2009 – 2010 Capital Expenditure Plan
and
2009 SDP Update

August 12, 2008
Kelowna, BC

Regulatory Timetable

Intervenor Registration	August 13
Participant Assistance Budgets Submitted	August 15
Commission Information Request No. 2 and Intervenor Information Request No. 1	August 28
FortisBC Responses to Information Requests	September 11
FortisBC Final Submission	September 16
Intervenor Final Submission	September 22
FortisBC Reply Submission	September 29

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2009 – 2010 Capital Expenditure Plan
2009 System Development Plan Update

9:00	Opening Remarks	Joyce Martin
9:10	System Development Plan	Doug Ruse
9:30	2009/10 CEP Overview	Doug Ruse
9:40	Generation	Steve Hope
10:00	Transmission, Stations	Paul Chernikhowsky
10:30	BREAK	
10:45	Telecommunications	Paul Chernikhowsky
11:00	Distribution	Gary Williams / Marko Aaltomaa
11:45	General Plant	Tim Swanson
12:10	Demand Side Management	Mark Warren
12:30	LUNCH	
2:00	Copper Conductor Replacement CPCN Application	Doug Ruse
3:50	WRAP UP	Joyce Martin

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2009 System Development Plan Update and 2009/10 Capital Expenditure Plan

Doug Ruse
Director of Planning

August 12, 2008
Kelowna, BC

2009 System Development Plan Update

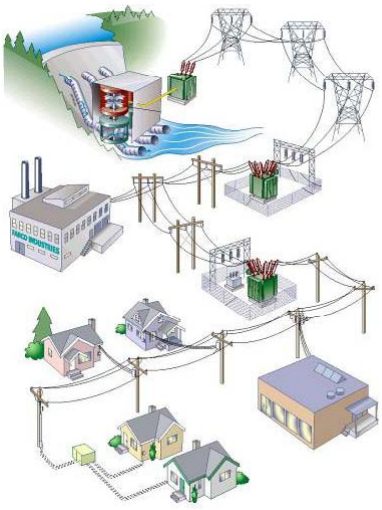
SDP Overview

- Transmission and Distribution system reinforcements
- Regional distribution
- Protection and control, communication systems
- System sustaining plan
- SDP included a 20 year high level with a 5 year detailed plan

2009 SDP Update (changes since 2007 Update)

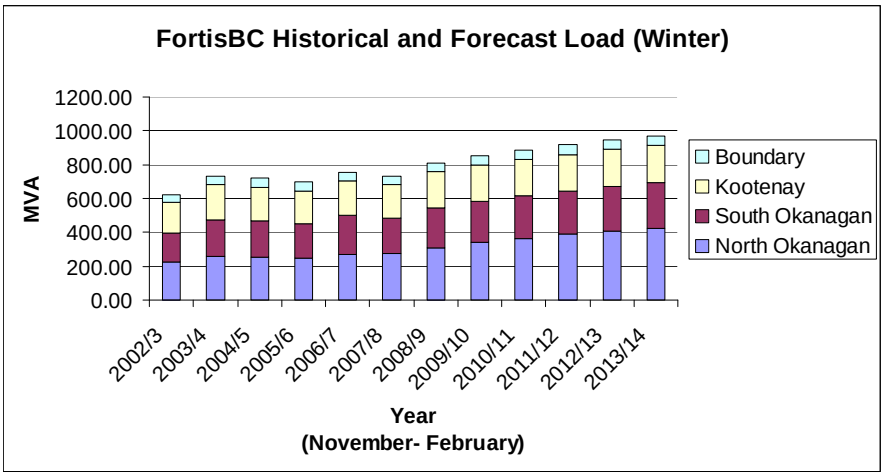
- Project timing
- Detailed engineering
- New projects – Condition Assessments
- New projects – Load Forecast
- Deferred projects
- Cancelled projects

System Planning Overview



- **Why We Need A Plan**
- **Current Plan Created in 2004**
- **Minor Updates Annually**
- **A New Plan Will be Developed in 2010**
- **Generation and DSM**

Load Forecast by Area



Building Permits FortisBC Territory

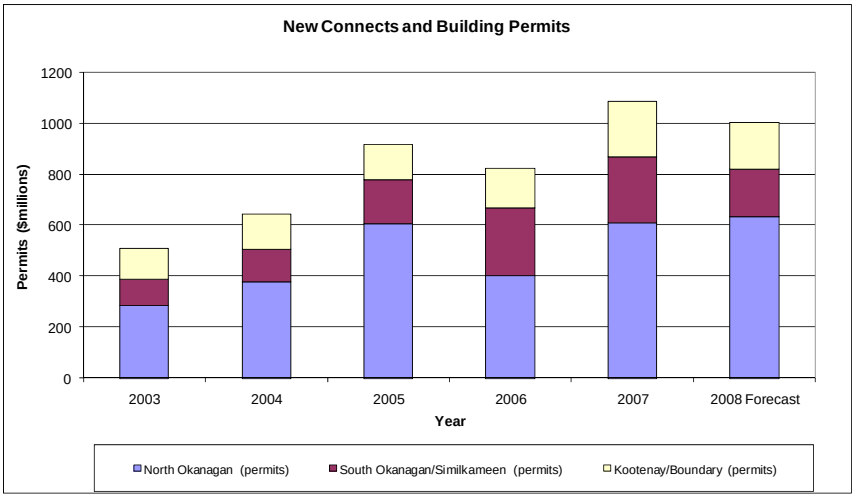


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Table 1.2 2009-10 Expenditures

2009/10 Expenditures - 2007 Update
Vs.
2009/10 Expenditures - 2009 Update

	2007 Update 2009/10	2009 Plan 2009/10	Change
	($million)		
Transmission Growth	85.4	160.6	75.2
Transmission Sustaining	7.3	14.1	6.8
Station Sustaining	6.6	10.1	3.5
Distribution	45.5	62.0	16.5
Telecommunication	5.6	4.4	(1.2)
TOTAL	150.4	251.1	100.7

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Changes to 2009/10 Transmission and Stations Growth

Timing Changes (Schedule and Inflation $32.0 million)

- **+ Naramata Substation** - rescheduled from 2005/07 to 2008/09
  Extensive consultation with stakeholders regarding location
- **+ Black Mountain Substation** - schedule extended to 2009
  Extensive consultation with stakeholders regarding feeders
- **+ Benvoulin Substation** - schedule extended to 2009
  Extensive consultation with stakeholders prior to submitting CPCN Application
- **+ OTR** - Schedule extended to 2010 due to timing associated with the detailed engineering and CPCN Application filing
- **- Ellison Transmission Loop** - Dependent on Ellison Completion
- **- Huth** - Deferred until OTR work on 76 Line complete
- **- Grand Forks Conversion** - Load uncertainty

Changes to 2009/10 Transmission Growth (cont'd)

Detailed Engineering (Project scope and accuracy $44.0 million)

OTR - More station upgrades required

Benvoulin - Anticipated location has changed

30 Line Conversion - More station upgrades required

Cancellations (-$4.2 million)

2010 Fault Level Reduction - no longer required

Coffee Creek T3 - no longer required due to 30 Line Conversion

Changes to 2009/10 Transmission Sustaining

New Projects - Condition Assessments ($7.3 million)

