



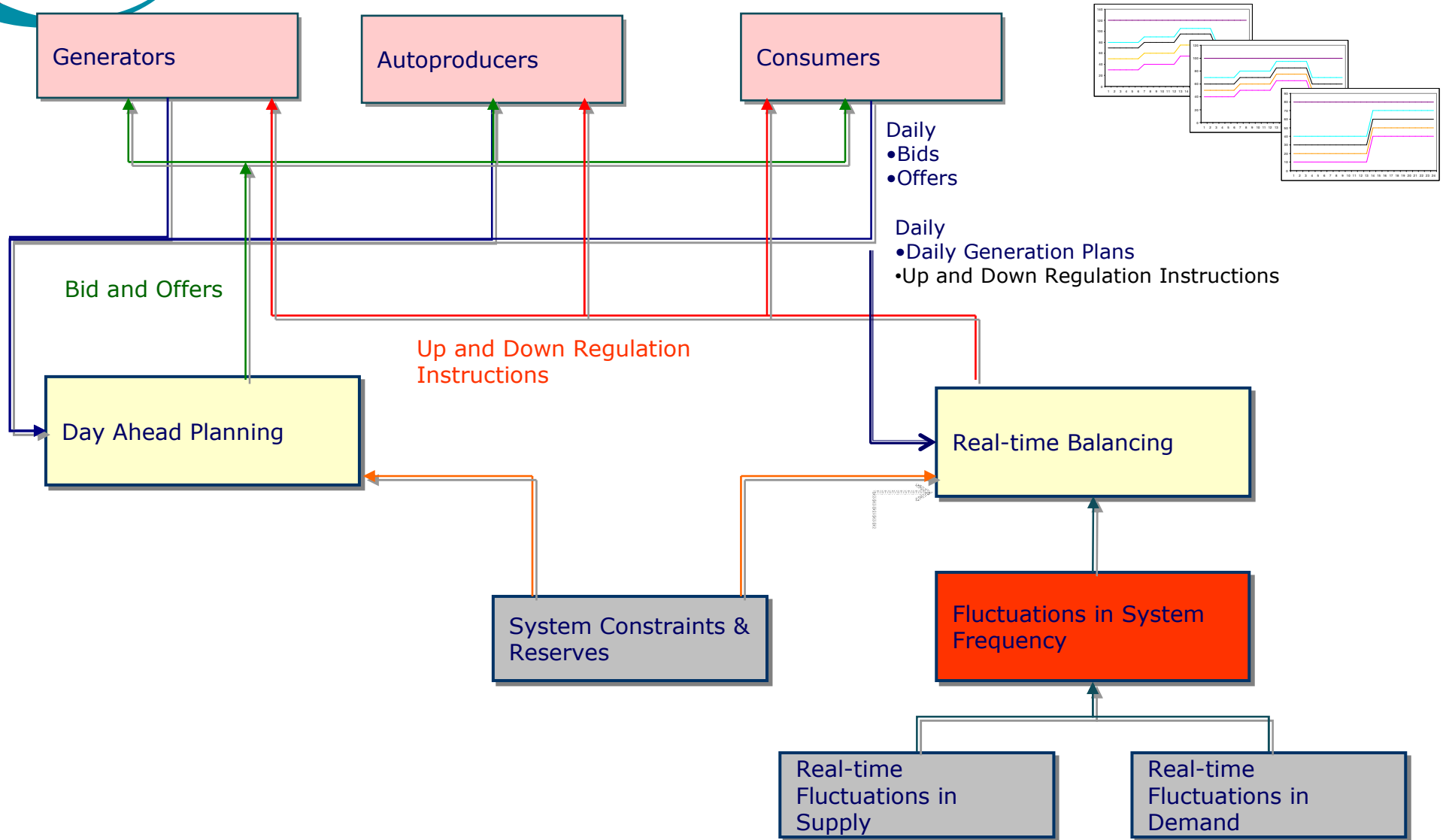
# Smart Metering and Its Applications in Turkish Electricity Market

