

# **United Energy Information and Consultation Network Investment, Asset Planning**

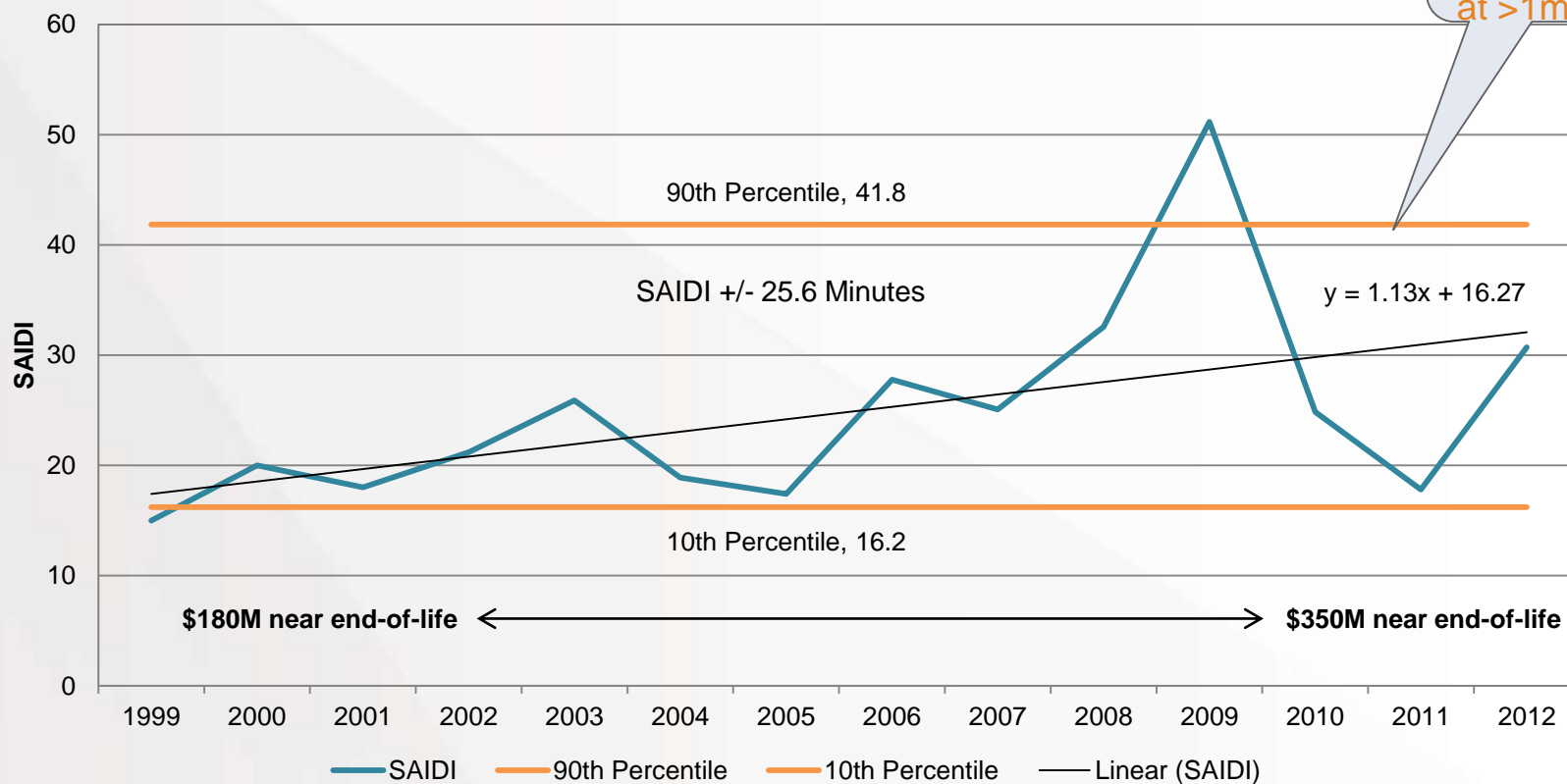
Michael Meraklis, Senior Asset Engineer

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# Asset Failure SAIDI over time

