Solar Energy & Summerland

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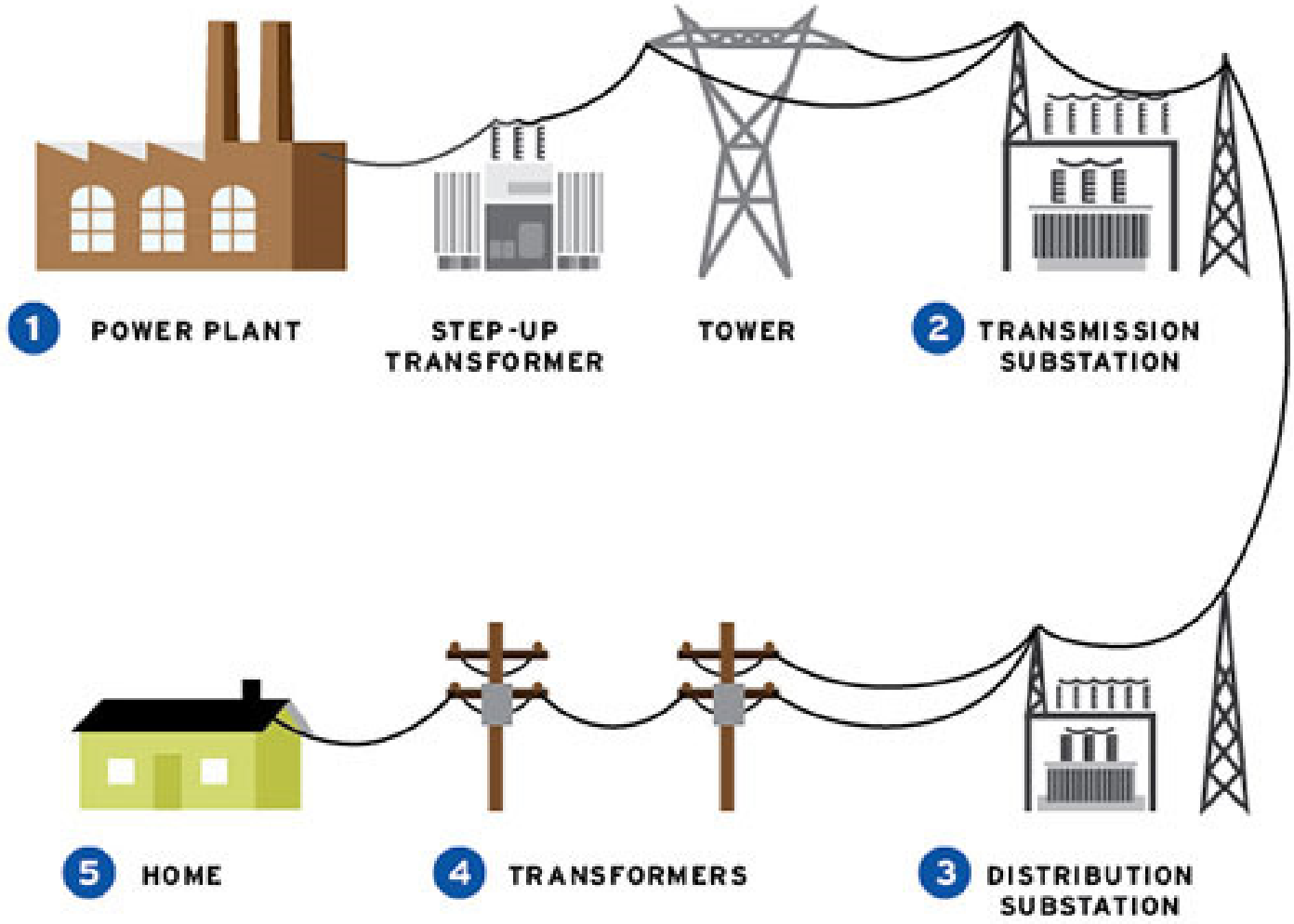
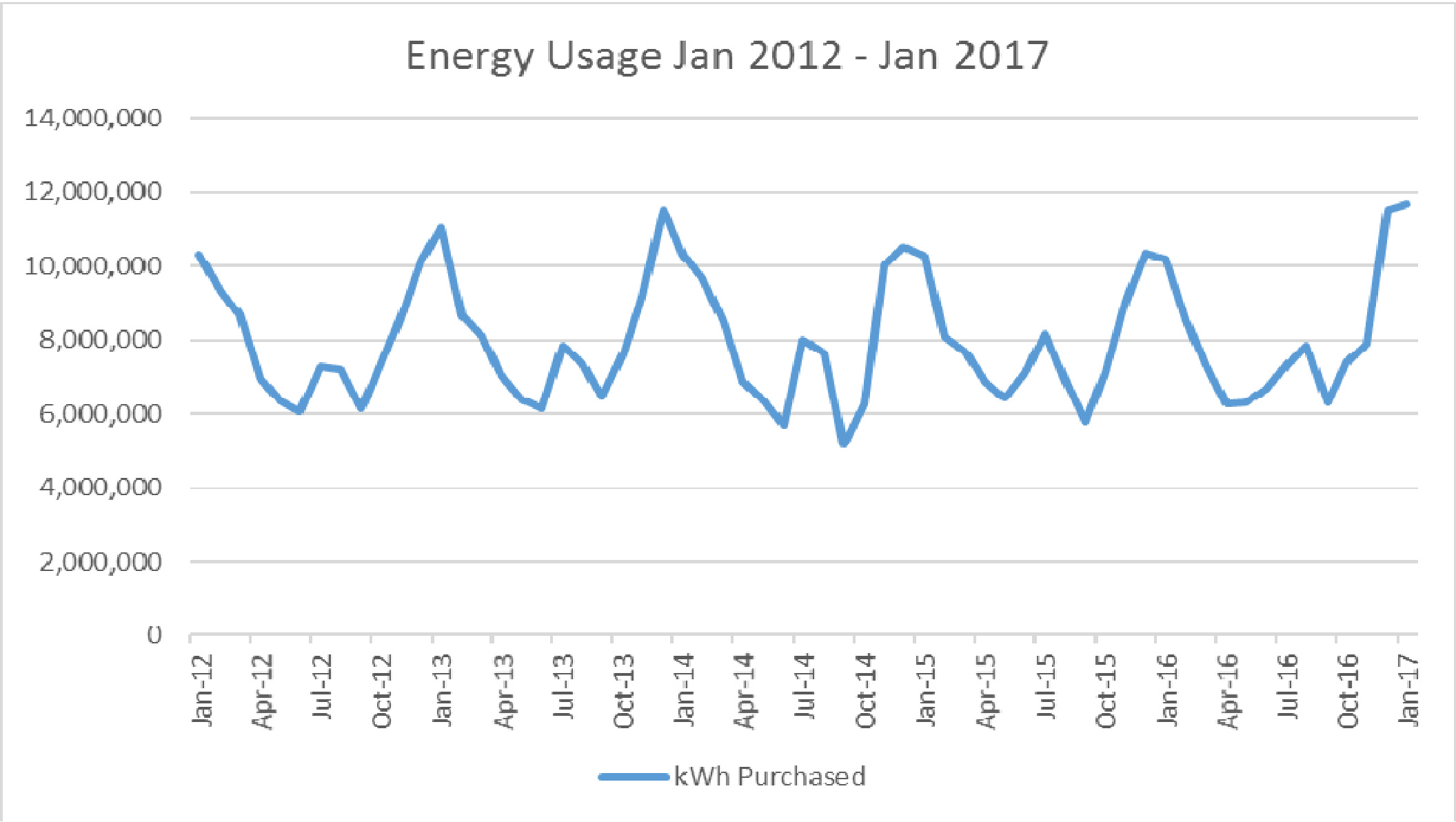
District of Summerland

