


Energy Losses Management Programme


Measurement & Effective Balancing of Energy

SARPA Conference
Eskom Distribution & EON Consulting
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16&17 July 2009

Eskom Distribution

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Determine and Target High Loss Areas

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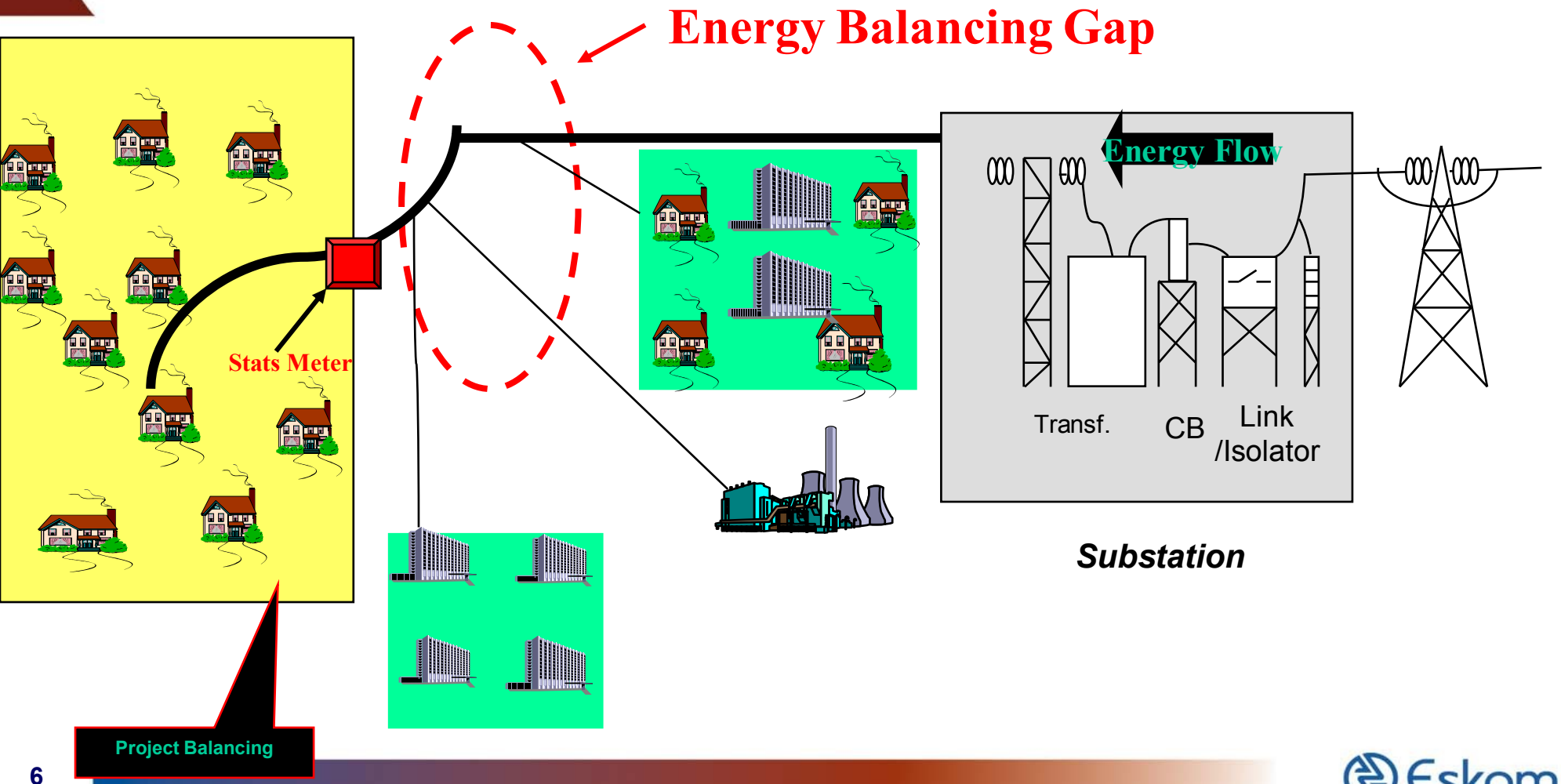
Background

