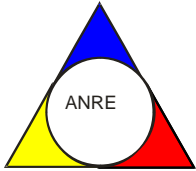
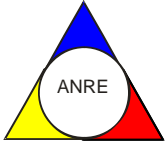


ROMANIAN ENERGY REGULATORY AUTHORITY (ANRE)



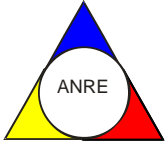
Electric energy market in Romania, present and perspectives





Ancillary Services (AS) MARKET

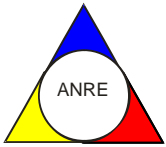
- AS :
 1. Primary adjustment reserve
 2. Secondary adjustment reserve
 3. Fast tertiary reserve
 4. Slow tertiary reserve
 5. Isolation of own service groups
 6. The ability of generating group to start without system source
-



AS MARKET

Primary adjustment reserve

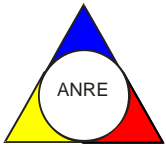
- must be deployed in maximum 30 seconds
 - mandatory for all DU
 - DU are checked regarding achievement of the primary adjustment
 - it is not paid this service
 - RRP is set centrally at interconnection level
 - basically it is declared the availability in Balancing Market considering RRP
-



AS MARKET

Secondary adjustment reserve

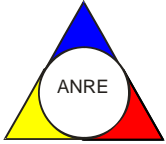
- it is provided in the form of an adjustment band
 - Must be deployed in maximum 15 seconds
 - the quantity is set by TSO
 - take part the qualified group for this service
 - selection to participate in secondary adjustment is made by a dispatcher in merit order of offers
 - paid at marginal price
-



AS MARKET

Fast tertiary reserve

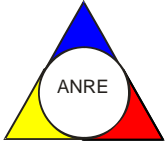
- must be deployed in maximum 15 minutes
 - it is sized by TSO to compensate the biggest loss in foreseen production (the launch of the biggest generator group, loss of a collector bar)
 - it is selected by the dispatcher in a merit order
 - it is paid at the offer price
 - it is provided both at power increase and reduction of power
-



AS MARKET

Slow tertiary reserve

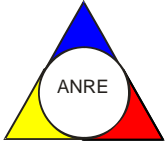
- it is determined by TSO (to restore the necessary RTR to compensate the launch of the second generator group – as a power
 - it is deployed in maximum 7 hours (time considered necessary to start a thermo group)
 - it is selected in merit order of offers
 - it is paid at the price of the offer
-



AS MARKET

Isolation of own service groups

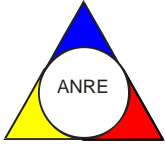
- in each plant must be possible to isolate at least one group of own services
 - this capacity is checked by tests
 - it is the condition of connection to the system
 - it is not paid
-



AS MARKET

The ability of generating groups to start without a system source

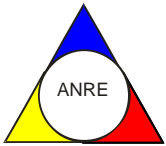
- it is checked by tests
 - it is a requirement specifically for hydro DU
 - it is not paid (at this capacity is called only upon extensive system damages, rare events)
-



AS MARKET

- Remunerated AS are acquired by TSO
 - at regulated prices
 - at tender prices

Acquisition types depend on the degree of competition on this market for each type of reserve: if we have a dominant participant the acquisition is made at a regulated price or a combined price



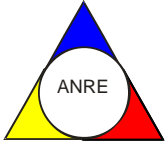
The Market on Allocation of Capacities of Interconnecting Lines

From 2010 :

- ✓ **Bilateral** coordinated-100% allocation 100% by a sole allocation center
- ✓ **Annual** : **RO-BG, RO-S, RO-HU**
- ✓ **Monthly** : **RO-BG, RO-S, RO-HU**
- ✓ **Daily** : **RO-BG, RO-S, RO-HU**-by default.
- ✓ **Intra-daily** : **RO-BG, RO-S, RO-HU**
- ✓ – currently 6 sessions, can be made maximum 24 de sessions

