FortisBC Community Consultation Workshop

Natural gas & electric long term resource planning

October 2016

Energy at work FORTIS BC™

Safety Message

- Identify the location of emergency exits
- Determine the muster location in case we have to evacuate the building
- Dial 911 for emergencies
- Earthquake Awareness: October 20 at 10:20 am marks the Great BC Shakeout

Please note

- Your contributions may be used for formulating our regulatory submission
- As such, your feedback may become public during the regulatory process
- We will not attribute statements to individual workshop attendees

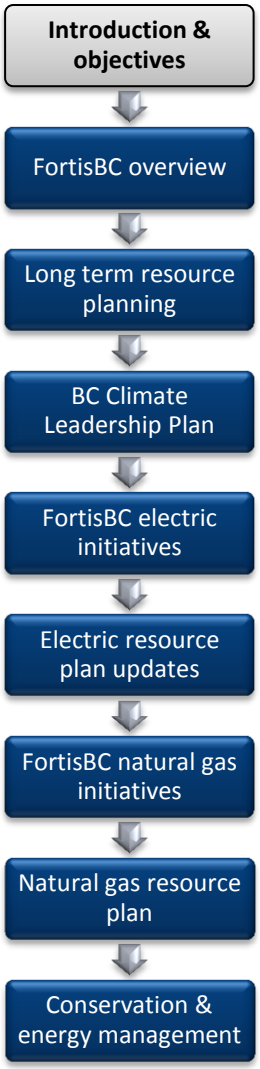
What we hope to achieve today

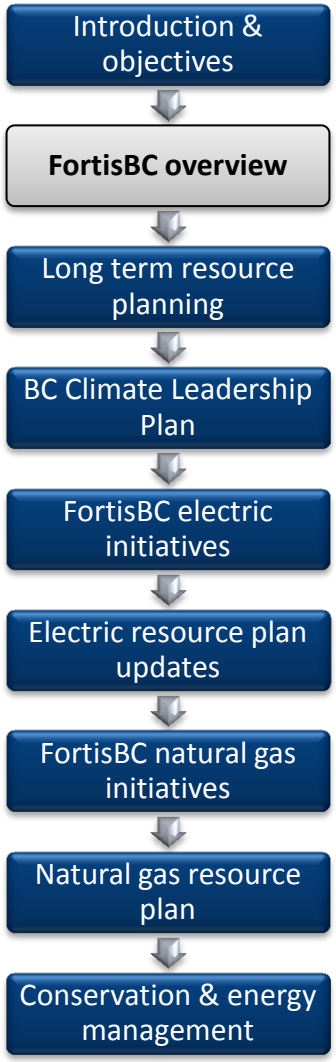
1. Obtain your feedback on long term resource planning and conservation & energy management issues

2. Provide a better understanding of the energy planning environment

3. Raise awareness of local community initiatives and natural gas for transportation, renewable natural gas, and conservation & energy management programs

4. Identify community opportunities and concerns





Energy at work

FORTIS BC™

FortisBC: delivering natural gas, electricity and piped propane

- More than 1.1 million customers
- Serving 135 communities across B.C.

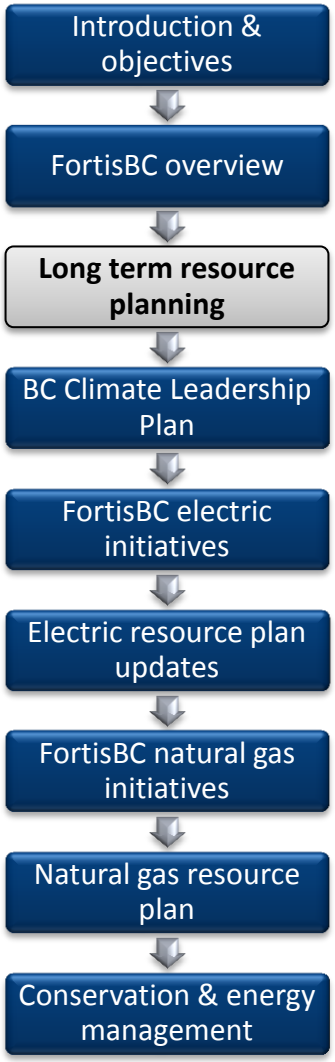
Today's focus: FortisBC's combined service territory

Community engagement

FORTIS BC™

We're dedicated to giving back where we live and work.

- Community Investment Program
- Youth Energy Efficiency and Safety Education Programs
- Residential Energy Efficiency Works (REnEW) Program
- Aboriginal Skills 3G: BC



Energy at work

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Thank you for providing resource planning feedback in 2015

- Street lights and LEDs
- Electric vehicle infrastructure
- FortisBC and solar photovoltaics
- Energy efficiency and conservation

Natural gas vs. electric resource planning

Electricity

Generation | Market Purchases | Transmission & Distribution | Delivered to Customers | Energy Efficiency & Conservation





Natural Gas

Market Purchases | Distribution | Delivered to Customers | Energy Efficiency & Conservation

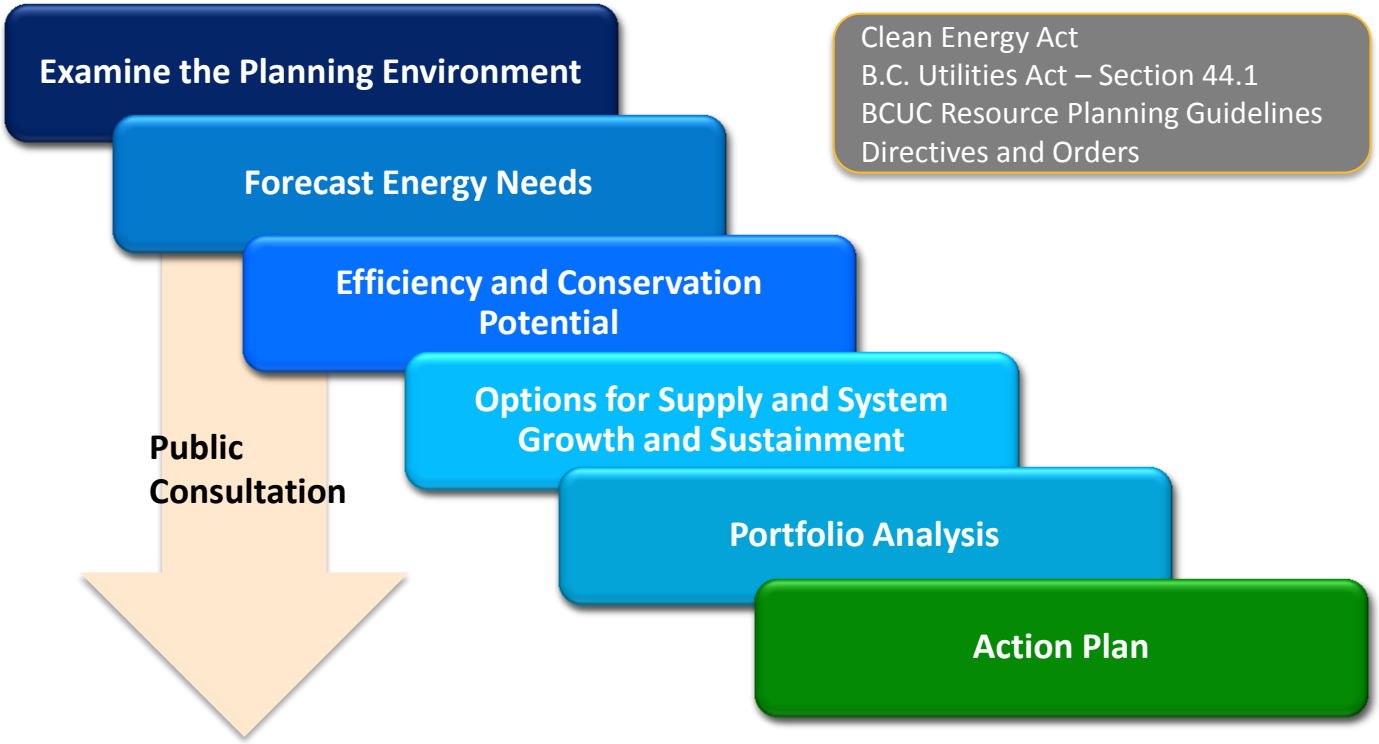



Resource Planning Objectives

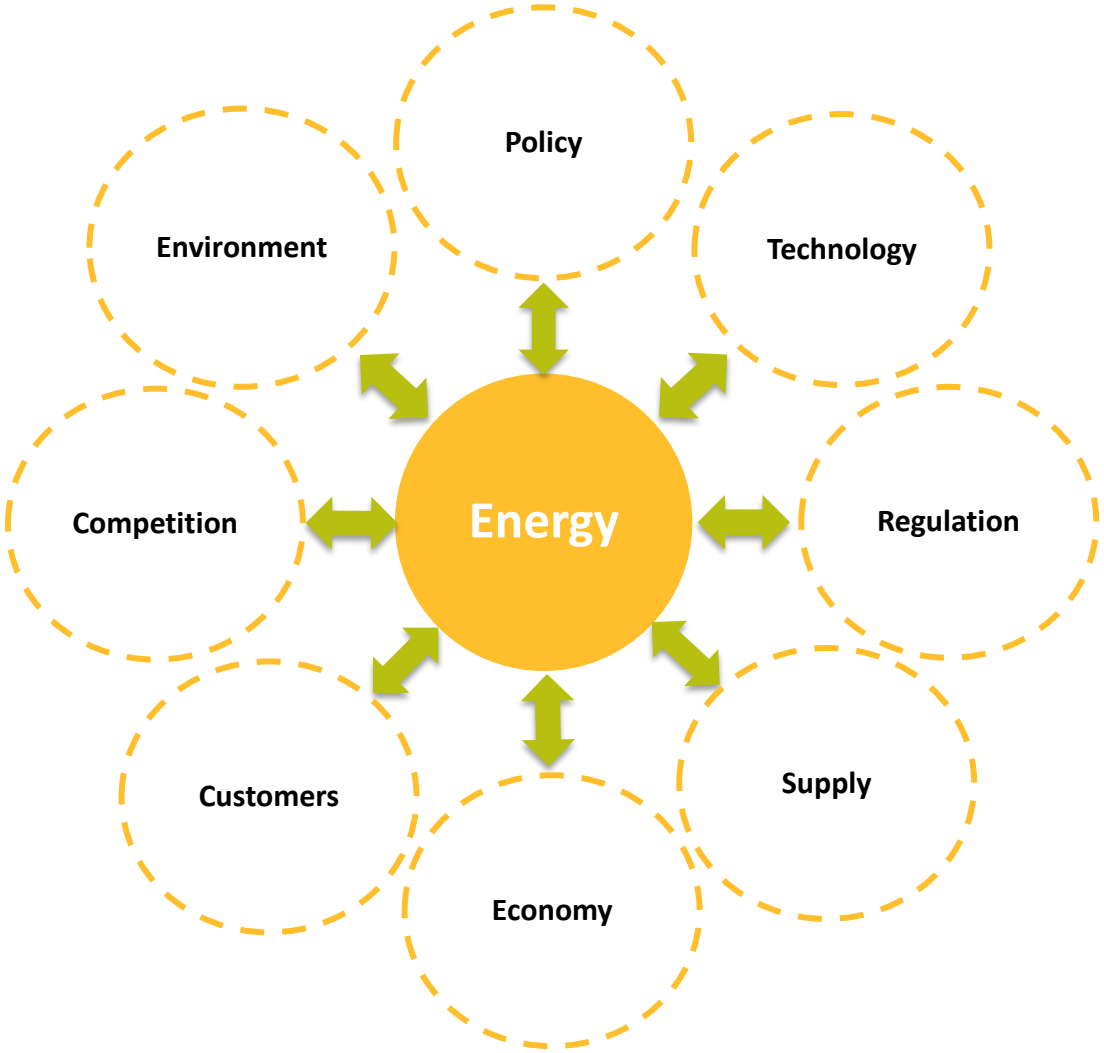
- Ensure cost effective, secure and reliable energy for customers
- Provide cost-effective energy efficiency and conservation initiatives
- Ensure consistency with provincial energy objectives (e.g. applicable *Clean Energy Act* objectives, Climate Leadership Plan)

The resource planning process

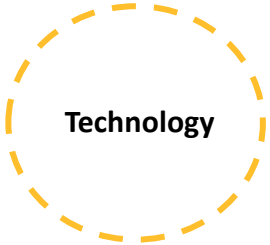
What resources must FortisBC have in place to supply customers' energy needs safely, reliably and cost-effectively over the next 20 years?



