Eskom Revenue Recovery

Revenue Risk Identification and Revenue Recovery Analytics

SARPA Conference

Date: 24/5 August 2017

Powering your world

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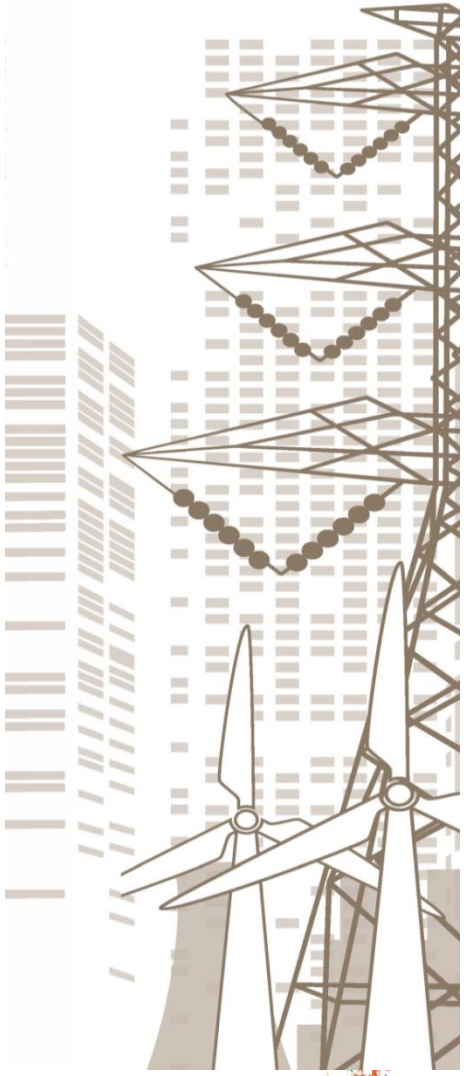
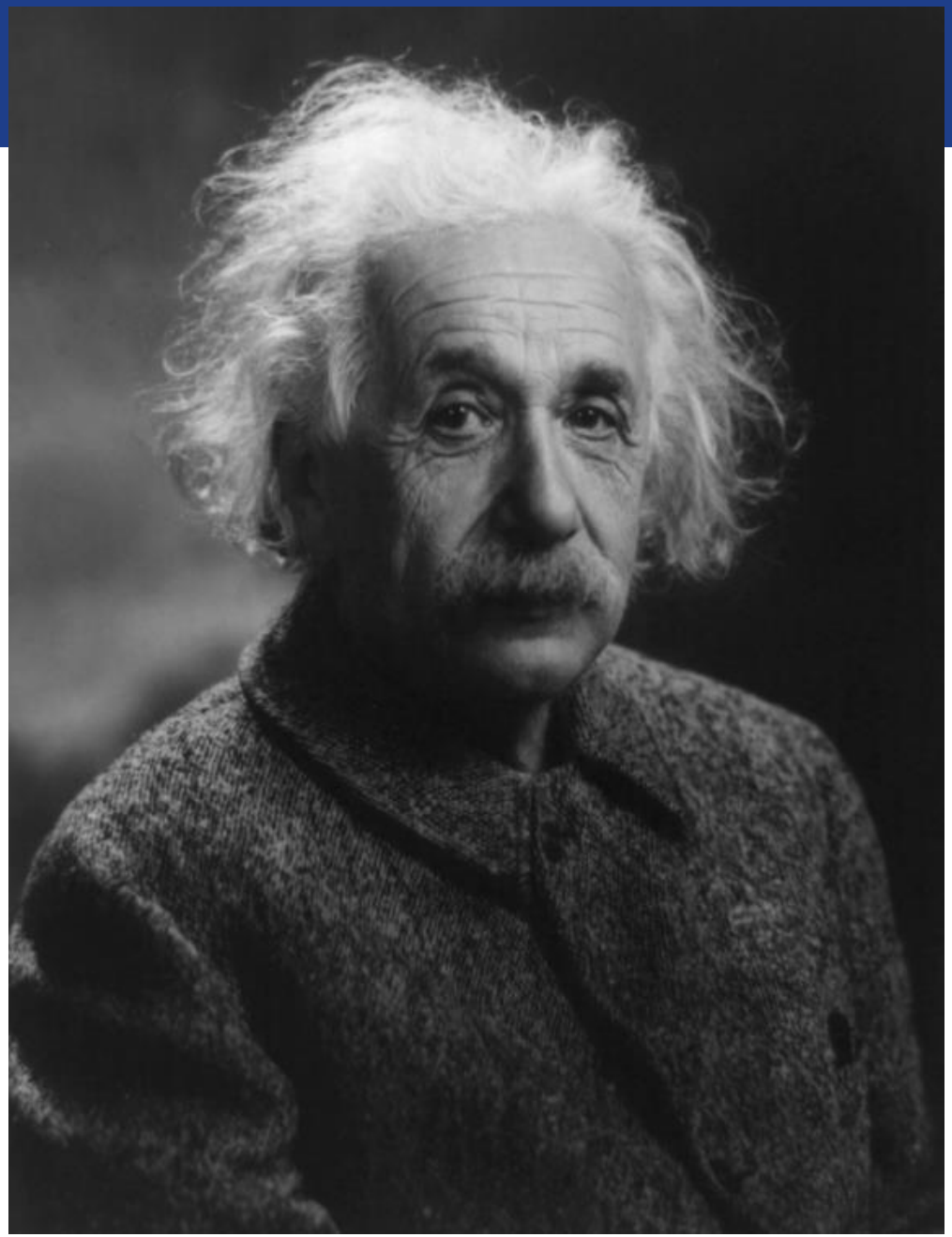


Background - published Financial Statements

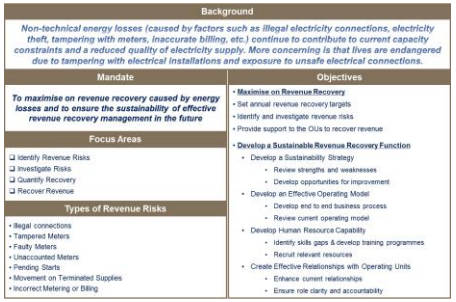
- During the past financial year, total energy losses were 8.85%
- Transmission energy losses performed better than target, at 2.22%
- Although distribution losses deteriorated quite significantly to from 6.43% to 7.55%, losses performance is within international norms.
- More than 600 000 meter audits were completed during the year, covering large, small and prepaid customers. This resulted in R215 million being billed to recover revenue due to meter tampers, faulty or vandalised metering installations or customers not correctly loaded on the system.
- Tamper fines of R24 million were also raised.
- Future focus area
    - Reduce non-technical losses by implementing an early warning system, regular and targeted meter audits through automating analysis, and by converting residential customers in Soweto, Midrand and Sandton to split meters



