

SaskPower Presentation to the Lake Diefenbaker Stakeholder Group

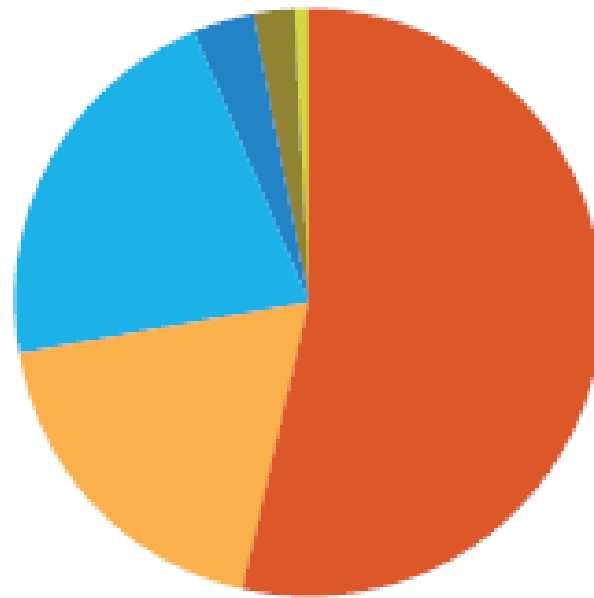
May 30, 2012

Coteau Creek Generating Station at Gardiner Dam



Coteau Creek Plant Description

- **Commissioned 1968**
- **Three 62MW units, total plant capacity of 186 MW**
- **Capacity Factor 33%**
- **Median Generation 540 GWh/year**
- **Lower Quartile Generation 441 GWh/year**
- **Upper Quartile Generation 846 GWh/year**

