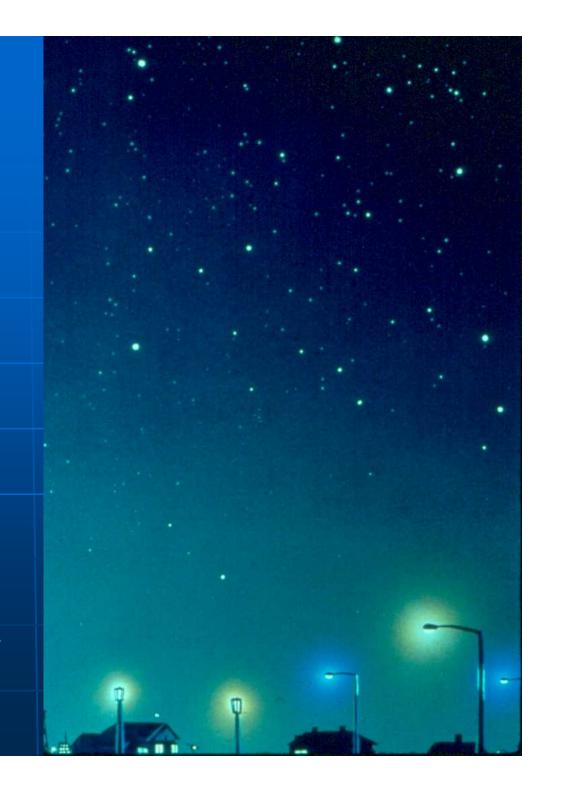
Light Pollution Energy Reduction and the Environment

Richard Huziak

Saskatchewan Light Pollution Abatement
Committee
Rural Preservation Association of
Saskatchewan

Energy Management Task Forces
Breakfast Meeting
May 5, 2010



Saskatchewan Light Pollution Abatement Committee



Joint committee of the Saskatoon and Regina Centres, RASC

- Cypress Hills Dark-Sky Preserve (2004)
- Grasslands Dark-Sky Preserve (2009)
- Saskatoon Comprehensive & Integrated Dark-Sky Policy (2008)
- co-challenge to EMPA, 2002 about casino lighting (2008)
- co-applicant for Sask Environmental Code (2009)
- nose in various lighting projects

Rural Environment Preservation Association of Saskatchewan



Community group opposed to (casino) lighting invading country & city space

- co-challenge to EMPA, 2002 about casino lighting (2008)
- co-applicant for Sask Environmental Code (2009)
- assist SLPAC with other lighting projects

What is Light Pollution?

Light that shines where it is not needed or wanted.

It also includes light that is too bright.