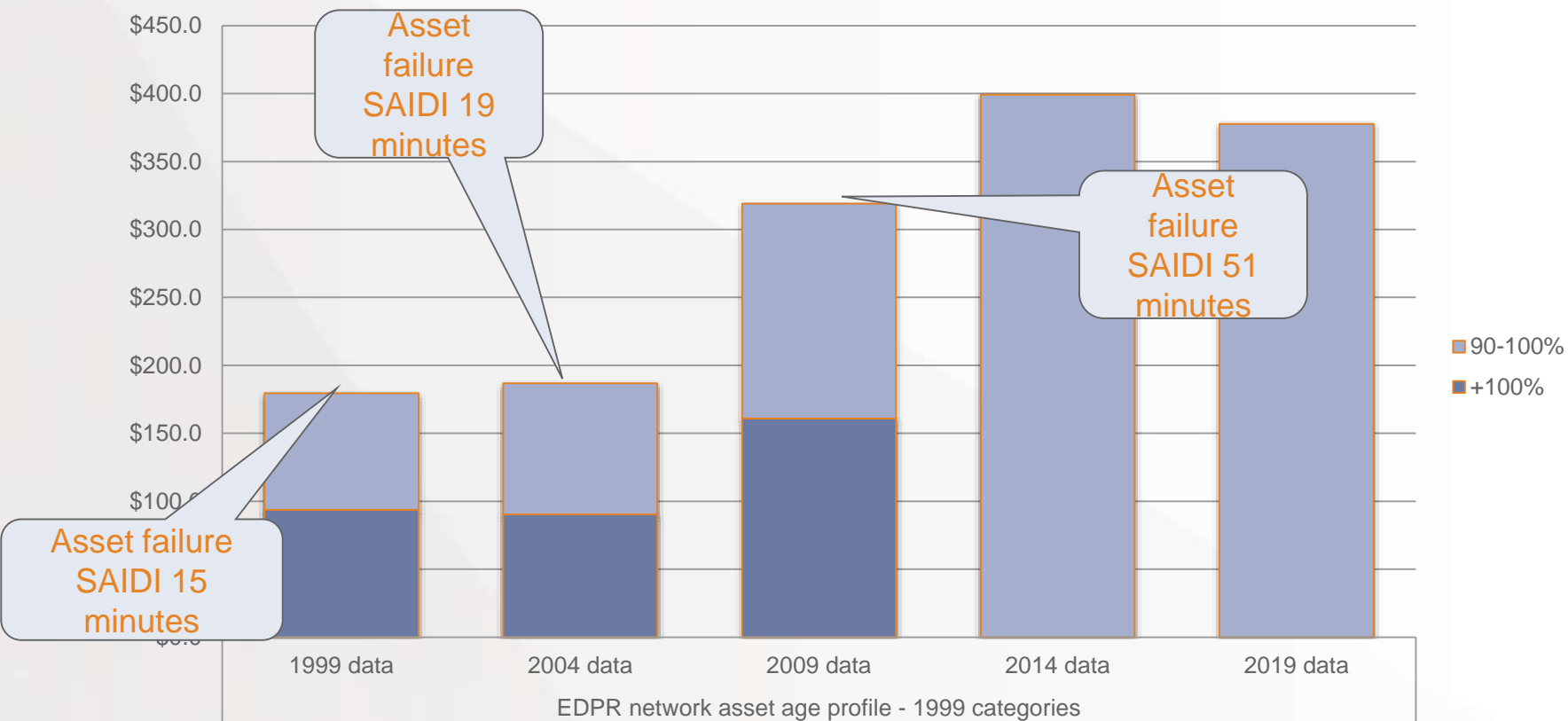


## SAIDI - Asset Failure



# Assets at End-of-Life Over Time

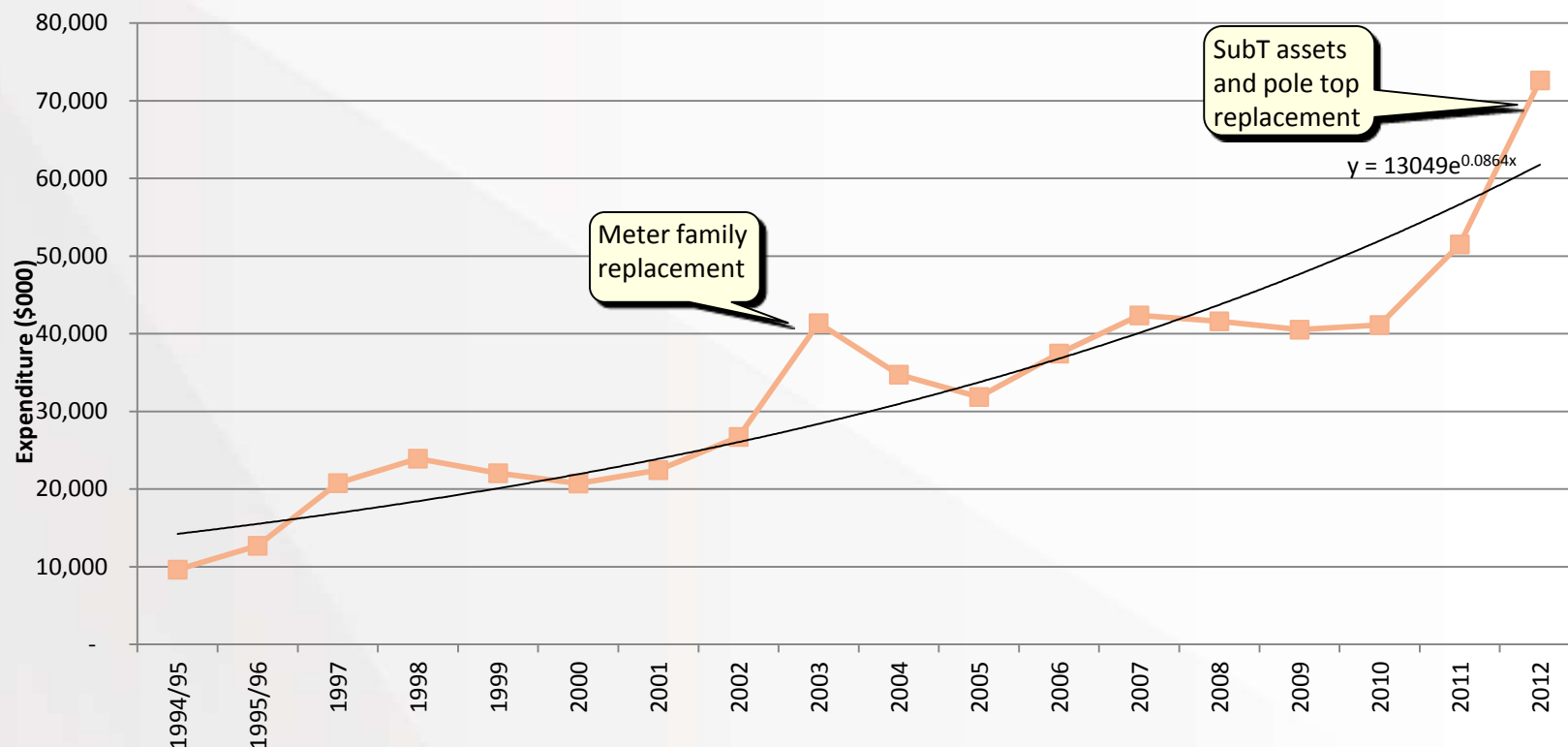
## Assets at End-of-Life Over Time



# Historical Asset Replacement



## Asset Replacement Capital (\$2013)



- Steady growth over period
- Reflects 1950's network expansion, increasing population at end of life