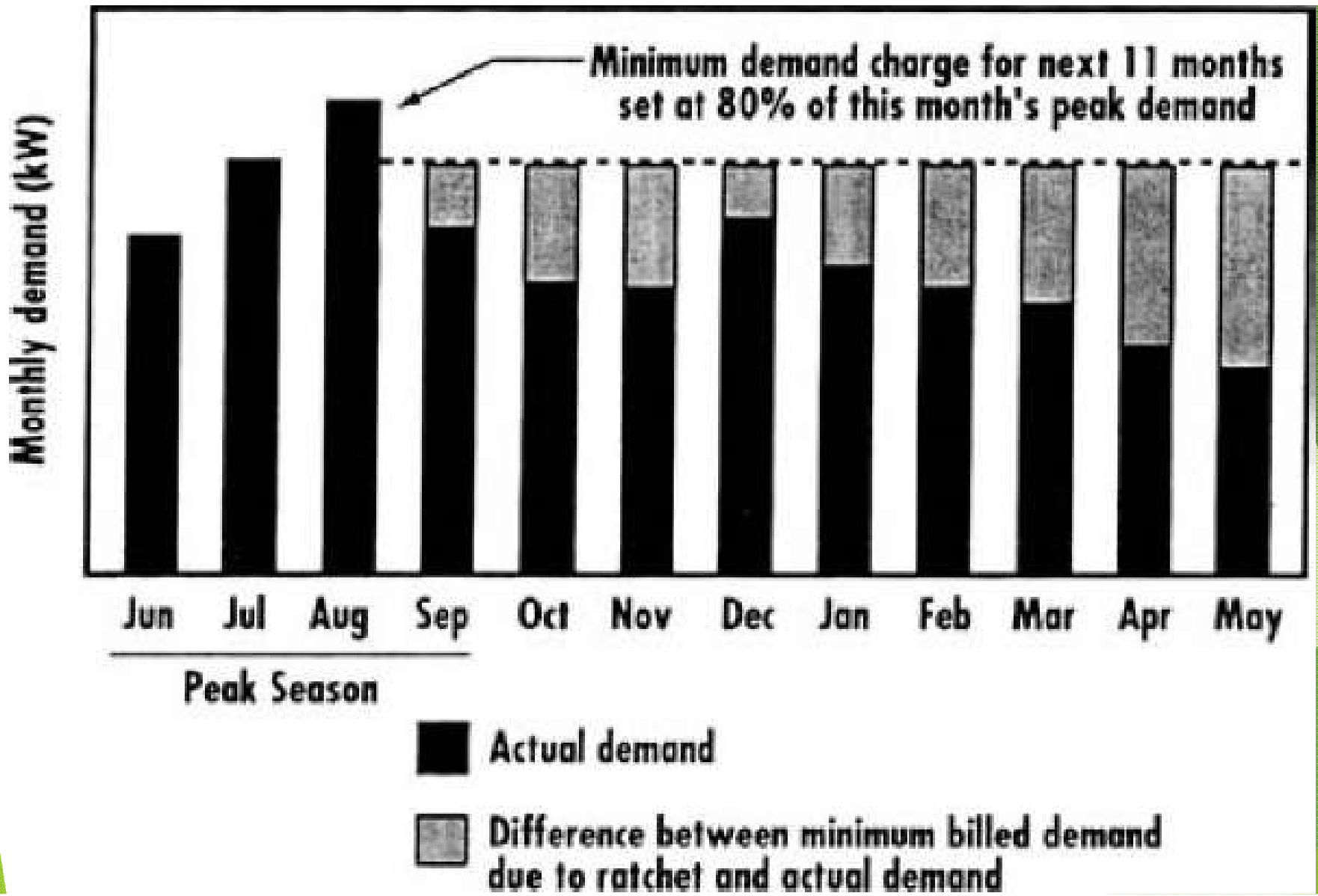
DISTRICT OF SUMMERLAND

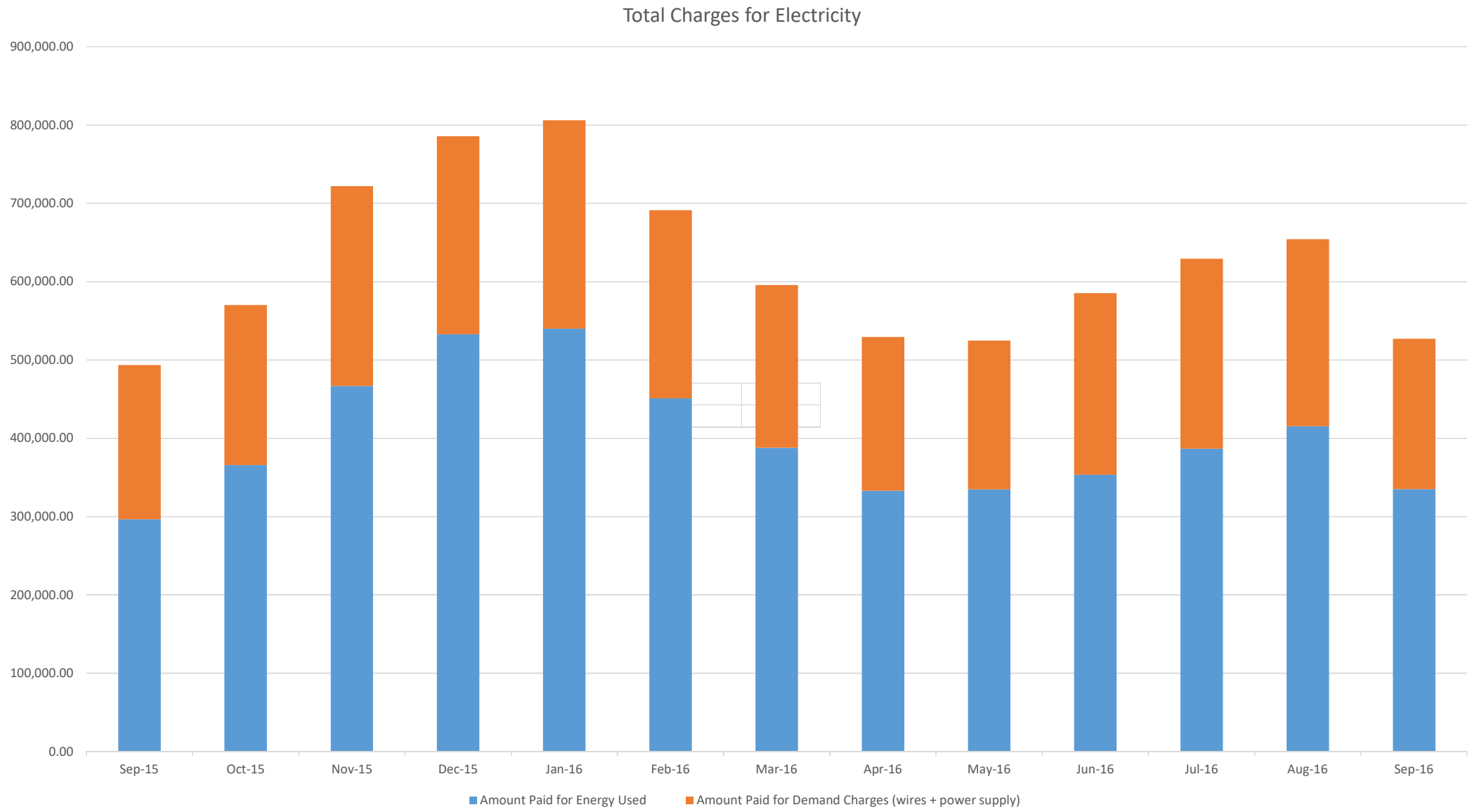

1
POWER PLANT
STEP-UP
TRANSFORMER
TOWER
2
TRANSMISSION
SUBSTATION
5
HOME
4
TRANSFORMERS
3
DISTRIBUTION
SUBSTATION

Guiding Documents

- Official Community Plan
  - GHG reduction targets of 33% below 2007 levels by the year 2020; and 80% below 2007 levels by the year 2050
  - Objective (13.3.1.2): To encourage energy-efficiency, conservation, and renewable energy generation
- Strategic Plan
  - Environmental Integrity Vision: Summerland is a model steward working to improve and balance the natural and built environments
  - Objective (F4): Increase and diversify the revenue base for infrastructure replacement including...renewable energy generation...
- Community Climate Action Plan
  - Action 5-24: Investigate opportunities for alternative renewable energy generation
- BC Climate Action Charter
  - Reduce GHG emissions & make progress to carbon neutrality
  - Create complete, compact, more energy-efficient communities


Energy Usage Jan 2012 - Jan 2017
14,000,000
12,000,000
10,000,000
8,000,000
6,000,000
4,000,000
2,000,000
0
Jan-12
Apr-12
Jul-12
Oct-12
Jan-13
Apr-13
Jul-13
Oct-13
Jan-14
Apr-14
Jul-14
Oct-14
Jan-15
Apr-15
Jul-15
Oct-15
Jan-16
Apr-16
Jul-16
Oct-16
Jan-17
kWh Purchased