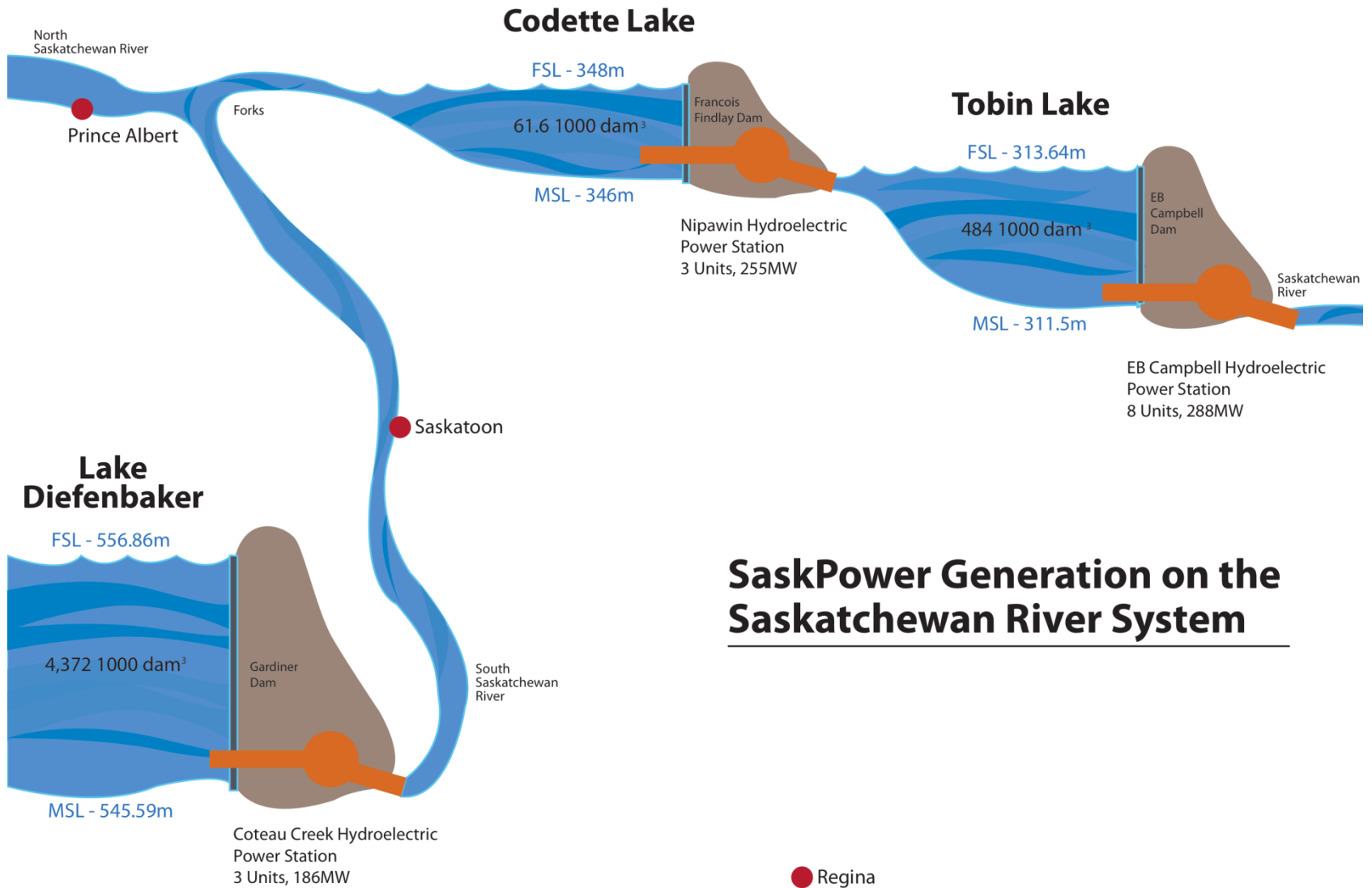


2011 GROSS ELECTRICITY SUPPLIED – 21,611 GWh

- | | |
|-------------|--------------|
| ■ COAL 54% | ■ WIND 3% |
| ■ GAS 19% | ■ IMPORTS 2% |
| ■ HYDRO 21% | ■ OTHER 1% |

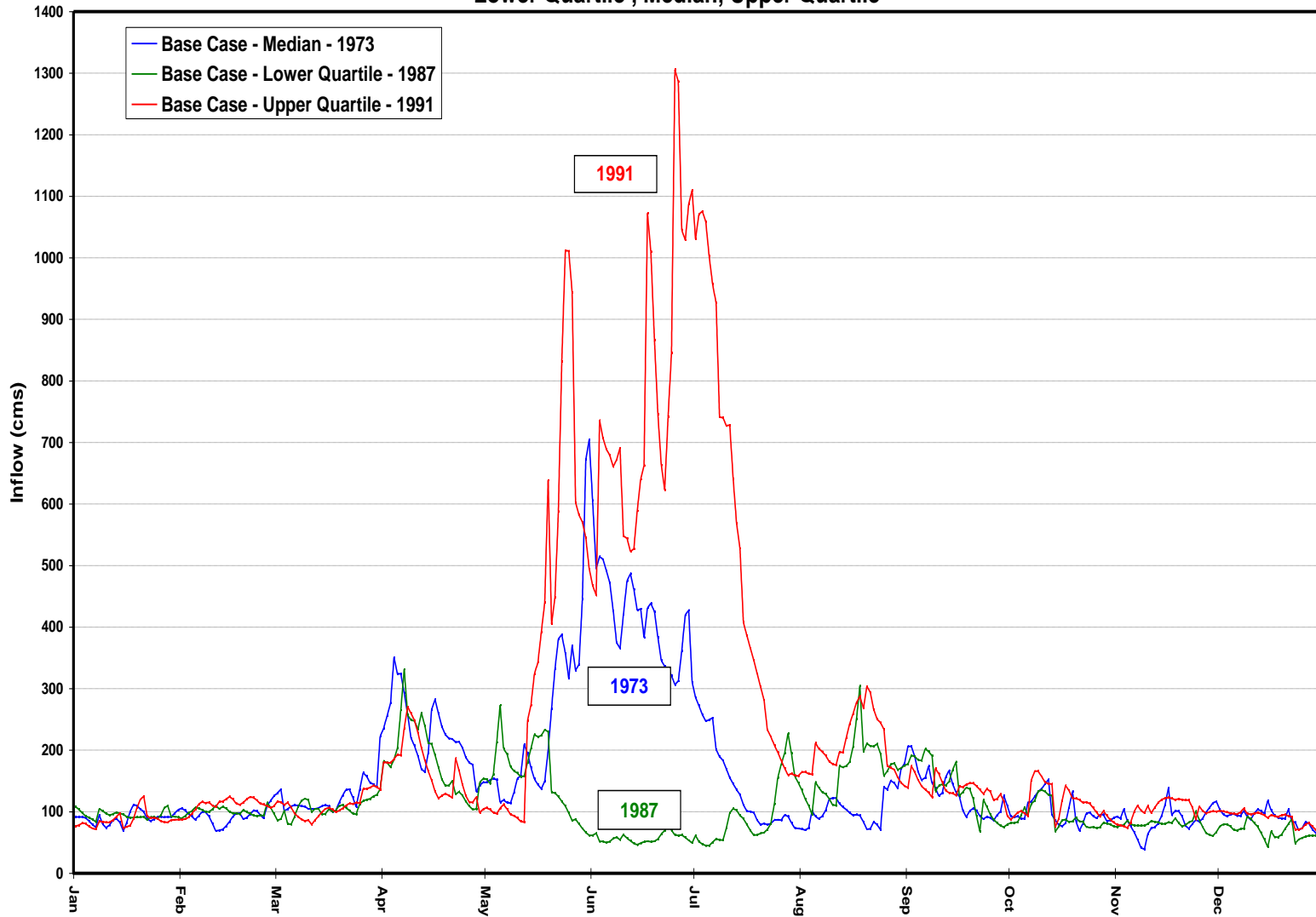
Operational Characteristics / Grid Impacts