Planning environment: the factors that influence the analysis



Examples of uncertainty across the planning horizon



New end-use technologies

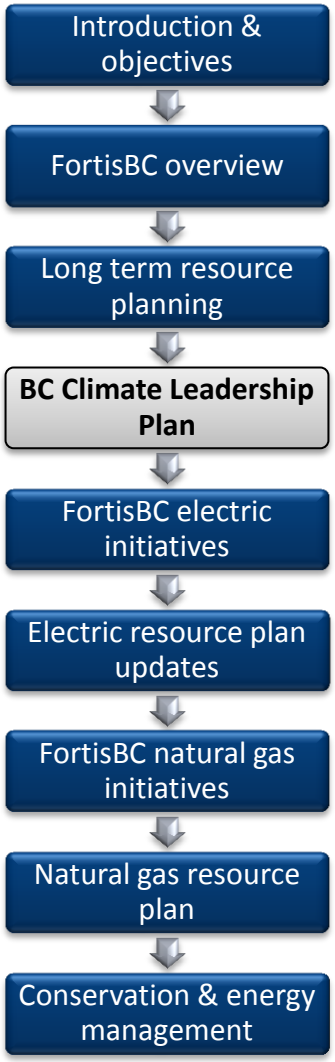
- Heat pumps reduce gas use, increase electricity use
- Higher efficiency appliances and industrial processes
- Electric vehicles present potential new electricity load

Shifting policy environment

- New activism at multiple levels of government
- Impacts to demand from transportation (gas and electricity)
- Changing equipment and building performance standards

Customers interacting differently with the energy grid

- Distributed generation (e.g. localized solar and geothermal)
- Producing and choosing renewable natural gas (RNG)



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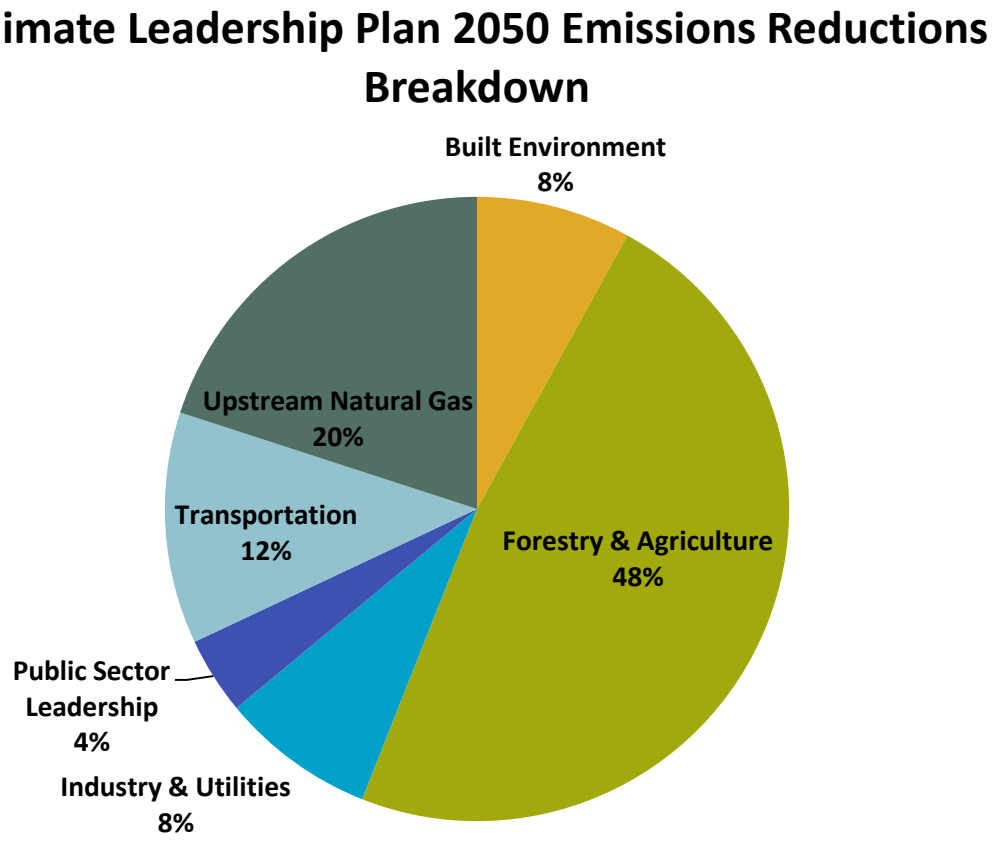
Planning impacts focus on upstream resources, transportation and built environment



Planning impacts are possible from actions in upstream gas and electricity supply

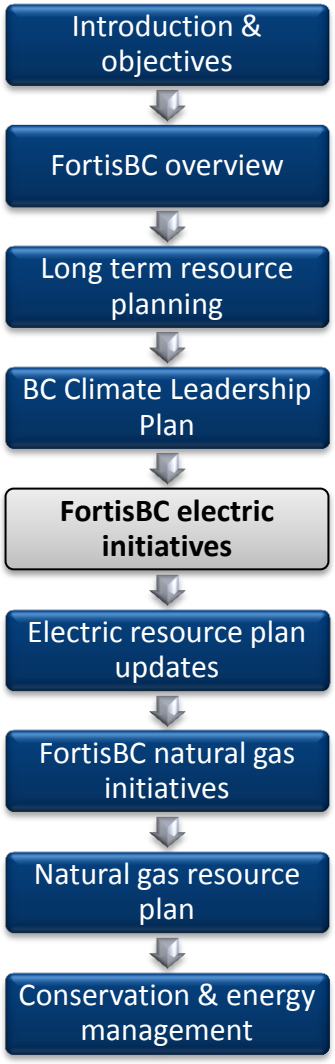
Goals & Actions	Utility Impact	Planning Impact
Reduce natural gas upstream methane emissions by 45 per cent by 2025	Gas	Cost of Gas GHG Intensity
100 per cent target for BC Hydro clean electricity procurement	Electric Gas	Cost of Electricity

Planning impacts are likely from transportation actions

Goals & Actions	Utility Impact	Planning Impact
Amend regulations - enable utilities to double incentives for commercial fleets switching to natural gas if they switch to RNG	Gas	Natural gas for transportation load
Affirmed Greenhouse Gas Reduction Regulation amendment – enable utility incentives for marine, mining, remote power generation	Gas	Natural gas for transportation and regional LNG load
Expand Clean Energy Vehicle Program	Electric	Electric load
Enable regulations for vehicle charging infrastructure	Electric	Electric load

Planning impacts are also likely for actions in the built environment

Goals & Actions	Fuel Impact	Planning Impact
DSM Regulation Amendment – increase C&EM incentives by at least 100 per cent	Gas	C&EM program gas savings
Equipment performance standards	Gas Electric	Use per customer
Building code updates & stretch codes	Gas Electric	Use per customer Customer counts



Energy at work

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Advanced Metering Infrastructure

- Network deployment and optimization: July 2014 – October 2016
  - 169 routers
  - 263 range extenders
- Mass meter deployment: August 2014 – February 2016
  - 130,500 AMI meters installed; including 2,800 radio-off AMI meters
- Project completed on schedule and under budget
- Automated meter readings began August 2015
  - Fewer ‘estimates’; 99.5% successful automated reads in 2016
  - Monthly billing, consolidated billing and “pick your bill date” available
- Future Related Projects
  - Outage and Workforce Management
  - Customer interval data online

Kootenay Operations Center

- 100 Employees moving to the KOC in Ootischenia from South Slocan, Castlegar District Office, Warfield and Trail.

- Construction underway, expected to be complete in Q3 2017

Electric Vehicles

- Electric vehicle scenario developed for long term planning
- FBC providing financial support for L2/L3 charging infrastructure
- FBC-owned Level 2 station installed in downtown Kelowna in 2016
- 3 DC fast charging stations installed in FBC service territory
- Application in for 6 additional DC fast charging stations in FBC service territory
- Partnering with CEA and municipalities in Kootenays on L2/L3 infrastructure for Hwy 3 corridor
- www.fortisbc.com/Electricity/Environment/ElectricVehiclesForBC

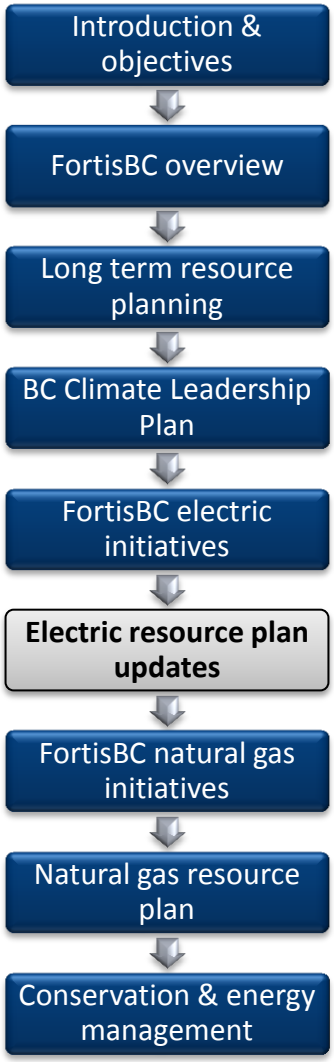
DC Fast Charging Station Map

FBC Solar Survey Results – Roof Top Solar

Consider installing rooftop solar in the next 3 to 5 years	Residential	Commercial
Likely to Consider	**41%**	**51%**
Save money	81%	84%
GHG emission reductions	60%	59%
Energy independence	48%	51%
Resource preservation	48%	47%
Energy use reduction	47%	52%
Safe reliable source of energy	42%	50%
Unlikely to Consider	**47%**	**39%**
Too Expensive	60%	56%
Too long to pay back	43%	42%
Waiting for tech improvements	24%	-
Don't think it will save money	22%	-

FBC Solar Survey Results – Community Solar

Consider joining a Community Solar Project in the next 3 to 5 years	Residential	Commercial
Likely to Consider	**42%**	**41%**
Save money	69%	73%
Part of a green community	64%	69%
GHG emission reductions	57%	49%
Resource preservation	53%	48%
Energy use reduction	37%	39%
Affordability of joining	36%	41%
Energy independence	-	39%
Unlikely to Consider	**42%**	**45%**
Too Expensive	46%	49%
Don't think it will save money	33%	33%
Waiting for tech improvements	27%	37%
Reliability Concerns	17%	-
It won't work at the home/business	15%	30%



Energy at work

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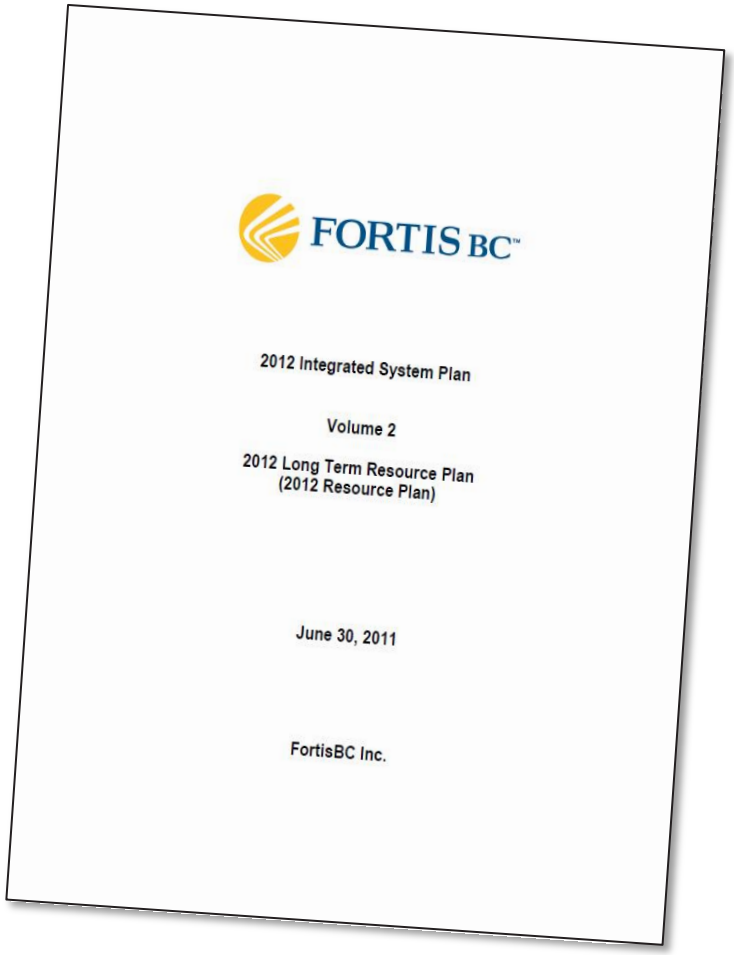
Long Term Electric Resource Plan

