

'Who has Seen the Wind?'

Public Policy and Renewable Energy Development Saskatchewan

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Presentation Overview

- **Will focus on Saskpower policies concerning electrical power generation.**
- **Discuss benefits of suggested changes to Saskpower policies.**
- **Like a detective story, trying to understand *why* Saskpower maintains their stance on independent power producers, especially wind energy.**
- **Perspective of well informed outsider looking in.**

Policy Definition

Policy: A plan of action adapted by a person, group, or state.

Government policy creates the investment climate and opportunity.

Saskpower energy purchasing policies

1) Small Power Producer Policy (< 100 kW)

- Limited to <100 kW turbines
- Buy-back rate currently \$0.031/kWh. Rate in 2003 \$0.0248/kWh.

2) Large-scale power generation (> 100 kW)

- Saskpower reviews and selects projects that are beneficial to them.
- Buy-back rate negotiable.

3) Environmentally Preferred Power

- Refers to small, independently developed and operated power stations, with goal of 45 MW by 2007
- In 2003, only 3 projects totaling 13 MW selected out of 52 submittals! In 2005, only 32 MW selected from 320 MW submitted!*
- Generally > 100kW, SaskPower reserves right to selection based on size, cost of power, technology, number of projects.

*Saskpower web site, Saskpower publication "Environmental Report 2005"

Saskpower policies toward wind power

There are two main reasons state by Saskpower as to why they cannot increase the amount of wind power allowed in the province:

1. They can not afford it.

2. Wind power is unreliable.

The rest of this presentation will answer *why*.

SaskPower Statistics*

Generating Capacity (2005)		
Type	Capacity (MW)	% Total
Coal	1653	47.2
Hydro	853	24.3
Gas	539	15.4
Wind**	11	0.3
Purchase***	449	12.8
Total	3505	100.0

Type	Electrical Energy Supplied			
	Energy (GWh)	% Total (2004)	Energy (GWh)	% Total (2005)
Coal	12302	60.3	11570	56.2
Hydro	2746	13.5	4573	22.2
Gas	876	4.3	734	3.6
Wind**	35	0.2	34	0.1
Imports	1531	7.5	1125	5.5
Purchased ***	2892	14.2	2558	12.4
Total	20382	100.0	20595	100.0

Lots of unused natural gas potential!!!

*"2005 SaskPower Annual Report".

**Centennial Wind Facility (150MW) came on line Fall 2005.

***Includes: Meridian Gas (210 MW), Cory Gas (228 MW), Sunbridge Wind (11MW).

A word about capacity factors

- **No power generator works 100% of the time.**
- **Capacity factors tell you what percentage of time it can run at full power output, typically coal ~85%, wind ~40%, natural gas ~90%.**
- **Saskpower has a huge amount of unused capacity right now with their natural gas resources – its capacity factor is running at about 15%! They are expensive to run at high capacity, but are a good resource to balance the grid as demand goes up or down.**
- **That means they are a great match for distributed wind power**

Wind power overview

- **Worldwide, wind energy is growing at 30%/yr***
- **Cost to produce electricity from wind have drop 80% in the last 20 years***
- **Small wind turbine sales (1 to 5 kW) are increasing 50%/yr in the US****
- **Right now, there are 2 wind turbines and 4 solar units grid-tied in the whole province!*****

*National Energy Board

**<http://www.windenergy.com/>

*** That fit in the Small Power Producer Policy

Our future power needs

- All power generation sources must be replaced or renewed in the next 25 years.*
- Electrical demand is going up at 1.5%/yr (45 MW/yr)
- A coal boiler is to be de-commissioned in 2012 (~300 MW).
- A coal boiler it to be de-commissioned in 2016 (~300 MW).

Right now, Saskpower believes the only viable supply alternative is clean-coal.