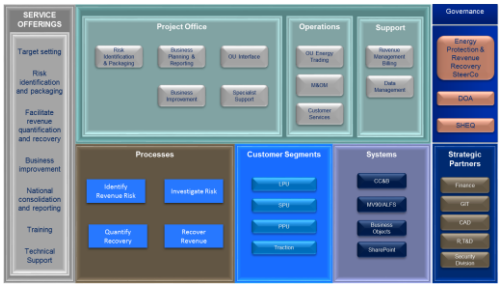
"We can't solve problems by using the same kind of thinking we used when we created them"

Six-steps towards improving Revenue Recovery

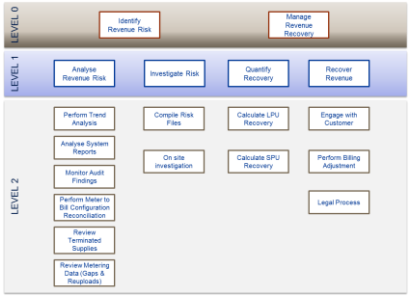
1 Determination of key objectives, drivers and deliverables



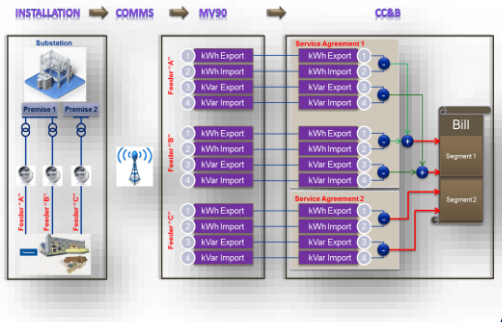
2 Get Organised (Operating Model)



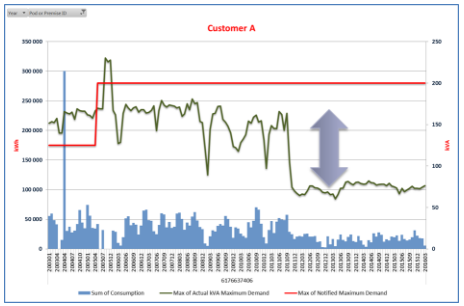
3 Development of Robust Business Processes



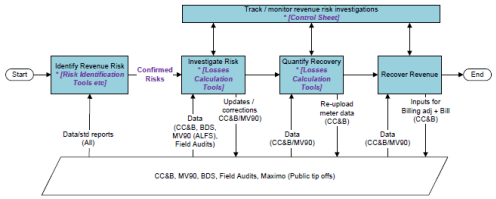
4 Identification of new Risk Sources



5 Development of Analytical Tools



6 Developing IT Infrastructure (Advanced Analytics)



1 Key Objectives

Background

Non-technical energy losses (caused by factors such as illegal electricity connections, electricity theft, tampering with meters, inaccurate billing, etc.) continue to contribute to current capacity constraints and a reduced quality of electricity supply. More concerning is that lives are endangered due to tampering with electrical installations and exposure to unsafe electrical connections.

Mandate

To maximise on revenue recovery caused by energy losses and to ensure the sustainability of effective revenue recovery management in the future

Focus Areas

- ❑ Identify Revenue Risks
- ❑ Investigate Risks
- ❑ Quantify Recovery
- ❑ Recover Revenue