All light pollution is CONSERVABLE WASTE

Much light that is NOT considered light pollution is also conservable

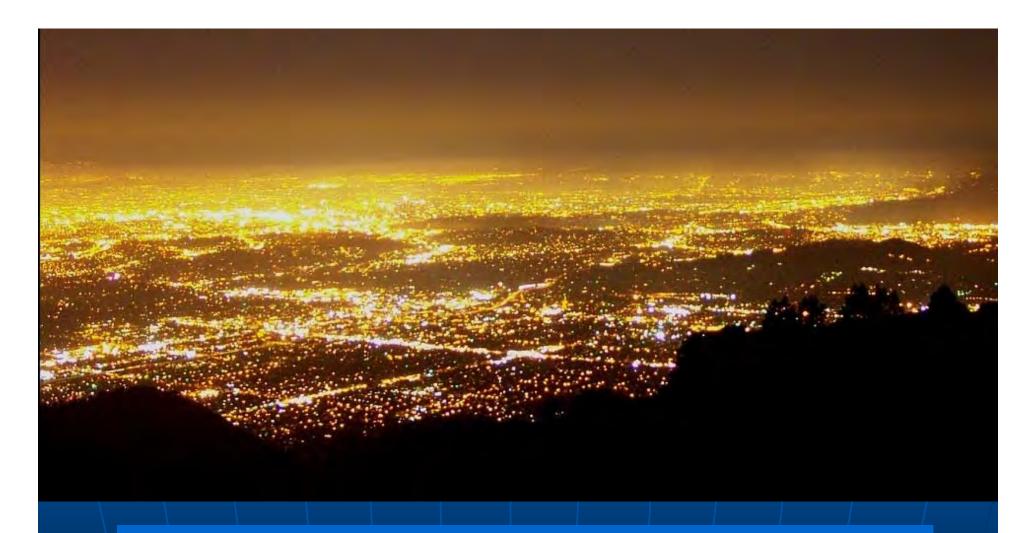




from Mount Wilson Observatory