A word about “clean-coal”

- **Wind energy is a well established technology at much lower risk and expense than clean-coal**
- **A clean-coal plant costs approximately \$1.5 billion* and supplies 2200 GWh of electrical energy per year.**

Dollar wise, that’s equivalent to

- **Six Centennial Wind Facilities (500 large wind turbines) supplying 3100 GWh of energy.**
- **A 500W grid-tie solar unit for every house in Saskatchewan (400,000 units) supplying 450 GWh of energy.**
- **Seven Canadian Light Source (synchrotrons).**

*Leader Post March 31, 2006.

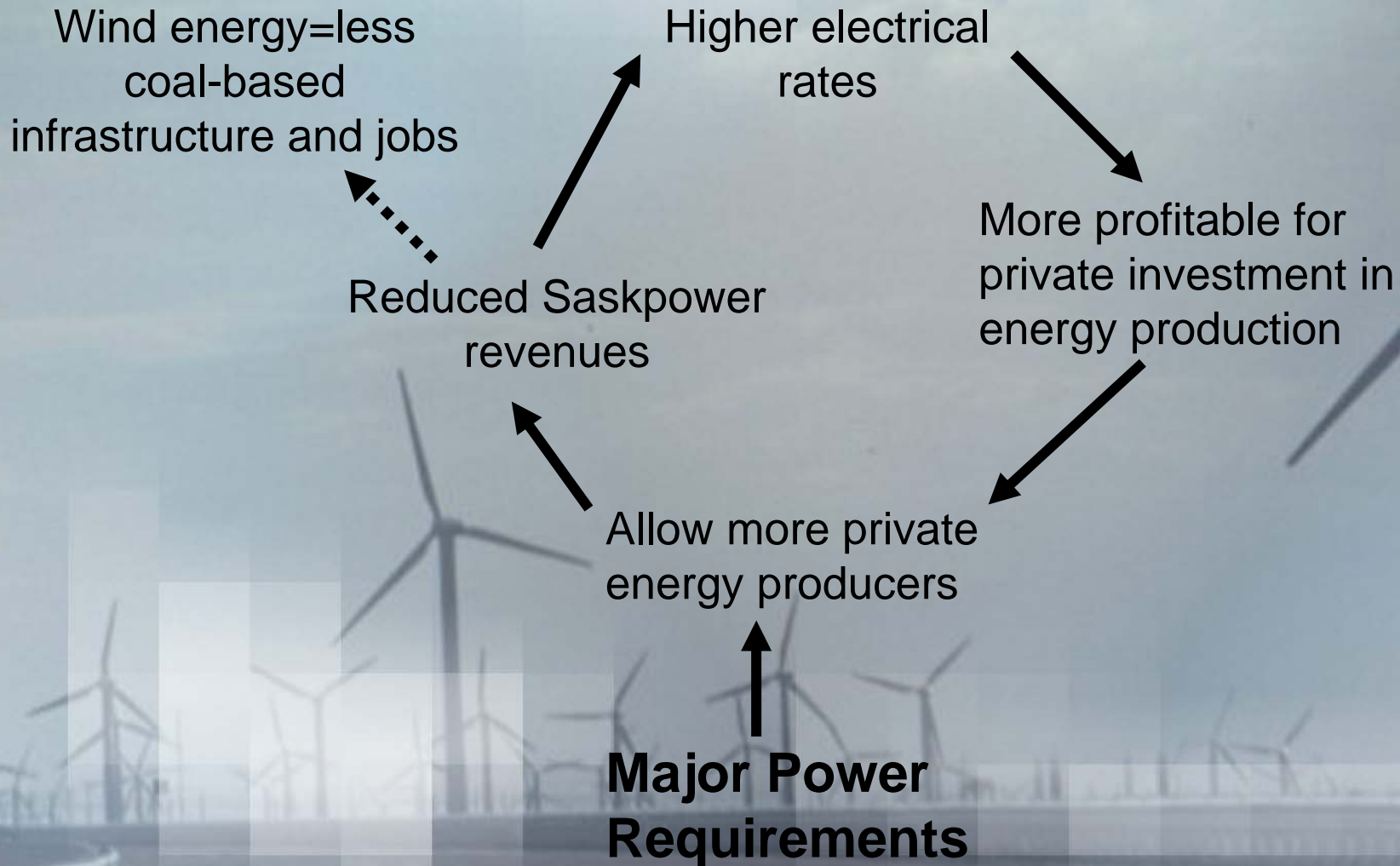
Notes on Saskpower's annual statements*

- Long-term debt \$2.2 billion – or \$920,000 for every full-time Saskpower employee.
- Long-term debt is growing at 3.3%/yr (five year average).
- Finance charges are \$150 million/yr – or close to \$0.01/kWh.
- Finance charges account for over 11% of all expenditures.