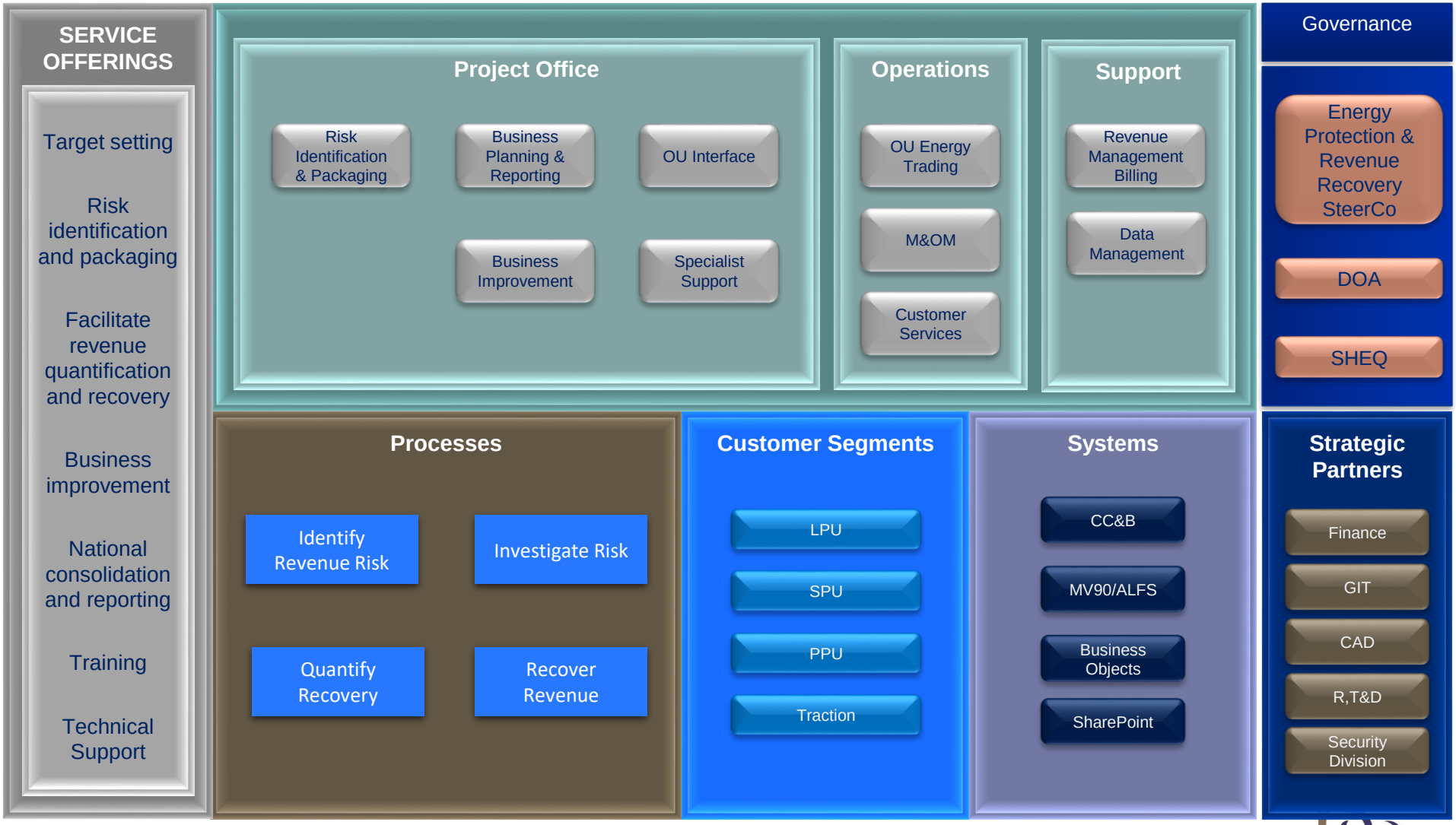
Types of Revenue Risks

- Illegal connections
- Tampered Meters
- Faulty Meters
- Unaccounted Meters
- Pending Starts
- Movement on Terminated Supplies
- Incorrect Metering or Billing

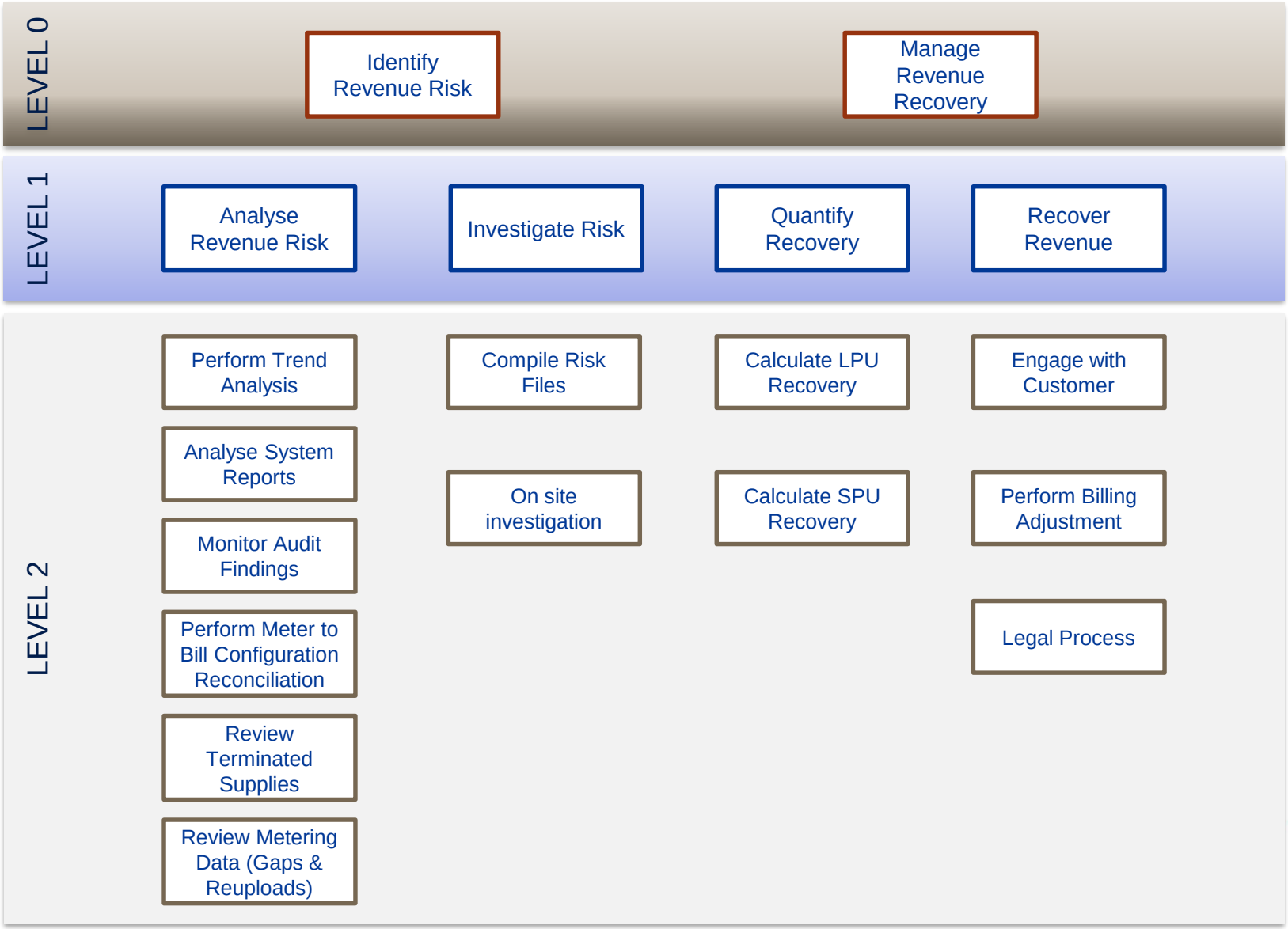
Objectives

- **<u>Maximise on Revenue Recovery</u>**
- Set annual revenue recovery targets
- Identify and investigate revenue risks
- Provide support to the OUs to recover revenue
- **<u>Develop a Sustainable Revenue Recovery Function</u>**
  - Develop a Sustainability Strategy
    - Review strengths and weaknesses
    - Develop opportunities for improvement
  - Develop an Effective Operating Model
    - Develop end to end business process
    - Review current operating model
  - Develop Human Resource Capability
    - Identify skills gaps & develop training programmes
    - Recruit relevant resources
  - Create Effective Relationships with Operating Units
    - Enhance current relationships
    - Ensure role clarity and accountability