- Energy Losses **prevalent** in utilities **worldwide**
- T**otal Energy** Losses **= Energy** Purchases **– Energy** Sales
- Linear **Increase** in Eskom Distribution Losses
- **Launch** of Energy Losses Programme
  - **Objective:** Arrest, Reduce and Sustain
- Variety of **initiatives** to tackle problem
  - Measure and Balance

Measure and Balance

- **Key Initiatives and Activities**
  - Total Loss **Measurements** at Eskom Distribution
  - **Regional** Total Loss **Measurements**
    - **Technical** Losses
    - **Non-technical** Losses
  - Statistical Metering **Planning and** Installation
  - Development of **alternate** solutions for losses measurement in the interim
  - Energy Balancing to **target** high loss areas
    - Energy Balancing Modules
    - Feeder Balancing Modules

Initial Approach - (EBM)



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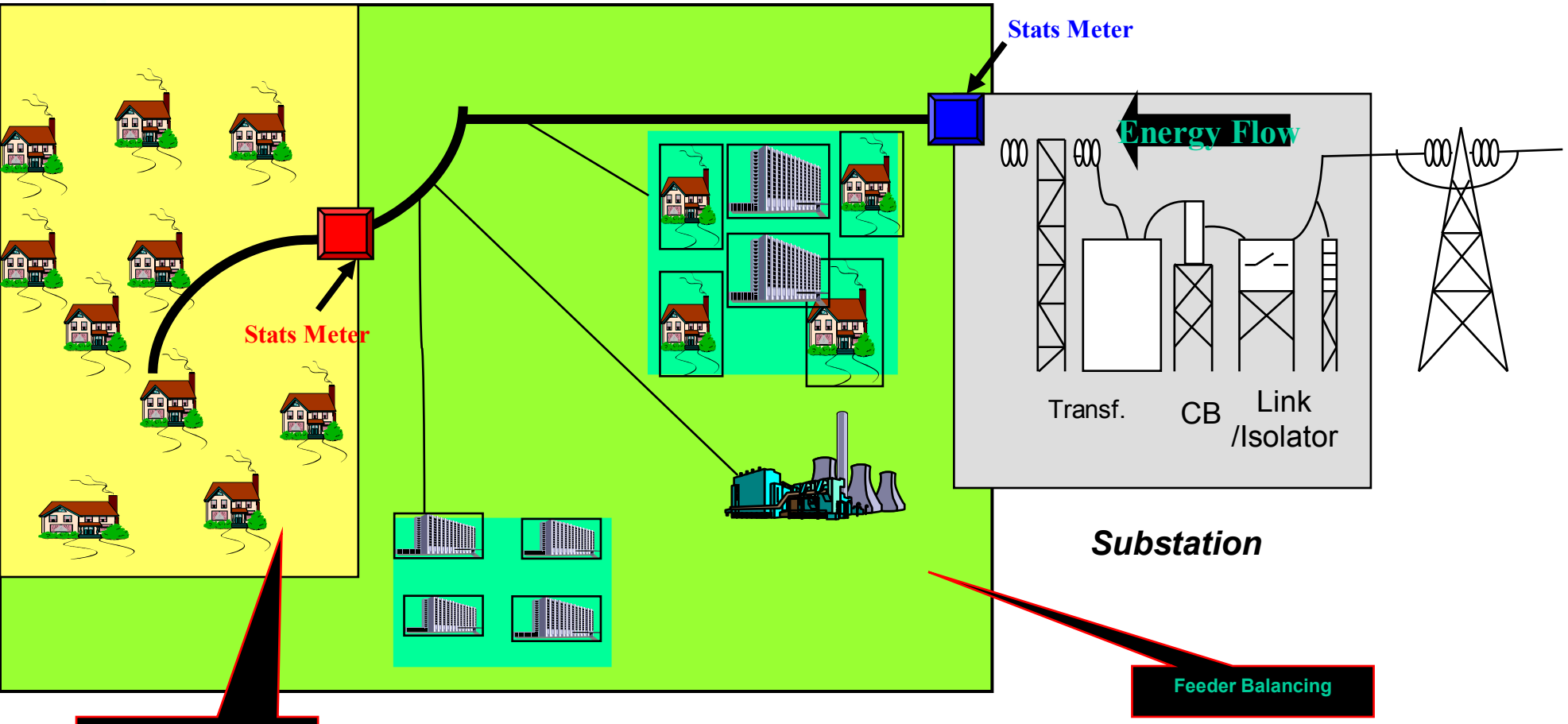
Enhanced Approach - (FBM)