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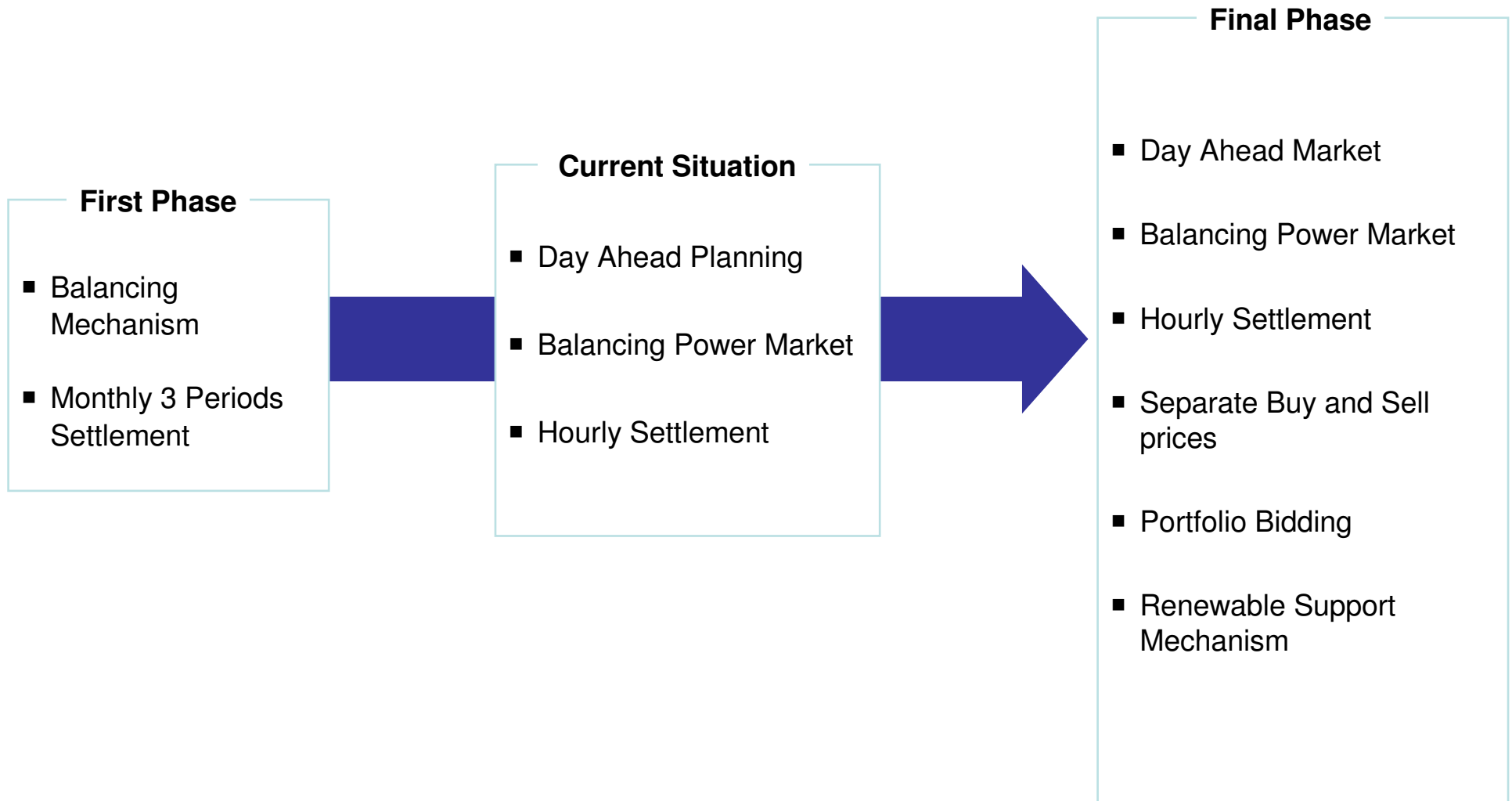
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Workshop  
Dubrovnik

