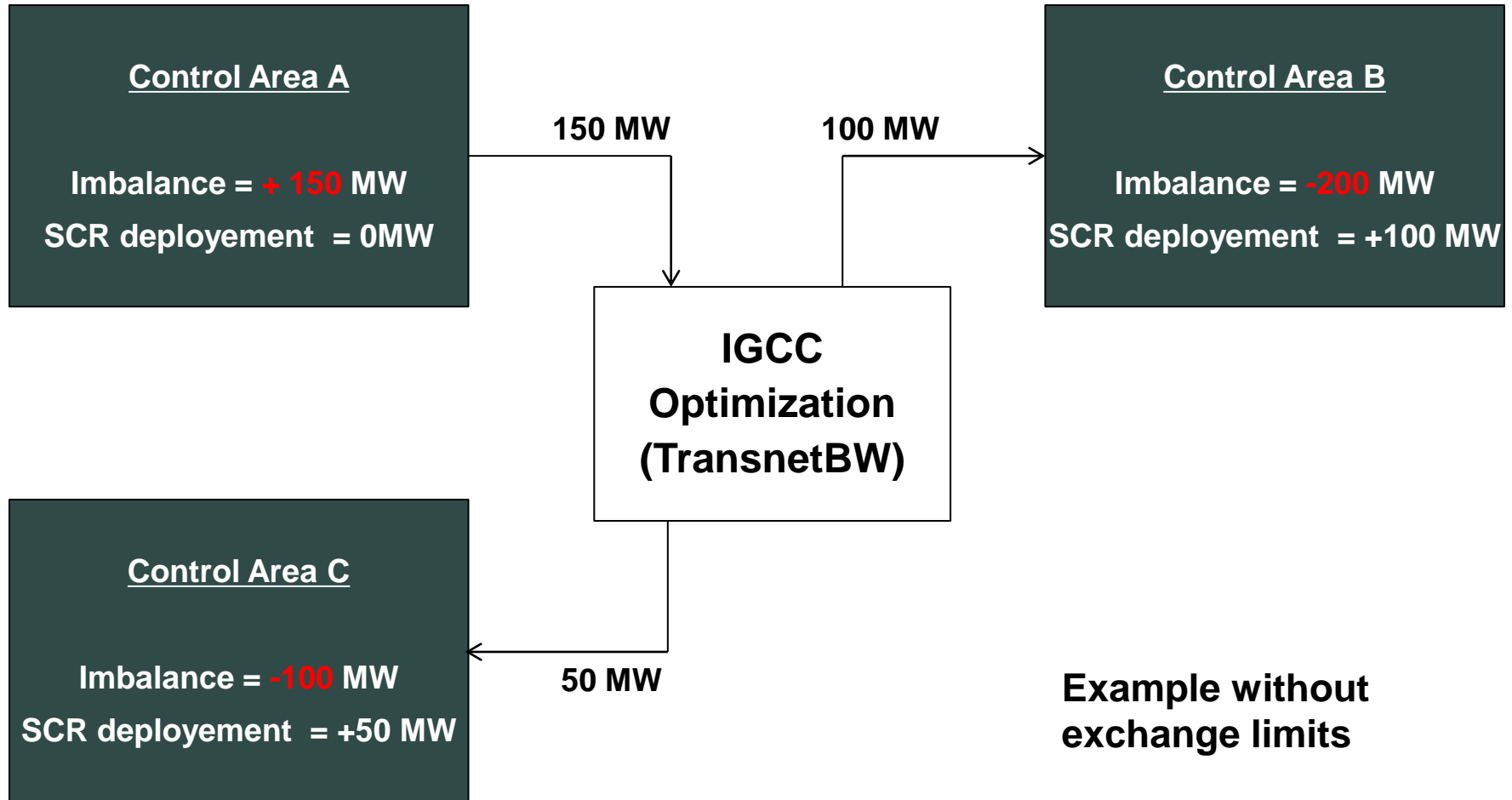


## IGCC – Participation Elia



- On 01/10/2012 Elia started with IGCC for a trial period of 1 year.
- Presently: Energinet (DK-W), TenneT TSO (NL), SwissGrid (CH), Ceps (Czech Republic) and Elia
- What: IGCC aims to prevent counteracting deployment of secondary reserves in separate control blocks, by exchanging opposing imbalances between TSOs
- IGCC adjusts the imbalances of the control areas by netting all imbalances
  - Dynamic, real time
  - Limited to remaining ATC after Intra-Day Closure