- FortisBC submitted the last Long Term Resource Plan to the BCUC in June 2011
- BCUC accepted the plan in August 2012
- FortisBC plans to submit the next one November 30, 2016



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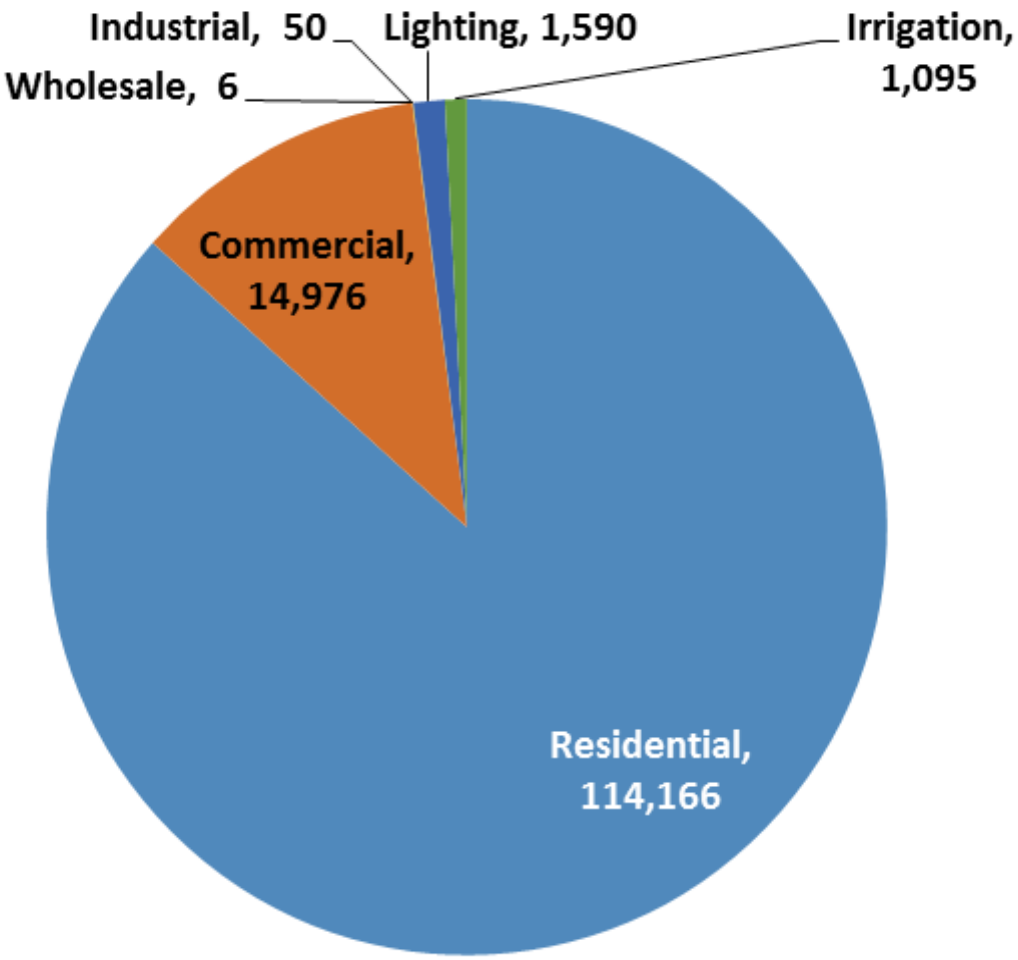
Customer Base (Number of Customers)



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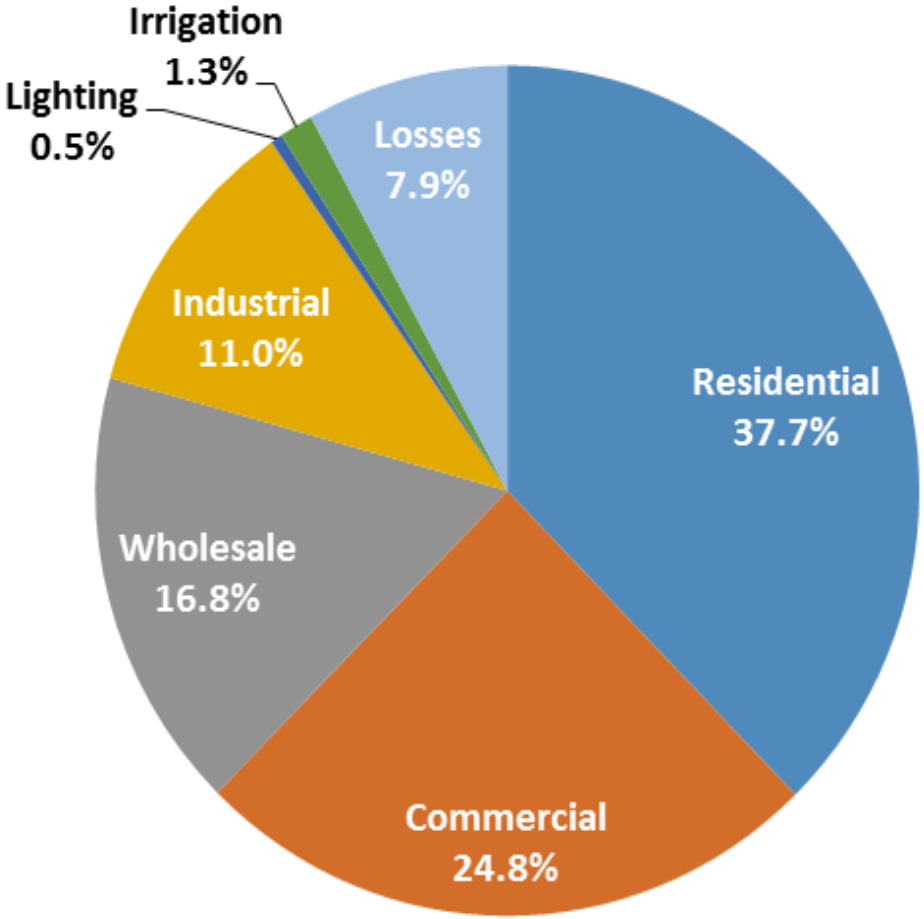
Customer Base (GWh)



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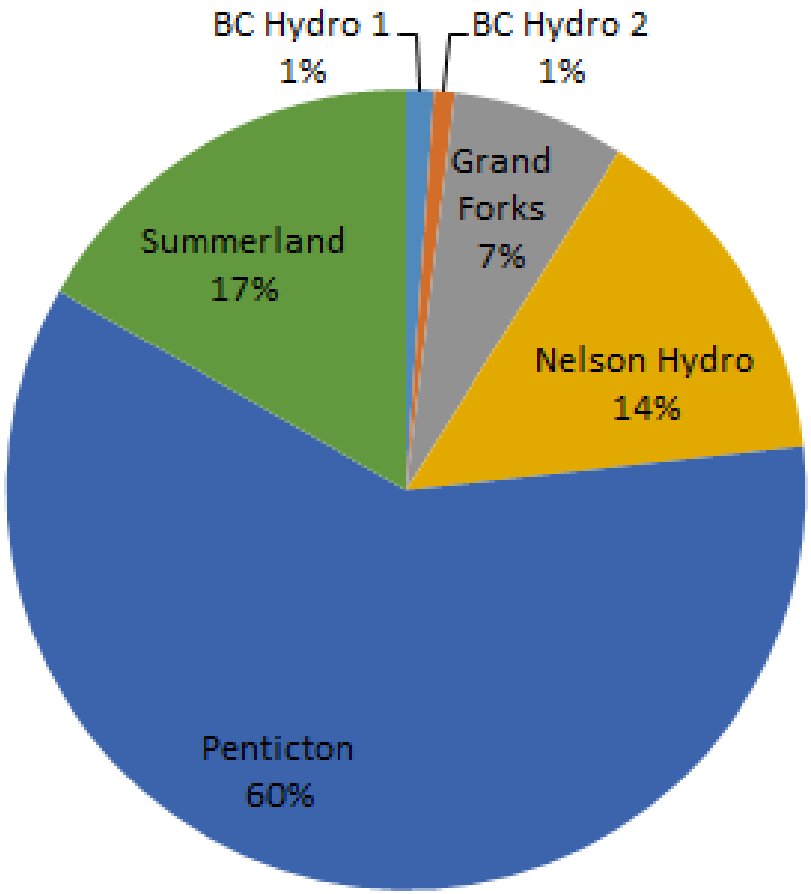
Wholesale Customers



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Energy vs. Capacity

Energy

- the electricity produced or used over a period of time (e.g. a year)
- is analogous to an ***Odometer*** reading
- usually measured in **GWh**

Capacity

- the instantaneous system electricity demand at any given time
- is analogous to a snapshot ***Speedometer*** reading
- usually measured in **MW**