## Asset Replacement Discretion (1)



### Philosophy

- Category 1 - Replace on fail (let it fail or failure caused by storms etc)
- Category 2 - Replacement on inspection of condition and serviceability
- Category 3 - Replacement based on optimum economic timing to minimise long term cost

We can and have been pushing out Category 2 & Category 3 replacement by:

- Adopting asset life extension whenever possible (pole staking etc)
- Managing a backlog (with risk) of Category 2 Replacement
- Delaying of Category 3 Replacement

However:

- In-service asset failure is materially increasing
- SAIDI and STPIS has risen as a result
- Number and value of assets coming to end of life continues to increase
- Higher opex fault response costs, higher emergency capex replacement costs
- Higher risk of public safety, reputation downside



## Asset Replacement Discretion (2)

### Category 1

- 31% spend replace on fail
  - Poles, cross-arms, transformers, service wires, cables damaged during faults, storms
  - Naturally none of this spend can be deferred

### Category 2

- 50% spend replace on inspection
  - Low-value assets generally in the streets - poles, cross-arms, transformers, service wires
  - Replacement criteria based on industry norms (guidelines, standards)
  - Such norms can be changed but a substantial process to support departure from industry standards
  - Changes involves public safety – ESV involved
  - Improvements to efficiency go to lower prices for customers
  - Deferring to save capex in the short term may cost more in the near term
  - Can be deferred (poles - six months, cross-arms, transformers - up to 1 year) but with higher emergency capex costs, fault costs, opex) and STPIS



## Asset Replacement Discretion (3)

### Category 3

- 19% spend replace on condition and risk
  - an economic assessment based on probability of failure
  - High value assets generally within zone substations
  - Major plant with long lead times (main transformers, switchboards)
  - Can fail with little public safety risk
  - In-service failure runs a high risk of collateral damage to adjacent plant
  - Cost to replace on fail is much higher with STPIS, opex and public outrage from prolonged periods of cyclic load shedding
  - Can be deferred for up to two years but with significant risk

## The Correlation between End-of-Life assets and Asset Replacement Spend is Very High



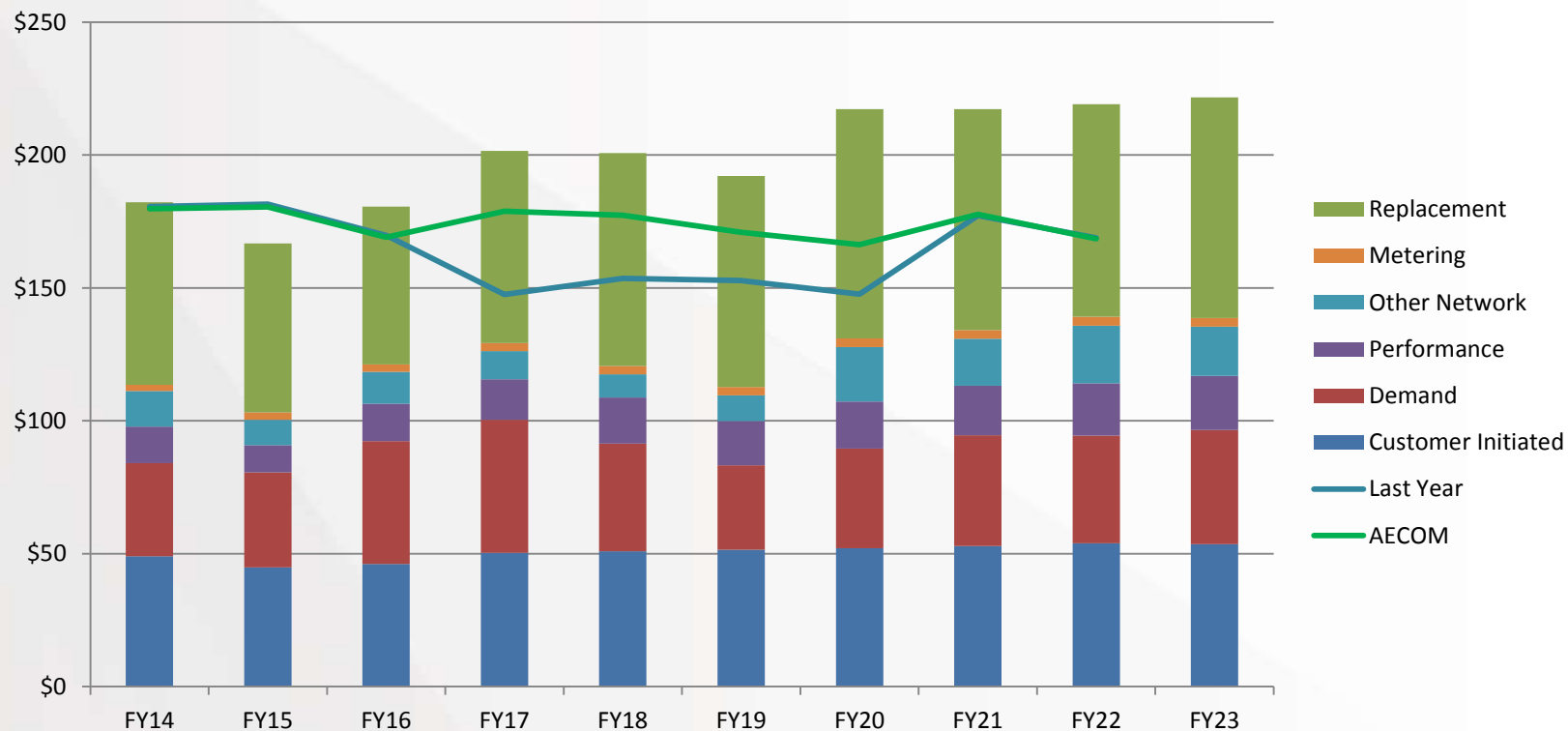
	% of life consumed	EDPR network asset age profile			
		As at end 1999	As at end 2004	As at end 2009	As at the end 2014
Total	>90%	180	187	319	400