2 Draft Operating Model

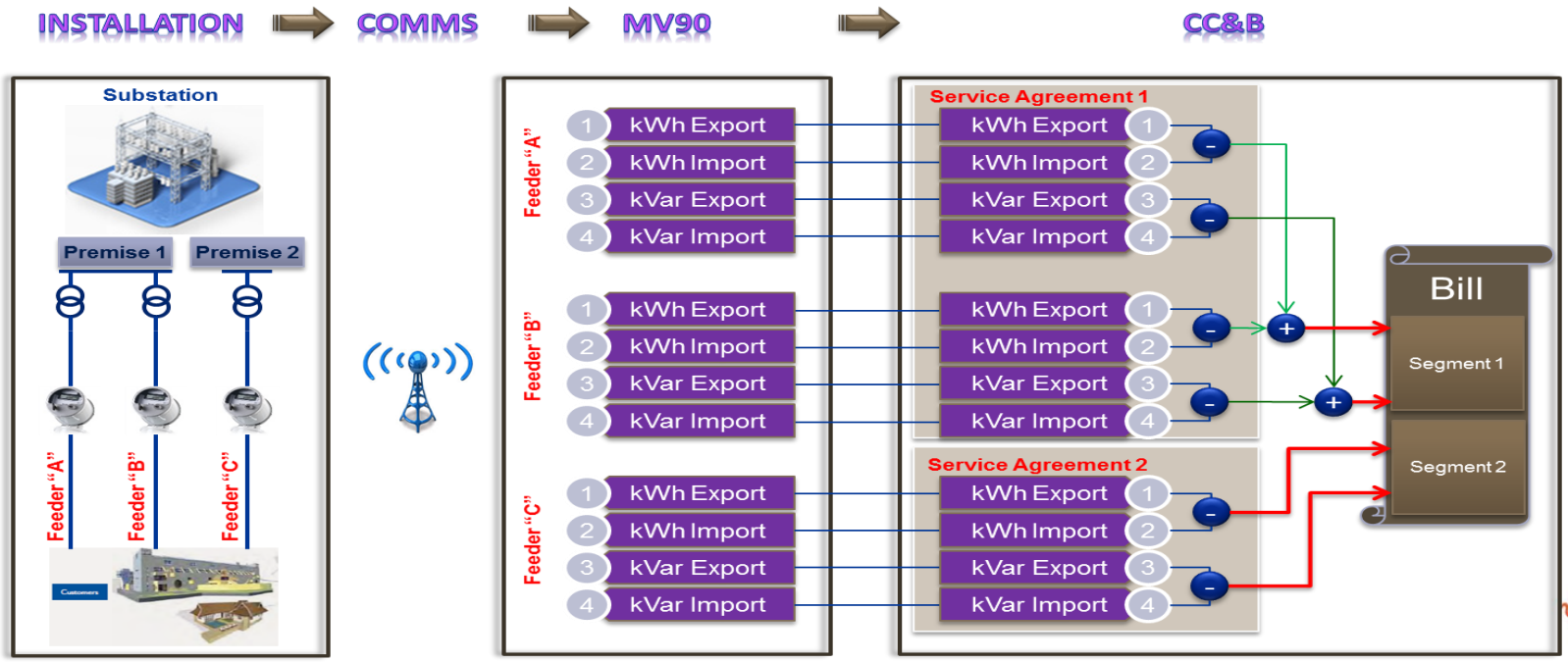


High-level Business Processes



New Risk Sources (LPU example)

- Analyse meter-to-bill value chain
- Review all system and process interfaces
- New controls identified
  - Interval Movement on Terminated
  - Recorders not Linked



Development of Analytical Tools

Current process : (field driven)

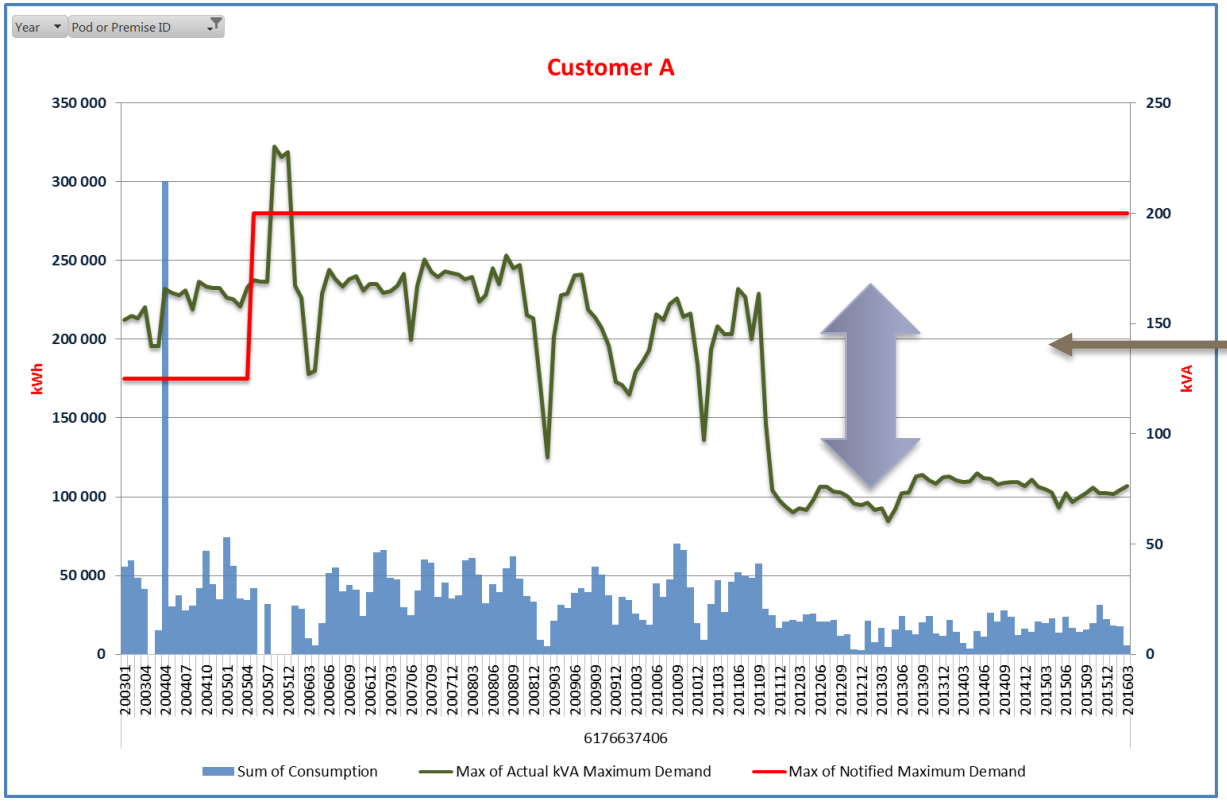
- One of the key mechanisms of mitigating energy losses is through conducting energy protection audits at metering installations and fixing of problems found.
- Currently areas are prioritized for audits based predominantly on MV Feeder losses.
- Once areas are prioritized, these audits are typically conducted on an entire area at a time.