Monthly demand (kW)
Minimum demand charge for next 11 months set at 80% of this month's peak demand
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Peak Season
Actual demand
Difference between minimum billed demand due to ratchet and actual demand


Total Charges for Electricity
900,000.00
800,000.00
700,000.00
600,000.00
500,000.00
400,000.00
300,000.00
200,000.00
100,000.00
0.00
Sep-15
Oct-15
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
Sep-16
Amount Paid for Energy Used
Amount Paid for Demand Charges (wires + power supply)

Energy Efficiency Hierarchy

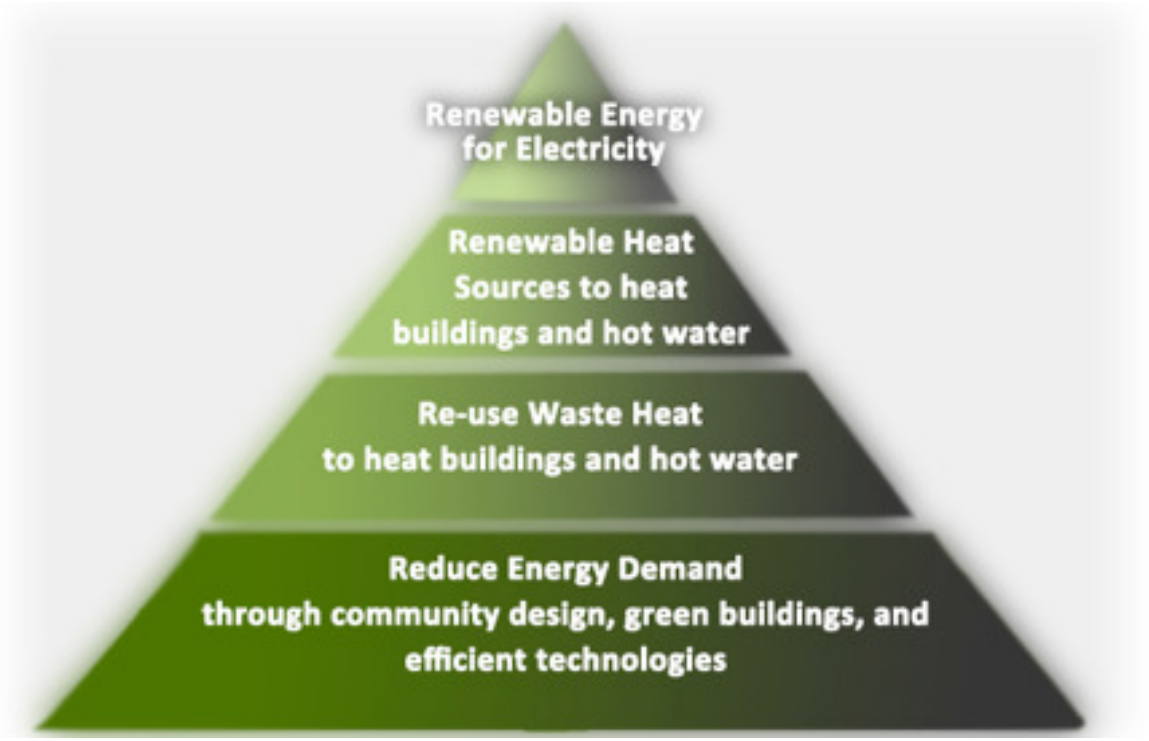


Image: BC Hydro

So Many Alternatives

Renewable Heat:

- Biomass
- Biogas
  - Renewable Natural Gas
- Solar Thermal
  - Active
  - Passive
- Heat Pumps
  - Air Source
  - Ground Source

Renewable Electricity:

- Wind
- Micro-hydro
- Geothermal
- Biogas
  - Renewable Natural Gas
- Solar
  - CSP - Concentrating Solar Power
  - PV Panels – Photovoltaic Panels
    - Rooftop
    - Ground Mounted

And Don't Forget:

- Combined Heat & Power (Co-generation)
- Combined Heat, Cooling, Power (Tri-generation)

What Are The Impacts?