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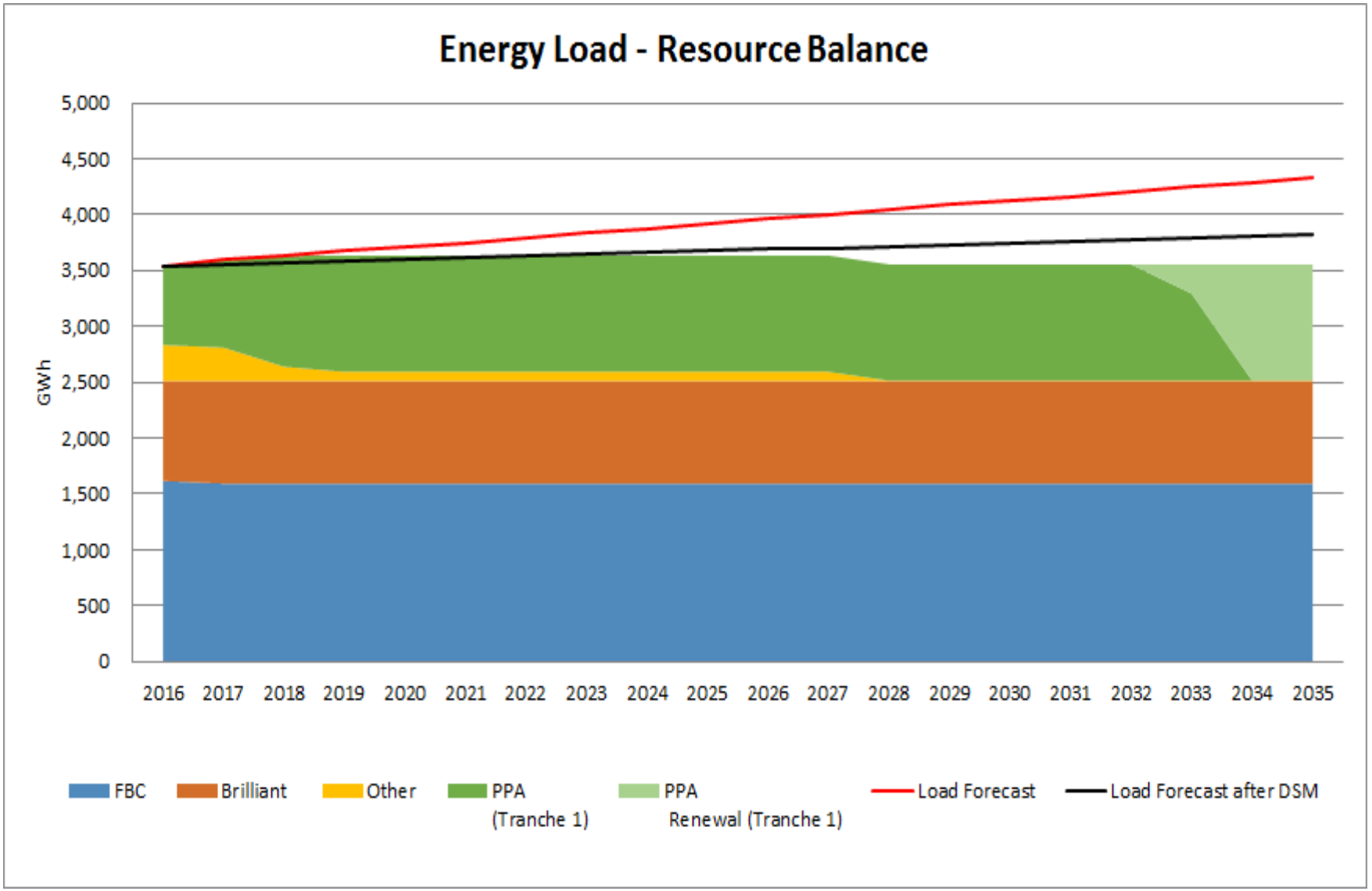
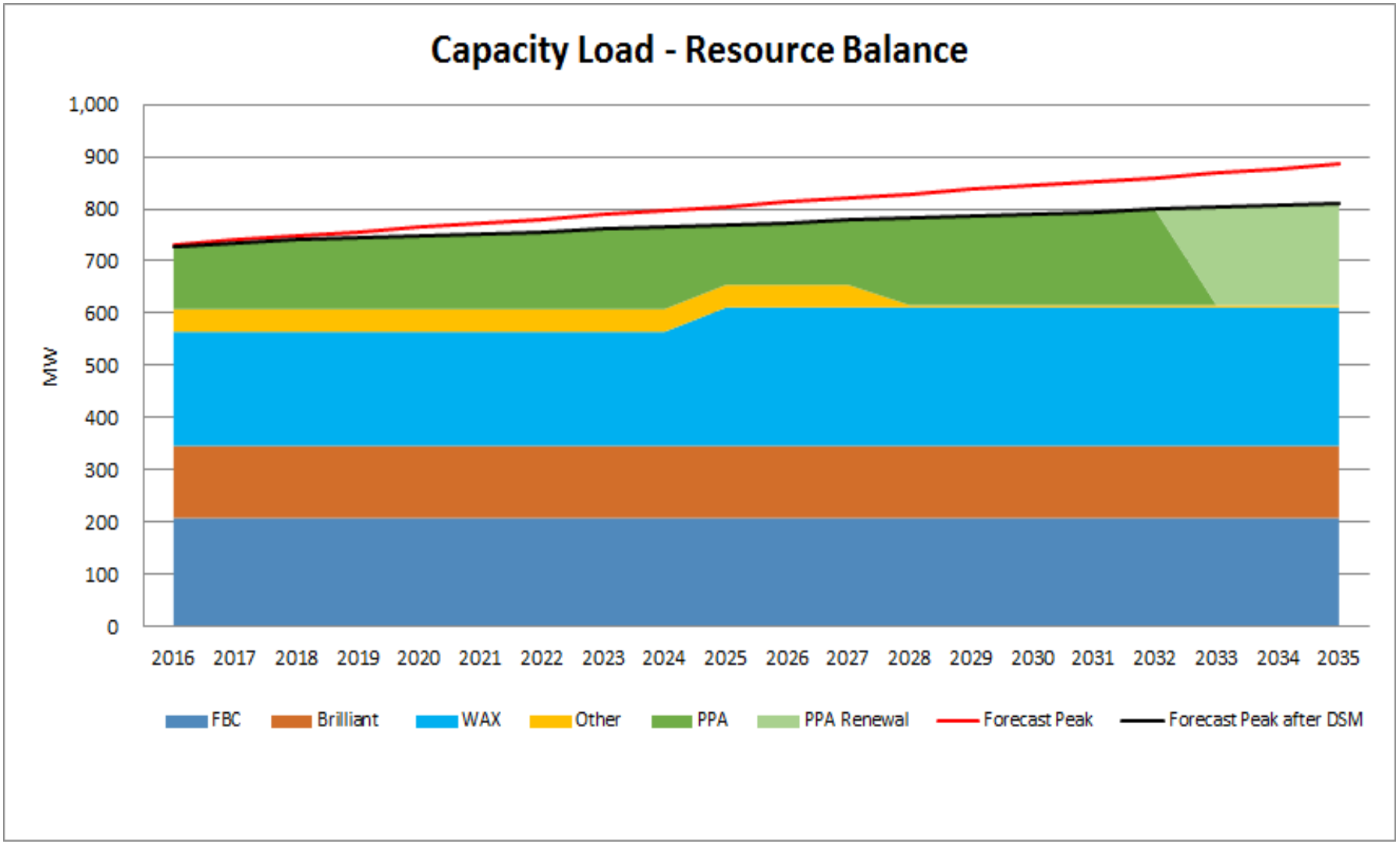
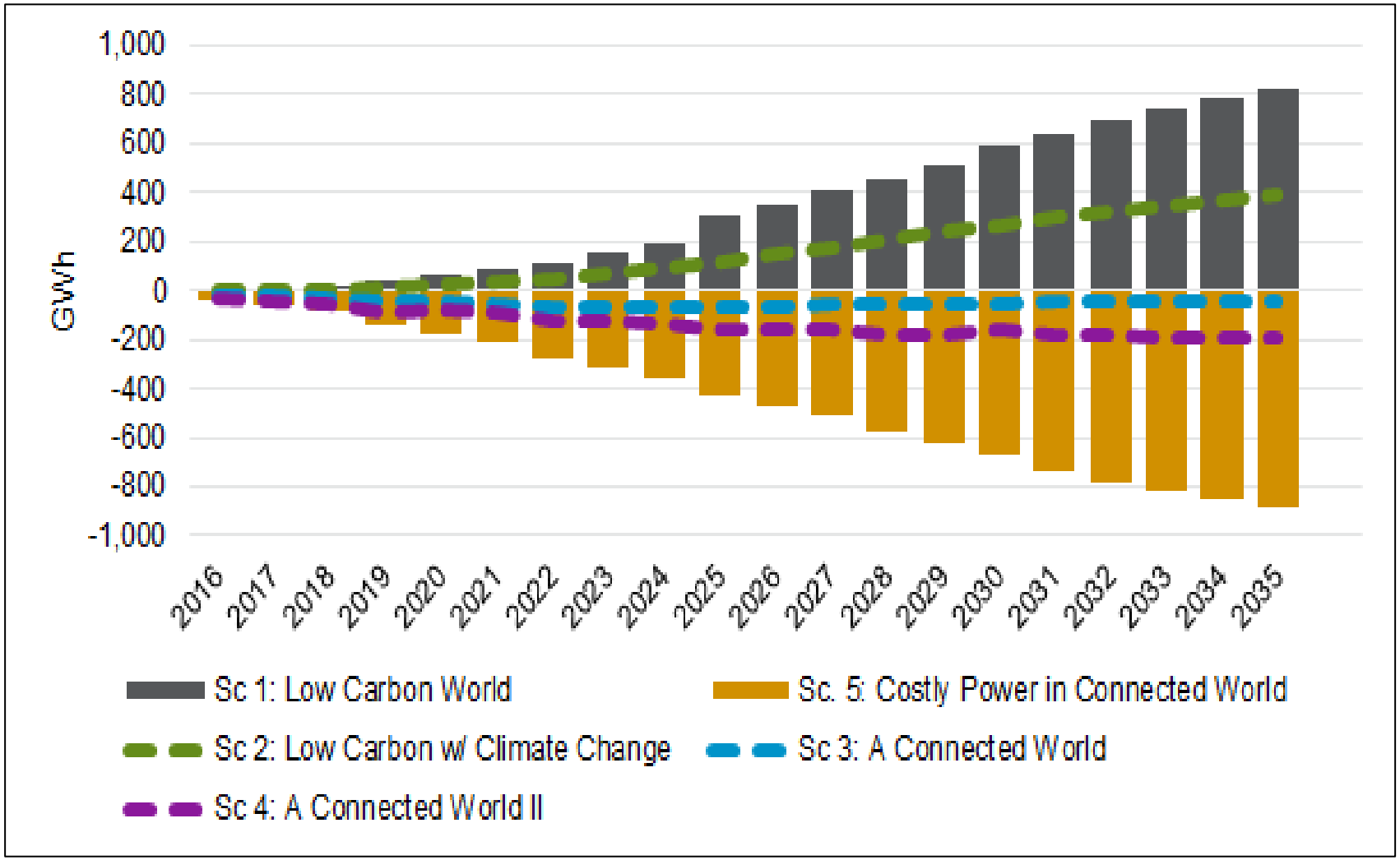
Energy Load-Resource Balance