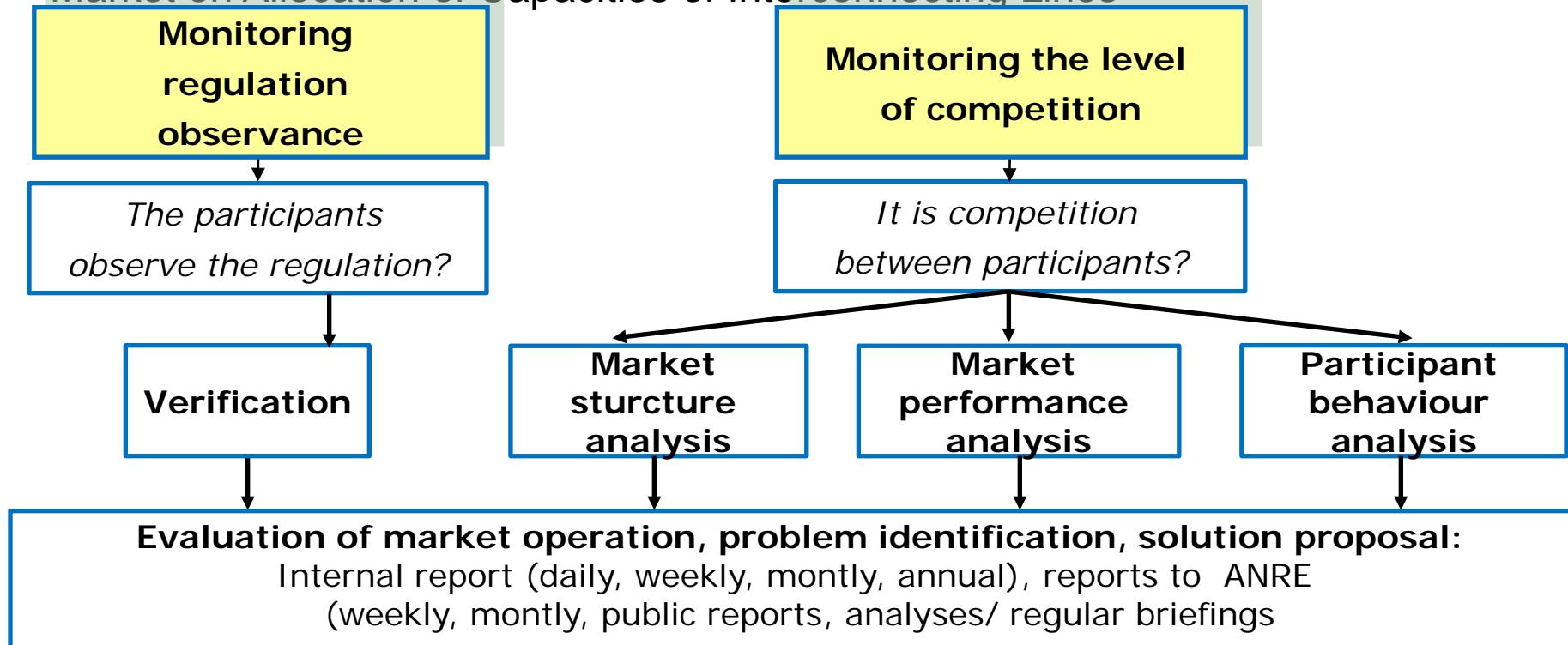
Allocation principles :

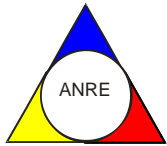
- It is subject to allocation the full capacity that remained available from previous allocations (it wasn't reserved capacity even for default allocation)
- The daily and intra-daily allocations apply net market principles
- If the demands are lower or equal with the available capacity the allocation is made free of charge
- If the demands exceed the available capacity the allocation is made at the lowest price in descending order of prices, allocating the entire available capacity
- A participant cannot be allocated more than 50% of the available capacity – at monthly and annual allocation



Monitoring Markets operated by TSO

- **ROLE:** monitoring the way of implementation and evaluation of the consequences of provisions of Commercial Code and the regulations in force in operating of Balancing Market, AS Market, The Market on Allocation of Capacities of Interconnecting Lines





Structrural indices / market concentration

Market concentration ratio (%):

C1 (market share of the largest market participant)

C3 (total market share of the first three participants)

Market ration (%) :
$$\frac{\text{Vol. balancing en. / SS / AAC for each participant}}{\text{Total vol. balancing en. / SS / Capacity on interconnection}}$$