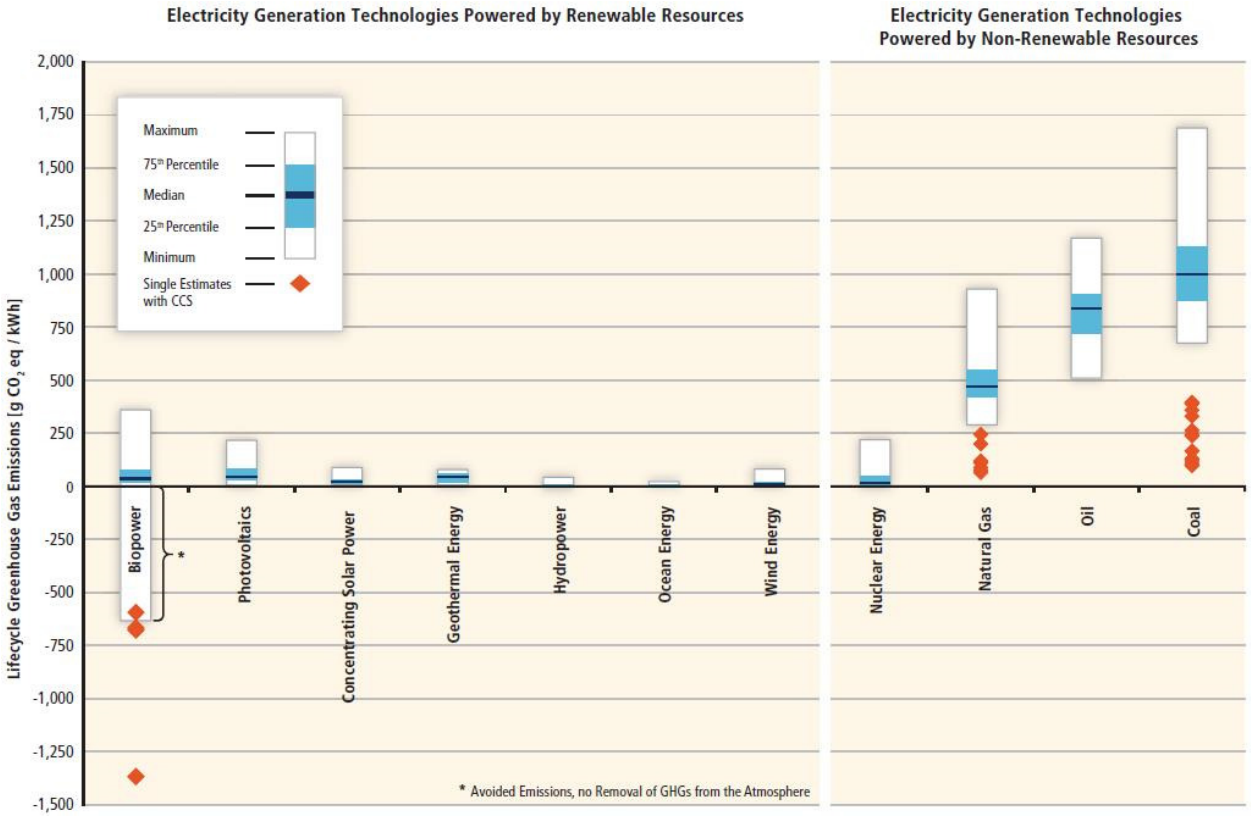


Image: International Panel on Climate Change

What About Costs?