New direction: (system driven)

- Simple "Risk Identification" tools were developed to better understand customer's usage patterns and thereby identifying potential risks much easier.
- This has enabled a platform for a move from blanket meter audits to risk based targeted meter audits.
- Other tools were also developed to assist with the calculation and processing of adjustments

Customer Load Profiling

- *"A picture paints a thousand words"*
- Identifying potential risks by reviewing load profile patterns



- Sudden trend step-down
- No change in NMD

Risk Investigation Tool

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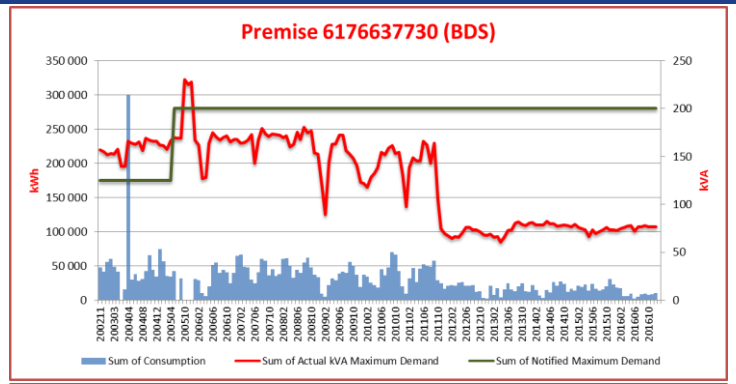
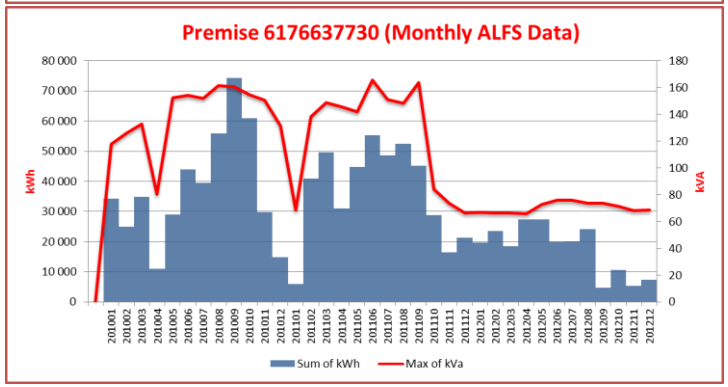
Billing Profile



Metering Profile



Billing vs Metering

ALFS

Start Date	2011-01-20
End Date	2012-01-21

REFRESH DATA

Row Labels	Sum of kWh
201101	2 416
201102	40 909
201103	49 563
201104	30 953
201105	44 697
201106	55 358
201107	48 585
201108	52 372
201109	45 083
201110	28 735
201111	16 405
201112	21 223
201201	13 758
Grand Total	450 057

BDS

Start Month (CCYYMM)	201102
End Month (CCYYMM)	201201

REFRESH DATA

Row Labels	Sum of Consumption
201102	31 833
201103	47 237
201104	26 757
201105	45 874
201106	51 985
201107	49 620
201108	48 636
201109	57 496
201110	28 882
201111	24 625
201112	16 509
201201	20 594
Grand Total	450 048

Meter Data Review

CLEAR ALFS DATA | REFRESH DATA | DASHBOARD

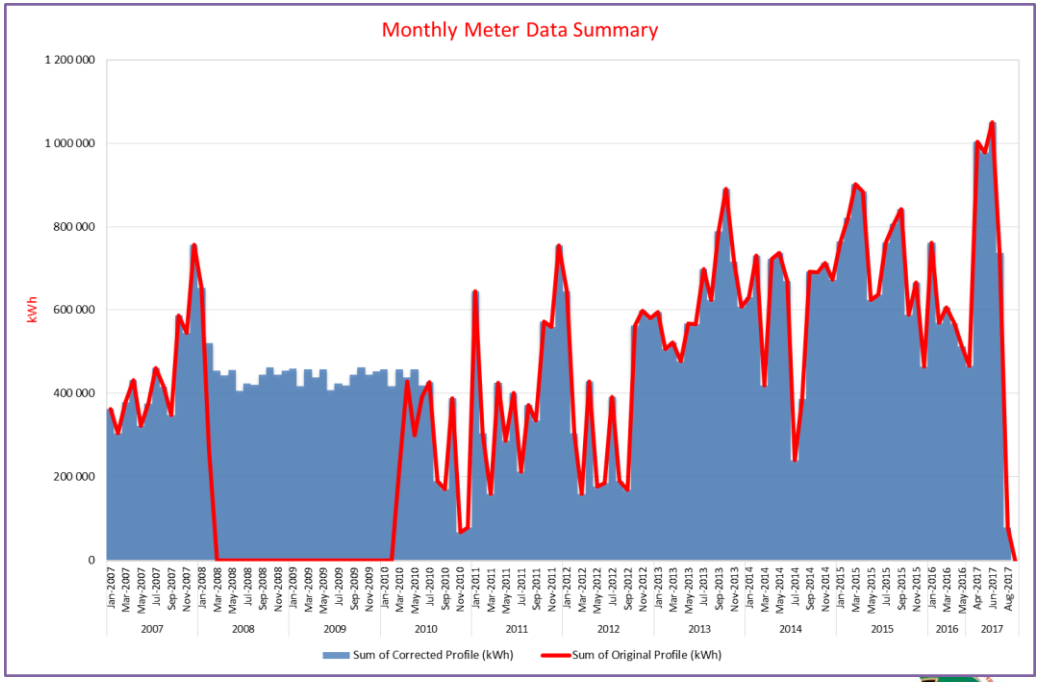
Year	Month	Date	kVA	DATE2	METER	kWh	S1	kVA	S2
2010	201001	2010-01-01	66	2010-01-0100:00	6176637730F	29.35	0	14.9	0
2010	201001	2010-01-01	65	2010-01-0100:30	6176637730F	29.28	0	14.6	0
2010	201001	2010-01-01	66	2010-01-0101:00	6176637730F	29.37	0	14.7	0
2010	201001	2010-01-01	66	2010-01-0101:30	6176637730F	29.41	0	15	0
2010	201001	2010-01-01	66	2010-01-0102:00	6176637730F	29.35	0	14.9	0
2010	201001	2010-01-01	66	2010-01-0102:30	6176637730F	29.41	0	15.1	0
2010	201001	2010-01-01	66	2010-01-0103:00	6176637730F	29.36	0	15.2	0
2010	201001	2010-01-01	68	2010-01-0103:30	6176637730F	30.08	0	15.7	0
2010	201001	2010-01-01	68	2010-01-0104:00	6176637730F	29.99	0	16.2	0
2010	201001	2010-01-01	72	2010-01-0104:30	6176637730F	31.09	0	17.9	0
2010	201001	2010-01-01	107	2010-01-0105:00	6176637730F	45.77	0	27.8	0
2010	201001	2010-01-01	106	2010-01-0105:30	6176637730F	45.71	0	27.2	0
2010	201001	2010-01-01	113	2010-01-0106:00	6176637730F	49.19	0	27.8	0
2010	201001	2010-01-01	112	2010-01-0106:30	6176637730F	48.73	0	27.9	0
2010	201001	2010-01-01	111	2010-01-0107:00	6176637730F	47.82	0	27.8	0
2010	201001	2010-01-01	112	2010-01-0107:30	6176637730F	48.6	0	27.4	0
2010	201001	2010-01-01	111	2010-01-0108:00	6176637730F	48.71	0	27	0
2010	201001	2010-01-01	113	2010-01-0108:30	6176637730F	49.63	0	27	0
2010	201001	2010-01-01	115	2010-01-0109:00	6176637730F	50.85	0	26.7	0
2010	201001	2010-01-01	114	2010-01-0109:30	6176637730F	50.31	0	26.8	0