C1 < 20% competition

C1 > 20% competition concerns

C1 > 40% suggest a dominant market position

C1 > 50% dominant market position

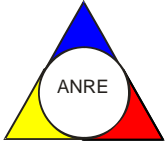
C3 → 0% perfect competition

40% < C3 < 70% moderately

concentrated market

70% < C3 < 100% excessively

concentrated market



Structrural indices / market concentration

Herfindahl- Hirschman Index (HHI):

No.of participants

$$HHI: \sum (\text{market ratio})^2$$

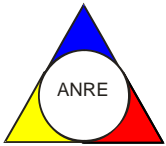
< 1000 competitive market; 1000 – 1800 moderately concentrated market; > 1800 risk of power abuse on the market

Producer Determinant Indicator (PDI):

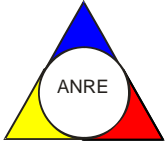
Def: Measure the limit when the available offer a certain participant is required to ensure the system demand, after considering the avaialble offers of other participants

$$r_{\text{schedul per participant}} = \frac{\text{TotalAvailableOffer} - \text{ParticipantAvailableOffer}}{\text{TotalDeliveries}}$$

$r < 1 \rightarrow PSI = 1 \rightarrow$ determinant participant (equivalent to absence of competition)

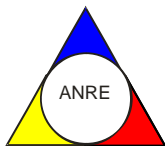


- **The available balancing energy** for each type of adjustment (secondary, tertiary fast and tertiary slow), increase or reduction in power;
- **Quantities and prices traded on Balancing Market (BM)** for each type of adjustment and each dispatching interval;
- **Congestion costs** reported to overall costs of balancing energy;
- **Degree of correlation between deficit/surplus costs and internal consumption;**
- **Evolution of BM volumes compared with Day ahead market;**
- **Consumption forecast per total SEN, compared with obtained consumption value;**
- **The quantities and prices for each technological system service offered/traded by participants on BM** for each type of service;
- **Transfer capacities on interconnection lines** offered, demanded and allocated and the resulted prices for each border, direction and allocation interval