  - Within the limits made available to the market → no extra risk
  - After closure of the market → no impact on the market
  - Limited to contracted volume R2 (140MW)
  - Exchange can be suspended at any moment for technical reasons

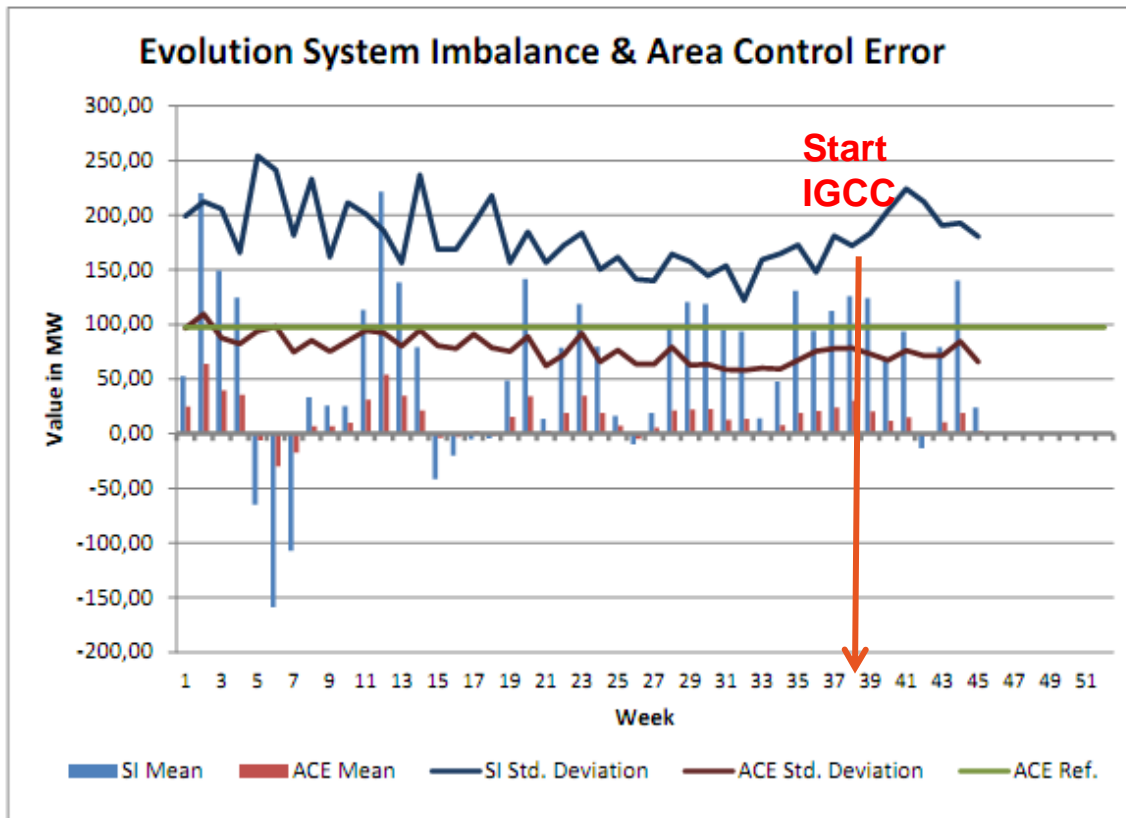
# IGCC – Participation Elia: Introduction to IGCC concept - example



# IGCC – Participation Elia:

## IGCC: Expected effects

- Minimal impact on the Imbalance Tariff
- Better control quality



# IGCC – Participation Elia:

## IGCC Settlement: impact Imbalance tariffs



- Imbalance Tariff:

		Net Regulation Volume (NRV)	
		Negative (Net downward regulation)	Positive (Net Upward regulation)
ARP Imbalance	Positive	<b>MDP - <math>\alpha 1</math></b>	<b>MIP - <math>\beta 1</math></b>
	Negative	<b>MDP + <math>\beta 2</math></b>	<b>MIP + <math>\alpha 2</math></b>

- No Impact NRV
  - IGCC exchanged volumes are considered as a part of the NRV
- Minimal Impact Marginal Prices
  - Instead of activating Secondary reserves, the imbalance will be exchanged via IGCC
  - IGCC exchanges are considered at R2 price in the imbalance tariff
- Calculation of alpha is based on the system imbalance, no changes
- Conclusion: IGCC will not impact the imbalance

# IGCC – Participation Elia:

## IGCC information on website Elia



- Volumes exchanged via IGCC

Non validated data for 20/11/2012

20/11/2012

Quarter	NRV (MW)	Upward regulation Volume					Downward regulation Volume				
		GUV (MW)	IGCC+ (MW)	R2+ (MW)	Bids+ (MW)	R3+ (MW)	GDV (MW)	IGCC- (MW)	R2- (MW)	Bids- (MW)	R3- (MW)
03:15 > 03:30	-25,9						25,9	18,6	7,3		
03:30 > 03:45	-45,9						45,9	45,0	0,9		
03:45 > 04:00	-80,0						80,0	43,9	36,1		
04:00 > 04:15	-133,0						133,0	12,9	120,1		
04:15 > 04:30	-171,3						171,3	50,6	120,7		
04:30 > 04:45	-250,3						250,3	133,5	116,8		

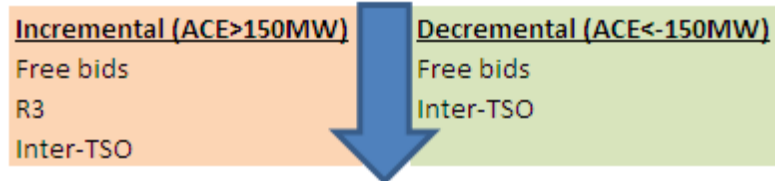
- Value IGCC exchanges in the imbalance tariff

Quarter	NRV (MW)	Incremental Prices					Decremental Prices				
		MIP (€/MWh)	IGCC+ (€/MWh)	R2+ (€/MWh)	Bids+ (€/MWh)	R3+ (€/MWh)	MDP (€/MWh)	IGCC- (€/MWh)	R2- (€/MWh)	Bids- (€/MWh)	R3- (€/MWh)
00:00 > 00:15	51,8	64,92		64,92			54,92	54,92			
00:15 > 00:30	84,9	64,92		64,92			54,92	54,92			
00:30 > 00:45	66,6	64,92		64,92			54,92	54,92			
00:45 > 01:00	-70,7						54,92	54,92	54,92		
01:00 > 01:15	4,9	64,92		64,92			54,92	54,92			
01:15 > 01:30	35,5	64,92		64,92			54,92	54,92			
01:30 > 01:45	-14,9						54,92	54,92	54,92		
01:45 > 02:00	-161,6						54,92	54,92	54,92		
02:00 > 02:15	-64,2						54,92	54,92	54,92		
02:15 > 02:30	76,6	64,92		64,92			54,92	54,92			
02:30 > 02:45	-77,2						54,92	54,92	54,92		

# IGCC – Participation Elia:

## Balancing management Elia

- **IGCC-volumes**; Quickly and automatically activated (140 MW – **non guaranteed**)
- **Secondary reserve- R2** : Quickly and automatically activated (140 MW – guaranteed)