Why am I telling you this? Because it affects policy!!

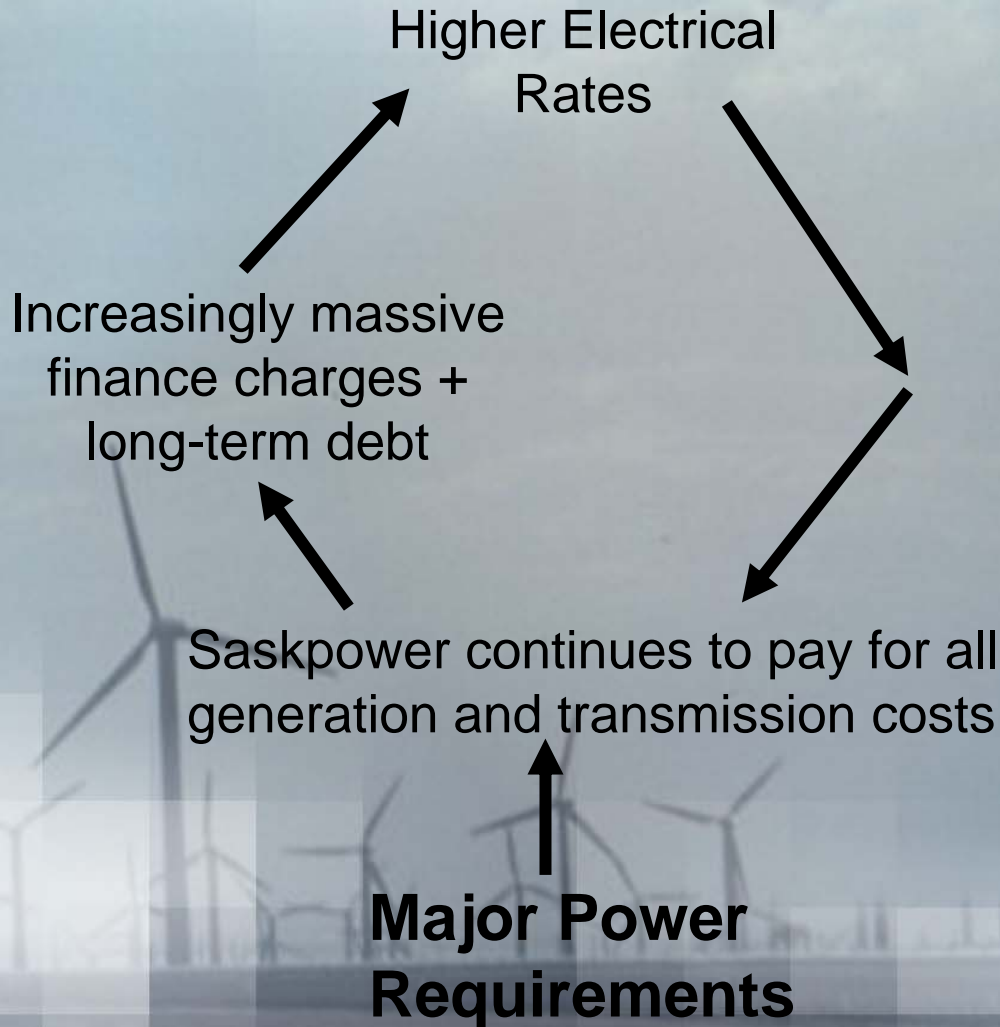
Inhibitors to private power investment

Option 1: Saskpower allows significant private investment in energy production (without restructuring)