Transmission Pine Beetle Hazard Allocation

20 Line Rebuild

27 Line Rebuild

Changes to 2009/10 Stations Sustaining

New Projects – Condition Assessments ($6.9 million)

- Slocan City - Valhalla Substation Upgrade
- Passmore Substation Upgrade
- Princeton Substation Recloser Replacement

Changes to 2009/10 Distribution

Distribution Growth ($4.8 million)

New Projects - Growth

- **Airport Way Upgrade**
- **Glenmore New Feeder**
- **Christina Lake Upgrade**
- **Beaver Park - Fruitvale Tie**

Distribution Sustaining ($12.7 million)

New Projects - Condition Assessments

- **Distribution Pine Beetle Hazard Allocation**
- **Copper Conductor Replacement Program**

Changes to 2009/10 Telecommunications

Schedule Change (-$1.2 million)

+ Distribution Automation – shift from 2007/08 to 2009/10

- High capacity communications link between Grand Forks and Trail - deferred in conjunction with Grand Forks Conversion Project

2009 SDP Update

Questions / Comments

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2009/10 Capital Expenditure Plan (CEP)

Overview and Summary of Expenditures

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CEP Overview
Table 1.1 , Page 6

	2009 Plan	2010 Plan	2009/10 Total
	($million)		
Generation	21.9	22.6	44.5
Transmission & Stations	96.1	88.7	184.8
Distribution	28.2	33.8	62.0
Telecommunication	2.2	2.2	4.4
Information Systems	5.2	4.5	9.7
General Plant	22.6	26.7	49.3
Demand Side Management	2.5	2.7	5.2
TOTAL	178.8	181.1	359.9
Annual Operating Savings	0.2	0.72	0.92

CEP Summary of Expenditures
Table 1.4, Page 15

	2009 Plan	2010 Plan	2009/10 Total
	($million)		
Previously Approved	31.0	18.1	49.1
CPCN Submitted	81.8	78.1	159.9
CPCN to be Submitted	7.7	20.1	27.9
Subtotal	120.5	116.4	236.9
Remainder	58.3	64.7	123.0
Total	178.8	181.1	359.9

CEP Overview

Category	Approval Requested ($millions)
Generation	11.1
Transmission & Stations	34.6
Distribution	48.2
Telecommunication	1.6
Information Systems	9.7
General Plant	12.6
Demand Side Management	5.2
TOTAL	123.0

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2009/10 Capital Expenditure Plan

Questions / Comments

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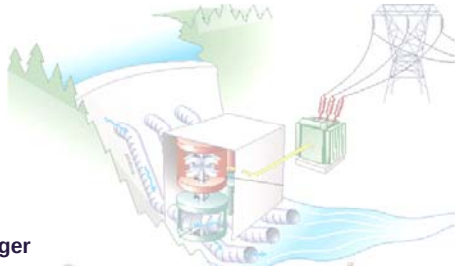
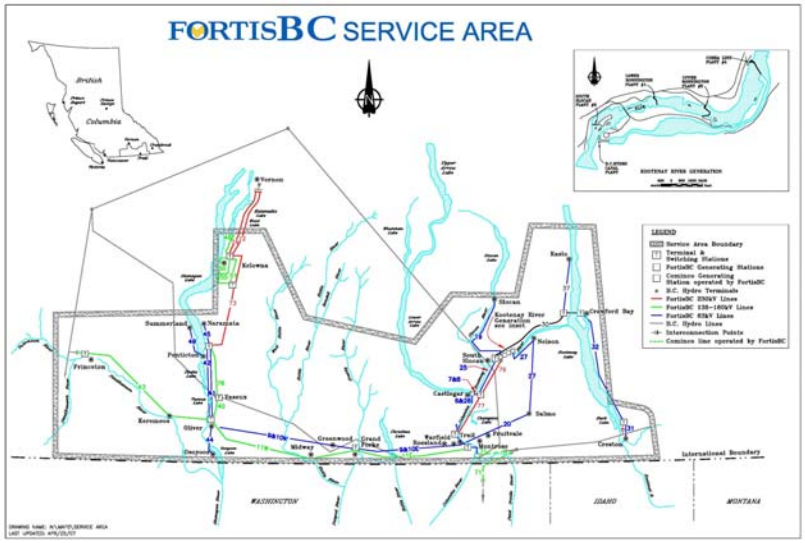
Generation



Steve Hope
ULE Project Manager

August 12, 2008
Kelowna, BC

FortisBC Generating Plants



FortisBC Generating Plants

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Generation Projects
Table 2.1

		Previously Approved	Expenditures to Dec 31\08	2009	2010	Future	Total
			($000s)				
	Sustaining						
1	South Slocan Unit 1 Life Extension	G-52-05	6,729	7,832	3,261	39	17,861
2	South Slocan Unit 3 Life Extension	G-147-06	11,010	2,051	-	-	13,061
3	Corra Linn Unit 1 Life Extension	G-147-06	874	4,487	8,476	5,113	18,950
4	Corra Linn Unit 2 Life Extension		-	104	5,264	17,313	22,681
5	South Slocan Plant Completion	G-147-06	1,012	940	1,598	-	3,550

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Generation Projects
Table 2.1

		Previously Approved	Expenditures to Dec 31\08[1]	2009	2010	Future	Total
			($000s)				
	Sustaining						
6	Upper Bonnington Civil \ Structural Upgrade and Old Unit Repowering (Phase 1)	G-147-06	4,142	1,094	651	-	5,887
7	South Slocan Unit 1 Headgate Rebuild	G-147-06	-	577	279	-	856
8	South Slocan Headgate Hoist, Control, Wire Rope Upgrade	G-147-06	669	434	-	-	1,103
9	Generating Plants Upgrade Station Service Supply	G-147-06	1,144	484	1,191	2,192	5,011
10	Generating Plants Area Lighting		-	478	338	-	816
11	All Plants Spare Unit Transformer		469	1,380	-	-	1,849
12	Subtotal Major Projects		26,049	19,861	21,058	24,657	91,625
13	Subtotal Minor Projects from Table 2.2		-	2,074	1,499	-	3,573
14	Total Generation		26,049	21,935	22,557	24,657	95,198

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Corra Linn Unit 2 LE - Objectives

- Low cost energy for customers
- Longer term reliability

Corra Linn

FORTISBC

Corra Linn Unit 2 LE - Scope

- Turbine maintenance

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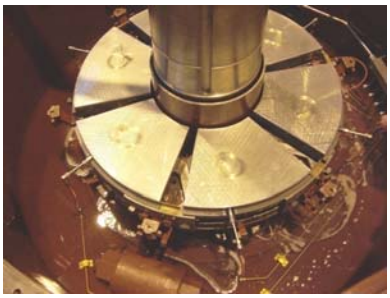
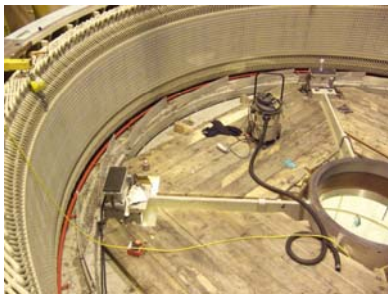
Corra Linn Unit 2 LE - scope

- Generator maintenance





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Upgrade and Life Extension Program - schedule