- 2001 – 2005 was \$157M
- 2006 – 2010 was \$203M
- 2011 – 2015 is forecast to be \$315M
- 2016 – 2020 is forecast to be \$407M

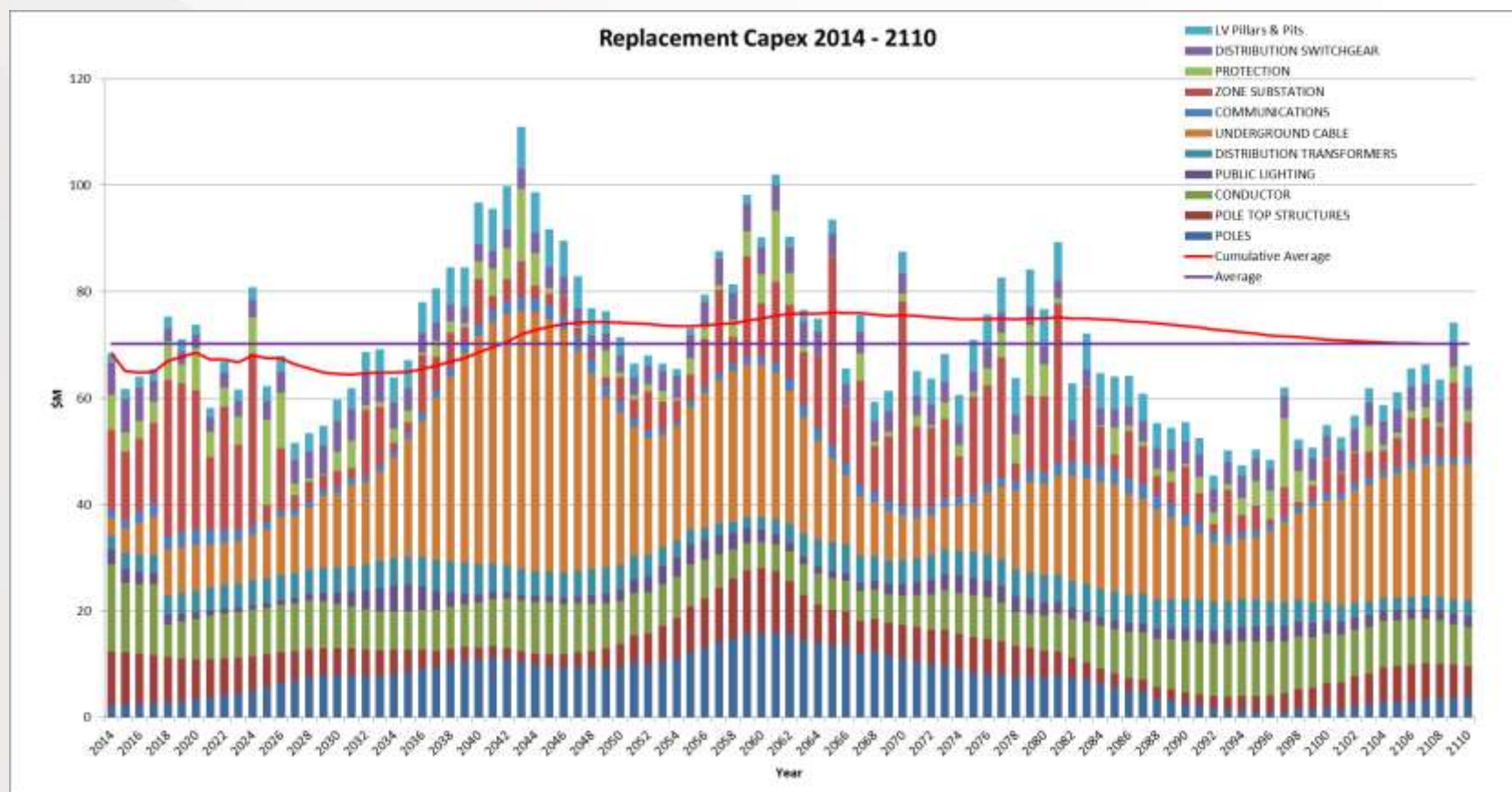


# Proposed 10 year Capex Forecast

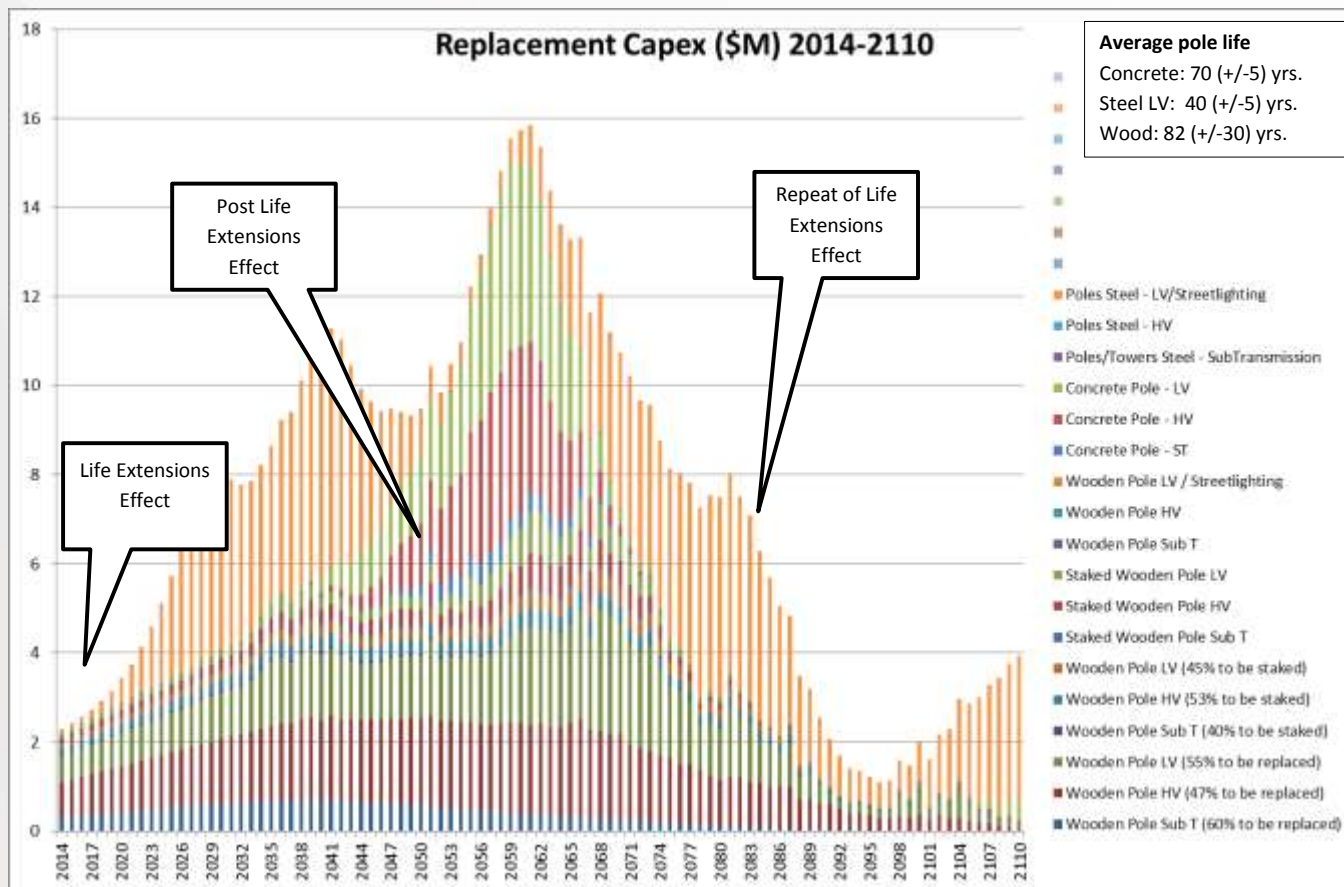
Proposed 10 yr Capex Forecast (\$2013M)