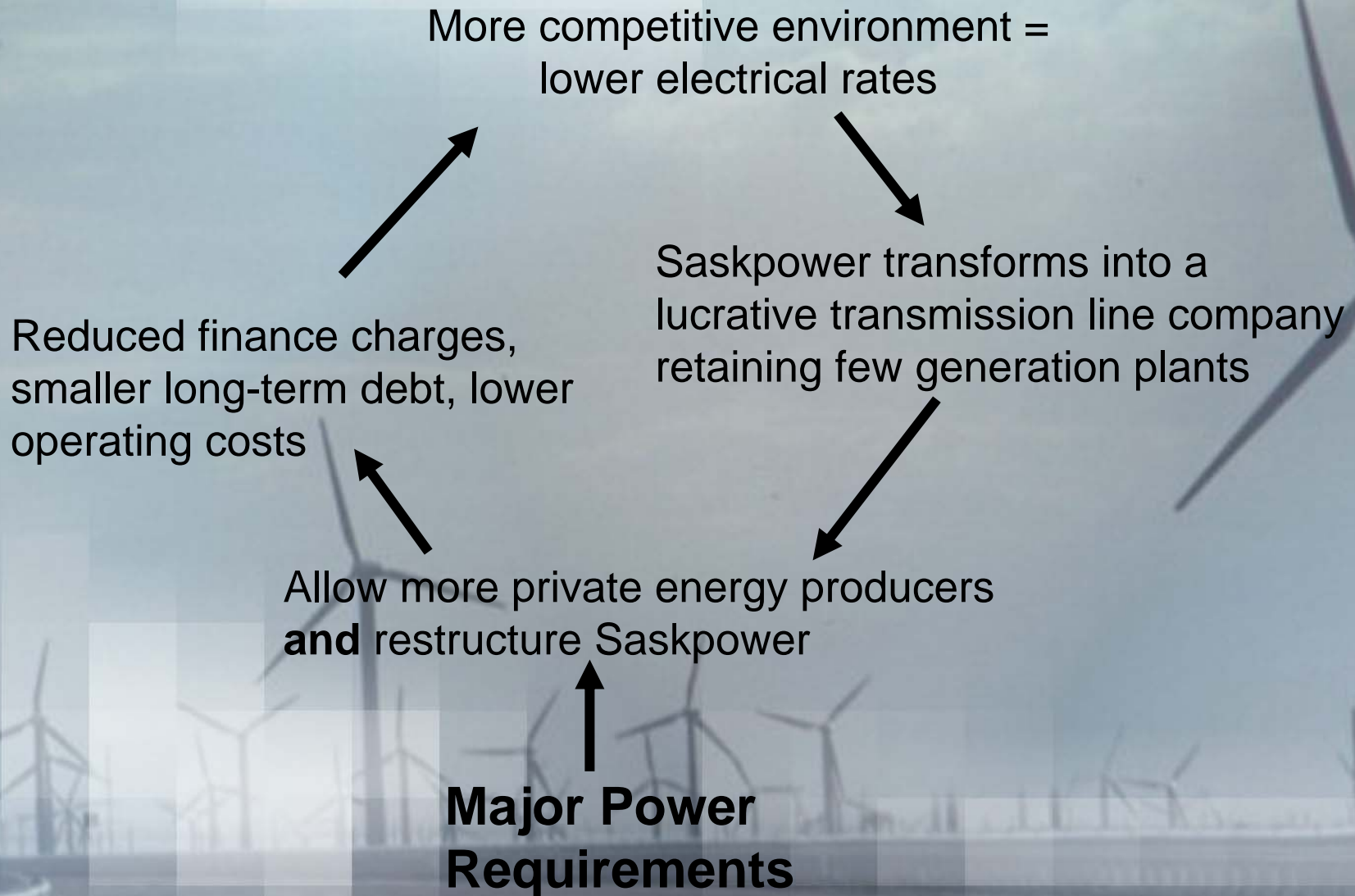
Inhibitors to private power investment

Option 2: Saskpower continues to “go it alone”