Plant	Upper Bonnington	Lower Bonnington	South Slocan	Corra Linn
Units Completed	Unit 5 ULE Unit 6 LE	Units 1 & 2 ULE Unit 3 LE	Unit 2 ULE	Unit 3 LE
2009 Schedule			Unit 3 LE	
2010 Schedule			Unit 1 LE	
2011 Schedule				Unit 1 LE
2012 Schedule				Unit 2 LE
Total Units	**2**	**3**	**3**	**3**

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Generation Plants Upgrade Area Lighting

All plants station Area Lighting

- **Safety**
- **Reliability**

Corra Linn – basement lighting

Upper Bonnington basement lighting – completed

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Generation Plants Spare Unit Transformer

All plants Spare Unit Transformer

- **Aging equipment**
- **Reliability**

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Generation Small Sustaining Projects Table 2.2

	Generation Small Sustaining Projects	2009	2010
		($000s)	
1	All Plants Fire Safety Upgrade Phase 1	241	
2	All Plants Public Safety & Security Phase 1	82	52
3	Lower Bonnington Power House Crane Upgrade	174	
4	Corra Linn Power House Crane Upgrade	172	
5	Corra Linn East Wingdam Handrail Upgrade	78	
6	All Plants Portable Headgate Closing Device	50	
7	All Plants Spare Exciter Transformer	24	116
8	South Slocan Water Supply Phase 3	47	50
9	All Plants 2009 Pump Upgrades	233	
10	Upper Bonnington & Corra Linn Deluge Valves	50	
11	Lower Bonnington, Upper Bonnington, & Corra Linn Sump Oil Alarm System Upgrade	128	

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Generation Small Sustaining Projects Table 2.2

	Generation Small Sustaining Projects	2009	2010
		($000s)	
12	Lower Bonnington & Upper Bonnington Upgrade Spillway Gate Control Phase 1	40	
13	Upper Bonnington & South Slocan Airwash Tank Rehabilitation	108	
14	South Slocan Tailrace Gate Corrosion Control		114
15	Queen's Bay Level Gauge Building Phase 1	67	
16	Upper Bonnington Unit 5 & Unit 6 Tailrace Gate Corrosion Control		139
17	Upper Bonnington Trashrack Gantry Replacement.		417
18	Lower Bonnington Forebay Access Rd. and Intake Upgrade Phase 1 & 2	393	102
19	Corra Linn Spillway Gate Isolation Study	46	
20	South Slocan Dam Rehabilitation Study	46	
21	Lower Bonnington & Upper Bonnington Plant Totalizer Upgrade		212
22	Lower Bonnington & Upper Bonnington Communications Network Completion	95	297
23	Total	2,074	1,499

Small Sustaining Projects

Projects primarily focus:

- **Safety**
- **Environment**
- **Reliability**

Questions / Comments

Upper Bonnington

Next

2009/10 Transmission Projects

Paul Chernikhowsky
Chief Planning Engineer

August 12, 2008
Kelowna, BC

Okanagan Area Development

"UBC Okanagan bucks B.C. trends, enrolment grows by 17 per cent"
UBC press release – Aug 2007

"The Best Place to Build a Data Center in North America"
CIO Magazine – February 2008

"First quarter ranks Kelowna as 9th busiest airport in Canada"
City of Kelowna news release – April 2008

"Thompson-Okanagan leads the province in job and population growth in last five years"
2008 BC Check-Up - Chartered Accountants of BC

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Transmission & Stations Growth
Table 3.1 (Page 42)

	Previously Approved	CPCN Filed	Expenditures to Dec 31/08	2009	2010	Total
GROWTH	($000s)					
Ellison Distribution Source	C-4-07		15,434	1,734		17,168
Black Mountain Source	C-7-07		9,913	4,517		14,430
Naramata Substation	G-124-07		3,562	3,962		7,524
Okanagan Transmission Reinforcement		Dec 14, 2007	18,250	65,265	57,893	141,408
Ootischenia Substation	C-10-07		7,702	389		8,091
Benvoulin Substation		Q3 2008	1,200	2,930	13,554	17,684

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Transmission & Stations Growth
Table 3.1 (Page 42)

	Expenditures to Dec 31/08	2009	2010	Future	Total
GROWTH	($000s)				
Recreation Capacity Increase		178	3,401		3,579
Kelowna Distribution Capacity Requirements		518	517		1,035
Tarrys Capacity Increase		403			403
Huth Substation Upgrade			413	3000	3,413
30 Line Conversion		4,500			4,500
Kelowna Static var Compensator			400		400
SUBTOTAL GROWTH	56,061	84,396	76,178	3,000	219,635

Benvoulin Substation

Project justification:

- Provides capacity in a growing area of the city
- Allows redistribution of load from the heavily loaded Hollywood and OK Mission substations
- Provides distribution backup for other substations
- Defers the Braeloch Substation
- In-service Q4 of 2009

Project scope:

- New 2.5 acre substation (5 acre property) off Casorso Rd
- Tie into the existing 51 Line between DG Bell and OK Mission
- 32 MVA 138/13 kV transformer
- Four 13-kV distribution feeders
- Room for additional two transformers and eight feeders

Benvoulin Substation

Substation Siting Considerations:

- Balance of numerous, often competing interests
- Extensive public consultation
- Three rounds of open houses
- Site selected is a former gravel mining operation
- Station site is still central to area load growth
- No known opposition to the preferred site

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Recreation Transformer Addition

Project justification:

- Supply for downtown Kelowna (Prospera Place, Cultural District, Waterfront)
- Load forecast shows transformer overloading in winter 2010/11
- Provides capacity in a densely populated, growing area of the city

Project scope:

- Doubles the station transformation capacity
- Addition of a second 32 MVA 138/13 kV transformer
- Connection to existing station buswork
- No additional property required

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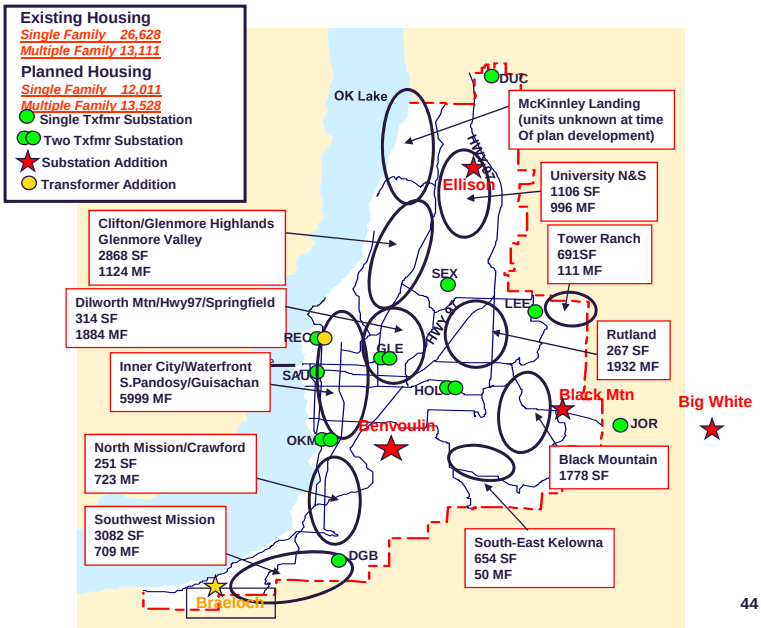
Kelowna Official 2020 Community Plan
New Residential Development