ALFS S1 CODE ANALYSIS (Percentage of Codes)

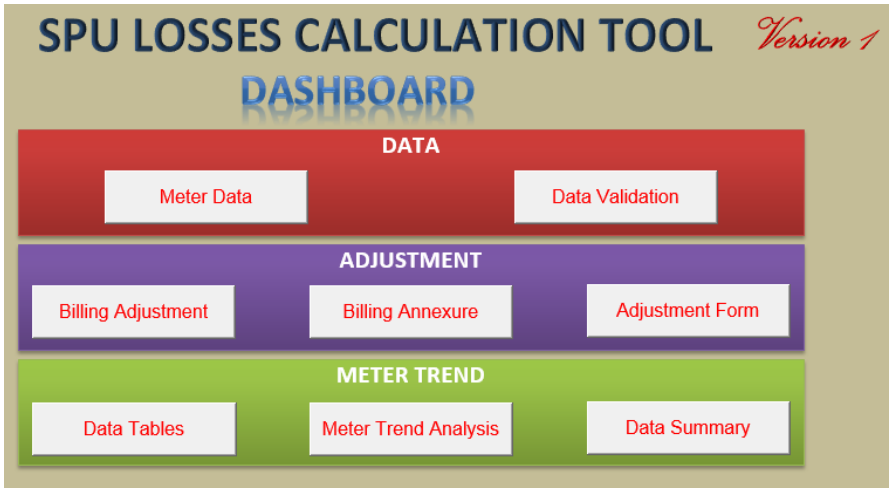
Count of kV		S1				
Year	Month	0	65536	512	66048	Grand Total
2010	201001	92%	1%	7%	0%	100%
	201002	93%	2%	5%	0%	100%
	201003	95%	2%	2%	0%	100%
	201004	95%	4%	1%	1%	100%
	201005	98%	2%	0%	0%	100%
	201006	99%	0%	0%	0%	100%
	201007	99%	1%	1%	0%	100%
	201008	93%	2%	4%	1%	100%
	201009	100%	0%	0%	0%	100%
	201010	96%	3%	0%	0%	100%
	201011	91%	1%	7%	0%	100%
	201012	92%	4%	4%	0%	100%
2010 Total		95%	2%	3%	0%	100%
2011	201101	99%	1%	0%	0%	100%
	201102	99%	1%	0%	0%	100%
	201103	96%	2%	1%	0%	100%

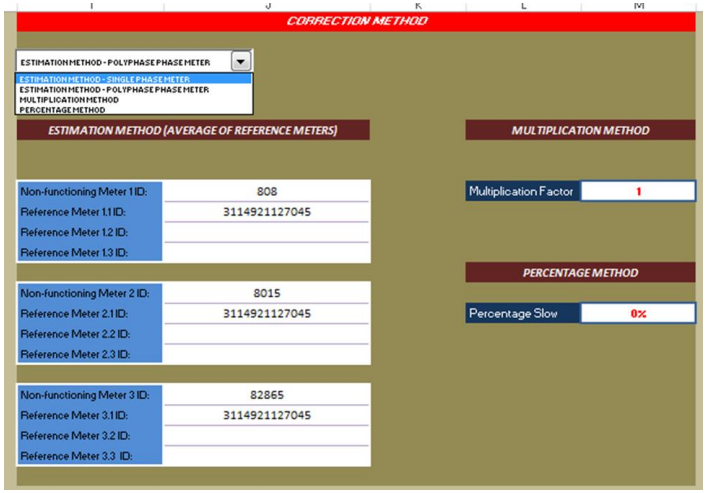
Interval Meter Data Estimation Tool

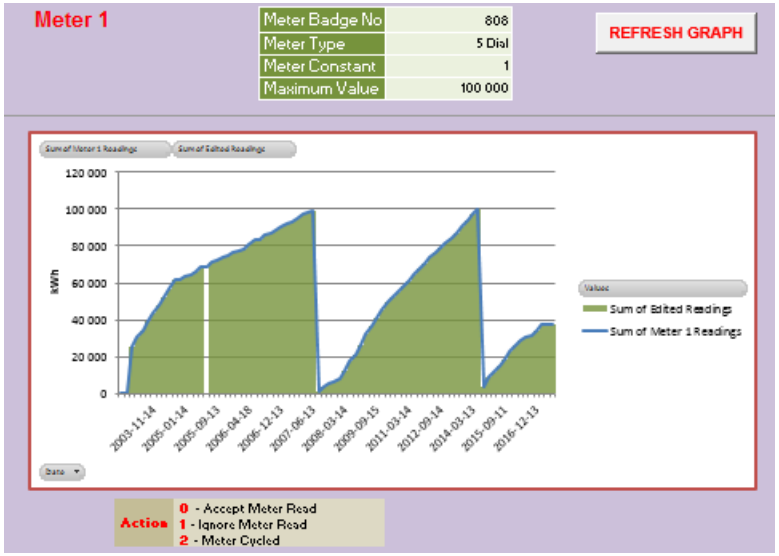
- Estimations of incorrect or missing interval meter readings
- Simulate correction