1908

Source: Int'l Dark-sky Association

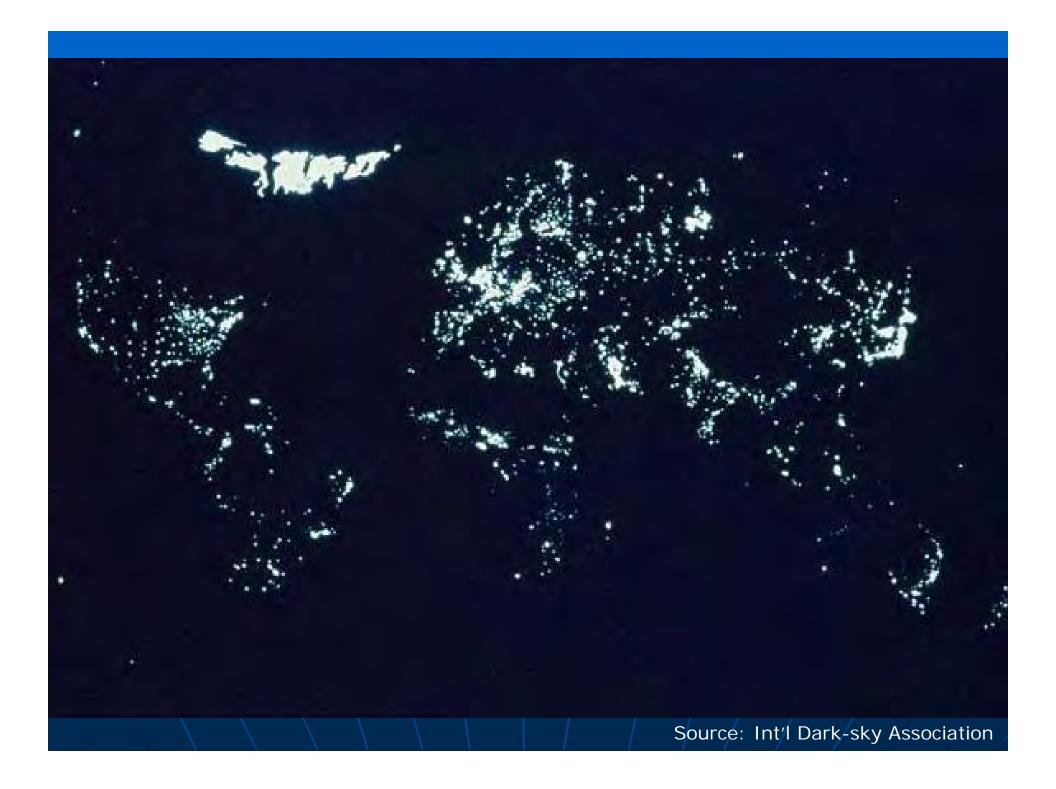


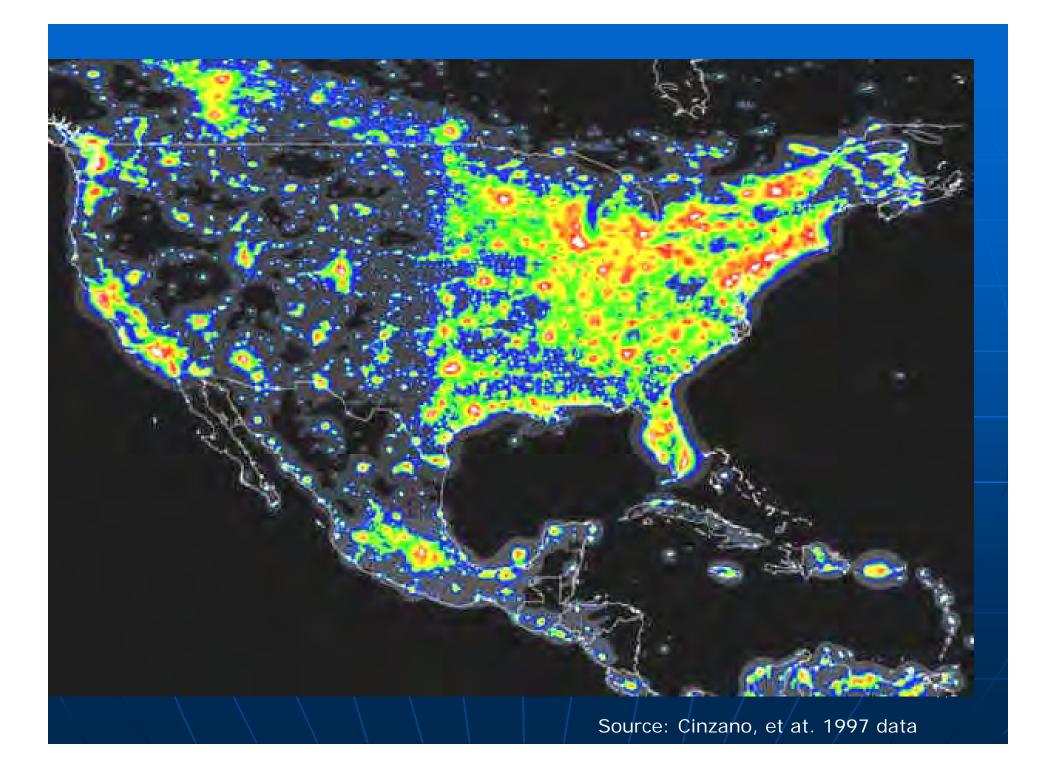
Los Angeles from Mount Wilson Observatory