Kelowna Distribution Capacity Requirements

- Kelowna peak load expected to grow **100 MW (36%) by 2012**
- Detailed investigation and recommendation to provide an integrated solution for capacity increases in the greater Kelowna area
- Long term vision
  - **Develop/formalize criteria**
  - **Future transmission needs**
  - **Evaluation of economic reach of feeders**
  - **13-kV vs. 25-kV distribution**
  - **Compact station designs**
  - **Leverage existing infrastructure as much as possible**

Huth Station Upgrade

- Major supply point for South Penticton, West Bench, Trout Creek and Summerland
- Combined peak load over 80 MW in 2010
- Originally constructed in the 1950's
- Modified many times / non-standard arrangement
- Normal supply via one of two 63-kV lines from RG Anderson
- Both lines cannot be operated in parallel
- Large amount of load is exposed to outages due to a single-contingency (N-1) event
- Circuit breaker and protection upgrades will allow N-1 reliability

- **Construction is deferred until 2011 (due to work on 76 Line as per OTR schedule)**
- **Engineering and some procurement in 2010**

Huth Station Upgrade

Project scope:

- Addition of three 63-kV circuit breakers
- Fibre-optic communications from Huth to RG Anderson
- Modifications to allow 52 Line and 53 Line to operate in parallel

30 Line Voltage Conversion

History:

- 161-kV line built in 1952 to supply power from South Slocan to the Sullivan Mine in Kimberley
- 30 Line section (Teck Cominco owned) from Crawford Bay to Kimberly retired in 2004
- Only remaining backup supply for area load is via 32 Line from Creston at 63-kV
- Seven aging transformers at South Slocan, Coffee Creek and Crawford Bay which require rehabilitation or replacement

- **No longer have full backup for loss of the South Slocan to Coffee Creek section (does not meet N-1 criteria)**

30 Line Voltage Conversion

Proposed solution:

- Reduce the line voltage from 161-kV to 63-kV
- No changes to the transmission line itself
- Removal of step-up/step-down transformers at South Slocan, Coffee Creek, Crawford Bay (saves approximately $10 million in replacement costs)
- Station reconfiguration at Coffee Creek and Crawford Bay
- Installation of capacitor banks at Kaslo and Coffee Creek
- Restores N-1 capability

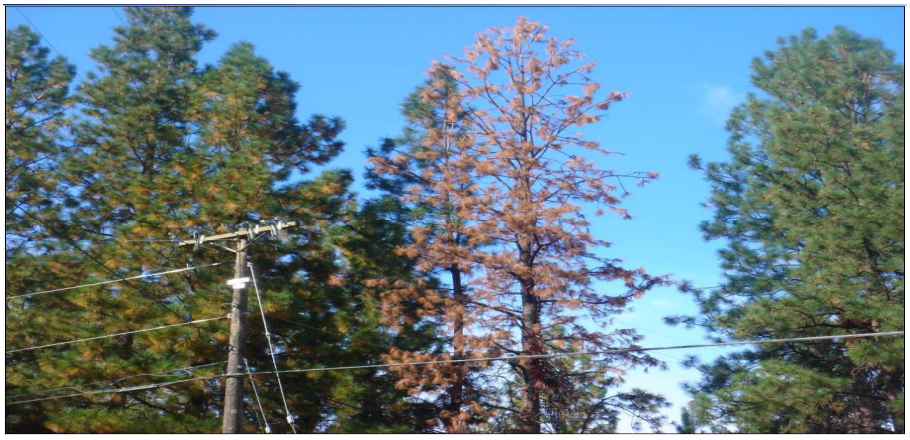
Transmission Sustaining Table 3.2 (Page 55)

		2009	2010
		($000s)	
1	Transmission Line Urgent Repairs	288	293
2	Right-of-Way Easements	311	345
3	Right-of-Way Reclamation	550	602
4	Transmission Pine Beetle Hazard Allocation	1,218	821
5	Transmission Condition Assessment	427	496
6	Transmission Line Rehabilitation	1,639	1,888
7	Switch Additions		132
8	20 Line Rebuild	1,943	1,540
9	27 Line Rebuild	648	642
10	30 Line Lake Crossing Rehabilitation		350
11	Total	7,024	7,109

Pine Beetle Kill Hazard Trees

Removal of Trees killed by Pine Beetle to Minimize Risk:

- **Falling Trees can break Conductor**
- **Downed Conductor can remain energized**
- **Fire and Electrocution Risk**
- **Negatively impacts Reliability**



Transmission Line Rehabilitation

- Remediation of defects identified in previous years' assessments
- In 2009/10 rehab lines assessed during 2008/09
- Also includes pole stubbing, replacement of poles or cross-arms and other miscellaneous repairs
- Project cost estimates based on historical information
- Required to ensure both safety and reliability

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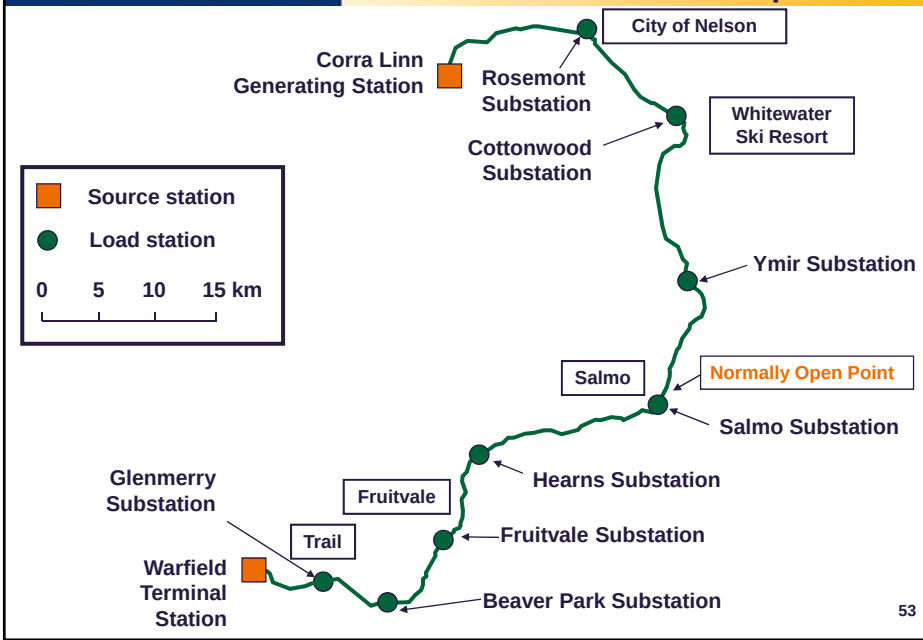
20 Line (20L) and 27 Line (27L) Transmission Map



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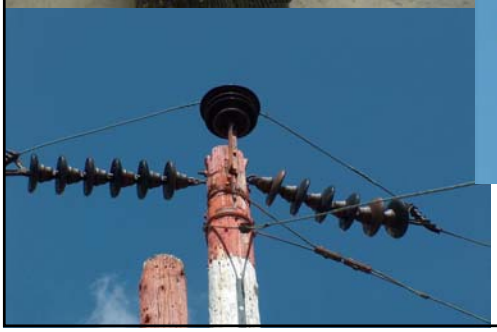
Transmission Rehabilitation