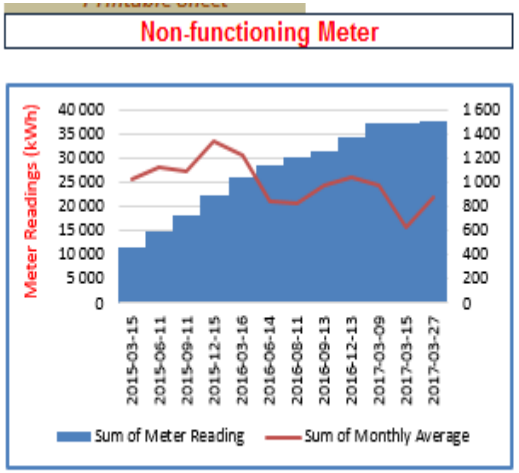


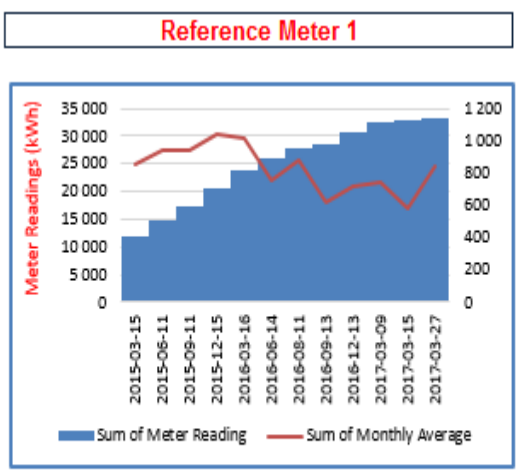
SPU Calculation Tool











Control sheet

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Overall control					Customer information										Fault information					CNC / CPM / Metering						
Status: Open Closed	Date entered on control sheet	Overall Feedback	Date Last feedback received	Energy Trading :Clarification of Issues/ Information required	OU	CSA	CNC	Feeder	LV Pole	Customer Name	Acc No:	Premise	Meter/ Recorder number	Read Type	Account relationship officer	Root cause	Tampered	Issue / Comments /Last Audit	Source	Date of Detection	Work Order #	Responsible person	Comment : Metering specialist	CPM comments	Field correction	Months not corrected in field (2013/12/12)	Date corrected in field

DAS				BILLING							Customer Negotiation			Legal process			Tamper fee		
Responsible person	DAS comments	DAS correction	Date DAS instruction executed	Responsible person	Billing comments	Billing Rebill Calculation Done	Adjustment Loaded on CC&B	Adjustment approved	Rebill completed	Last Billing feedback	Date rebilled	Last Customer negotiation date	Customer Negotiation status	Negotiation comments	Legal process to be followed	Responsible person	Legal comments	Amount of tamper fee raised (VAT included)	Date tamper fee raised	Date tamper fee Paid

Recovery					CLOSING	
Negotiated Settlement	Prescription	Recovery Amount	Recovery Paid	Estimated Amount	Date closed	Comment on Closing

Developing IT Infrastructure (Advanced Analytics)

- The business follows a largely manual process to identify revenue risks and ultimately recover revenue.
- A detailed Business Requirement Specification was developed for a revenue analytics solution that will:
  - Automate the existing Revenue Recovery process
  - Identify and prioritize points of supply with a high revenue risk using data/reports from various sources – Fraud Detection Modules
  - Investigate revenue risks - Generate Work-orders
  - Provide inputs to field audits which may lead to corrections
  - Use the results of field audits and other data inputs to quantify revenue recovery
  - Provide inputs for eventual revenue recovery in CC&B – bill adjustments or rebills
  - Provide relevant reporting
  - Monitor the entire revenue recovery process
- Provide an exploratory environment to identify additional revenue risks
  - Provide the user with the flexibility to analyse various types of data on individual or groups of customers – 'WHAT IF'

Project Development Approach
Waterfall vs Agile

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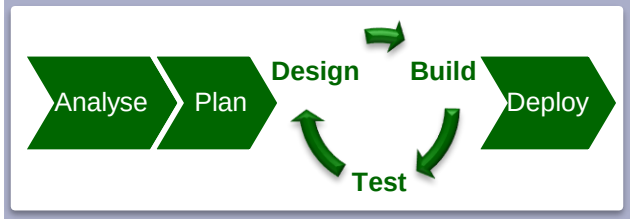
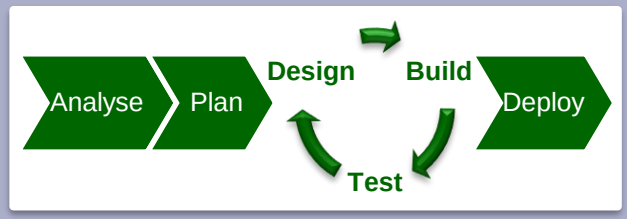
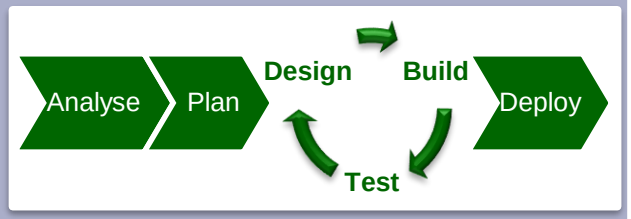
Waterfall – traditional PM approach

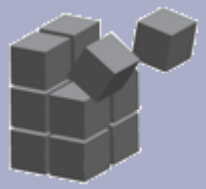
Analyse → Plan → Design → Build → Test → Deploy