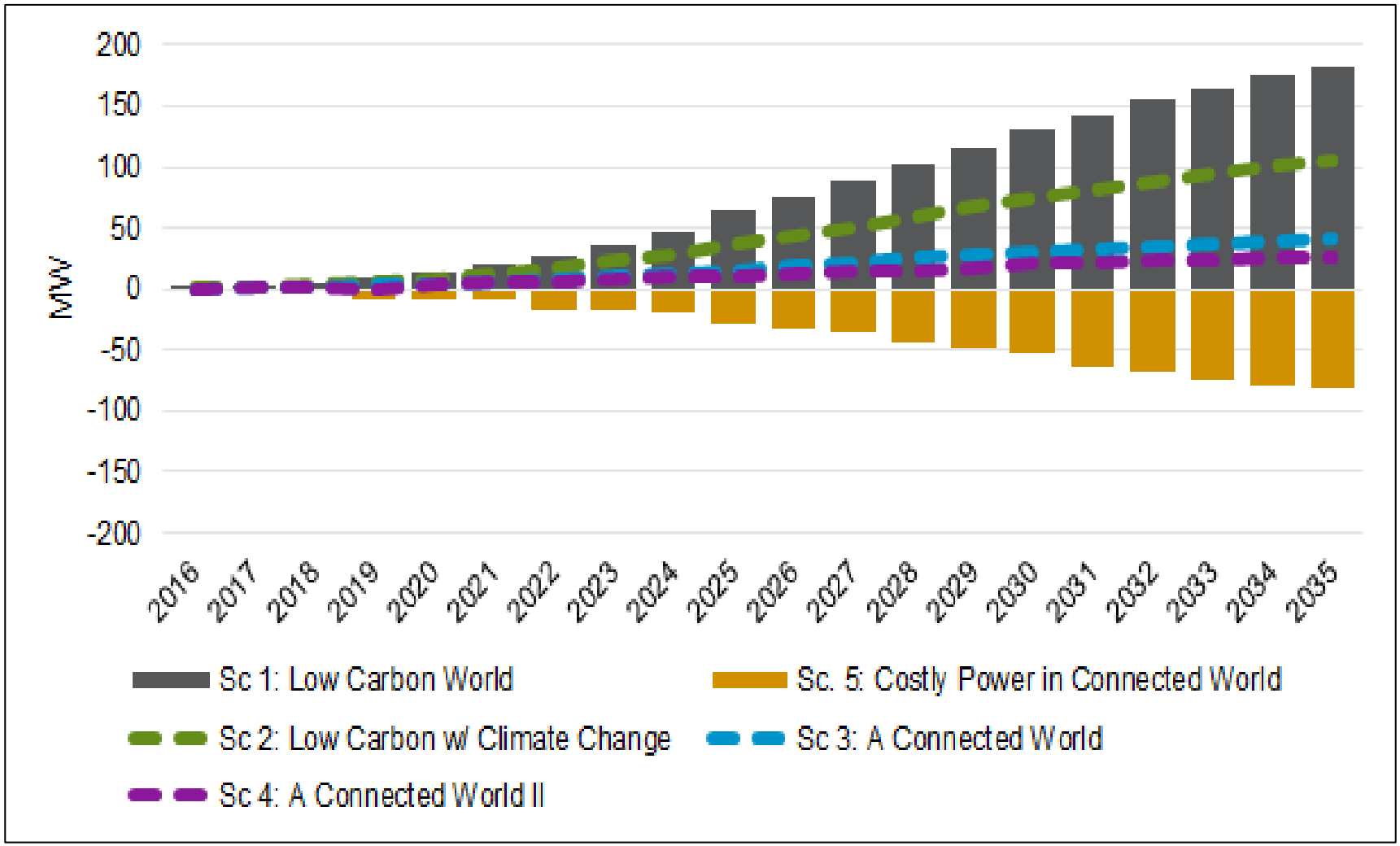
Capacity Load–Resource Balance



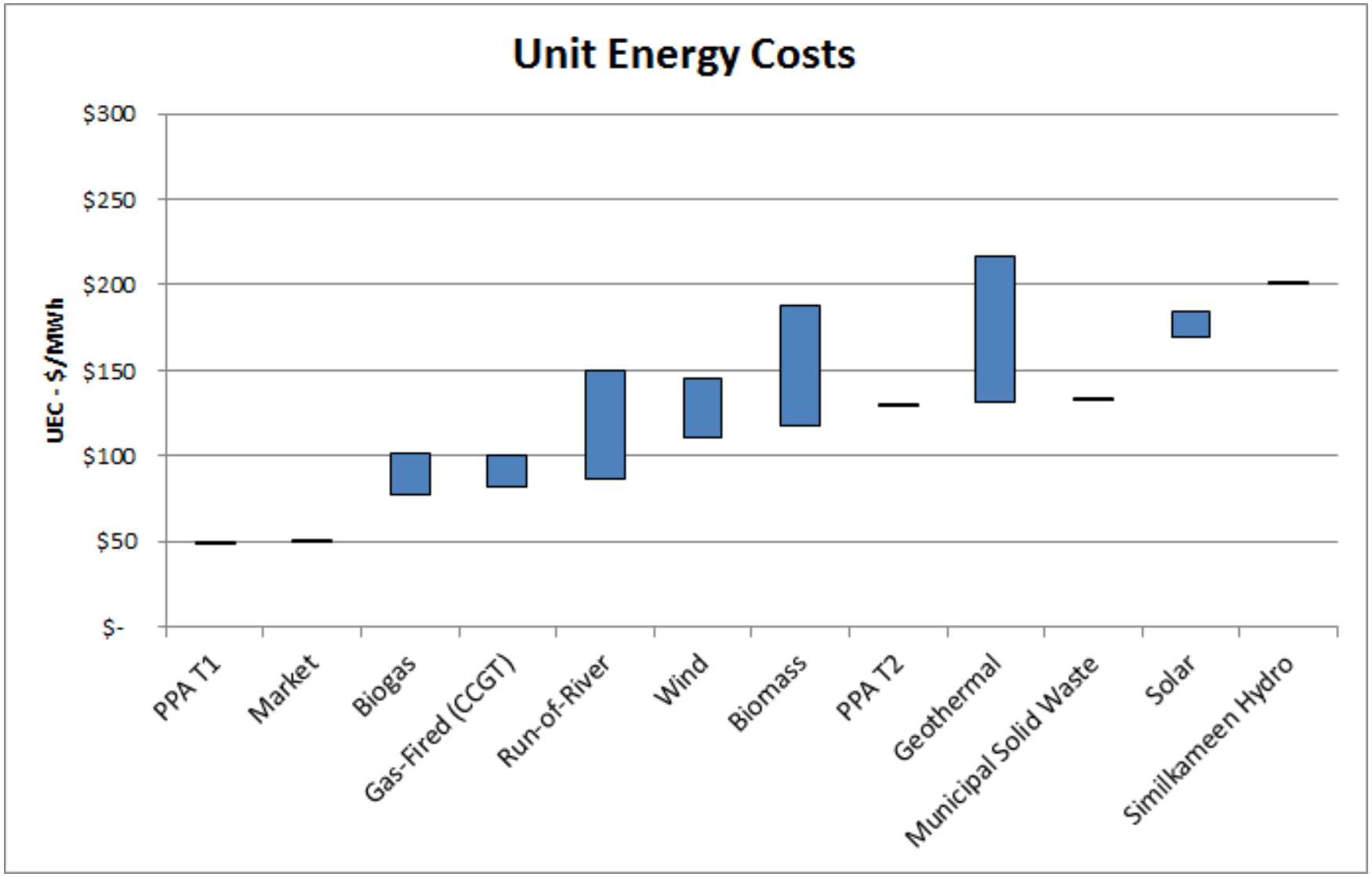
Load Scenarios – Energy Impacts



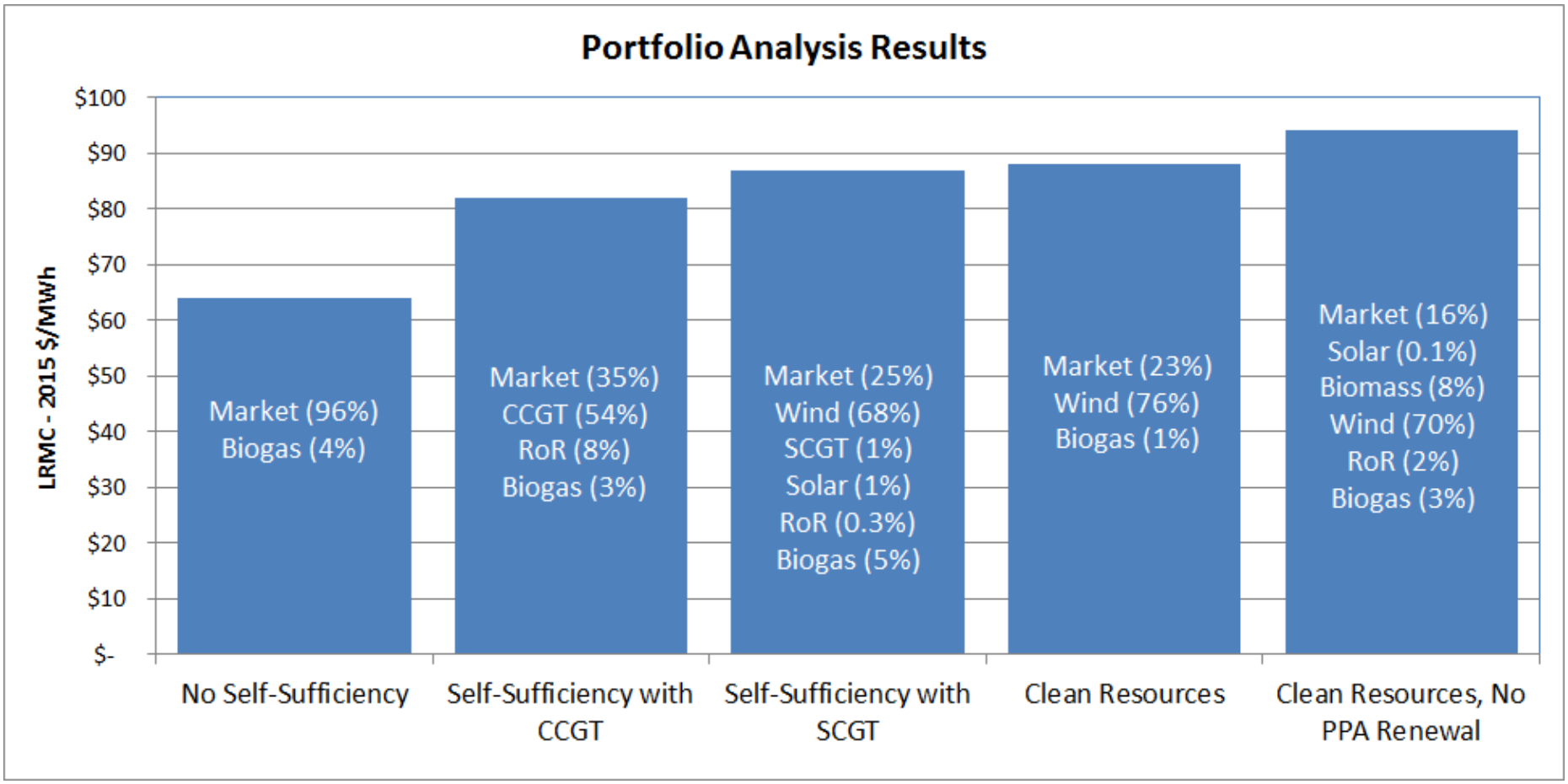
Load Scenarios – Peak Capacity Impacts



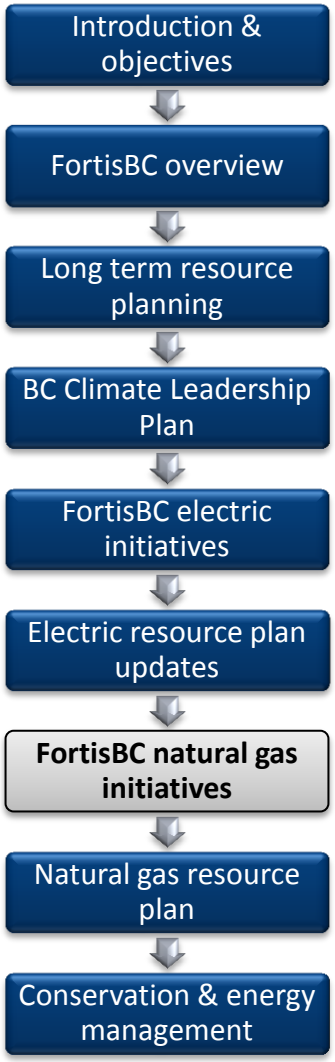
Supply-Side Resource Options



Portfolio Analysis Results (Preliminary)

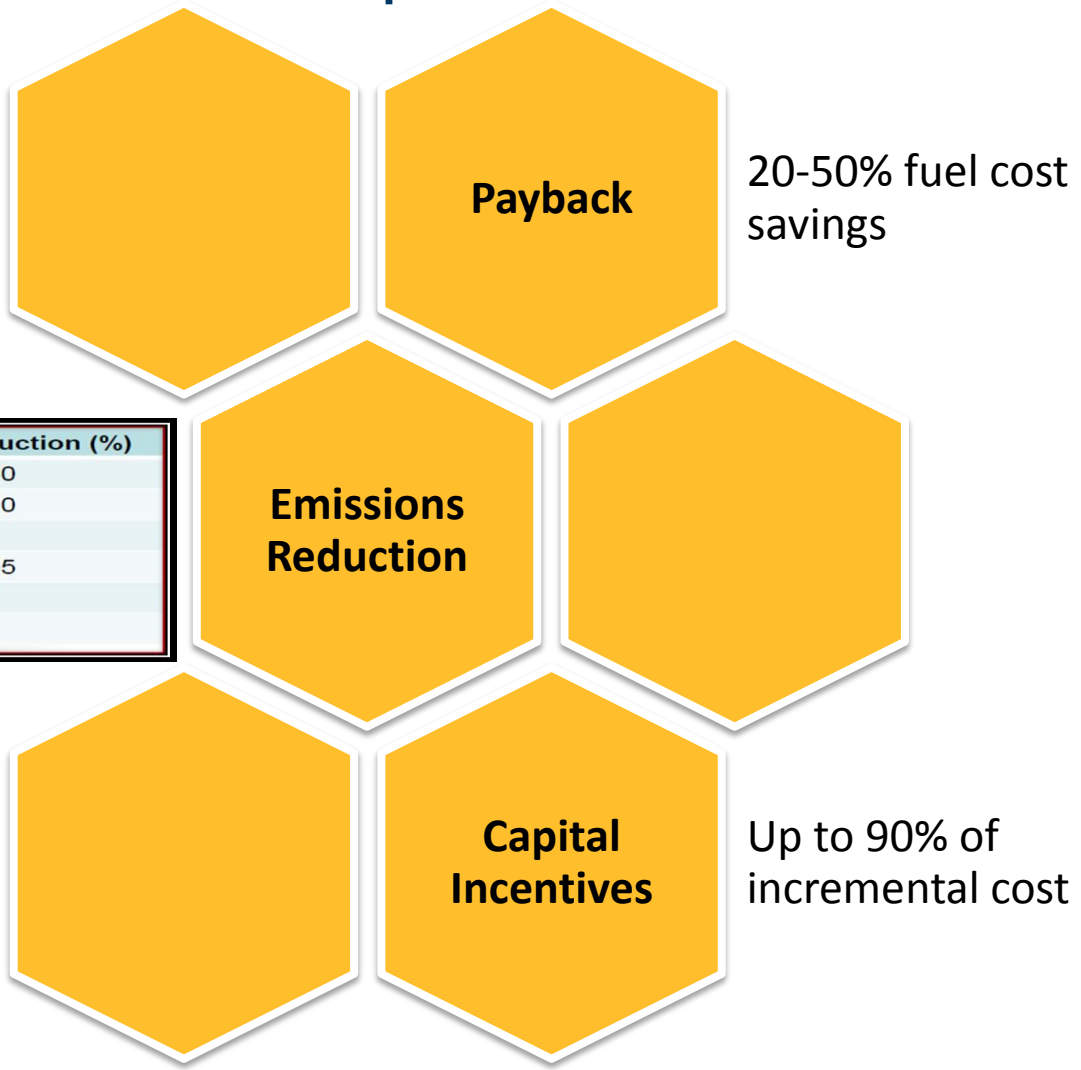


Questions?