- **Tertiary reserve**: manually activated, less quick than R2
    - **CIPU- & Free bids** :
      - power that can be activated upwards and/or downwards within 15 min
      - depending on the margin available in the production units
      - @ free price : positive for I-Bids and positive/negative for D-Bids
    - **Contracted R3** :
      - Upwards reserve
      - activation price is fuel cost based on technical parameters of power plants
    - **Load Shedding of Grid Users**:
      - upwards reserve
      - activation price is fixed
      - Limited number of activations & fixed duration of each activation
  - **Call for extra volumes/Activation of LC-units**:
    - Activation of LC-units if price is between -3000 €/MWh & +3000 €/MWh
    - Call for extra volumes to ARPs
  - **inter-TSO assistance**:
    - agreements made with RTE and TenneT operators about electricity imports or exports
    - emergency reserve with no guarantee
- When secondary reserves are not sufficient to resolve system imbalances, other resources are manually activated.
  - Reason; consider that suddenly only “guaranteed fast reserves” (R2) might be available to resolve imbalances

# IGCC – Participation Elia:

## Balancing management Elia: example



14/11/2012 

Quarter	NRV (MW)	Upward regulation Volume					Downward regulation Volume				
		GUV (MW)	IGCC+ (MW)	R2+ (MW)	Bids+ (MW)	R3+ (MW)	GDV (MW)	IGCC- (MW)	R2- (MW)	Bids- (MW)	R3- (MW)
07:45 > 08:00	64,2	306,9			306,9		242,7	129,2	113,5		
08:00 > 08:15	-80,1	7,3			7,3		87,4	19,5	67,9		
08:15 > 08:30	-57,5						57,5	29,0	28,5		
08:30 > 08:45	-73,4						73,4	56,0	17,4		
08:45 > 09:00	-76,6						76,6	56,2	20,4		
09:00 > 09:15	-59,4						59,4	19,6	39,8		
09:15 > 09:30	-143,3						143,3	94,7	48,6		
09:30 > 09:45	-126,8						126,8	107,3	19,5		
09:45 > 10:00	-162,8						162,8	132,7	30,1		
10:00 > 10:15	-72,1						72,1	60,9	11,2		
10:15 > 10:30	-114,0						114,0	24,9	89,1		
10:30 > 10:45	-263,2						263,2	16,1	39,2	207,9	
10:45 > 11:00	-272,1	2,0		2,0			274,1	55,6		218,5	
11:00 > 11:15	-321,9						321,9	140,0	108,8	73,1	
11:15 > 11:30	-232,0						232,0	140,0	92,0		
11:30 > 11:45	-288,0						288,0	54,8	25,3	207,9	
11:45 > 12:00	-273,3	28,1		28,1			301,4	1,4		300,0	
12:00 > 12:15	-210,7						210,7	109,4	9,2	92,1	
12:15 > 12:30	-258,2						258,2	138,5	119,7		



# Questions?

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### **Monthly IGCC settlement price determination: Two Step Approach**

- Estimating Opportunity Prices of each IGCC Participant for each 1/4h
  - The opportunity price is the price a TSO would pay for upwards/downwards regulation without IGCC.
  
- Calculating a Settlement Price as the weighted average of these Opportunity Prices for each 1/4h
  
- The Energy Imports and Exports of each IGCC Participant will be valued with that Settlement Price (which is valid for both) and then charged to each other.

# Imbalance tariffs

- New imbalance tariffs: single marginal pricing**

		NRV	
		Négatif (réglage net à la baisse)	Positif (réglage net à la hausse ou zéro)
Déséquilibre du Responsable d'Accès	Positif	MDP - $\alpha_1$	MIP - $\beta_1$
	Négatif	MDP + $\beta_2$	MIP + $\alpha_2$

- Level of tariffs driven by:**

- NRV: MDP or MIP?
- Highest/lowest activation price

Consider iGCC-volumes for NRV calculation?  
 Consider IGCC-settlement price for MIP/MDP?