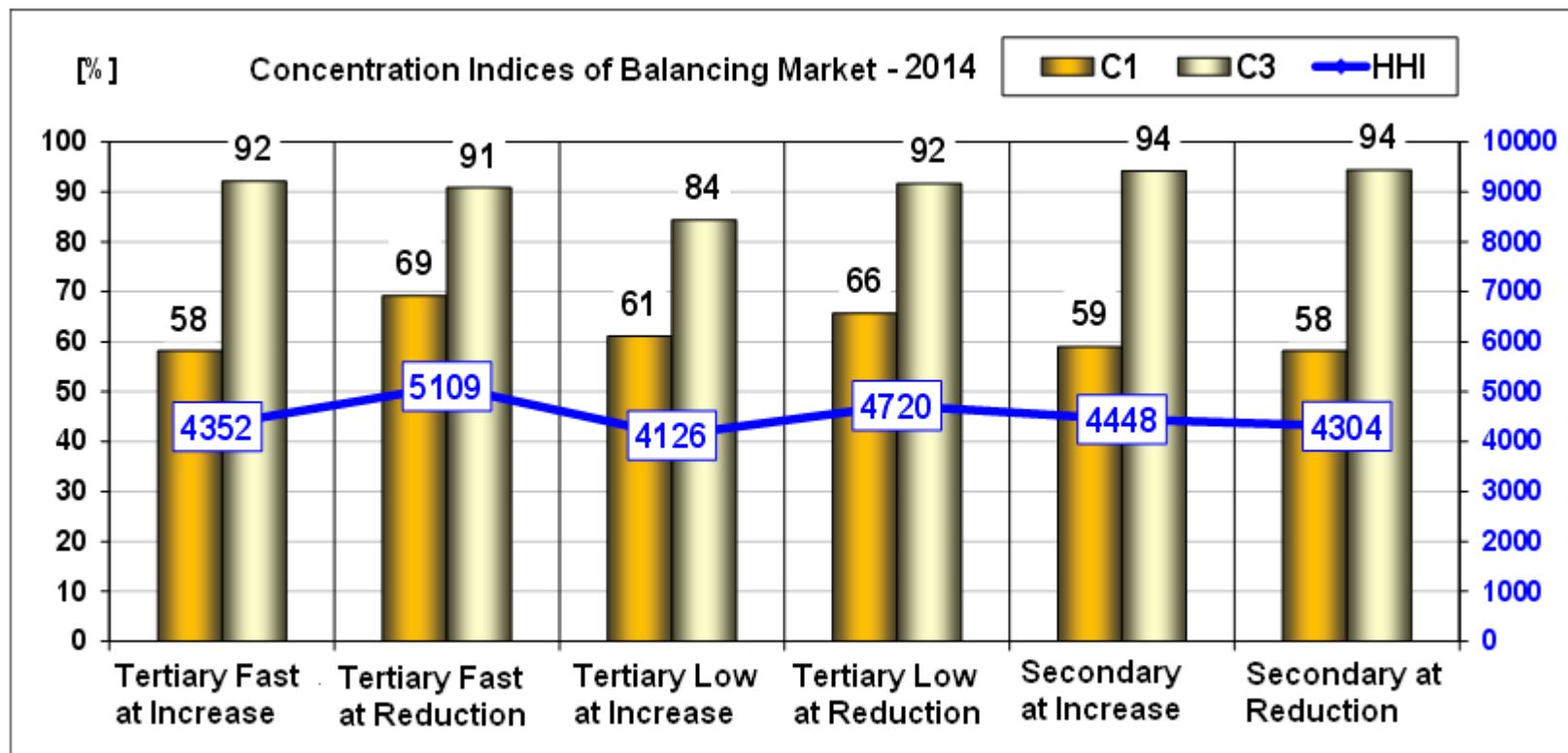


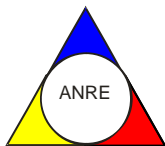
Assessment Indices of Participant Behavior

- **Bidding way of each market participant** (price offer excessively high/low, unusual offered volumes)
- **Total quantities offered / notified on balancing market, compared with availability declarations of producers for each DU**
- **Offered quantities on balancing market, compared with contracted/demanded by TSO reserves, per types of reserves and participants**
- **Notification of imbalances**
- **Frequent mistakes at preparation of offers/notifications**