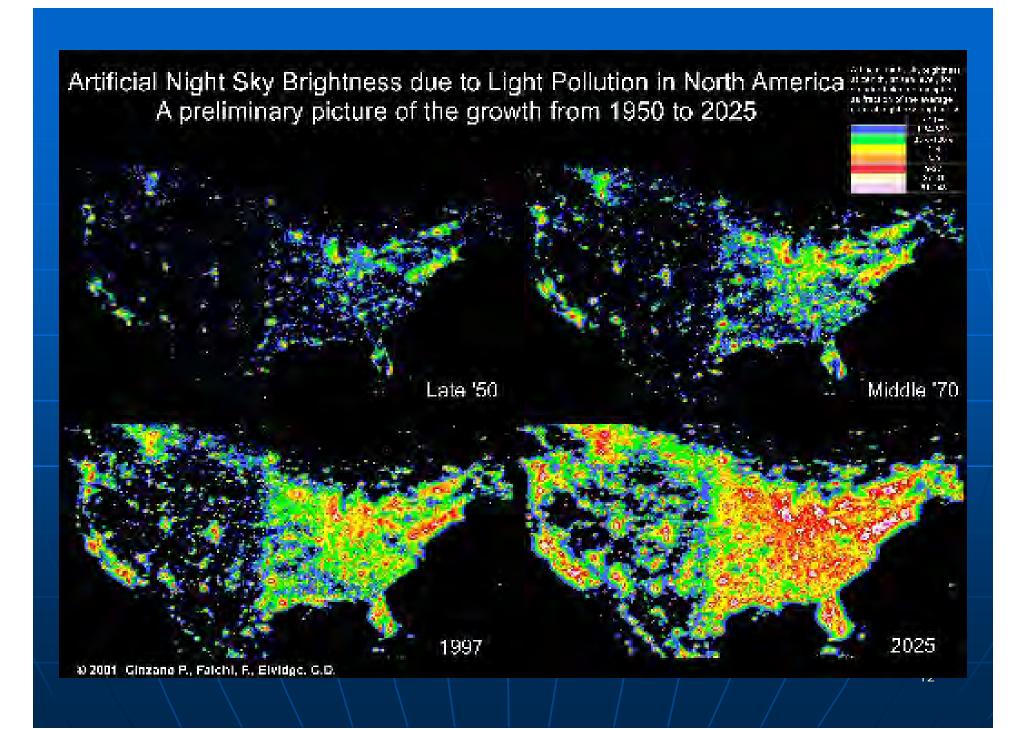
2006

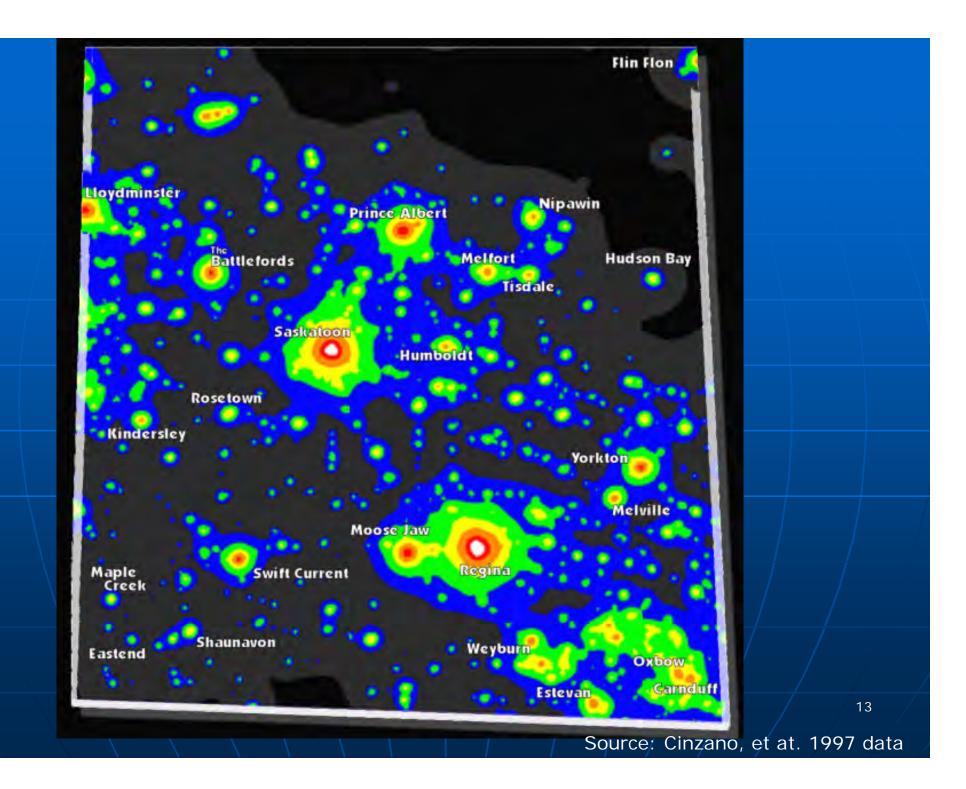












"Fire hydrants leaking 40% of our water would create an outcry. Winter heat escaping through wide open windows would cause neighbors to question our intelligence. Yet the 40% of electrically-generated light leaking from typical fixtures uselessly off-property and into the sky continues."

LCourier-Journal editorial, publishedApril 3, 1999.

The Cost of Inaction to Control Slide 18 Light Pollution

\$90 – \$115 billion annually worldwide in WASTED light.