- Overview
- Drivers
- Approach
- Regulations
- Development

# BALANCING AND SETTLEMENT MARKET



# STRUCTURE OF THE BALANCING AND SETTLEMENT MARKET

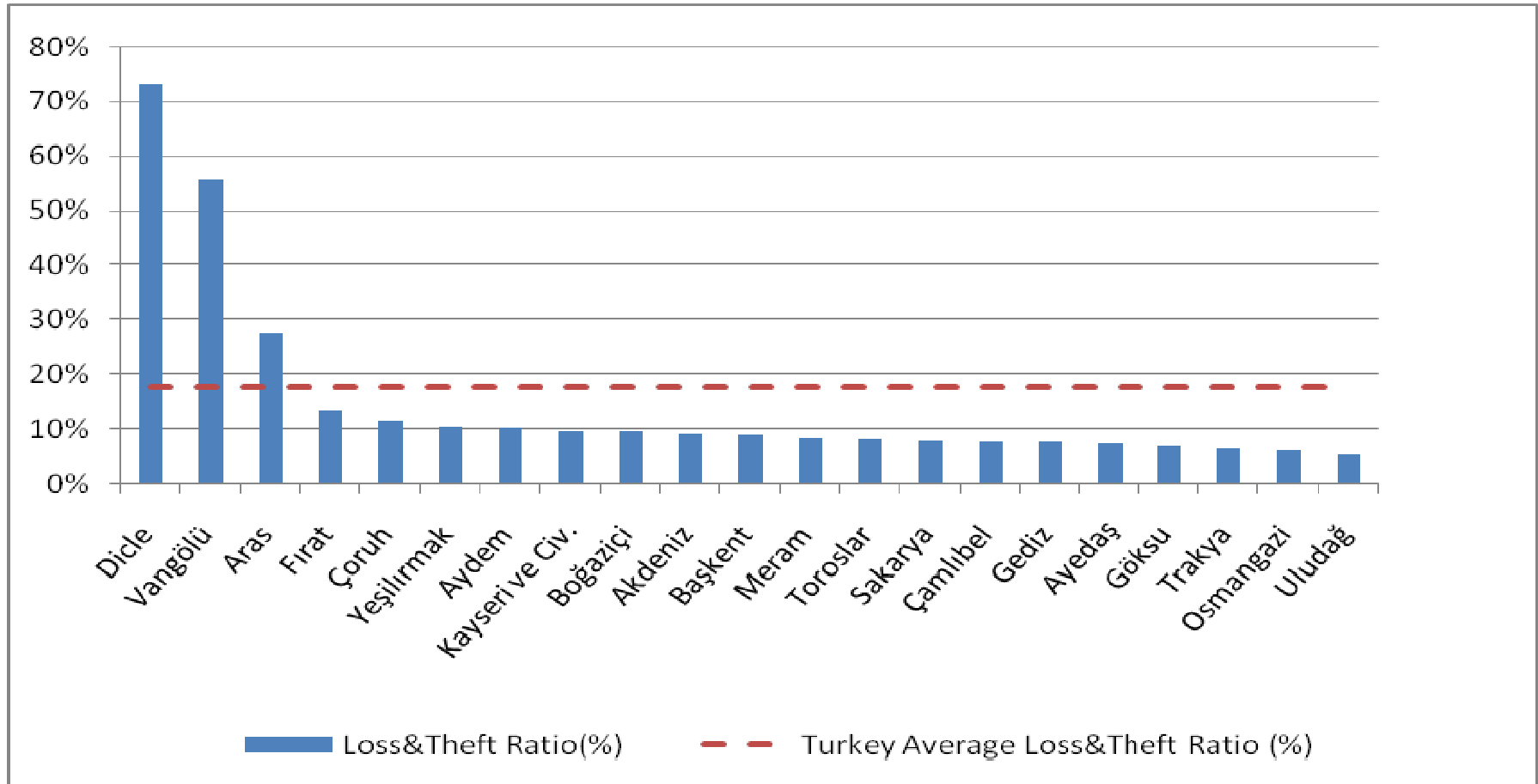


- Balancing and Settlement Market consists of 2 sub-markets: Day-Ahead Planning/Market and Balancing Power Market
- A consumption facility or part of a consumption facility can be eligible to participate in balancing.
- Flexible bids are designed especially for consumption facilities (and hydro generators).
- Flexible Sales Bid: Single hour active electricity energy sales bids submitted by market participants that participate to the day ahead market for the next day but that is not related to a certain hour,
- The level of demand side participation in Balancing and Settlement Market is still low.