Incentive for green energy investment

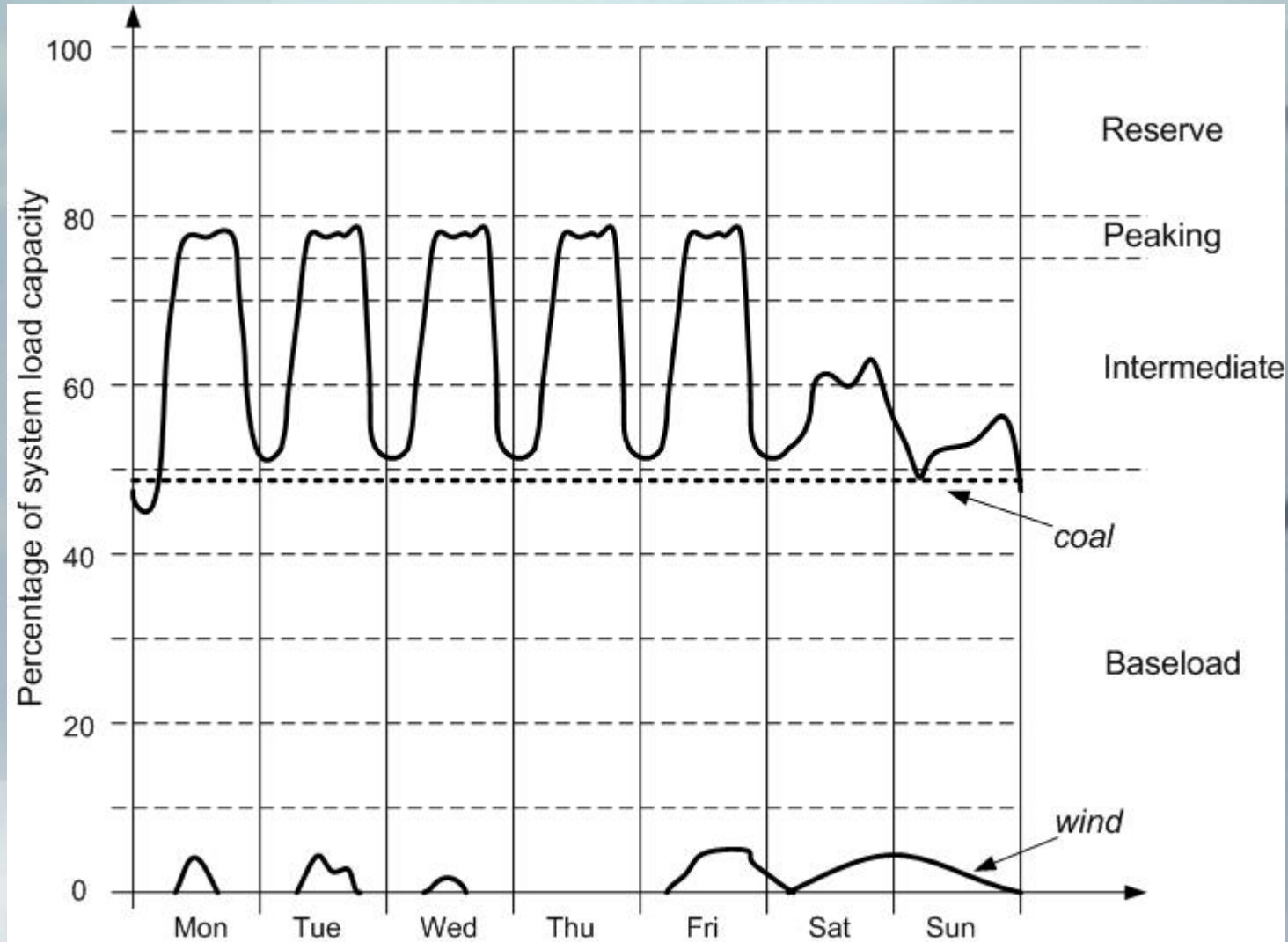
Option 3: Downsize Saskpower and allow outside investment