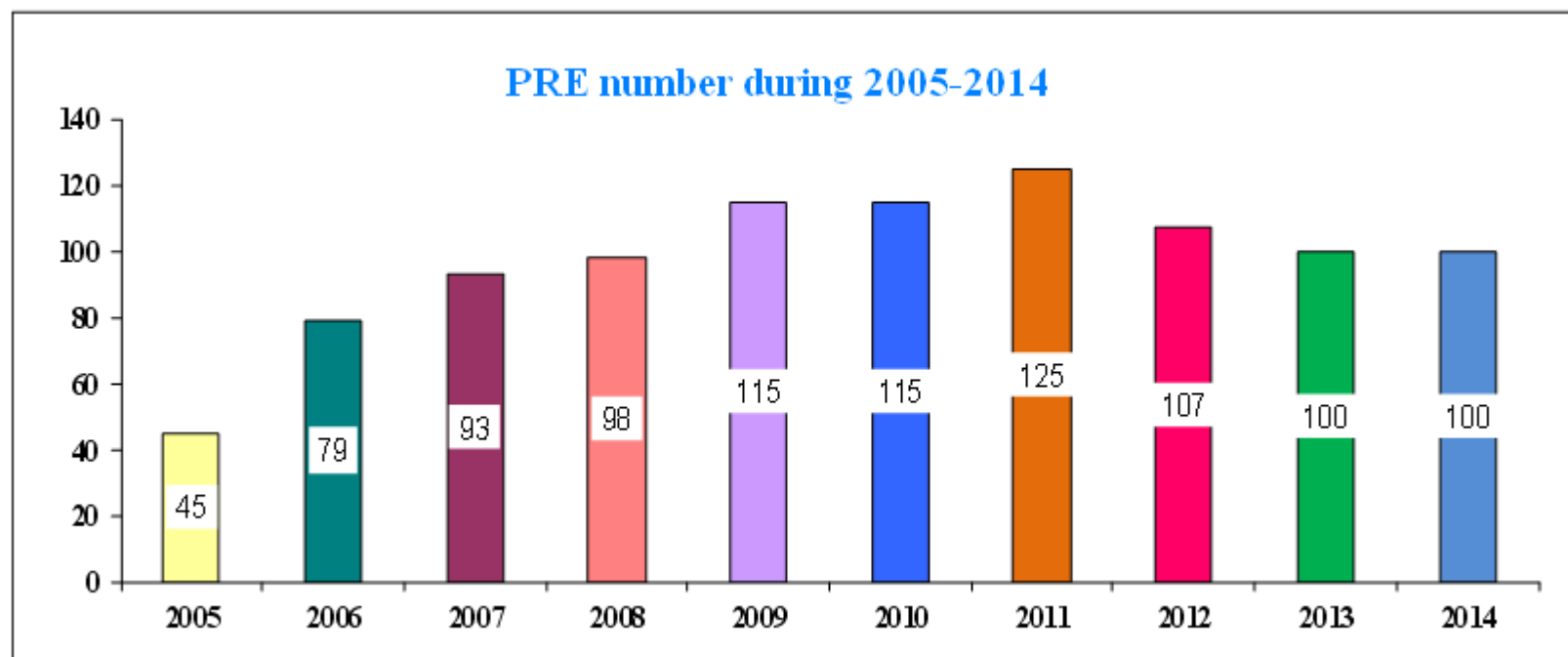


BM Monitoring Results 2014

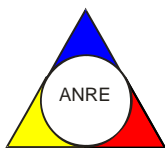