20L & 27L 63 kV Transmission Line Rebuilds

- 20L and 27L originally constructed in 1930/31
- 20L = 46 km / about 194 structures to be replaced
- 27L = 57 km / about 111 structures to be replaced
- Based on detailed Engineering assessments

20L and 27L Condition Issues



2009/10 Transmission Projects

Questions / Comments

Next

2009/10 Stations Projects

Paul Chernikhowsky
Chief Planning Engineer

August 12, 2008
Kelowna, BC

Stations Sustaining
Table 3.3 (Page 66)

		2009	2010
		($000s)	
1	Station Assessments & Minor Planned Projects	620	680
2	Ground Grid Upgrades	572	
3	Station Urgent Repairs	473	448
4	Bulk Oil Breaker Replacement Program		292
5	Transformer Load Tap Changer Oil Filtration Project	32	64
6	Slocan City-Valhalla Substation Upgrade	2,173	
7	Passmore Substation Upgrade		1,987
8	Pine Street Substation –Distribution Breaker Replacement	345	
9	Princeton Substation Distribution Recloser Replacement		1,513
10	Joe Rich Transformer Protection Upgrade		404
11	Creston Substation Protection Upgrade	488	
12	Total	4,703	5,388

Station Condition Assessment

Condition Assessments

- **Conduct an assessment of all FortisBC Stations over a ten year Period**
  - **Visual Inspection**
  - **Infra Red Scan**
  - **CMMS Data Collection**
  - **Identify Future Minor Projects**

Assessment Information:

Operational Issues
Environmental and Safety
Substation Standards
Reliability and Future Use

Station Minor Projects

Minor Projects

- **Replace DC Protection systems**
- **Replace Gap-Type Silicon Carbide Arrestors**

Replace DC Protection Systems

- DC protection batteries are critical substation components
- Directly impact the safe and reliable operation of protection systems
- Ensures that power is always available to operation protection equipment when needed

Existing batteries requiring replacement

New replacement batteries

Replace DC Protection Systems

Criteria for Replacement:

1. Gel Type banks not kept in temperature controlled environment or older than 10 years; and

2. Any bank below 70% capacity or older than 20 years.

2009	2010
Glenmerry	Tarrys
Cascade	Glenmore
Playmor	Hollywood
	OK Mission

Replace Gap-Type Silicon Arrestors

Replace aging and failing Gapped Silicon Carbide Arresters with modern MOV arresters

Replace Gap-Type Silicon Arrestors

- **Failures can result in arrester explosion**
- **Replacements will improve:**
  - work site safety
  - equipment protection from lightning and switching surges

Substation Grounding

Normal operating conditions ground potential ~ 0 Volts

Ground Potential Rise (GPR) is caused by

- Switching operations
- Fault on the system

Consequence:

- Voltages imposed on grounded metallic objects

Impact:

- Public and employee safety

FORTISBC
Ground Grid Upgrades
Castlegar

Substation Grounding

Proposed Solution for Castlegar Substation:

- **New ground grid**
- **Ground rods**
- **Ground wells**
- **Additional insulating gravel**

Slocan City - Valhalla Substation Upgrade

Slocan City Substation

- **Legacy substation built to serve the mill**
- **Transformer Purchased in 1965**
- **Transformer Weeping Oil**
- **30 Meters from Springer Creek – floodplain area**

Slocan City - Valhalla Substation Upgrade

Slocan City - Valhalla Substation Upgrade

Slocan City –Proposed Solution

- Valhalla Substation is located 1 kilometre away
- Install 10 MVA refurbished Transformer at Valhalla
- Transfer Load to Valhalla

Passmore Substation Upgrade

19 Line

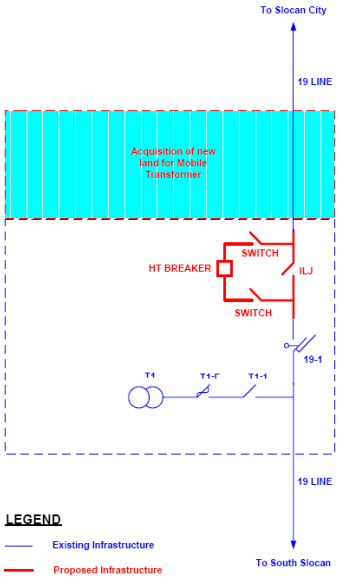
- **48 km radial 63-kV from South Slocan Generating Station**
- **Supplies:**
  - **Passmore Substation**
  - **Valhalla Substation**
  - **Slocan City Substation**
- **Experiences frequent and long duration outages**
- **Causes unnecessary outages to Passmore Substation**
- **Also: station is currently too small to house the mobile substation**

Passmore Substation Upgrade

Proposed solution:

- **Install 63-kV circuit breaker**
- **Protection and control equipment**
- **Remote communications**
- **Expand site to allow mobile installation**

- **Ensures that faults north of Passmore do not affect that station**
- **Allows safe installation of the mobile substation for maintenance**



Princeton Substation Recloser Replacement

- Replacement necessary for increased reliability and safety.
- Under-rated for fault duty
- Two units are at end-of-life
- Station infrastructure is in poor condition

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Princeton Substation Recloser Replacement

Princeton Transformer Replacement Project (completed in 2007)

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2009/10 Stations Projects

Questions / Comments

Next

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Telecommunications, SCADA, Protection & Control

Paul Chernikhowsky
Chief Planning Engineer

August 12, 2008
Kelowna, BC

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Telecommunications

This does not include:

Corporate communications

- Desk phones and faxes
- Cell phones
- Wide-area network (WAN)
- Computers for business purposes
- SCADA Master Station hardware and software

Telecommunications

This does include:

- Teleprotection (relay to relay communications for system protection)
- SCADA communications for the System Control Centre
- Remote access to substation metering, relaying and recording equipment
- Remedial Action Schemes (wide-area protection systems)

There are potential synergies – communications infrastructure can be used to provide corporate communications for IT group

Telecommunications

Communications between:

- 11 Terminal Stations
- 4 Generating Stations
- 49 Distribution Stations
- 12 Mountain-top Radio Repeater Sites
- 6 Business Offices

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Telecommunications Growth
Table 5.1 (Page 101)

	CPCN Approved	Expenditure to Dec 31\08	2009	2010	Future	Total
		($000s)				
GROWTH						
Distribution Substation Automation Program	C-11-07	1,982	1,338	1,438	1,621	6,379
SUSTAINING						
Harmonic Remediation			117	119		236
Protection Upgrades			448	508		956
Communication Upgrades			299	111		410
SUBTOTAL SUSTAINING			864	738		1,602
TOTAL		1,982	2,202	2,176	1,621	7,981

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Distribution Substation Automation, Metering and Communications

- **CPCN approved in 2007**
- **Multi-year program to improve protection, communications and monitoring at legacy substations**
- **Applies technology that is already included in new substation designs**
- **Main components:**
  - Metering (power quality, data logging)
  - Communications (SCADA visibility, remote access)
  - Upgrading protection to modern standards

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Protection Upgrades

Why upgrade?

Increased safety and reliability

- Older devices fail more frequently
- No spare parts
- Self-monitoring

Faster restoration

- SCADA monitoring (real-time)
- Direct crews to the correct location
- Remote access for interrogation

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Protection Upgrades

Why upgrade?