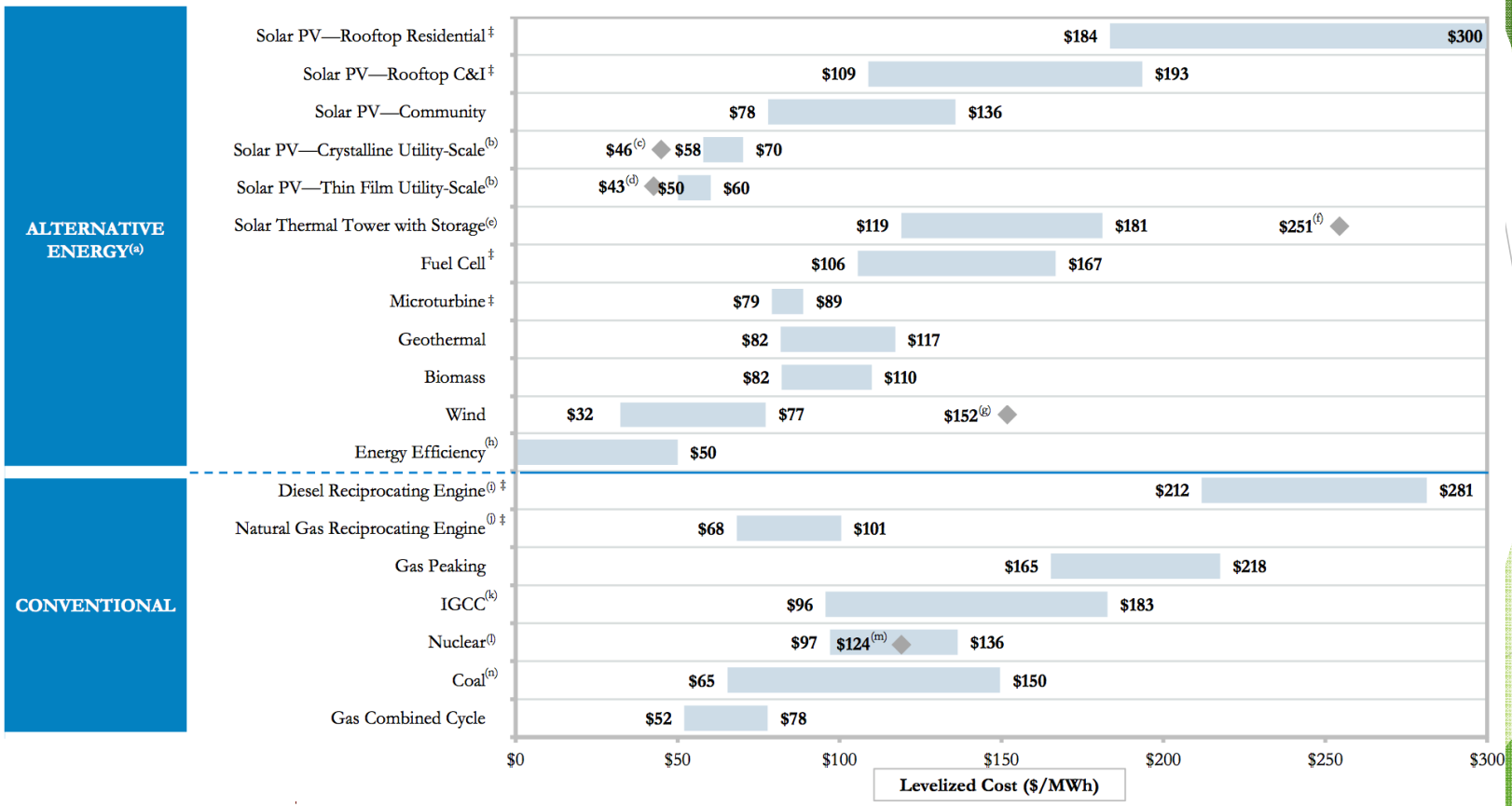


Image: Lazard

So…Why Begin with Solar?

- Proven technology
- LOTS of examples to draw on
- Emissions free generation
- Low operating costs
- Scalable
- Easily sited
- Well understood
  - But not *that* well – still a draw
- Fits trend towards distributed generation
- Opportunity for many co-benefits
- Residents, businesses, and schools are already pursuing solar on their properties

Benefits

For Utility:

- Get experience with generating & selling early on
  - Positioned to better adapt to changes to business model (DES)
  - Easier to capitalize on new opportunities
- Predictable costs
- Reduced line losses
- Good corporate citizenry

For Community:

- Reduce GHGs & address climate change
- Living in a community supporting & leading development of renewables
- Educational opportunities for local schools & researchers
- Increased interest in visiting & living in Summerland
- Economic diversification

Other possibilities:

- Investment opportunity
- Brownfield improvements

Possible Models for Solar Projects

Three Overarching Types of "Owners"

A. Distributor
   - E.g., Kimberley, DTE Energy (Michigan)

B. Community/Shared
   - E.g., Nelson, Roseville CA, Clark PUD (Vancouver WA)

C. Institutional
   - E.g., Okanagan College Penticton, Lower Nicola Indian Band

- MANY sub-types / possible variations for each
- Any could be owned/operated/maintained by a third party
- Any can be large or small scale
- Revenue for Utility: A = neutral or positive (7-15^{+} yr payback); B & C = neutral or loss