Introduction & objectives
FortisBC overview
Long term resource planning
BC Climate Leadership Plan
FortisBC electric initiatives
Electric resource plan updates
FortisBC natural gas initiatives
Natural gas resource plan
Conservation & energy management

Natural gas for transportation programs remain an attractive option

Emission Component	Reduction (%)
Carbon Dioxide (CO2)	20-30
Carbon Monoxide (CO)	70-90
Sulfur Dioxide (SOx)	99
Nitrogen Dioxide (NOx)	75-95
Particulate	90
Volatile Organic Compounds (VOC)	89

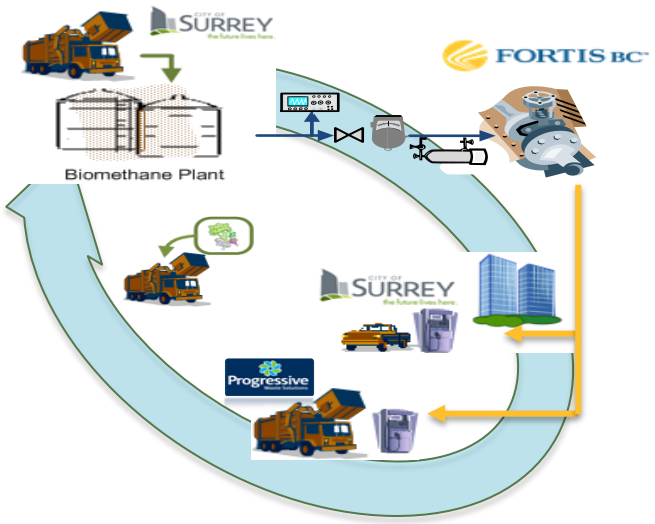


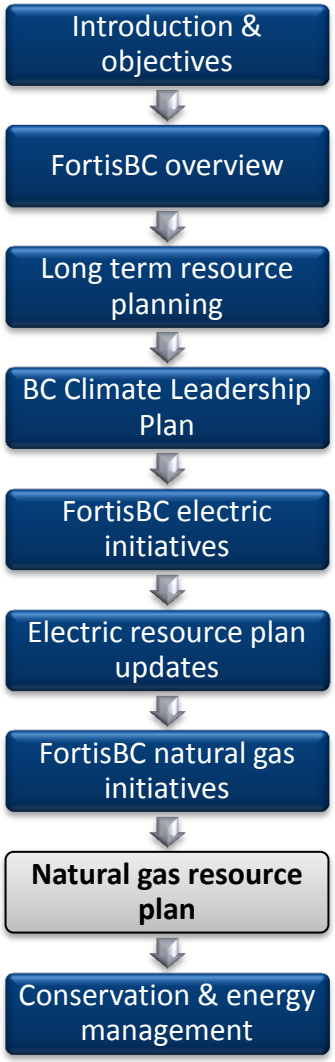
We are seeking to grow the Renewable Natural Gas initiative

Kelowna landfill serves as a successful case study

October 1, 2016: 29% decrease in RNG commodity rate

Seeking new supply:





Energy at work

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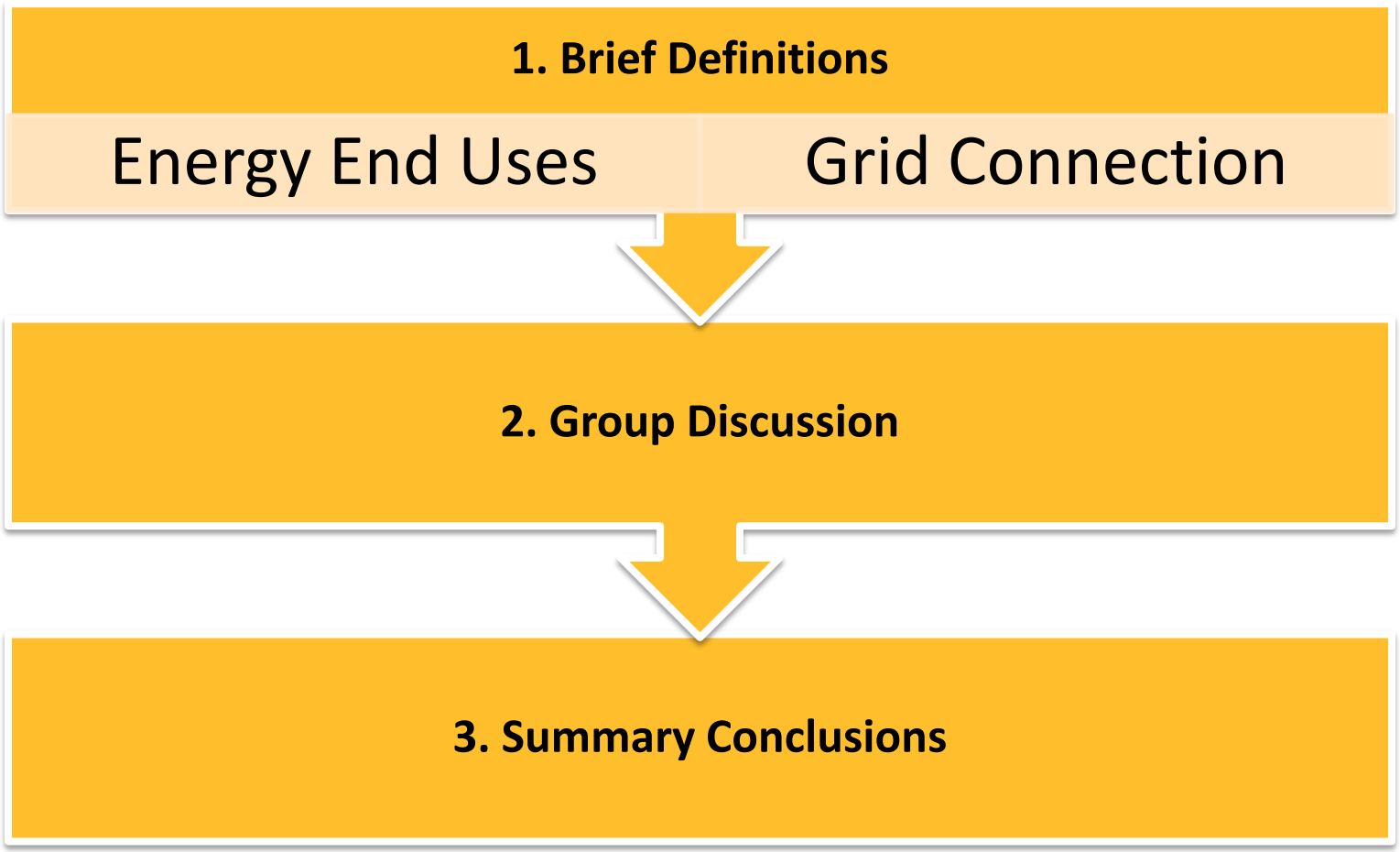
Interactive session: envision your energy future



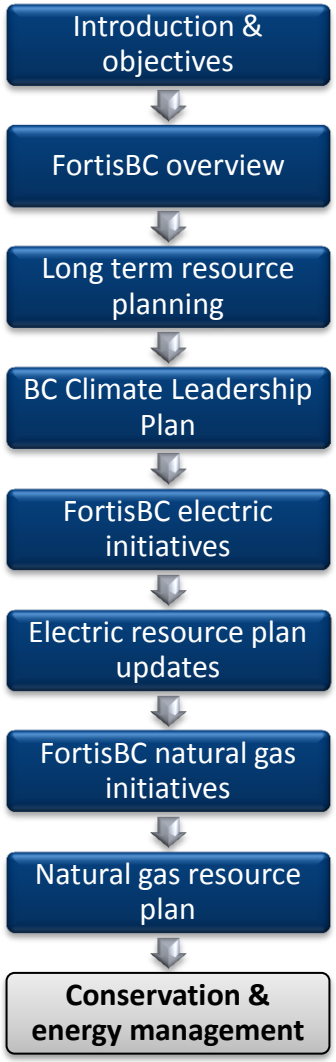
Interactive session: envision your energy future

1. What are your energy needs and how are they prioritized (e.g. growth, sector focus, GHG reduction, access to specific services)?

2. Does your organization have specific goals or contextual factors that guide your energy plans?

3. What uncertainties do you foresee that will impact your energy environment and needs in the future (e.g. policies, economic factors, technologies)?

4. What are the constraints on meeting your current and future energy needs and priorities?



Energy at work

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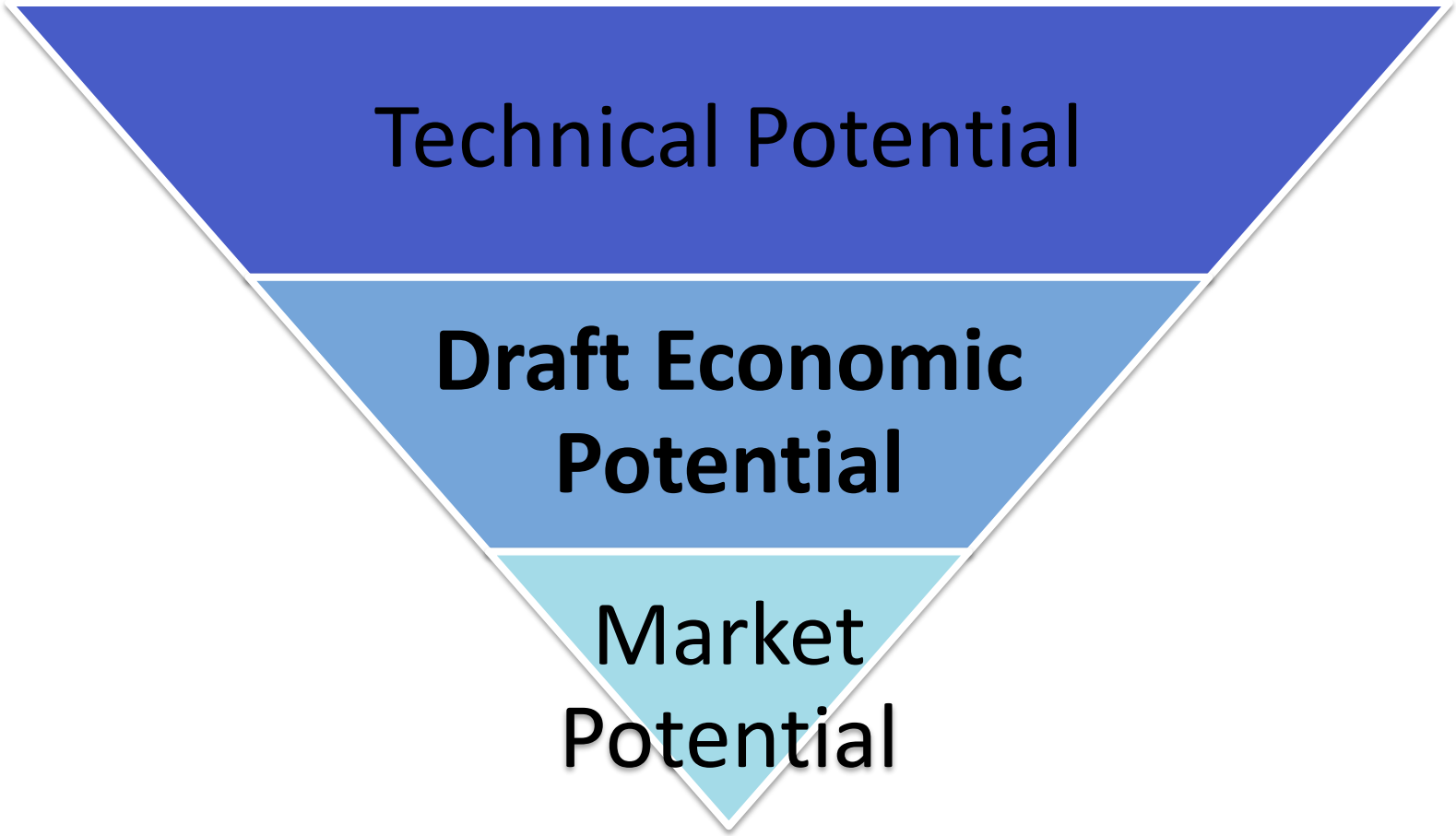
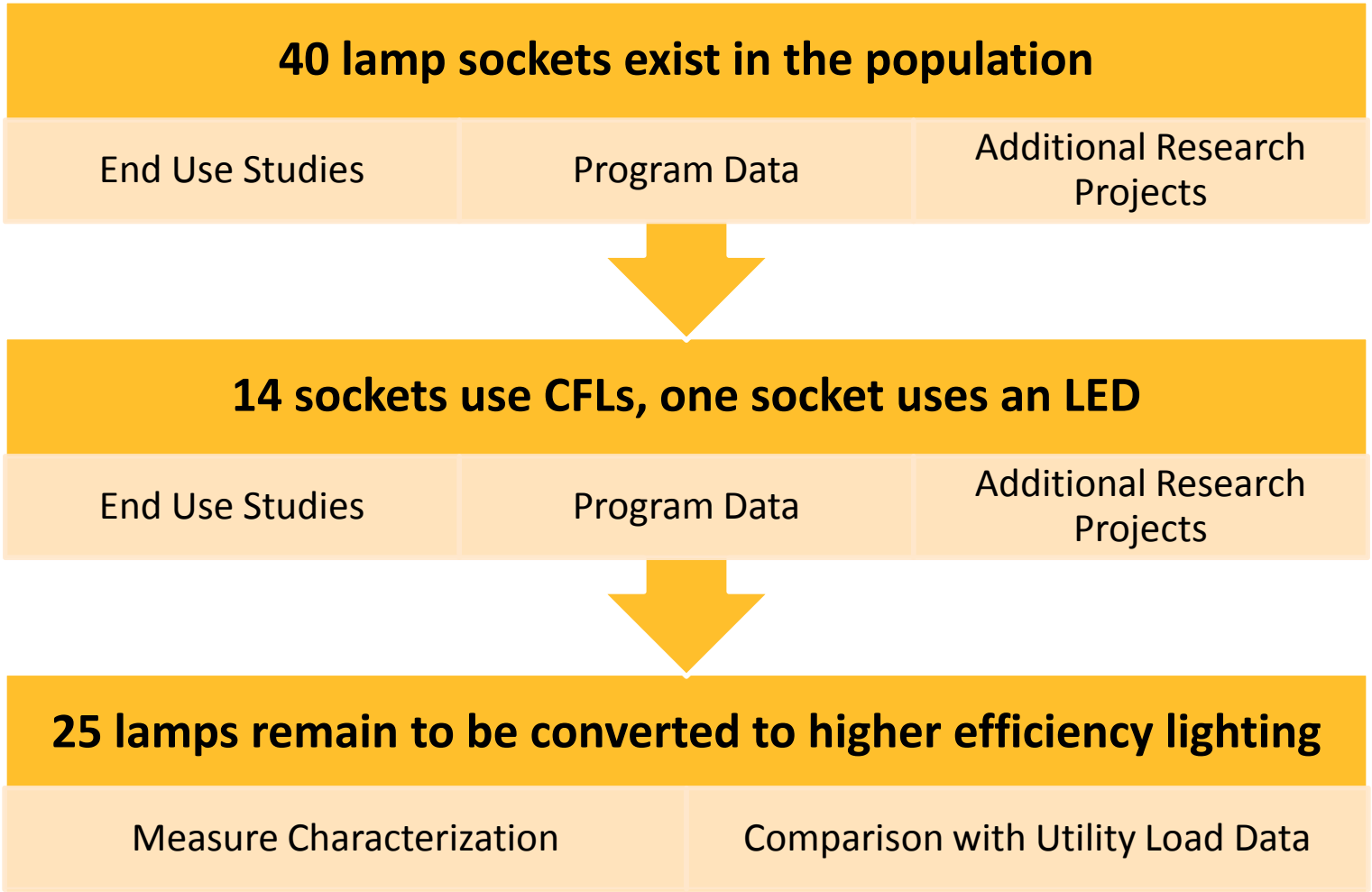
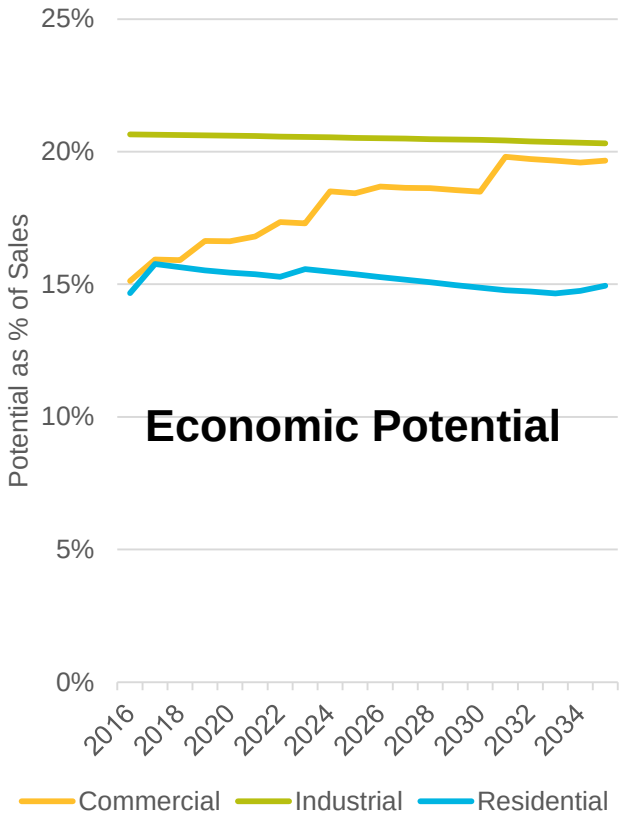
The BC Conservation Potential Review is a province-wide and dual-fuel study