Protection Upgrades

Continuation of upgrade programs started in late 1990s

- **Kootenay 230 kV System Development**
- **Vaseux Lake / South Okanagan**
- **Kelowna Capacity Increase**
- **Okanagan Transmission Reinforcement**
- **Distribution Substation Automation Program**

Protection Upgrades

Transformer Differential Relay Replacements
2009 Projects:

- **Hollywood T1 and T3**
- **Sexsmith T1**

2010 Projects:

- **Saucier T1**
- **Summerland T2**
- **Westminster T1 and T2**

Out with the old…

- By the end of 2011 all T&D protection equipment will be microprocessor-based relays
- No electromechanical relays left in service
- What does this mean for the customer?

Improved safety
Improved reliability
Reduced operating costs

Telecommunications, SCADA, Protection & Control

Questions / Comments

2009/10 Distribution Projects

Marko Aaltomaa / Gary Williams
Distribution Planning Engineers

August 12, 2008
Kelowna, BC

2009/10 Distribution Projects

Distribution Growth

- Extension of service to new customers
- Capacity improvements to meet normal load growth.

Distribution Sustaining

- Planned rehabilitation
- Urgent and unplanned rebuilds

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Distribution Growth
Table 4.1 (Page 78)

Table 4.1
Distribution Projects Expenditures

		Previously Approved	2009 Total	2010 Total
			($000s)	
1	GROWTH			
2	New Connects - System-wide		9,788	10,670
3	Distribution Growth Projects			
4	Glenmore -New Feeder		788	
5	Airport Way Upgrade Feeder			1,551
6	Hollywood Feeder 3- Sexsmith Feeder 4 Tie			365
7	Christina Lake Feeder 1 Upgrade		608	489
8	Beaver Park-Fruitvale Tie			1,227
9	Small Growth Projects			137
10	Unplanned Growth Projects		974	994
11	TOTAL GROWTH		12,158	15,433

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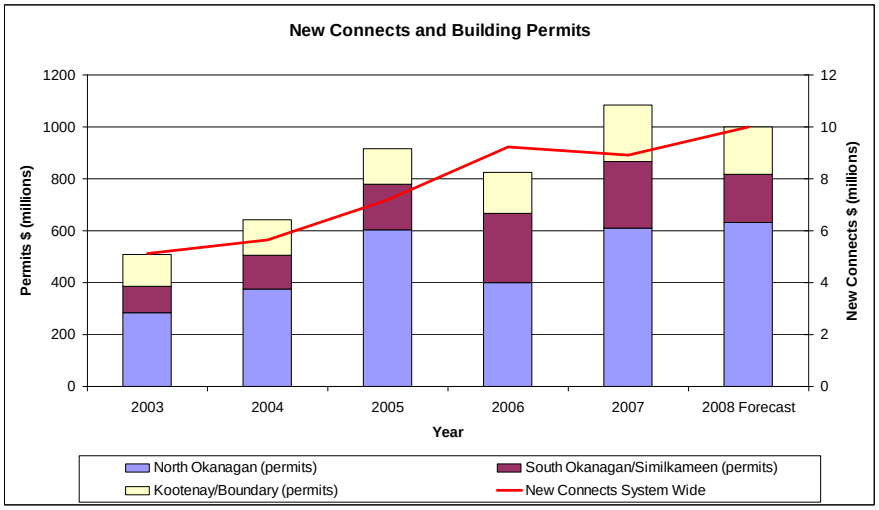
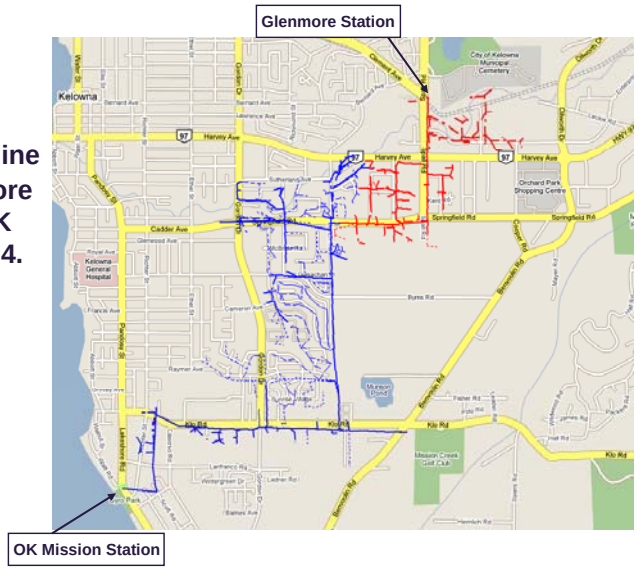
Building Permits and New Connects, System-wide



Glenmore Substation - New Feeder

Issue – Forecast line overload on Glenmore Feeder No. 1 and OK Mission Feeder No. 4.



Glenmore Substation - New Feeder

Project - build feeder into the Spall Road-Dickson Avenue Area.

Benefits - splitting load ensures distribution capacity and quality of service to Kelowna customers Springfield-Spall areas

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Airport Way Capacity Upgrade

Issue - Insufficient Capacity

Project - Replace No. 2 Copper U/G Cable With No. 750MCM U/G Cable

Benefits - Capacity
To accommodate forecast load and future expansion.

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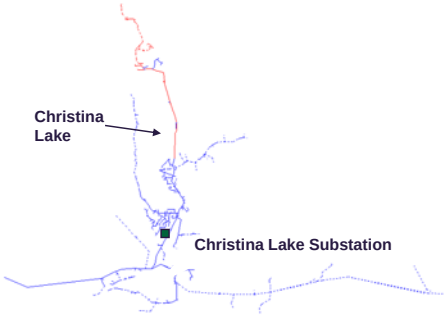
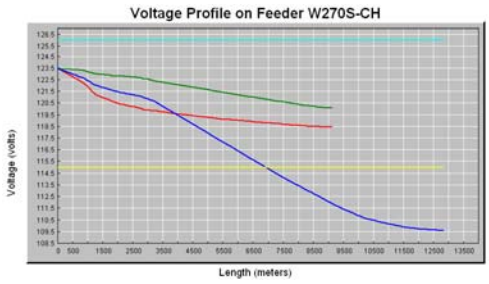
Christina Lake Feeder 1 Capacity Upgrade

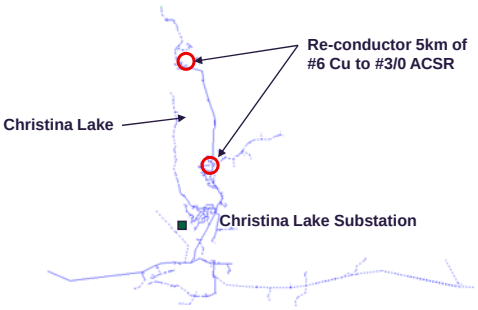
Issue - low voltage, overload, and poor condition



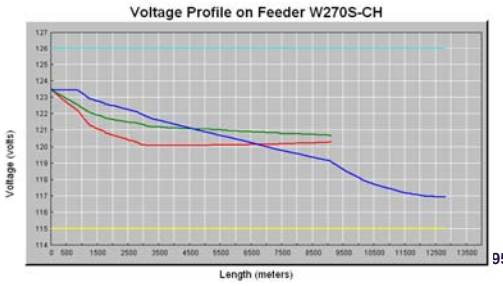


Christina Lake Feeder 1 Capacity Upgrade

Project - upgrade, re-conductor and phase balance line north of substation and east of Christina Lake