## Privatization Transfers of Distribution Regions

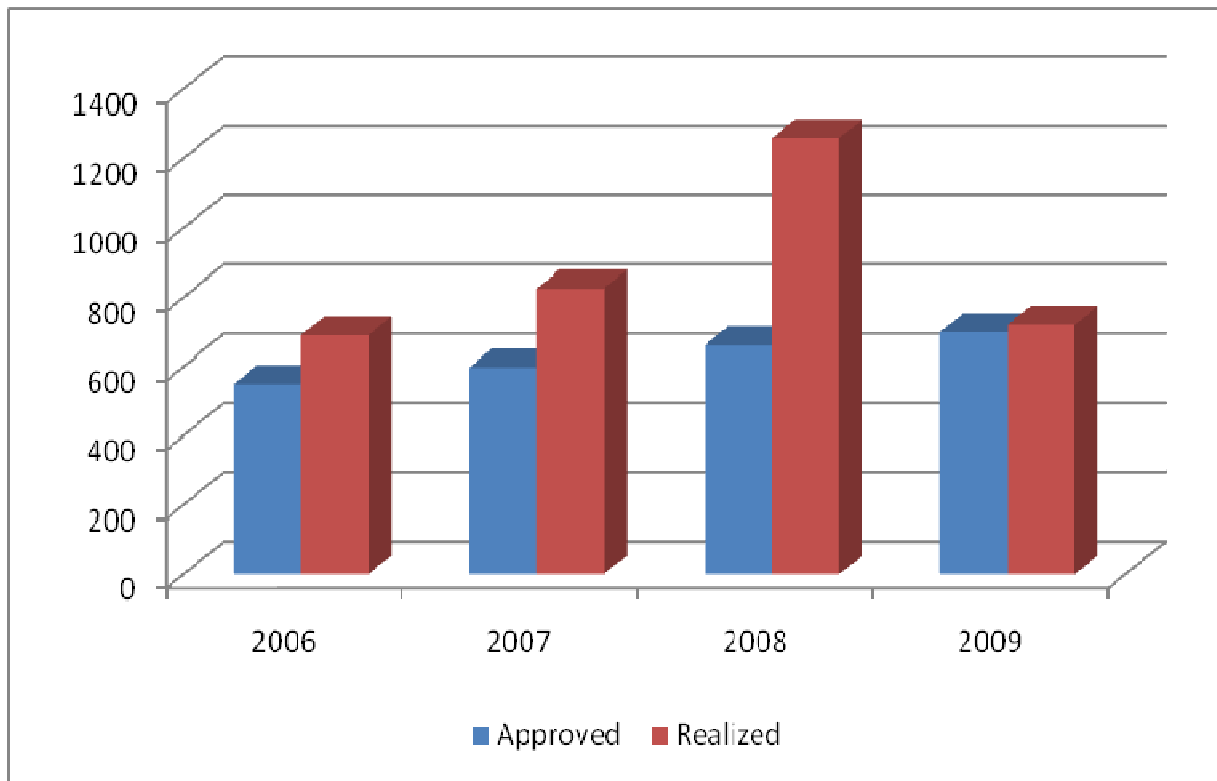


- High loss ratio in some regions



## Approved and realized investments

- In total 2.5 billion TL investment is approved for the period of 2006-2008,
- The distribution companies has made investment in amount of 3.5 billion TL in the this period, by an excess investment of 1.0 billion TL.