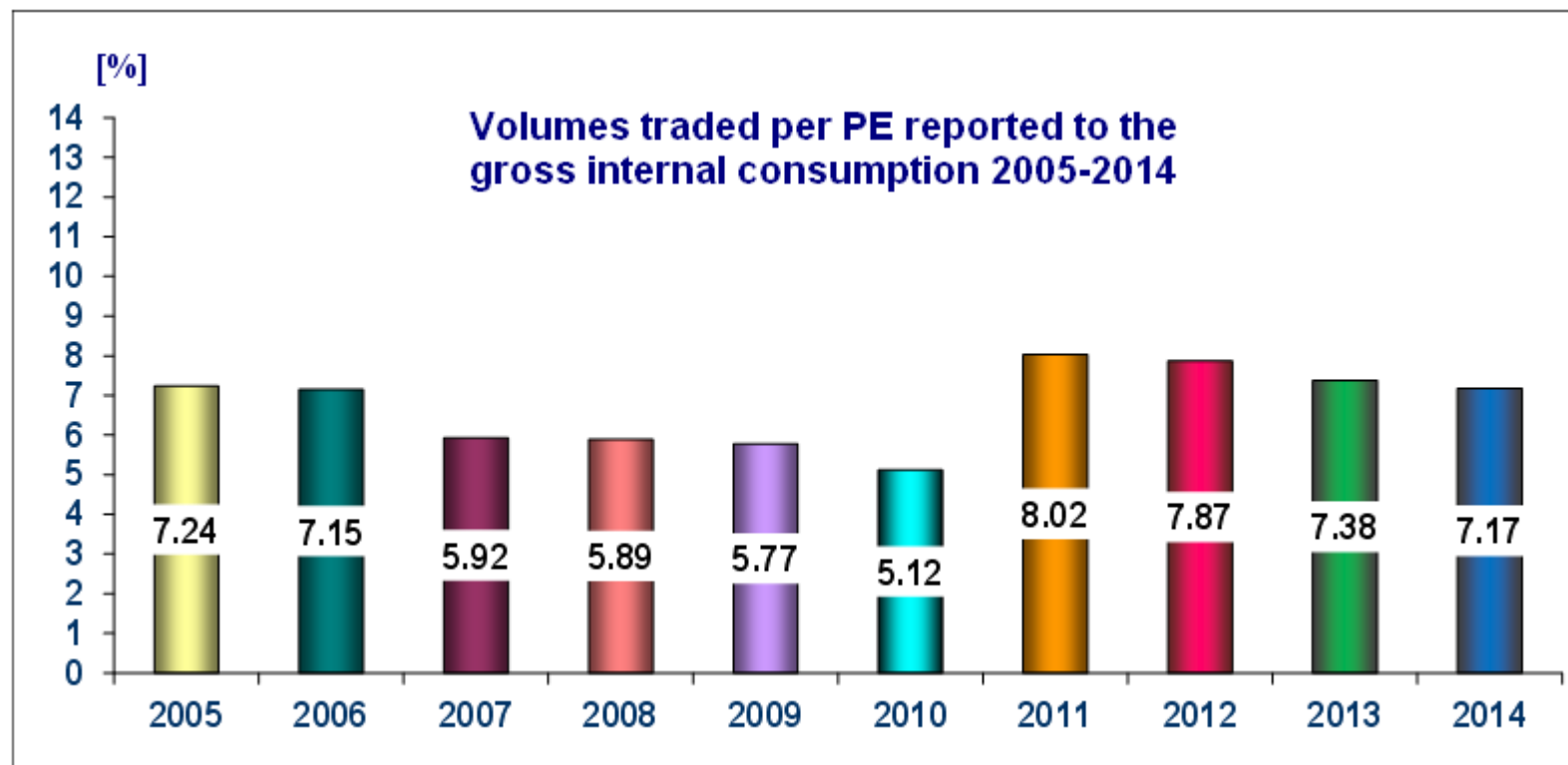
Evolution of PE Operation

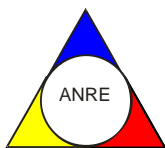


*PRE No.(at the end of the year)