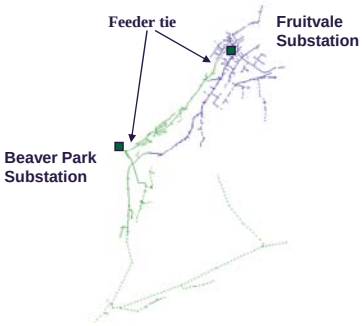


Benefits - quality voltage, safety and reliability for customers along Christina Lake

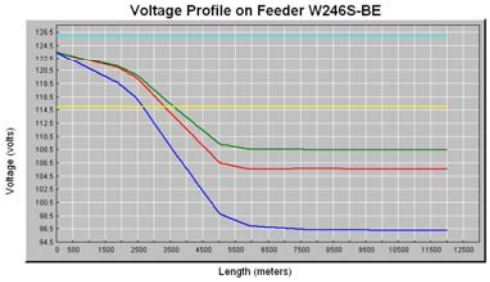


Beaver Park – Fruitvale Feeder Tie

Issues - Station Load, Transfer Capability, and Reliability



Existing voltage profile with Fruitvale load transferred to Beaver Park.



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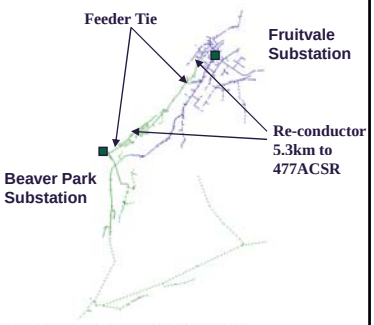
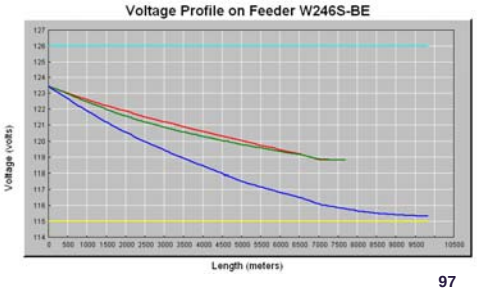
Beaver Park – Fruitvale Feeder Tie

Project - Upgrade 5.3 kilometers of line on Beaver Park Feeder 2 and Fruitvale Feeder 1.



Benefits - Station Load transfer capability and improved reliability for customers in the Fruitvale, Montrose, Trail Area.



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Distribution Sustaining Table 4.1 (Page 78)

Table 4.1
Distribution Sustaining Projects Expenditures

		Previously Approved	2009 Total	2010 Total
13	Distribution Sustaining Programs and Projects			
14	Distribution Line Condition Assessment		599	667
15	Distribution Line Rehabilitation		3,124	3,470
16	Distribution Right-of-Way Reclamation		621	646
18	Distribution Pine Beetle Hazard Allocation		722	551
19	Distribution Line Rebuilds		1,178	1,167
20	Small Planned Capital		668	747
21	Forced Upgrades and Line Moves		1,255	1,461
22	Distribution Urgent Repair		1,911	1,805
23	PCB Program	G-52-05	1,073	1,117
24	Aesthetic and Environment Upgrades	G-58-06	100	100
25	Copper Conductor Replacement Program	CPCN to be filed	4,798	6,586
26	TOTAL SUSTAINING		16,049	18,317

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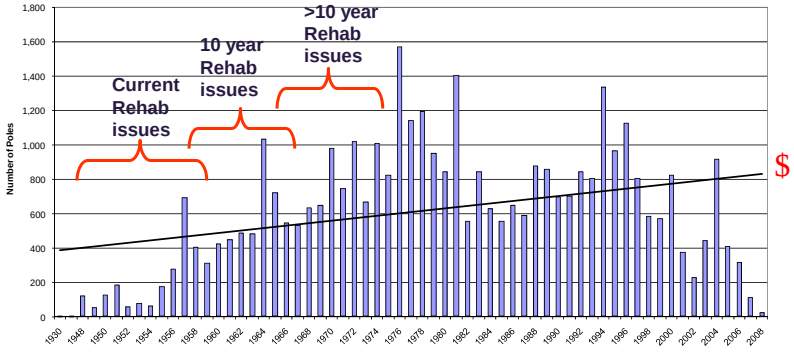
Distribution Sustaining

Distribution Pole Age Profile



Distribution Sustaining Capital is forecast to increase over present levels in future years due to the age of the plant.

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Distribution Sustaining

- **Condition Assessment**
  - **Rehabilitation**
    - **Rebuilds**

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Distribution Line Condition Assessment

Distribution Assessment

The program;

- **provides a detailed assessment of each feeder**
- **based on an eight year cycle**
- **tests and treats poles**

Proactively manages;

- **risk to employee and public safety**
- **life extension of distribution plant**

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Distribution Line Rehabilitation

Distribution Rehabilitation

Rehabilitation of distribution lines assessed in previous years condition assessment project.

Includes;

- **Stubbing poles**
- **Replacing poles**
- **Replacing crossarms**
- **Guy wire repair**
- **Replace Hot Tap Connectors**
- **Other defects found during assessments**

Benefits to customer

- **Employee and public safety**
- **Service reliability**

Distribution Line Rebuilds

Rebuild

Project to replace sections of deteriorated lines.

- **Line sections in general poor condition identified by annual or detailed line patrol or day to day operations.**
- **Assessed by Engineering and Planning for consistency and priority.**
- **NOT based on feeder level reliability but rather on localized safety/reliability of the section identified.**

Benefits

- **Employee and public safety**
- **Service reliability**

Small Planned Capital

Project captures off-cycle work required to keep the distribution lines safe and reliable.

- **Operational and safety concerns on the distribution system related to damage, clearance problems and aging equipment.**

Forced Upgrades and Line Moves

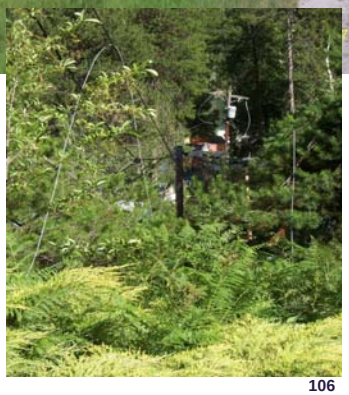
Project captures capital upgrades driven by third party requests.

- Relocation of distribution lines due to highway/road widening initiated by Ministry of Transportation / municipalities.
- Line moves driven by insufficient land rights located on private property.

Distribution Urgent Repair

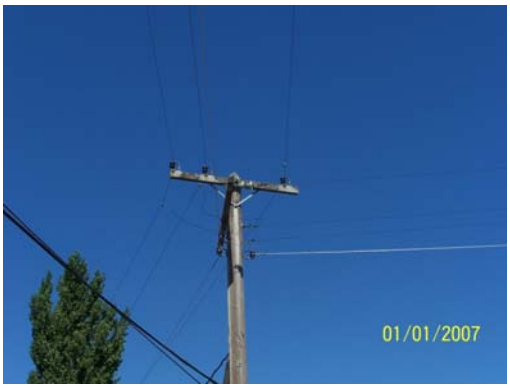
Project for repair or replacement of failed equipment.