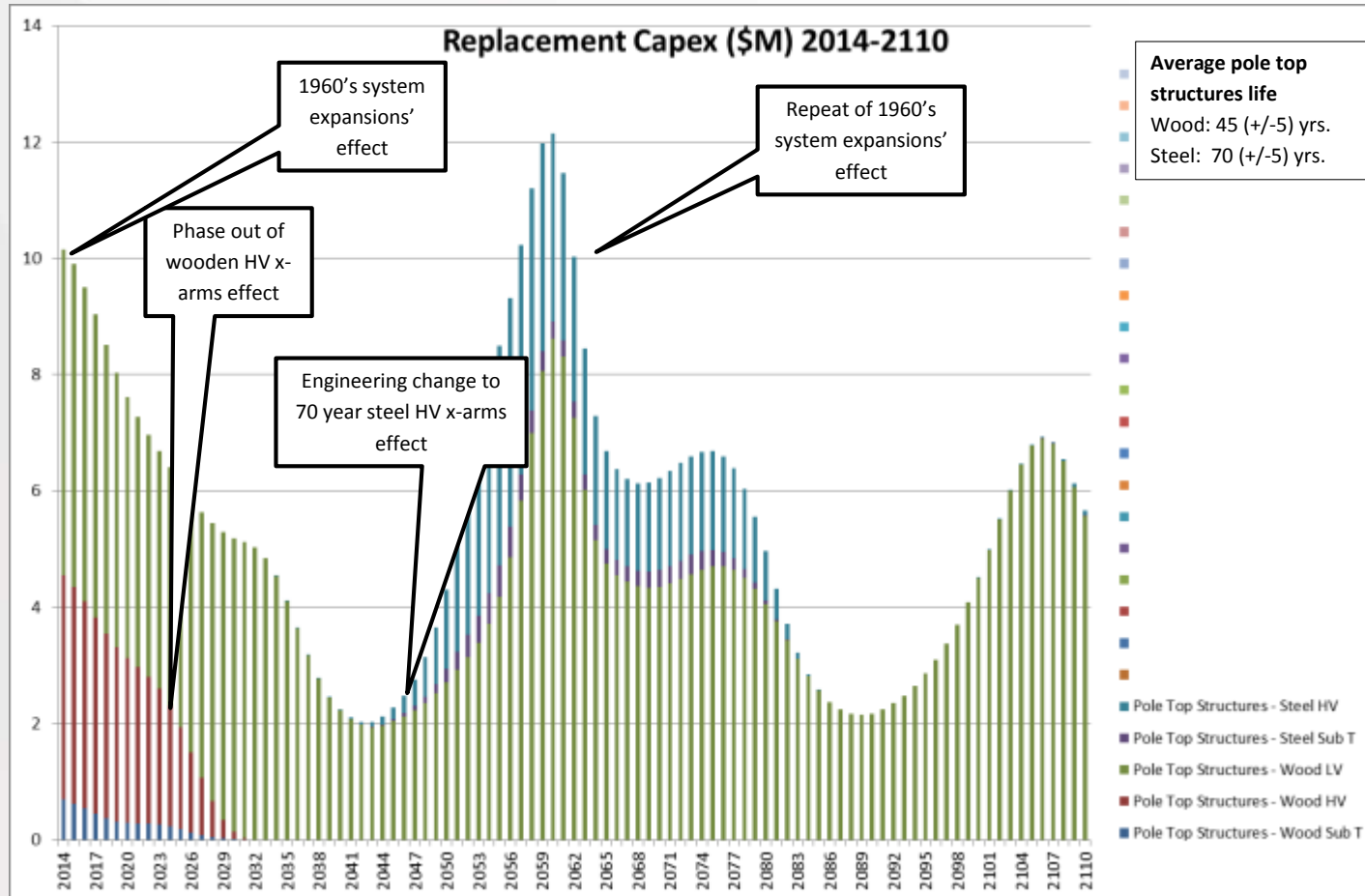
# Long-Term Asset Replacement Forecast



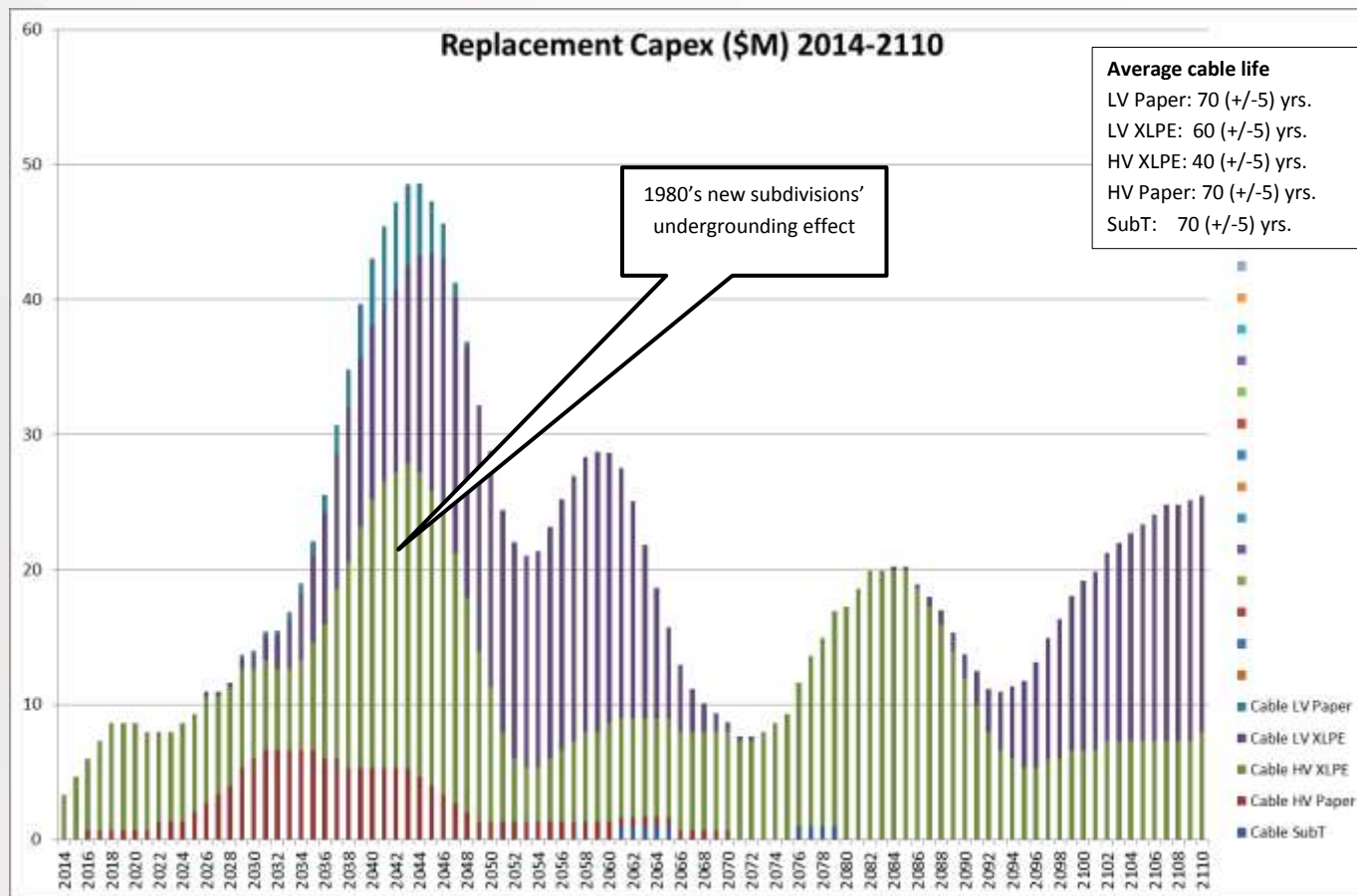
# Pole Replacement Capex



# Pole Top Replacement Capex



# Cable Replacement Capex





## Efficient asset deferrals

Much already done to extend lives and defer investments

- Pole staking in mid-80's – extend life by ~ 20 years
- Pole preservatives in late 90's – extend life by ~ 5 years
- Developed ZSS asset life extensions 2000's – extend life by ~ 10 years

## Asset Replacement Improvements



- Improved identification of deteriorated assets and prioritize asset replacements more accurately
  - Introduction of pole top camera
  - Investigating cable testing regimes
  - Introduction of Condition Based Risk Monitoring on key asset classes
- Life extension techniques
  - Increasing life of HV cables by looking at cable cure techniques