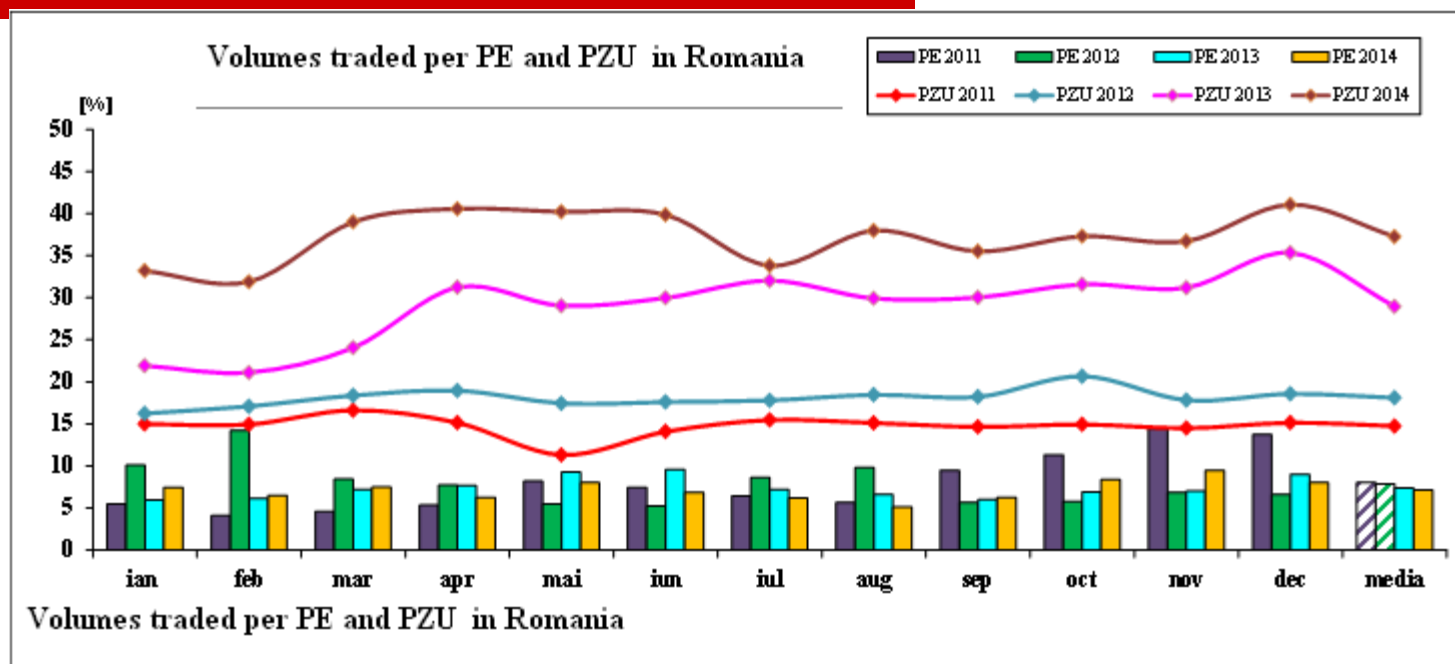


Evolution of PE Operation



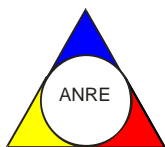


Evolution of PE Operation

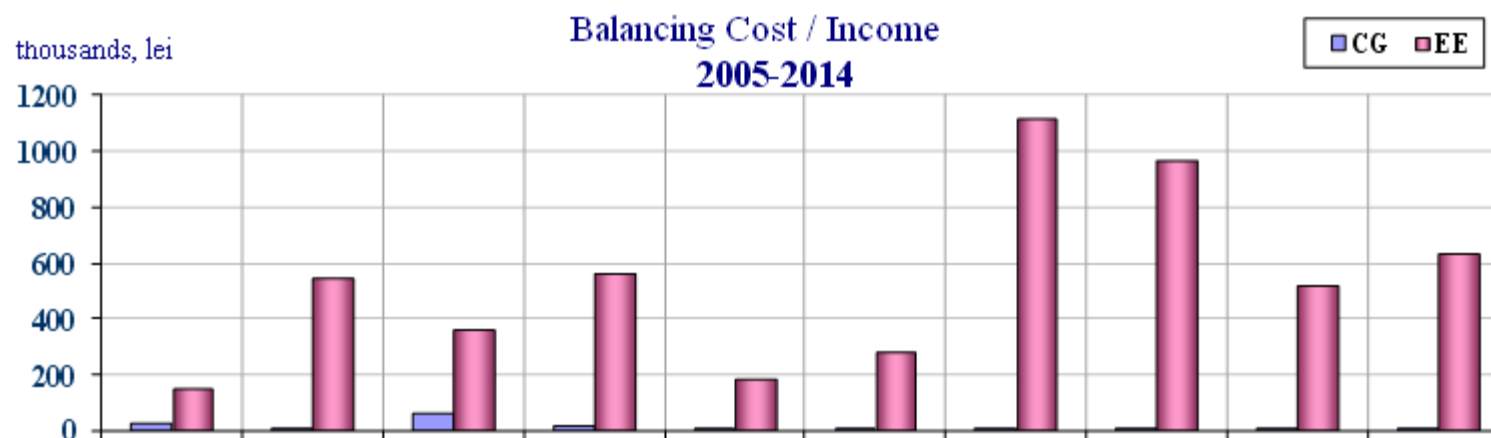


	2011 - 2012 - 2013 - 2014												
	jan	feb	mar	apr	may	iun	iul	aug	sep	oct	nov	dec	average
PE 2011	5.50	4.07	4.60	5.35	8.19	7.44	6.46	5.67	9.46	11.33	14.46	13.73	8.02
PE 2012	10.08	14.18	8.45	7.71	5.45	5.24	8.62	9.79	5.66	5.79	6.85	6.61	7.87
PE 2013	5.94	6.13	7.20	7.65	9.28	9.59	7.22	6.60	5.98	6.94	7.02	9.00	7.38
PE 2014	7.46	6.53	7.49	6.26	8.01	6.87	6.20	5.13	6.27	8.36	9.47	8.02	7.17
PZU 2011	14.99	14.94	16.63	15.14	11.31	14.09	15.46	15.11	14.65	14.94	14.49	15.14	14.74
PZU 2012	16.24	17.09	18.38	18.97	17.45	17.61	17.80	18.47	18.22	20.67	17.83	18.58	18.11
PZU 2013	21.92	21.11	24.06	31.23	29.05	29.98	32.03	29.92	30.04	31.59	31.20	35.35	28.96
PZU 2014	33.19	31.90	39.01	40.58	40.21	39.86	33.82	37.98	35.52	37.30	36.73	41.07	37.26

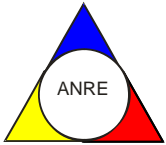
Note: volumes reported to gross internal consumption



Evolution of PE Operation



Costs [000,lei]	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
EE	150.2	544.3	364.2	565.4	187.7	282.9	1123.2	971.6	523.7	632.2
CG	20.8	7.4	57.6	13.2	0.5	0.2	0.7	6.2	3.1	0.5



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