- Principal goals**

- Give incentives to ARP's to restore/keep their balance
- Should be transparent: real time publication
- Activations requested by Elia resolve imbalances should be done in merit order => imbalance tariffs should increase in function of system imbalance

# IGCC – Calculation of the NRV

- **Compare simulations Consentec:**

No IGCC Mean positive/negative SCR Activation (MW)

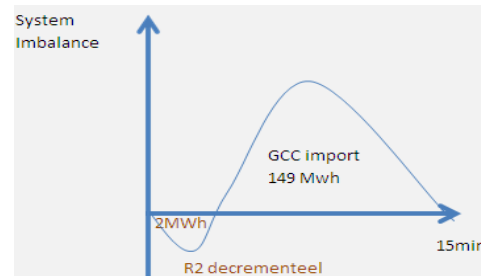
with IGCC Limited Cap Mean positive/negative SCR Activation (MW)

- **Results:**

–20% of the time “NRV without IGCC” isn’t reflecting the situation of the Belgian control area.

– Example:

NRV+GCC	GCC	NRV	Imbalance tariff delta
147,7	149,7544	-2,05437	-11,69



- “NRV Without IGCC”: **WRONG** signal imbalance tariff=> MDP: zone is long
- “NRV With IGCC”: **CORRECT** signal imbalance tariff => MIP: zone is short

- **Conclusion:**

– Imbalance tariffs should reflect the situation of the Belgian control area.

– Therefore IGCC-volumes should be considered in the calculation of the NRV

# IGCC – marginal activation price

- **Compare:**
  - Settlement price Consentec with marginal activation price
- **Transparency (real time publication)**
  - Settlement price is only available at very earliest W+1
- **Analysis merit-order activation:**
  - +/-27% of the time the settlement price of IGCC is influencing the imbalance tariffs.
  - The settlement price of IGCC is reflecting the situation of other control areas.
  - Imbalance tariffs should reflect only the situation of the Belgian control area.
- **Conclusion:**
  - Do not consider IGCC settlement price in imbalance tariffs
  - For the imbalance tariffs IGCC volumes will be valued at R2-prices

date	Quarter	Net Regulation Volume (MW)	GCC settlement €	MIP/MDP
04/07/2009	00:45 -> 01:00	-21,0	33,7	18,7
04/07/2009	01:00 -> 01:15	2,0	38,5	28,7
04/07/2009	01:15 -> 01:30	37,9		28,7
04/07/2009	01:30 -> 01:45	19,9	37,6	28,7
04/07/2009	01:45 -> 02:00	-11,9	38,7	18,7
04/07/2009	02:00 -> 02:15	25,9	42,6	28,7
04/07/2009	02:15 -> 02:30	73,8	37,7	28,7
04/07/2009	02:30 -> 02:45	-14,7	34,0	18,7
04/07/2009	02:45 -> 03:00	49,3	29,8	28,7
04/07/2009	03:00 -> 03:15	18,5	16,8	28,7
04/07/2009	03:15 -> 03:30	-52,4	16,6	18,7
04/07/2009	03:30 -> 03:45	-123,8	15,4	15,4
04/07/2009	03:45 -> 04:00	-31,9	15,9	15,9
04/07/2009	04:00 -> 04:15	-3,6	16,7	18,7
04/07/2009	04:15 -> 04:30	-37,8	13,4	18,7

## IGCC – Calculation of $\alpha$

- **In tariff proposal additional component “ $\alpha$ ” is foreseen:**

$\alpha_2$  (€/MWh) = 0 if  $ABS(\text{System imbalance}) \leq 140 \text{ MW}$

$\alpha_2$  (€/MWh) = average  $((\text{System Imbalance}^{\text{QH-7}})^2, \dots, (\text{System Imbalance}^{\text{QH}})^2) / 15.000$  if  $ABS(\text{System imbalance}) > 140 \text{ MW}$

System imbalance = ACE – NRV

- **IGCC-volumes are necessary to calculate the system imbalance:**

– As the “ $\alpha$ ” should reflect the situation of the Belgian control area “NRV incl IGCC” will be used to determine the real time system imbalance

System imbalance = ACE – NRV

Where  $NRV = NRV_{\text{Elia}} + \text{IGCC}$

- **Conclusion:**

– IGCC-volumes need to be considered in the calculation of the  $\alpha$