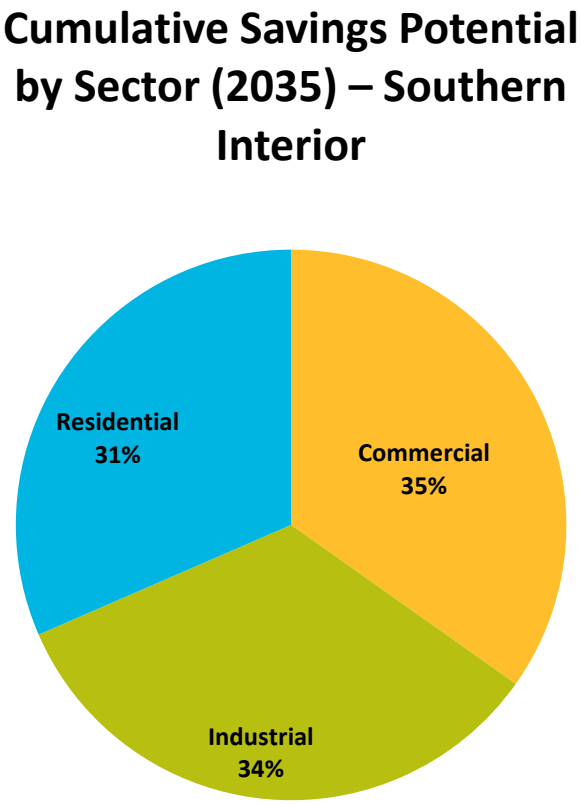


How the CPR estimates savings potential – a simplified example

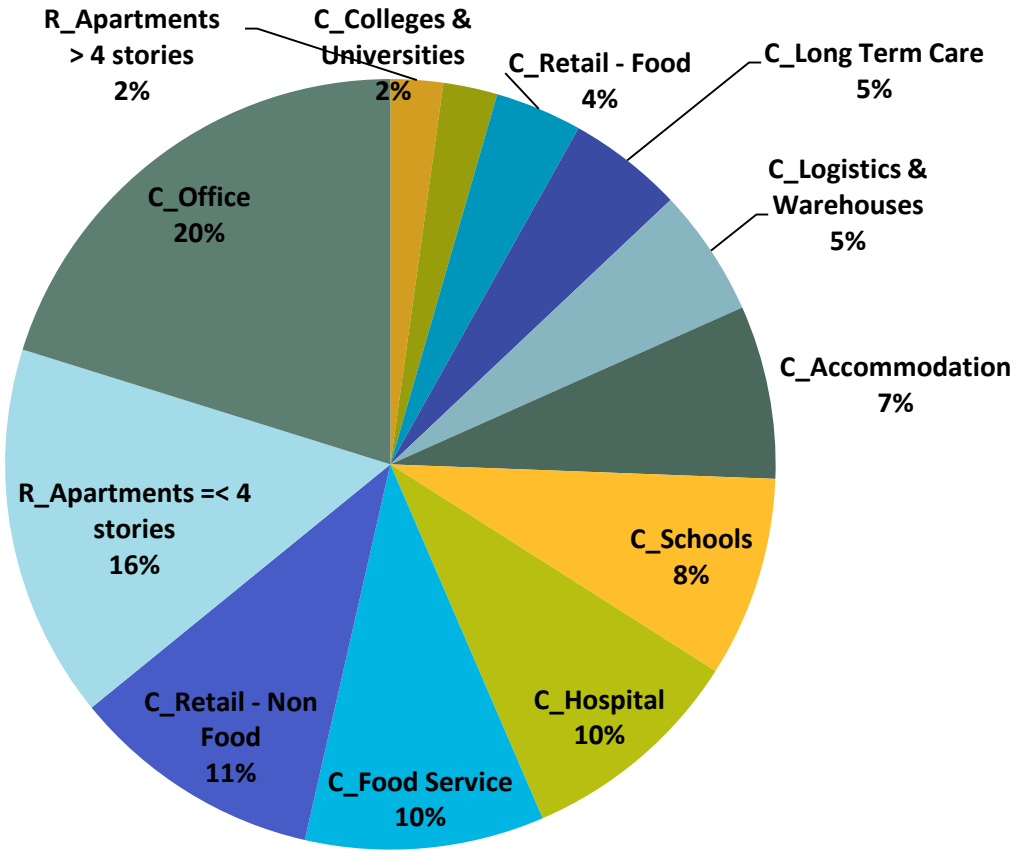


Draft natural gas economic savings potential results

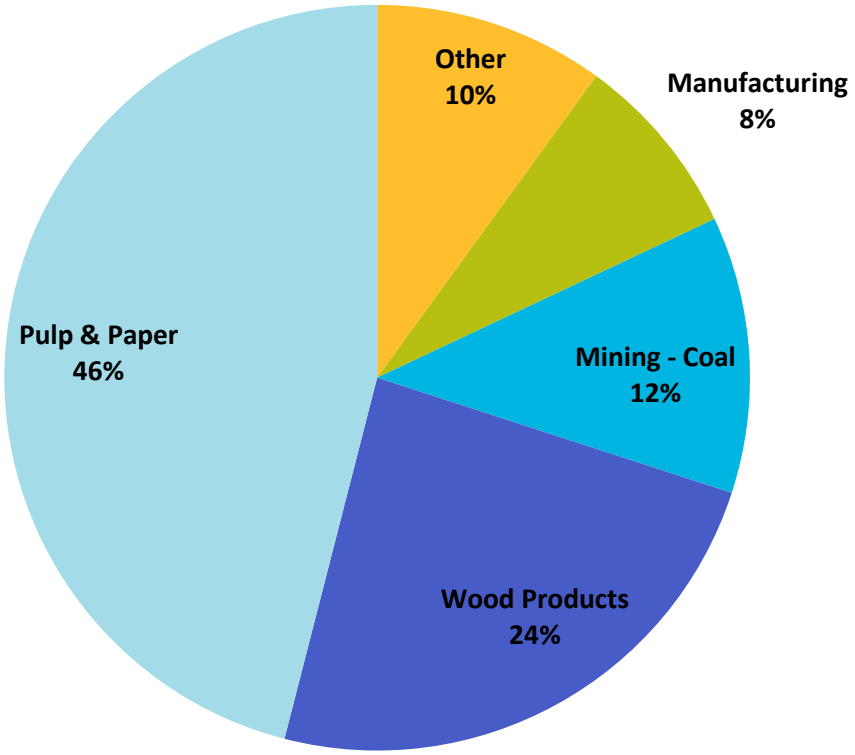




Draft natural gas economic savings potential results – Commercial, 2035 Cumulative, Southern Interior



Draft natural gas economic savings potential results – Industrial, 2035 Cumulative, Southern Interior