- **Economic Load Shaping**
- **Operating Reserve**
- **Load Following**
- **Reliability**
- **Energy Limited**
- **Black Start**
- **Operational planning for releases from CC for cascade impacts on Nipawin and EB Campbell**

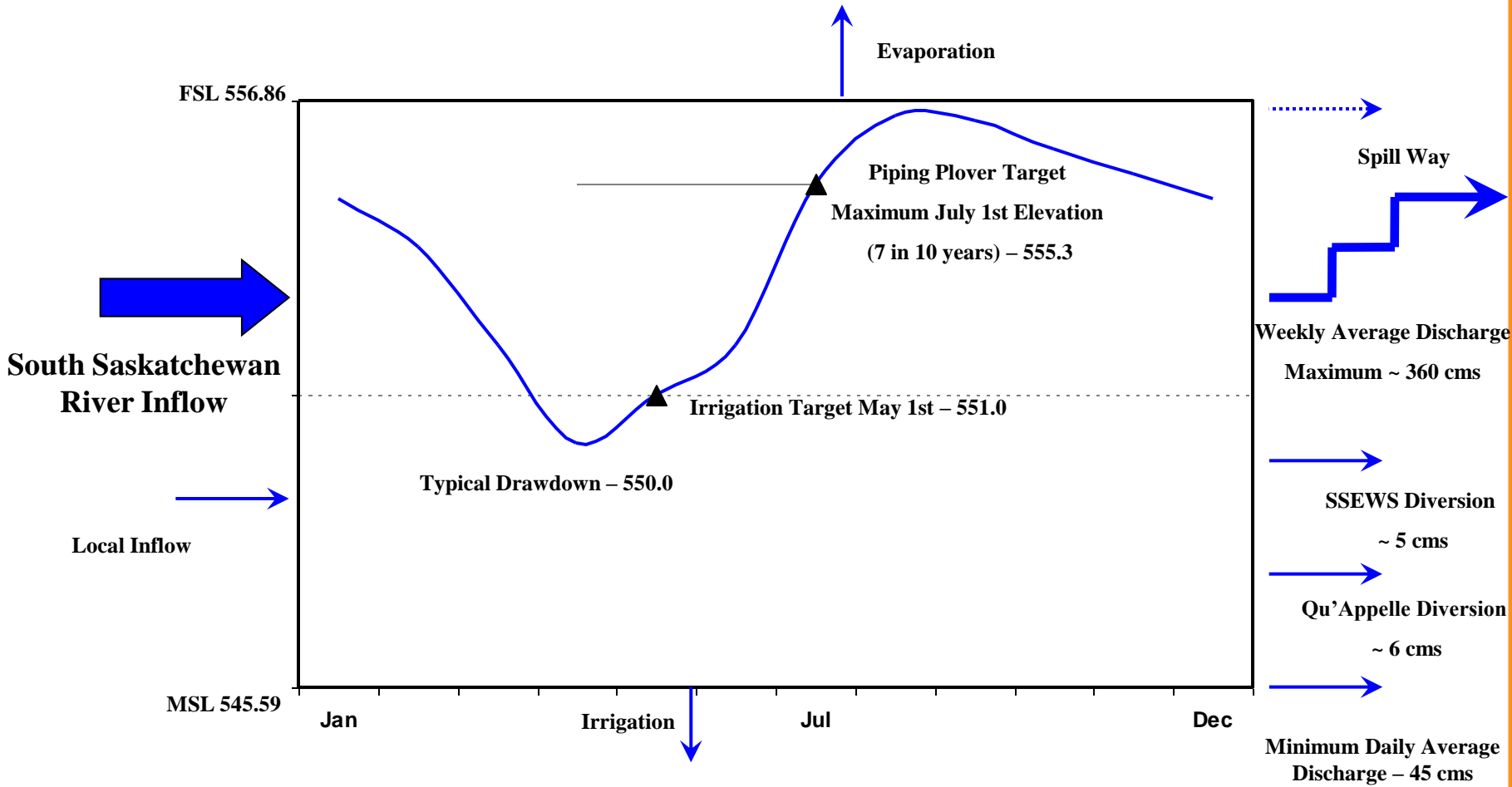


SaskPower Generation on the Saskatchewan River System

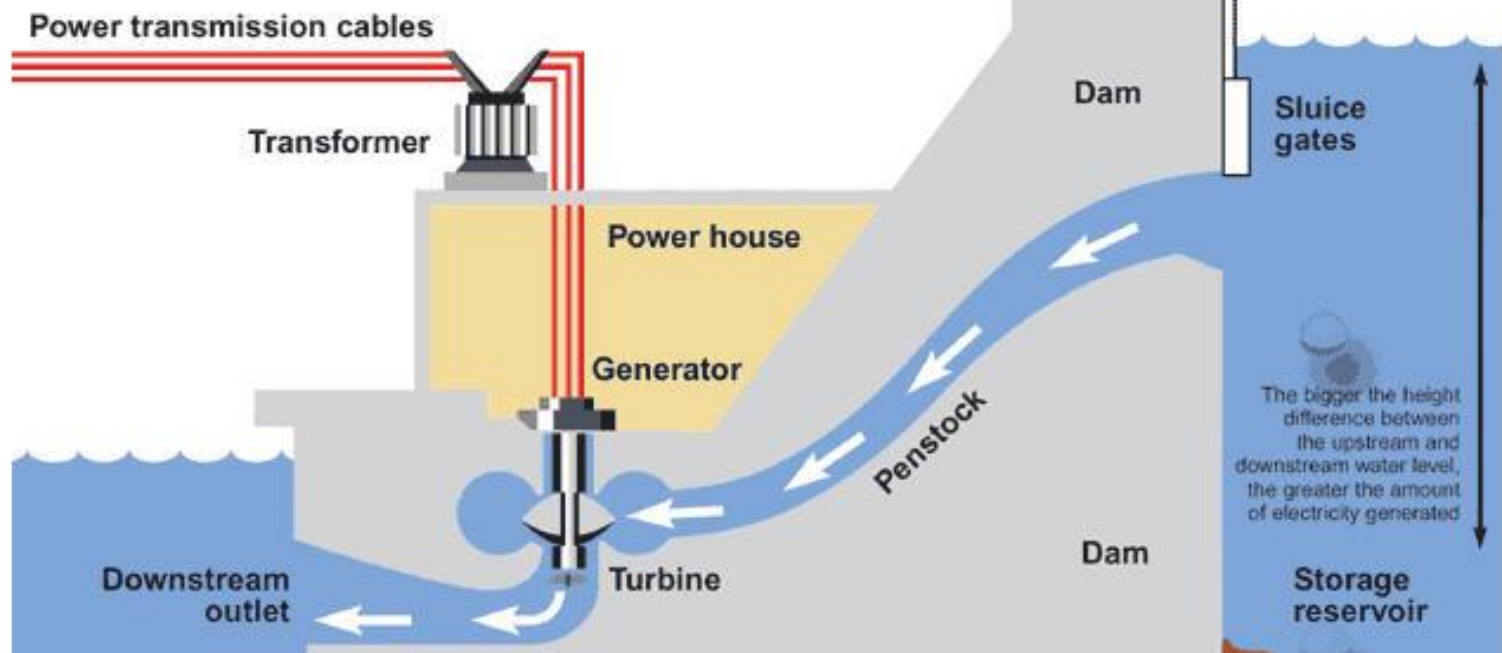
Lake Diefenbaker Inflow on South Saskatchewan River for Base Case Lower Quartile , Median, Upper Quartile



Typical Lake Diefenbaker Elevation



Hydroelectric power generation



Hydro Power

$$P = \rho * \mu * q * g * h$$

Where:

P - Theoretical power in (W)

μ - Efficiency (.7 to .95)

ρ - Density (Water – 1000 kg/m³)

q - Flow (m³/s)

g - acceleration of gravity (9.81 m/s²)

h - head (m)

Simplified

$$P = 9.81 * \mu * q * h \text{ (power in kw)}$$

Financial Impacts

- **1 m head = 1 to 2 Million \$/year**
- **Average reservoir elevation 553.5 m, and FSL 556.8**
 - **Average reduced head 3.3m or 3.3 to 6.6 Million \$/year**
- **1 m of water in the reservoir produces = 100,000 MWhrs = 3 to 7 Million Dollars**
- **1 cms = 9,400 MWhrs = \$250,000 to \$500,000/year**

- **Spill means what to SaskPower = lost opportunity, reduced head (higher tail race), safety concerns, environmental issues, reduced operation flexibility (increased costs)**

Environmental Impact

- **For each additional MWh of energy produced by Coteau Creek, means one less MWh of energy produced by burning a hydrocarbon**
- **Displacing energy from a simple cycle gas turbine**
 - 1 GWh = 600 tonnes CO₂
- **Displacing energy from a combined cycle gas turbine**
 - 1 GWh = 420 tonnes CO₂
- **Displacing energy from a coal fired generating station**
 - 1 GWh = 1,100 tonnes CO₂

Questions?

Thank you

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