2006 Distribution of large wind turbines

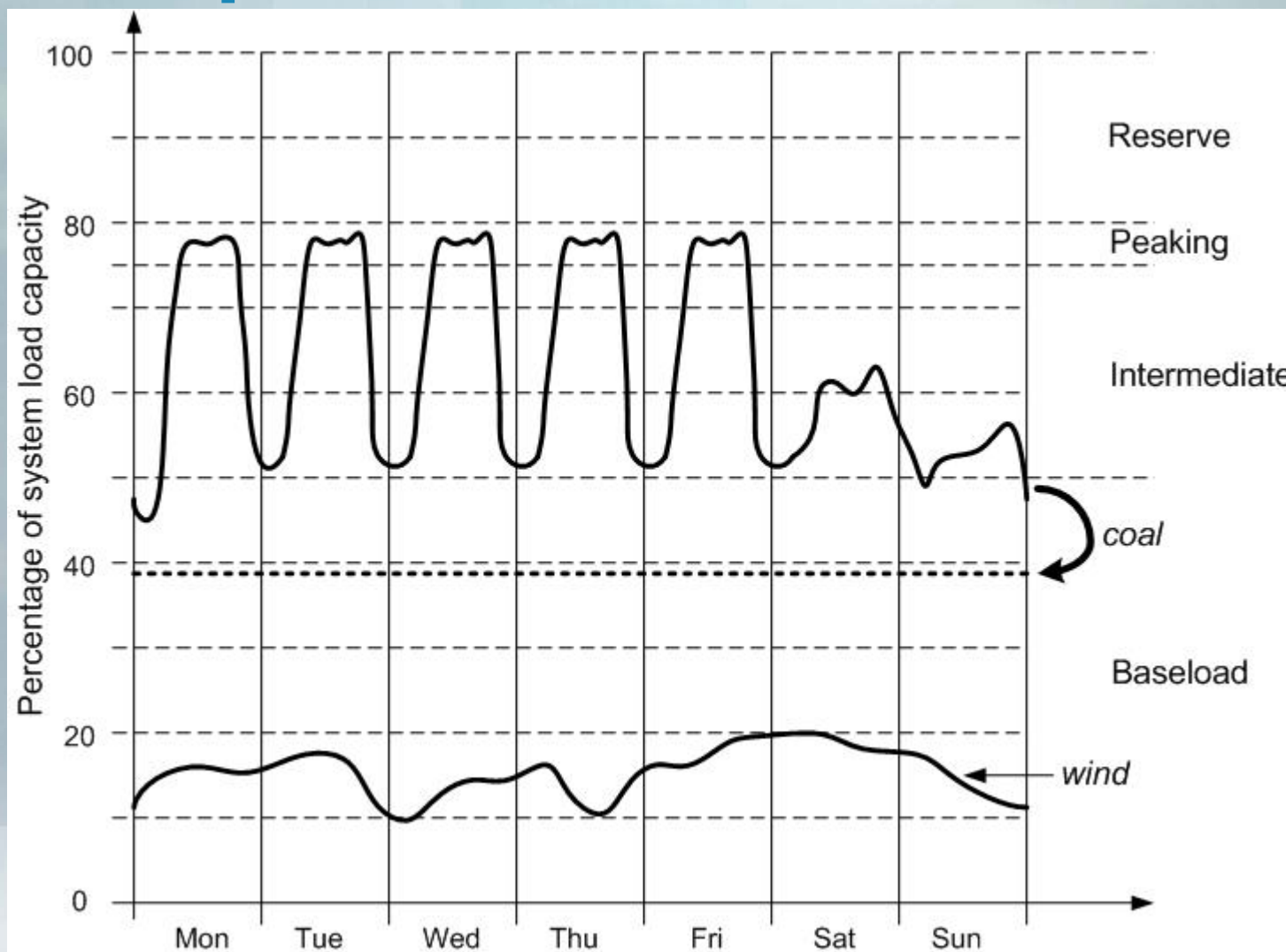


Simplified power chart (current)



Adapted from "Basic Electric Power Engineering", O.I. Elgerd.