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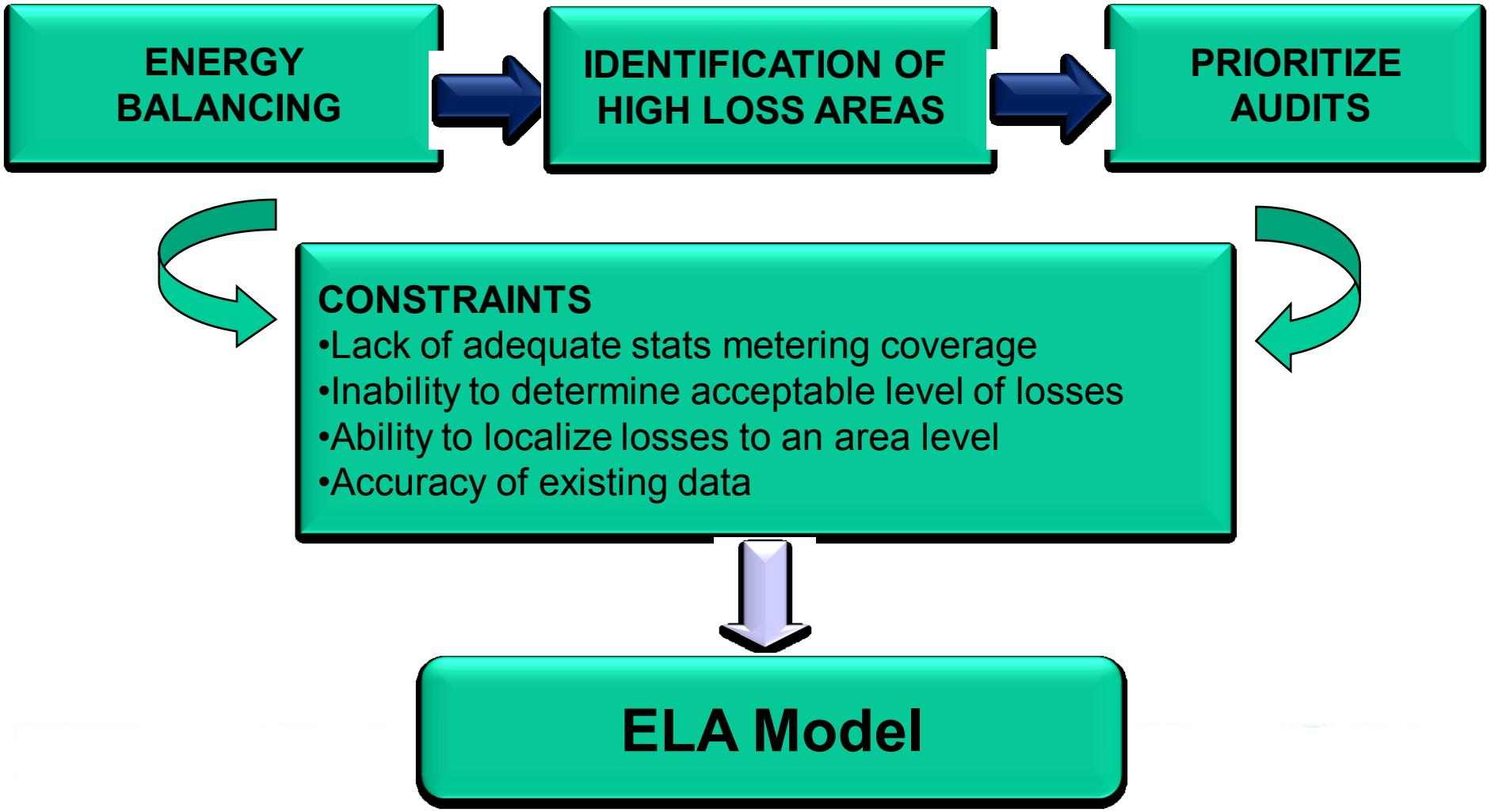
Targeting of Losses