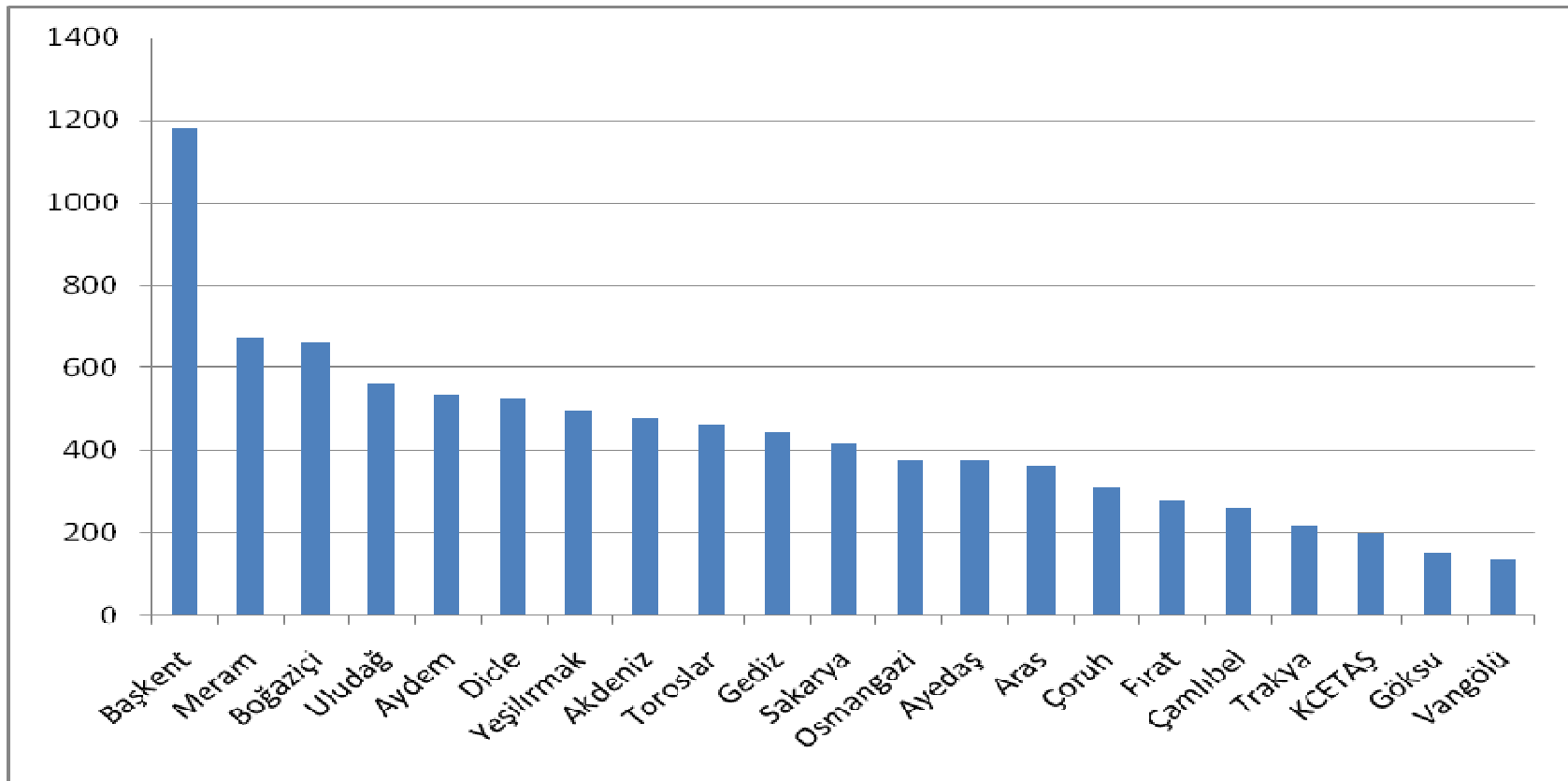
- The return on investments is %10,49 (real, before tax)
- The amortization period is 10 years.



- 21 distribution regions
- All of those regions have target losses (technical + non-technical)
- Targets are set for creating incentives to decline the level of losses.
- If they can reduce the loss level more than the target, distribution companies gain more profit than the regulated profit.
- If they can't reduce the loss level to the targeted level, distribution companies get less profit than the regulated profit (or they lose money).

# 2011-2015 Investment Budget

- Roughly, a 9 billion TL investment budget has been approved for the 21 distribution companies by the Board for the second implementation period, that is, between 2011 and 2015.



- Incentive based regulation
- Quality has to be measured.
- Distribution Companies have to complete the necessary investment for measurement of quality indicators until the end of 2012.
- They should begin recording all data related to supply sustainability and technical quality starting from the beginning of 2013.
- 1.29 billion TL subsidy has been approved by the Board for 2011-2015.

- There are multiple drivers for smart metering in the Turkish electricity market. Mainly,
  - Solving the problems encountered in operation of day-ahead and balancing markets.
  - Increasing the quality of supply and efficiency
  - Reducing the loss & theft ratios in distribution level

- The general approach of EMRA is as follows;
  - It is an innovative sector, hence no need to restrict and direct the market development with regulations
  - Set the minimum criteria and allow the distribution companies to make necessary adjustments for their own systems.
  - Use the incentive based regulation to produce optimum solutions.

## Electricity Market Metering Regulation

- Sets the minimum criteria for all the meters
- Introduces the condition to use electronic meters for new consumers
- Refers to Balancing & Settlement Regulation for smart meters

## Balancing & Settlement Regulation

- Requires the metering reading in the first 4 days of following month which is not possible without AMRS
- Refers to The Procedures and Principals regarding Determining the Scope and the Meter Values of Automated Meter Reading Systems(AMRS)

## The Procedures and Principals regarding (AMRS)

- Issued in official gazette (April 10, 2011; No: 27901)
- Will come into force on December 1, 2011
- Sets the criteria in detail

# Objective of the AMRS Regulation

- The objective of the regulation is to determine;
  - The periods of meter values used in settlement process
  - The types of the meters that will be included in AMRS
  - Share of responsibilities regarding installation of AMRS metering equipment
  - The procedures and principles regarding share of metering data

- The consumption limit for meters that have to be involved in AMRS, is 800MWh for all the distribution companies until the new limit is approved by the EMRA board.
- The distribution companies will propose the new limit and submit for EMRA approval until July 10, 2011.
- The infrastructure for the share of metering data with consumers will be developed, at the latest, in two years after AMRS come into operation.
- For the discos which already have AMRS, this time is 6 months.