DSM Economic fundamentals

Benefits = energy + demand savings

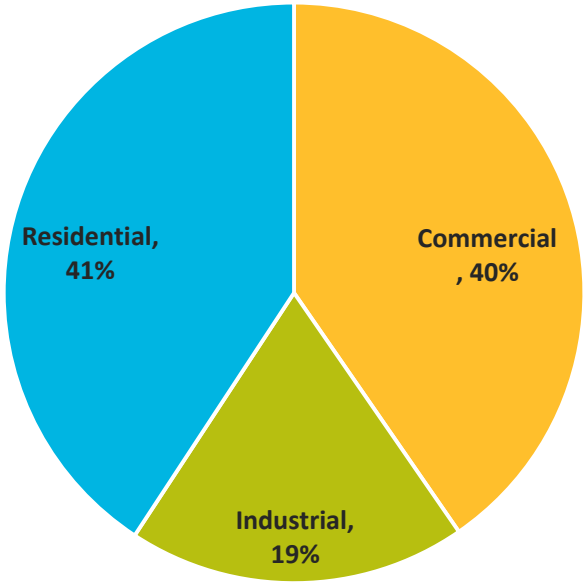
Costs = measure + program costs

2015 Electric Program Results

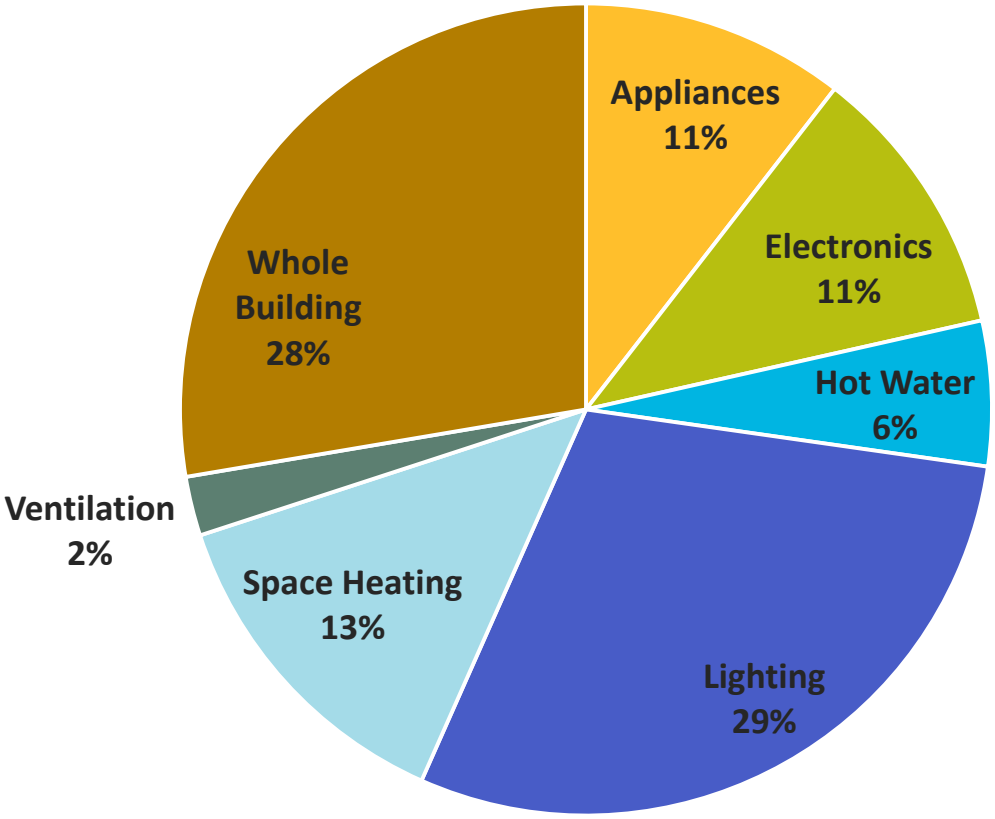
Program Area	Energy Savings (MWh)	FBC Expenditure ($000s)	TRC Benefit/Cost ratio
Residential	**5,639**	**1,050**	**2.9**
Commercial	**5,882**	**1,324**	**1.8**
Industrial	**1,087**	**226**	**2.0**
Programs total	**12,608**	**2,600**	**2.2**
Portfolio	**12,608**	**3,531**	**2.0**

CPR Draft Electric Economic Potential

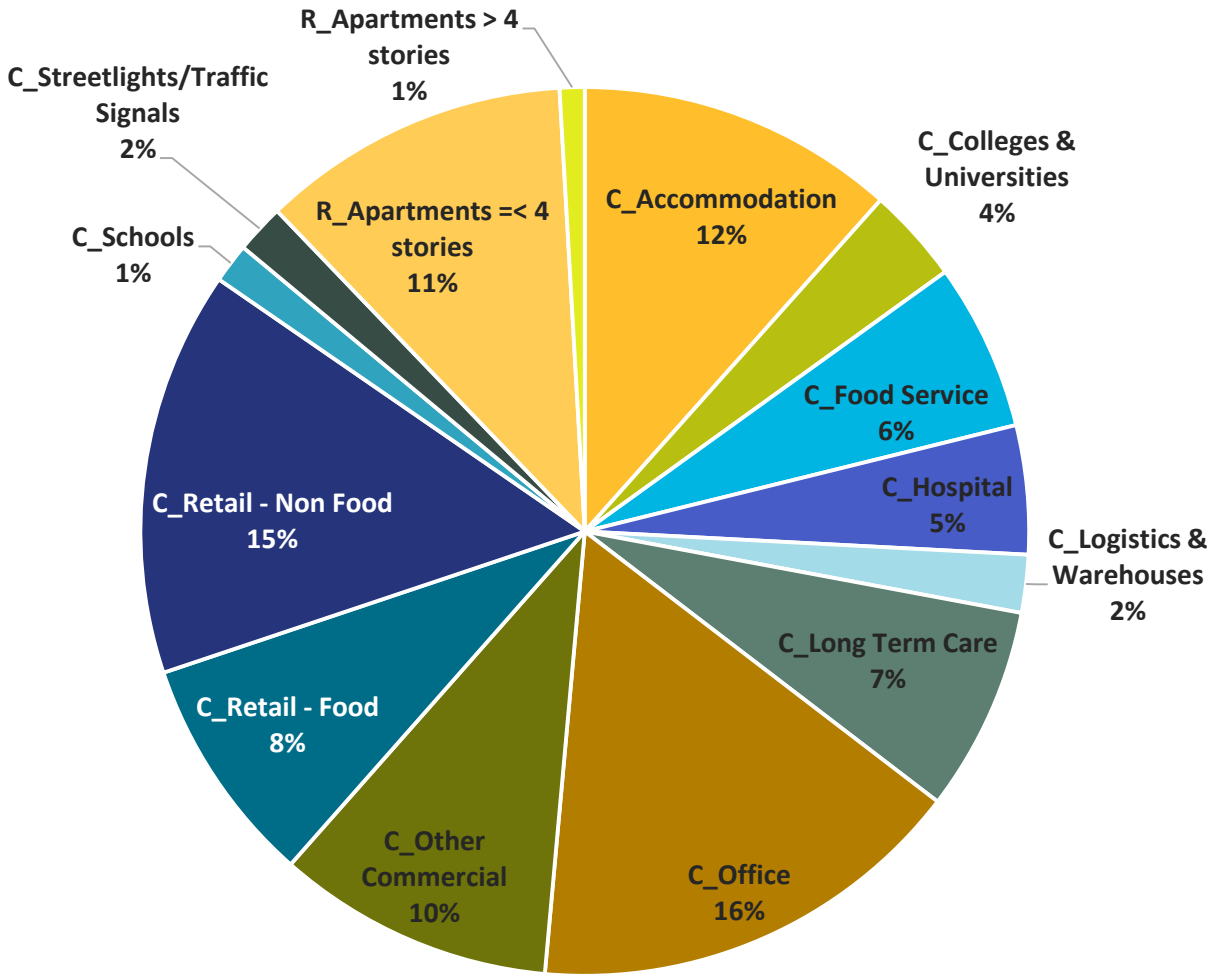
Economic 2035	
Sector	GWh
Res	329
Com	327
Ind	153
Total	809



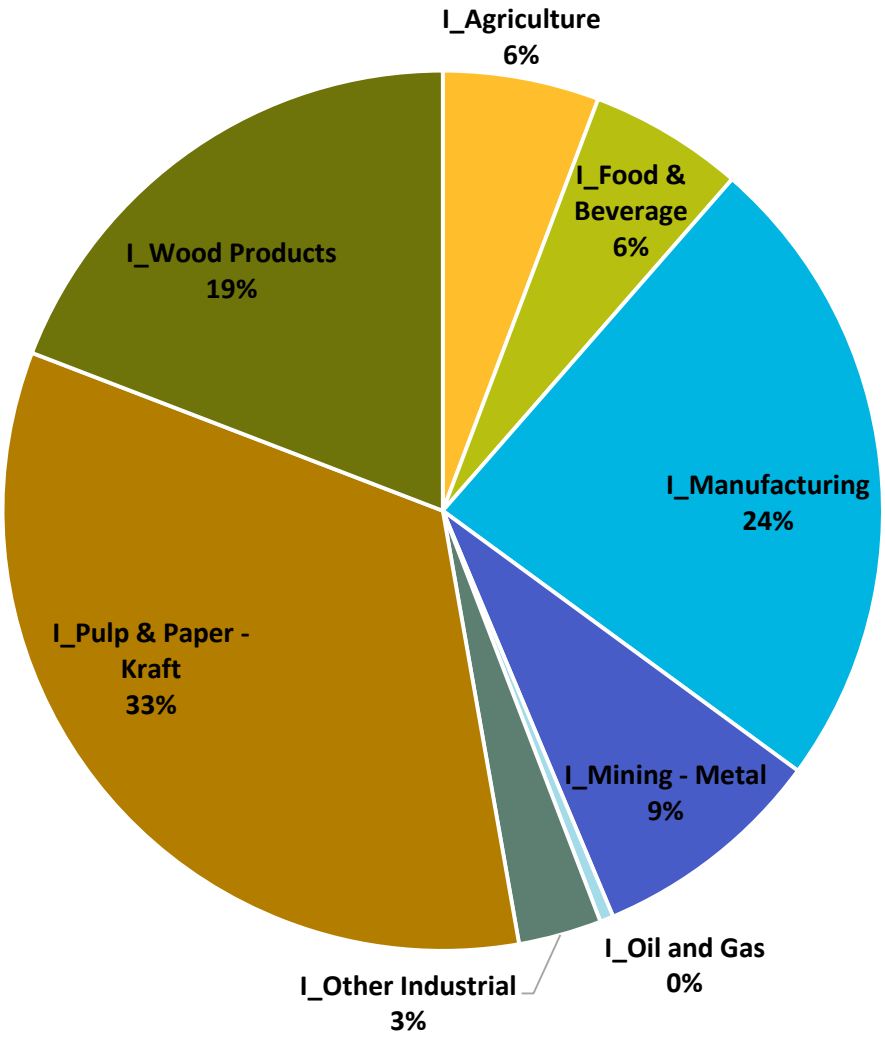
Residential Draft Economic Potential



Commercial Draft Economic Potential



Industrial Draft Economic Potential



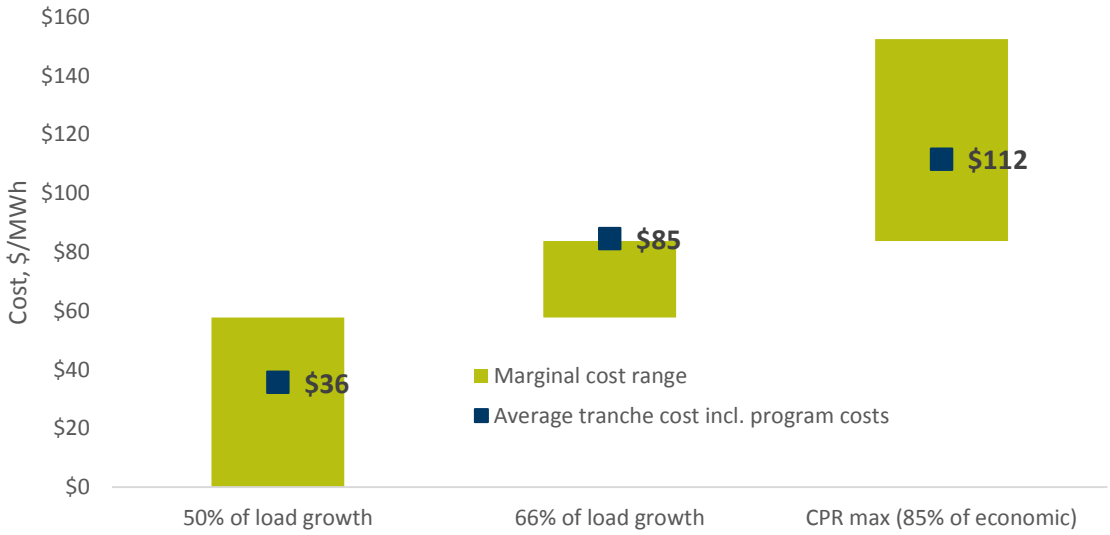
DSM Program targets

- DSM targets set as % load offset

Category	DSM Scenario		
	50% of load growth	66% of load growth	CPR max (85% of economic)
Annual Savings, GWh			
Average per annum	20.4	26.9	36.2
Total, 2016 to 2035	408	538	689

DSM tranche costs (levelized)

Category	DSM Scenario		
	50% of load growth	66% of load growth	CPR max (85% of economic)
Annual Savings, GWh			
	20.4	26.9	36.2
Total Resource Cost, $/MWh			
Marginal cost	*$58*	*$84*	*$152*
Avg tranche cost (measures)	$23	$71	$98
" incl. program costs	$36	$85	$112



DSM program costs (per annum)

Category	DSM Scenario		
	50% of load growth	66% of load growth	CPR max (85% of economic)
Annual Savings, GWh			
Average per annum	20.4	26.9	36.2
Average Annual DSM Budget, ($000s)	**$5,000**	**$7,900**	**$13,100**
Incentives	$2,300	$4,500	$8,500
Program costs	$2,700	$3,400	$4,600

DSM programs

Two key Commercial program offers:

- Commercial Prescriptive Rebates
- Custom Business Efficiency program

www.fortisbc.com/offers

DSM discussion

- Questions?
- Comments?
- Feedback?

Wrap-up & next steps

- Your inputs are used in our planning processes:
  - Identifying uncertainties
  - Assessing resources to meet new energy demand
  - Developing and offering new energy services such as new Conservation & Energy Management programs
  - Informing our engagement with policymakers
- **Electric resource plan –** filing November 30, 2016
- **Natural gas resource plan –** further consultations across the province in spring 2017

Thank you

Energy at work FORTIS BC™

For further information, please contact:

FortisBC Integrated Resource Planning

irp@fortisbc.com

Find FortisBC at:

Fortisbc.com

604-676-7000