Energy Losses Analysis Model

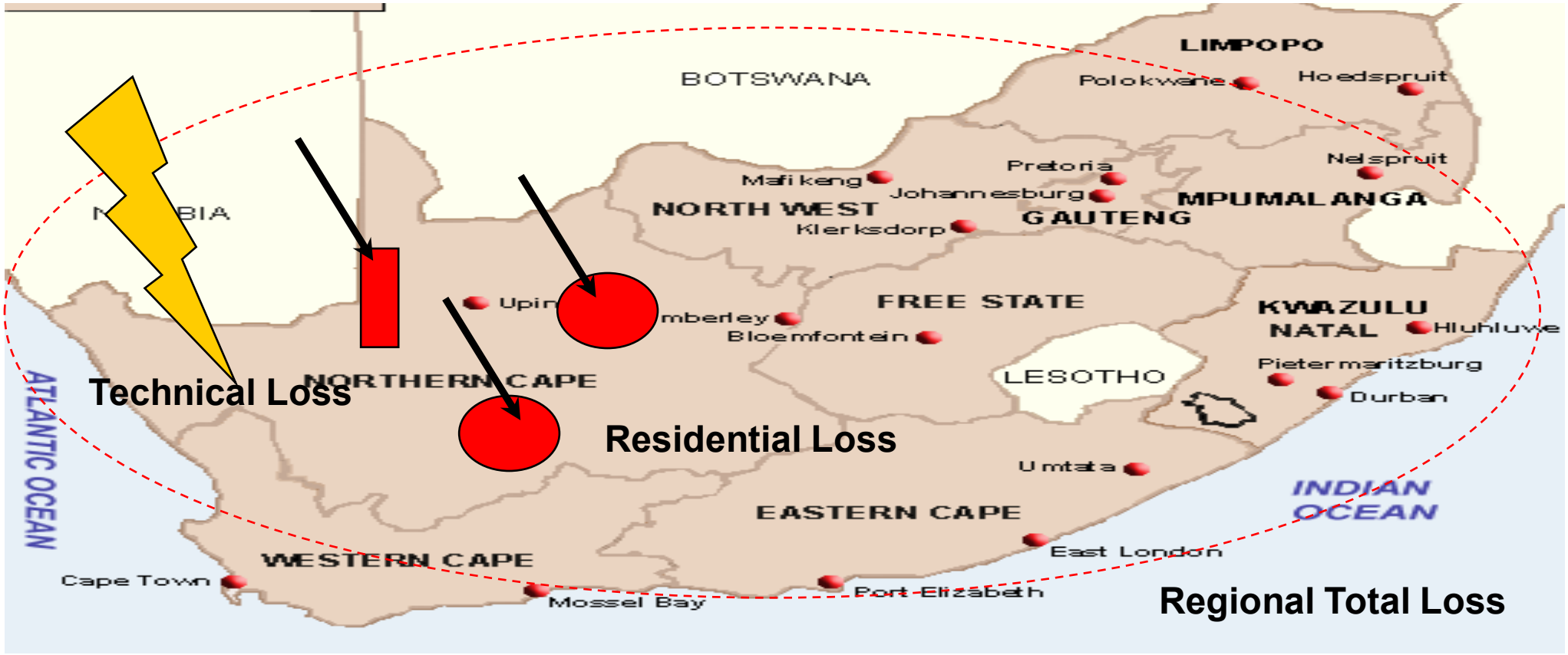
Objectives of the Model

- To understand what is **acceptable** in terms of losses
- Determine high loss **areas**
- Determine high loss **customer** classes
- Cost **benefit** analysis of loss reduction