Revised power chart w/ distributed wind



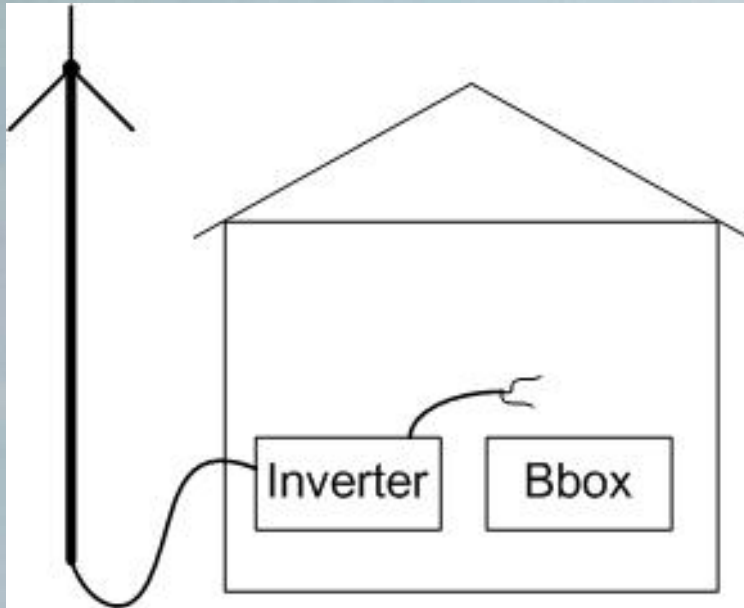
By utilizing natural gas backup and stored hydro capacity intermittently, the power supplied evens out with the potential to de-commission a coal boiler!

Notes on distributed wind energy

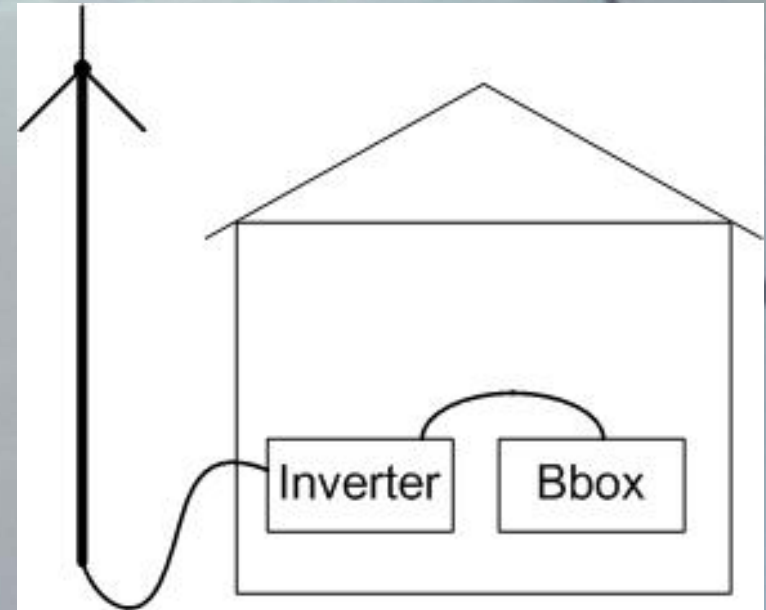
- Right now, for every kWh of grid energy spews 0.56 kg of CO₂, or 4,500 kg (10,000 lb) for the average home in Saskatchewan. Wind power produces none of these*.
- Supplying grid power with wind energy requires a long-term commitment to wind energy. One moderate size wind farm in one location is too unreliable.
- A distributed approach leveraging the awesome potential of private investment will work to the advantage of the Saskatchewan consumer and the environment.

Why are there no small wind turbines in Saskatchewan (current)?

2 hours to install



6 months to install!



Small energy policies (< 5kW)...there is hope!