Agile– delivering “bite-size” sections



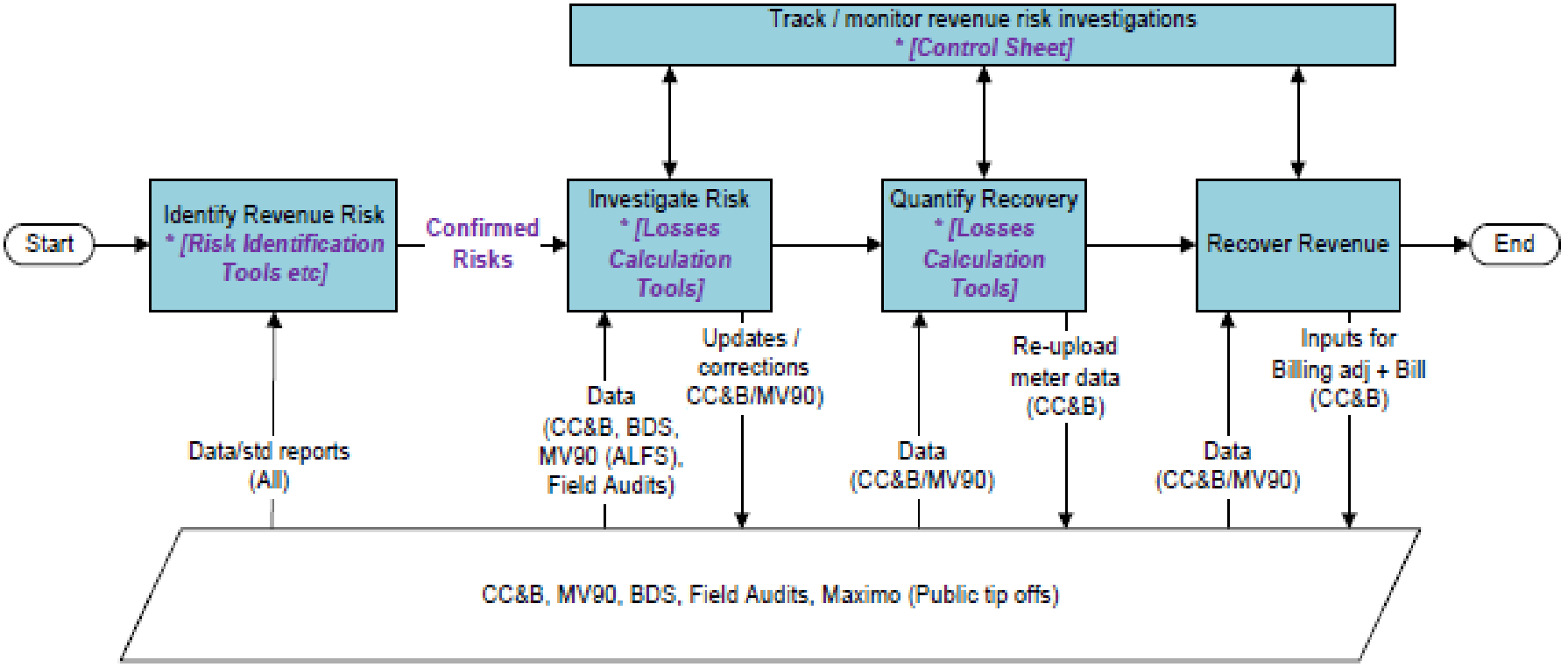




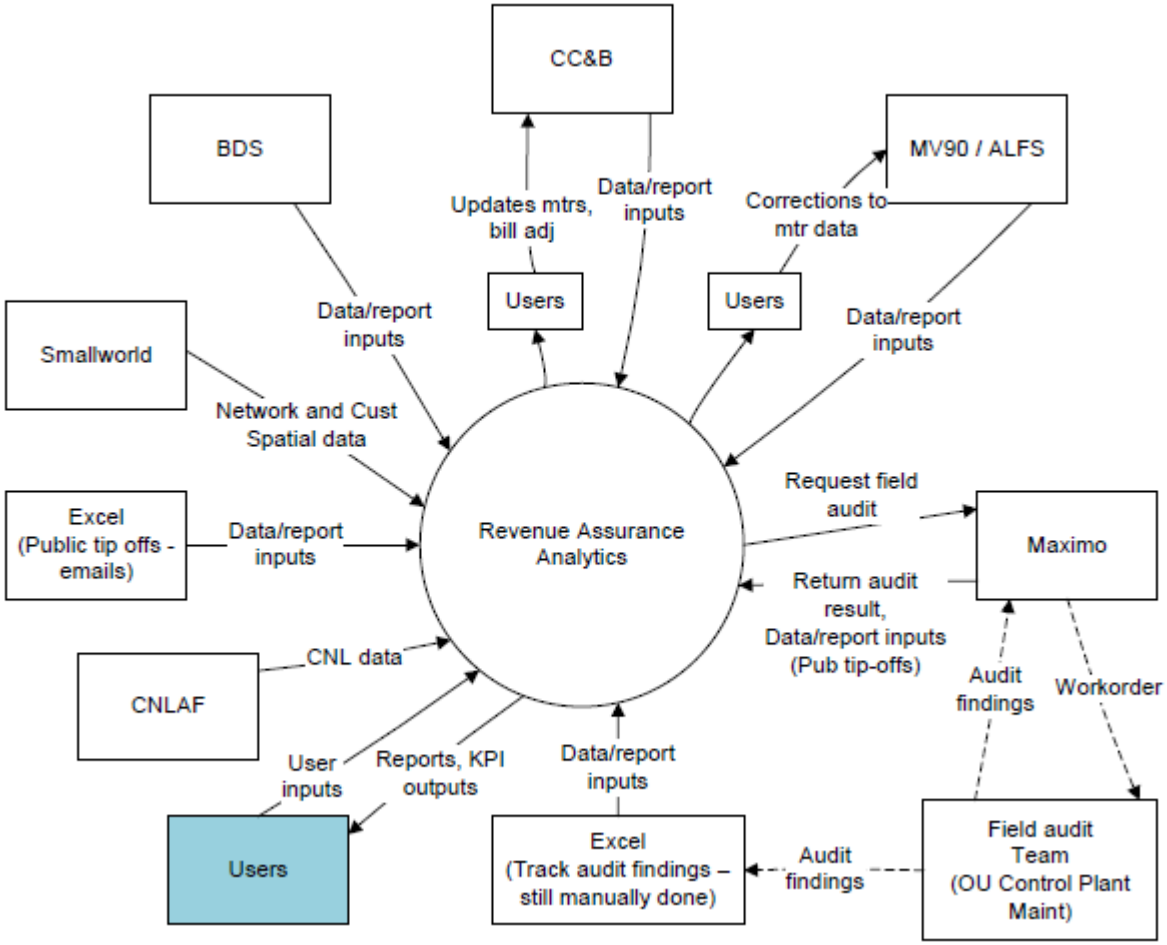


Multiple iterative developments

High-level Process



Data Flow Diagram



Thank you