## Benchmark UE



Capex per Network Length

Replacement CAPEX

Replacement Capex to RAB

Replacement Capex to Network Length

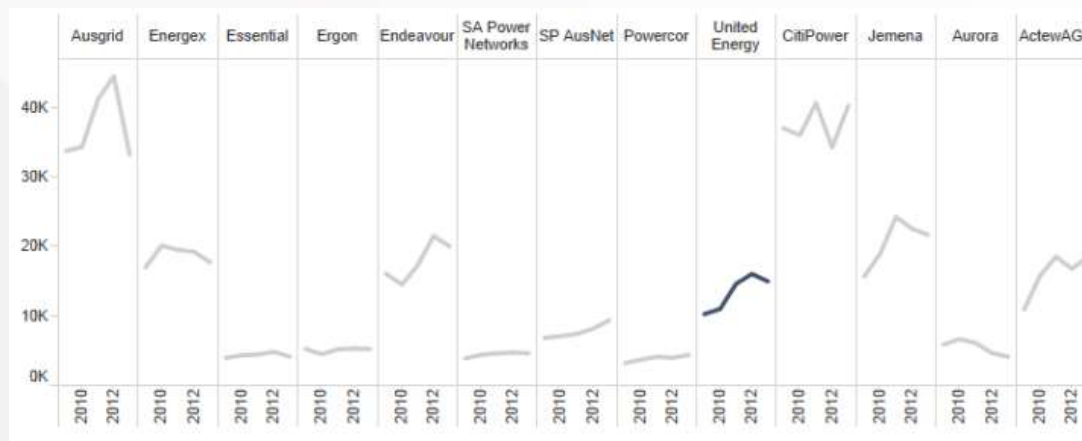
Capex per customer

### Conclusion

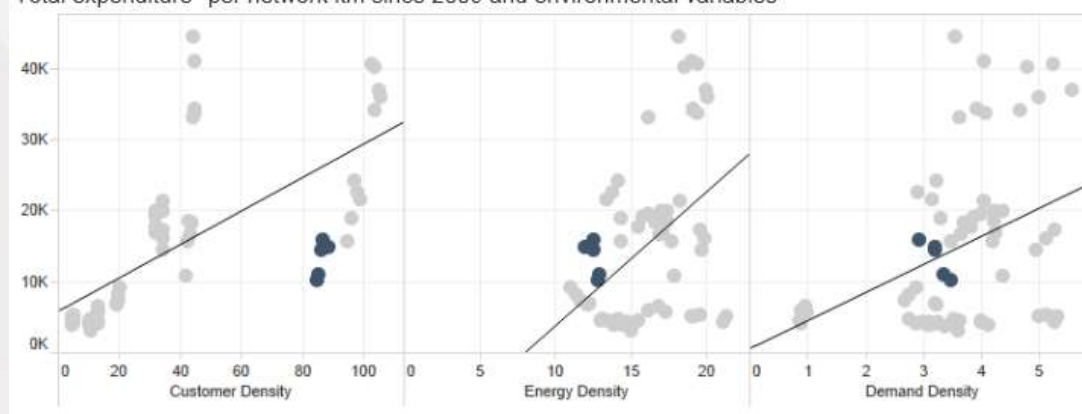
UE's capex in the previous and current periods are lower than Victorian peer benchmarks and is likely at least comparable to its peers in the next period



# Benchmark UE – Capex 2009-13 to Network Length



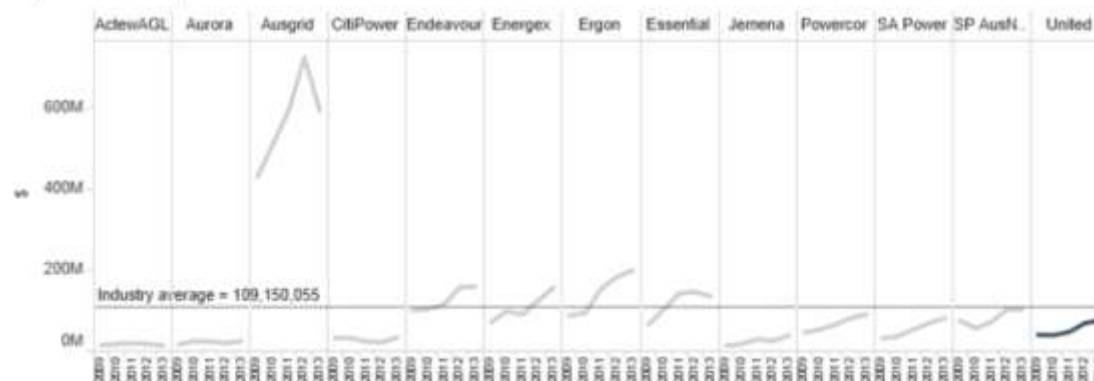
Total expenditure\* per network km since 2009 and environmental variables



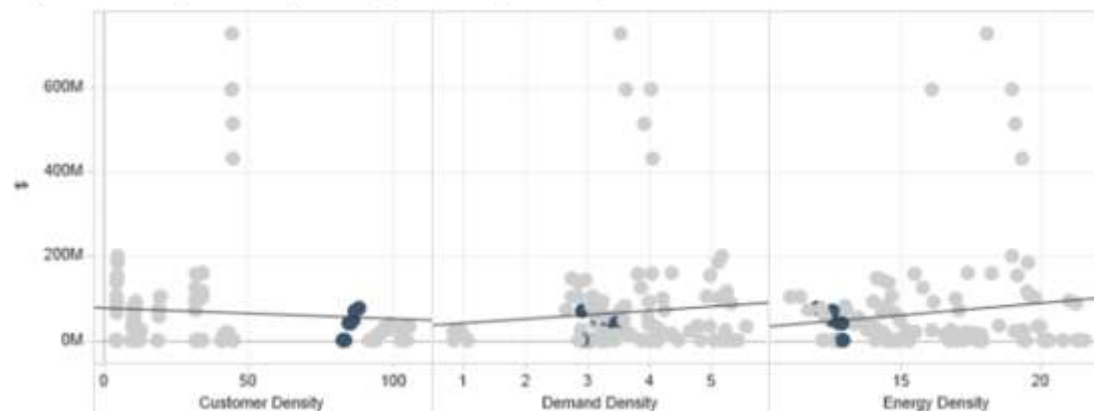
# Benchmark UE – Replacement Capex 2009-15