	Current Policy	Future Policy (Expected)
Buyback Rate	\$0.031/kWh	Likely >\$0.04/kWh
Permitting 1 to 5 kW generation	Cost: >\$300 Time: >6 months (two studies)	Cost: <\$100 Time: Immediate* (one page form)
Incentives ie. grants, tax breaks, etc	None	None

*If using a Saskpower-approved inverter

Everyone can benefit in large-scale private wind energy investment

- 1. Private investors win on profitable investment in wind energy**
- 2. Saskatchewan wins in job creation, healthier environment, and more competitive electrical supply of power**
- 3. With the right policy, Saskpower can win since they are needed to tie turbines into the grid, provide dynamic power management, maintain the grid, etc.**

Summary of points

- **Saskpower is making significant progress on small independent power generation (< 5 kW)**
- **Clean-coal will be a cornerstone of our energy future, but in the near-term is far too risky and expensive relative to moderate development of our wind resources**
- **Current policies for large, independent generation likely not going to change significantly in the near term**
- **Sixty years ago a policy created Saskpower, the only way to significantly restructure a monopoly is with a government policy (amendments to the Saskpower Act)**

Some benefit of large-scale wind energy investment

1. **Revitalizes rural Saskatchewan by increasing property value and cash flow.**
2. **Creates jobs such as: wind assessments, installation, maintenance, turbine and tower manufacturing.**
3. **Reduces greenhouse gases by using less fossil fuels.**
4. **General public can do something tangible to help themselves and the environment eg. installing solar panels on the roof.**
5. **Potential impact on First Nations land could be significant since almost all land becomes more valuable.**
6. **Distributed power reduces SaskPower's loads (loads turn into sources) which would in turn reduce overall system losses.**
7. **Reduces SaskPower's costs by reducing need for dirty and/or expensive coal plants running all the time (dynamic power).**

Other thoughts

- Based on US experience, small wind turbine deployments work best when several incentives work together such as: 1) enabling policies (net metering); 2) incentives (grants, buy-back rate increases); 3) technology development (R&D, testing, assessment), and 4) public awareness and education (wind atlases, pamphlets, installation guides, guides to local permitting and metering, etc).
- One can think of wind turbines as energy wells in the sky. Both oil and wind systems can be assessed for their potential before investment, farmers/ranchers can lease land for both, both have man-made structures distributed in landscape, and both can be viewed as desirable and increase property value. But unlike oil wells, wind plants never run out of fuel, and the “mineral rights” belong to the one who owns the plant.
- The electrical energy consumption increase of adding one oilfield pumpjack is roughly equivalent to 100 residential geothermal units.
- Legislation is in place where SaskPower must provide transmission capability for wholesale green energy transmission. However, they are reluctant to provide this service, so much so that the City of Swift Current is taking SaskPower to court over their lack of providing transmission service. For a very interesting outline of the issues, see:
[www.city.swift-current.sk.ca/pdfs/cityhall/light\\$power/statementofclaim10-251.pdf](http://www.city.swift-current.sk.ca/pdfs/cityhall/light$power/statementofclaim10-251.pdf)

Electrical rates expected to go...higher

Average residential electrical rate increases per year (not inflation adjusted):

1970-1993	4.90%	
1993-May 2005	2.45%	(Natural Gas 5.6%/yr over same period)
1970-May 2005	4.05%	
2006 January	7.50%	

1. Aging infrastructure*
2. Keeping up with power demand*
3. Fuel accounts for 42% of SaskPower's expenses. Natural gas provides 20% of power consumption but costs 50% of all fuel costs (combining SaskPower gas-fired plants with Meridian and Cory independent producers)*.
4. Paying only the *interest* on current debt makes up 12% of SaskPower's expenses. Long-term debt is still increasing 3.3%/yr (five year average).
5. Kyoto accord will cost Saskatchewan taxpayer \$30-40M/year starting in 2006 in the form of energy credits**.
6. The NDP government has committed to having 33% of our energy come from renewable energy sources by 2030.**
7. All power generation sources must be replaced or renewed in the next 25 years.**

*"Important Information About Our Electrical Rate Application" August 2005 SaskPower mailer.

**Star Phoenix article "Caught in Kyoto Crunch" 12/3/05.