

Asset Age Profiles & Losses

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The Digital Age?

- Electric Power is a vital pre-requisite in today's digital world
- Opportunity exists for NZ to upgrade the ancient poor performing network components, modernize the network systems to;
 - introduce both DG and DR, &
 - provide secure electricity supply at agreeable cost & economic benefit for all NZ's citizens.

Why don't we get on with it !

A Cultural Shift

We need to establish co-operation, and education of what is involved to change from;

- non co-operative SRMC "profit centre" culture, to
- co-operative LRMC policies

Government Responsibility

Government must provide leadership:

Policy changes to direct the use of;

- Smart TOU metering,
- Effective cyclic load management,
- Embedded generation in distribution networks,
- Revision of measurement techniques used by Commerce Commission

All to

- increase efficiencies (η)
- manage DG
- reduce losses in the delivery T&D networks

Why Educate?

Understanding of what is required to reduce losses & increase η comes in 4 phases:

- Understanding of structural & policy impediments
- Knowledge of what causes losses
- Commercial & operational matters that inhibit loss reduction
- Persuasion & selling efficiency improvement

Loss Drivers (1 of 2)

Causes of low Power & Energy delivery Efficiencies & Losses are:-

- Customer load factor causing huge power & energy loss at peak demand
 - up to 19% with 30% loss factor
- Lack of power factor correction within networks & customer premises
 - perhaps because of ripple control (audio frequencies)
- 40-50 year old power & distribution transformers with high standing losses
 - should be replaced

Loss Drivers (2 of 2)

Causes of low Power & Energy delivery

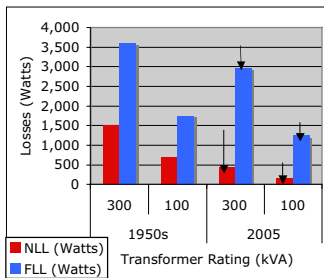
Efficiencies & Losses (contd.):-

- Unbalanced load & losses in neutrals
 - half sized neutrals
- Deemed profiles used for tariff formations
 - losses are mixed with customer demand gives poor tariff formation
- Resistance by the "stakeholders" & political system to advance financial & performance benefits with universal TOU metering and cyclic load management
 - Too many Government players resulting in lack of decision
 - No practical research & trial programmes in place
- Lack of Government funding for R&D + innovative encouragement

Transformer Facts

3Ø transformers built in the 1950's & early 60's have very high no load losses (NLL)

- due to core materials



Transformer Facts (contd.)

- A transformer running at 110 % load has 2x the losses at 80% load
- NLL of ancient units makes this worse
 - Add to this no concerted drive for power factor correction & management of reactive energy
- There are 170,000 11kV/400V distribution transformers in NZ
 - about 25-30% need replacement
 - Transpower's situation is much the same

Network Losses

Due to these facts & load imbalance with heavy neutral losses we have;

- Network losses with central generation model & poor power factor & load factor from domestic & other loads such as dairy farms
- Peak power losses of 16 to 19 % in some networks requiring extra generation
- Power and energy losses must be examined separately under various load conditions
- **It is mis-representation to quote average kWh losses in asset plans & omitting to look at power & energy losses separately under different load conditions.**

To Measure & Manage (1 of 2)

The means to measure & reduce losses:

- Smart metering
 - throughout a network at all ICPs
- Smart communications
 - for both half-hour & 5 minute reading
- ASP service
 - to all with needed back office software

To Measure & Manage (2 of 2)

- Government policy direction for LRMC co-operative attitude
 - not isolated SRMC profit centres - which do not encourage loss reduction
- Demand Response & Distributed Generation must be encouraged
- Commerce Commission
 - A change in the attitude & measurement criteria applied
- Government by policy insist that both
 - price based demand response [TOU tariffs] &
 - incentive based demand responseare universally applied to all customers in an aggressive 5 year programme

Closing Summary

- We must have change !
- Faraday's magnetic field changed the world
 - AC delivery & transformation systems
- The PC killed the mainframe computer
 - Where is IBM today?
- Why not NZ leading the urgently needed world electricity supply & delivery policy & technology changes
- We need it at least for our own economic survival

Thank You

Thank you and best wishes
to you to encourage the essential
policy & attitude changes needed

Any Questions?