Replacement capex since 2009



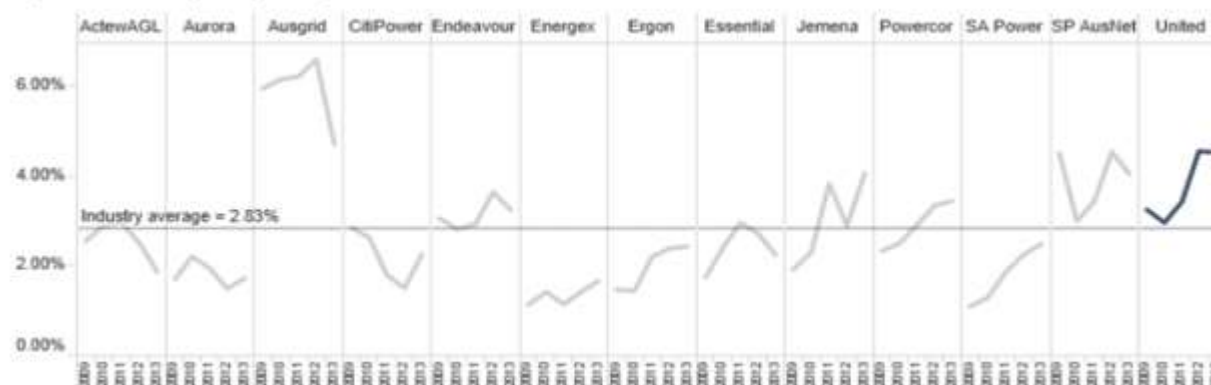
Replacement capex and explanatory variables (2009/13)



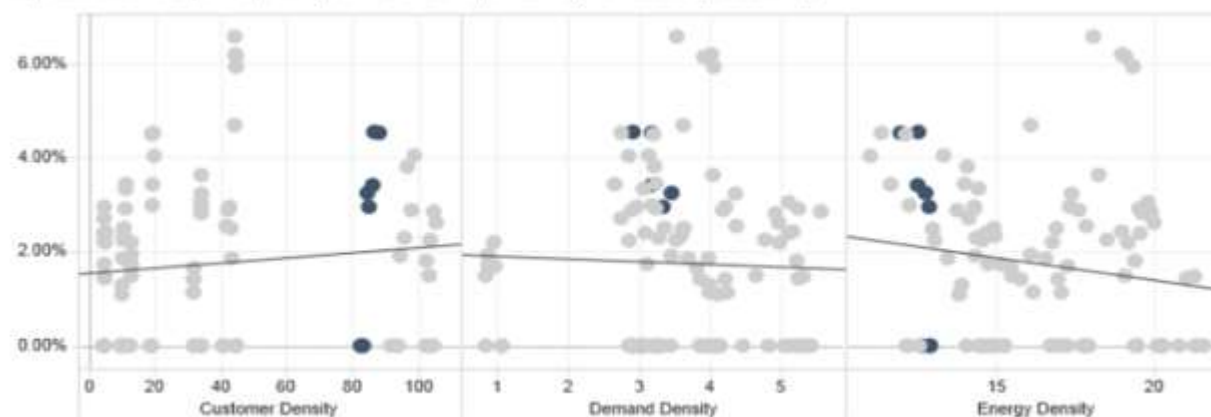
# Benchmark UE – Replacement Capex to RAB 2009-13



Replacement capex/opening RAB since 2009



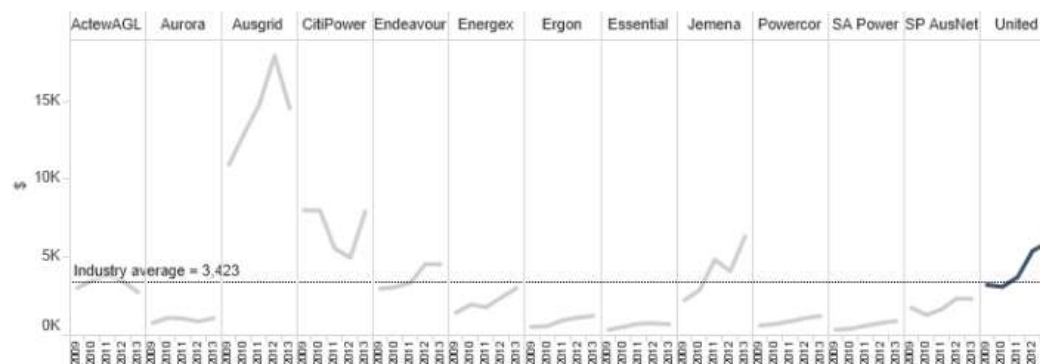
Replacement capex/opening RAB and explanatory variables (2009/13)



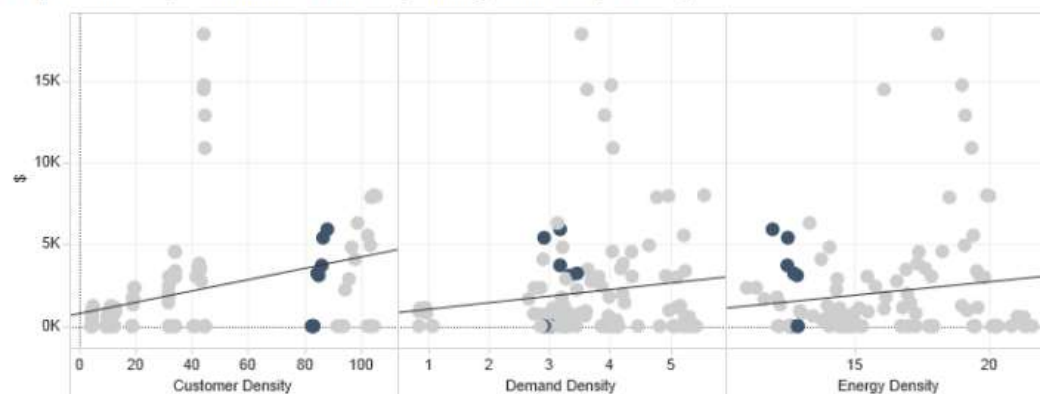
# Benchmark UE – Replacement Capex to Network km 2009-13



Replacement capex/network km since 2009



Replacement capex/network km and explanatory variables (2009/13)



## Benchmark UE – Capex per Customer 2011-2015