ELA - Key Assumptions

- Losses of **15%** will be acceptable in the **residential sector**
- **Zero tolerance** for losses in the **Non-residential**
- Technical and Non Technical Losses are given **equal** weighting
- The average loss percentage per customer area (Residential customers) calculated using the **average** of the residential projects balanced in the area
- Data Used - **EBM reports** (April 2007-March 2008)
- Average audit costs for **customer classes** used for cost benefit analysis

Illustrated Approach



Regional Total Loss – Technical Loss – Residential Loss = Non - Residential Loss

Sample Area – Loss Analysis

	% of Customer Base	% of Total Energy Base	Customer Numbers	% Losses
Residential SPU's & PPU's	**97.00%**	**6.50%**	**500,000**	**40%**
Area 1	20.00%	0.50%	100,000	70%
Area 2	19.00%	2.50%	100,000	50%
Area 3	21.00%	0.50%	100,000	30%
Area 4	17.00%	2.00%	100,000	30%
Area 5	18.00%	1.50%	100,000	25%

	% of Customer Base	% of Total Energy Base	Customer Numbers
Non-Residential SPU's & LPU's	**3.00%**	**93.00%**	**10, 000**
Area 1	1.00%	21.00%	8,286
Area 2	0.50%	3.00%	4,589
Area 3	0.50%	27.00%	3,839
Area 4	0.10%	22.00%	1,186
Area 5	0.10%	19.00%	1,105

Figures indicated are for illustrative purposes

Sample Area – Cost Impact Analysis

	% Energy Loss	Approx Revenue Loss	Losses (Gwh)	Cost of Audits	Benefits	Reduce % Losses By
Total Losses	8.00%	R 1.061				
Losses - Residential SPU's & PPU's	**2.50%**	**R 452.**	**11**	**R 5980**	**R 3881**	
Area 1	0.50%	R 3706	7	R 776	R 2905	0.11%
Area 2	0.50%	R 2579	5	R 757	R 186	0.05%
Area 3	0.50%	R 2203	6	R 135	R 207	0.97%
Area 4	0.50%	R 1004	9	R 233	R 767	0.27%
Area 5	0.50%	R 6482	1	R 853	R 561	0.31%
Technical Losses - Region	**3.00%**	**R 3613**				
Non-Residential SPU's & LPU's	**2.50%**	**R 2470**				

	Acceptable % Loss
Losses amidst Residential SPUs & PPU's	1.00%
Technical Losses	3.00%
Non- Residential SPU's &LPU's	0.00%
Target Total Loss	4.00%
Room for Improvement	**4.00%**

Figures indicated are for illustrative purposes

Benefits Derived from Model

- **Simple**, systematic and easily **replicable** approach
- Provides clarity on the **overall** Distribution Losses **composition**
- **Cost** effective approach
- Allows for introducing intelligence into **planning** of audit methodology
- Makes provision to determine **targets** for total losses
- Optimization of losses **reduction spend / potential** revenue recovered
- Can be adopted as **interim** mechanism until **comprehensive** statistical metering coverage is achieved

Conclusions

- Comprehensive statistical metering coverage is essential to determine **accurately** the losses compositions
- ELA can be used as an effective **mechanism** to predict key focus and high loss areas **until** comprehensive statistical metering coverage **is achieved**
- A trade-off in terms of **complexity** versus **accuracy** is a critical decision criteria
- An audit strategy that **aligns** with the outcomes of the model allows for flexibility in terms of **setting** and **achievement** of targets

Thank you!