- Discos can also install AMRS meters for the customers who have lower consumption than 800MWh.
- However number of these meters can't exceed % 10 of the AMRS meters in that distribution region.
- Data security is under the responsibility of discos.

- The cost of infrastructure required for fulfilling the minimum criteria specified in the regulations, will be covered by investment budget approved by the board.
- However, discos can install more advanced and prevalent AMRS, by recovering additional costs from:
  - R&D budget
  - Additional revenues coming from improving
    - Quality
    - Loss & Theft ratios
    - Efficiency

Distribution Company R&D Budgets(TL)	2011	2012	2013	2014	2015
<b>Akdeniz EDAŞ</b>	637.120	652.944	669.755	687.351	705.767
<b>Toroslar EDAŞ</b>	1.291.345	1.302.397	1.314.109	1.326.101	1.338.353
<b>Dicle EDAŞ</b>	1.426.217	1.434.446	1.448.446	1.466.769	1.487.651
<b>Meram EDAŞ</b>	1.694.056	1.728.109	1.762.723	1.797.711	1.833.036
<b>Trakya EDAŞ</b>	381.789	389.793	395.621	402.992	410.829
<b>Uludağ EDAŞ</b>	976.324	989.375	1.003.050	1.017.117	1.031.576
<b>Vangölü EDAŞ</b>	627.417	629.653	633.376	638.204	644.364
<b>Gediz EDAŞ</b>	937.533	947.532	958.122	969.011	980.185
<b>AKEDAŞ</b>	513.046	516.971	521.134	525.463	529.873
<b>Kayseri ve Civarı ETAŞ</b>	359.215	364.084	369.176	374.392	379.733
<b>Çamlıbel EDAŞ</b>	533.544	541.038	548.976	557.181	565.857
<b>Aydem EDAŞ</b>	764.439	777.392	791.008	805.243	820.220
<b>AYEDAŞ</b>	788.606	799.577	811.135	823.000	835.157
<b>Yeşilırmak EDAŞ</b>	1.020.293	1.033.561	1.047.606	1.062.031	1.076.817
<b>Boğaziçi EDAŞ</b>	1.357.861	1.377.937	1.399.055	1.420.739	1.442.964
<b>Başkent EDAŞ</b>	2.119.420	2.149.852	2.180.277	2.211.374	2.243.714
<b>Aras EDAŞ</b>	868.395	880.073	892.685	905.744	919.194
<b>Çoruh EDAŞ</b>	773.646	783.010	792.922	803.089	813.488
<b>Fırat EDAŞ</b>	657.690	667.717	678.411	689.487	700.906
<b>Osmangazi EDAŞ</b>	642.362	650.138	658.664	667.439	676.476
<b>Sakarya EDAŞ</b>	874.932	885.276	896.273	907.888	920.114

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# APPENDIX

## Demand Side Participation as Ancillary Services

- Instantaneous Demand Control Service is one of ancillary services (Though system operator did not start to purchase this service).
- In the case of decreasing system frequency, the consumption facilities directly connected to transmission system change their consumption level to stabilize system frequency.
- The facilities that can provide this service are chosen by an auction process (by system operator).
- Instantaneous demand control relays are used by the consumption facilities (so when their participation is needed they can easily do that.).
- The instantaneous demand control service can be purchased maximum for a 15 minutes-period.

## Inefficient Retail Market as a Barrier to DSM

- No retail companies except for distribution companies selling energy in their pre-determined regions.
- Domestic customers and small commercial customers can not choose their supplier.
- Undiversified contracts
- Revision of the periods
- National tariffs
- Cross-subsidies between customer groups
- High market opening but low switching (most customers buy energy from distribution companies)
- From 2013- No retail tariff, Only LRS tariff
- From 2013, no cross-subsidy

- Energy Efficiency Law – 2007
- No direct relationship between energy efficiency and tariffs
- State incentives for efficiency-increasing projects
- Regulations stipulating energy efficiency in buildings, industry, schools, transportation.....
- Awareness-raising campaigns
- The main bottleneck: High level of non-technical losses