- Failures on the distribution system due to weather, defective equipment, animals, vandalism, vehicle collisions, and human error.
- Can cause outages or present risk that must be addressed in an expedient manner to ensure employee and public safety and service continuity is maintained.



Copper Conductor Replacement Program

- Approximately 500 kilometres of No. 8, No. 6, & No. 90 MCM Copper to be removed
- All in excess of 50 years old
- Approximately 200 failures in the last five years
- Failures have resulted in energized lines on the ground
- This is a ten year program
- A CPCN Application has been filed



Distribution Projects

Questions / Comments

Next

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General Plant

Tim Swanson
Manager, Information Systems

August 12, 2008
Kelowna, BC

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General Plant
Table 7.1 (Page 116)

	General Plant	CPCN filed	Exp Dec 31\08	2009	2010
			($000s)		
1	Vehicles			1,326	2,868
2	Advanced Metering Infrastructure	Dec. 19, 2007	568	16,492	20,240
3	Metering Changes to Uninstalled Meter Inventory			526	559
4	Information Systems			5,167	4,499
5	Telecommunications			105	106
6	Buildings			3,248	1,981
7	Furniture and Fixtures			347	393
8	Tools and Equipment			572	575
9	TOTAL		568	27,783	31,221

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Vehicles

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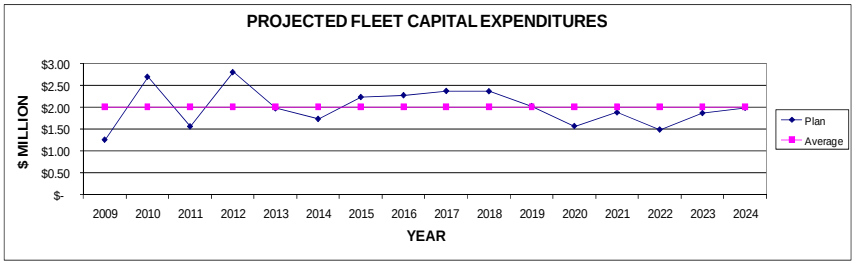
Long Term Planning

- **Fifteen year outlook for Vehicles**
- **The average annual expenditure is $2.01 million**



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Hybrid Low Emission Vehicles

- Six passenger vehicles in service by Fall 2008
- One single bucket aerial device to be piloted in 2009 as rental/demonstrator
- One single bucket aerial device budgeted to purchase in 2010
- More Hybrids will be purchased as technology advances and as they can be matched to practical applications in the organization

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Vehicle Purchases
Table 7.3 (Page 118)

	Category	No. of Units 2009	No. of Units 2010
1	Heavy Fleet Vehicles	3	6
2	Service Vehicles	2	5
3	Passenger Vehicles	3	7
4	Off-Road Vehicles\Trailers	1	6
5	Total Units	9	24
6	Total Replacement Cost ($000s)	1,226	2,768
7	Contingency ($000s)	100	100
8	Total Cost ($000s	1,326	2,868

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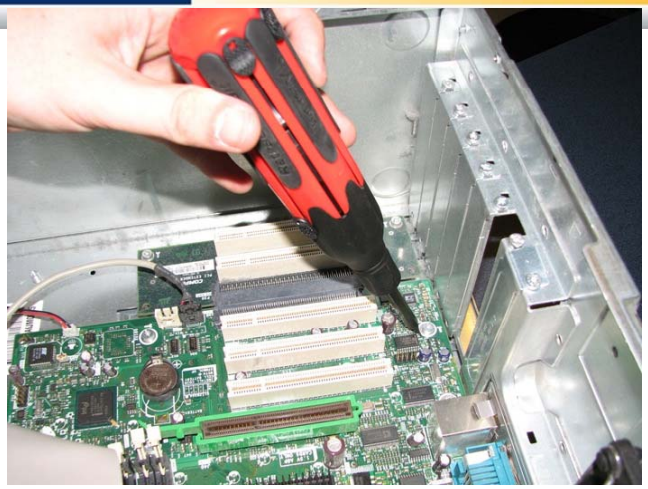
Information Systems



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Advanced Metering Infrastructure

- **Written CPCN process complete June 30, 2008**
- **Cost benefits**
- **Customer benefits**
- **Environmental benefits**

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Information Systems
Table 7.4 (Page 121)

		2009 Total	2010 Total
		($000s)	
1	Infrastructure Upgrade	789	794
2	Desktop Infrastructure Upgrade	842	847
3	SAP & Operations System Enhancements	947	953
4	AM/FM Enhancements	211	423
5	Customer Service Systems Enhancements	789	794
6	SCADA Enhancements	790	688
7	Distribution Design Software	799	
8	TOTAL	5,167	4,499

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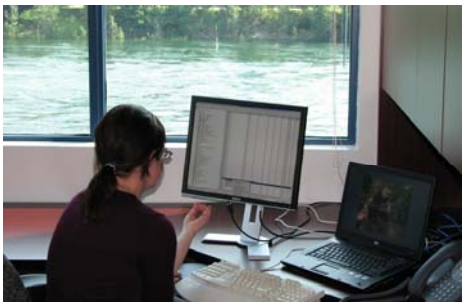
Infrastructure Upgrades

- Maintain up to date productive infrastructure
- Balance value and productivity

Business System Enhancements

- Enhancing existing systems – SAP, CIS, ESRI, etc.
- Based on business requirements and efficiency



SCADA Enhancements

- SCADA systems enhancements
- Integral to safety and reliability

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Distribution Design Software

- Integrated
- Efficient

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Basis for IT/Business Capital Requirements

- Reliable and scalable core systems & infrastructure

ESRI

Survalent Technology

hp invent

ORACLE

SAP

IBM

Microsoft

Buildings

Buildings
Table 7.5 (Page 130)

	Location	Project	2009	2010
			($000s)	
1	All	Facility Upgrades	2,637	1,368
2	All	Facilities Emergency	88	89
3	All	Construction Projects Requirements	218	219
4	All	Security System upgrades	305	305
5	Total		3,248	1,981

Major Facility Upgrade Initiatives

- **Safety & Security**
- **Environmental/Energy Conservation**

Tools and Equipment

2009 - $0.572 Million

2010 - $0.575 Million

General Plant

Questions / Comments

Next

Demand Side Management

Mark Warren
Director, Customer Service

August 12, 2008
Kelowna, BC

Demand Side Management Environment

BC Energy Plan

Bill 15 Utilities Commission Act Amendments

Customer expectations

Demand Side Management

Expenditure and GW.h Savings 2008-10

Sector	2008 Approved Plan ($000)	2008 Plan Savings (GW.h)	2009 Plan Expenditure ($000)	2009 Plan Savings (GW.h)	2010 Plan Expenditure ($000)	2010 Plan Savings (GW.h)
Residential	1,023	8.4	1,391	10.7	1,516	12.1
General Service	754	9.1	1,287	11.6	1,380	12.1
Industrial	200	2.0	345	3.0	388	3.4
Plan/Evaluate/educate	378	-	644	-	667	-
Total	2,355	19.5	3,668	25.3	3,952	27.6
Total (Net of Tax)	1,498		2,568		2,806	

2009/10 Activities

- Continuation of existing programs
- New Programs Residential
- New Programs General Service
- New Programs Industrial
- Conservation Education

- DSM Strategic Plan

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Demand Side Management

Questions / Comments