(This does not include potential savings from better-designed lighting practices) Study – *The* \$230-billion Global Lighting Energy Bill – E. Mills, 2002

\$10 billion in North America alone (Source: IDA)

\$45 -\$100 million in Canada (Cinzano, 1998)

>\$500,000 for City of Saskatoon (estimate based on other cities – includes city, business, residential waste only – not reduction)



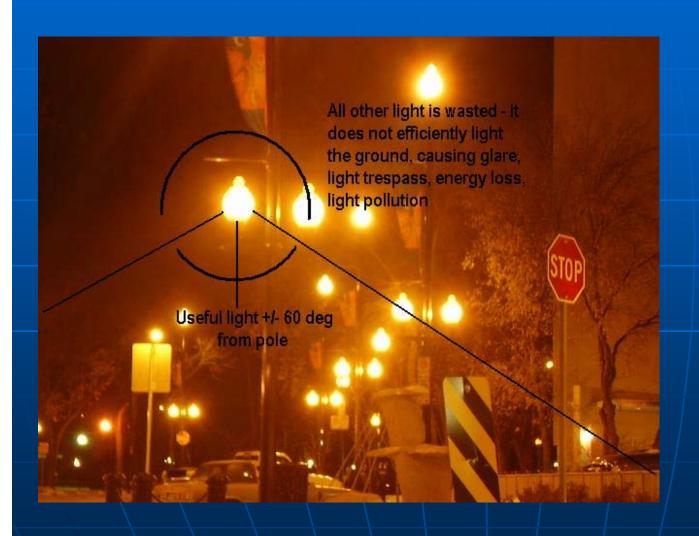


Modern society generally desires outdoor lighting in our environment to provide:

- safety
- security
- utility
- advertising
- decoration



Light Pollution 101



Useful light for human use is in a +/-60° cone downward.

Glare

Light directly seen from fixture is called "glare"

Sadly, equated with good lighting!

This light is 500 watts – 25 watts is sufficient!



Over- Lighting

Recommend levels are

- 5 foot-candles (fc) in dark env.
- 10 in bright env.

This one ~60 fc



Is this necessary?

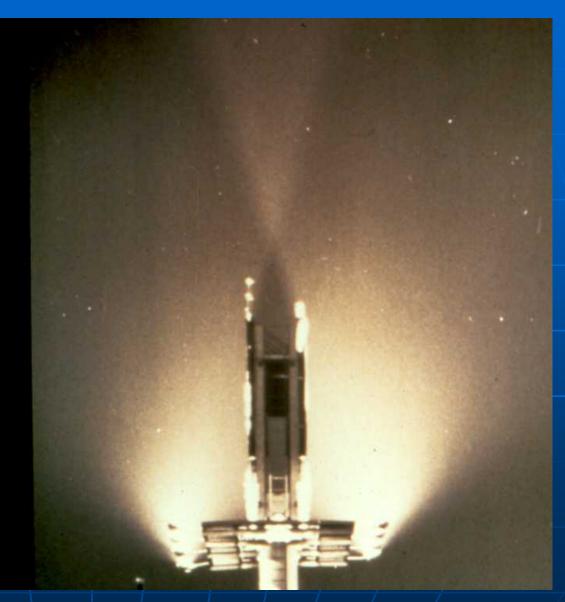
Almost inevitably, over-lighting is due to name-branding!

Swift Current FasGas

Up-lighting

Light shining into the sky creating urban sky-glow.

Wouldn't it be more effective to put the lights above the sign pointing down and actually point them at the sign?



Source: IDAP



Over-light and Up-lighting!

The spotlights are for advertising only

– not necessary for safety, security, utility

The parking lot can be safely lit with 1/10th the light currently used



Reports surface of migratory birds caught in the Yorkton casino's lights, with "literally thousands*"

littering the surrounding blocks. (The casino's new location is only 100m from a nature preserve!)

* Yorkton News Extra, Sept 11, 2008 (palm warbler)



Light Trespass & Nuisance

Light that shines off the property where the light fixture is located

The sports lights are located 2 km away!



Source: IDA

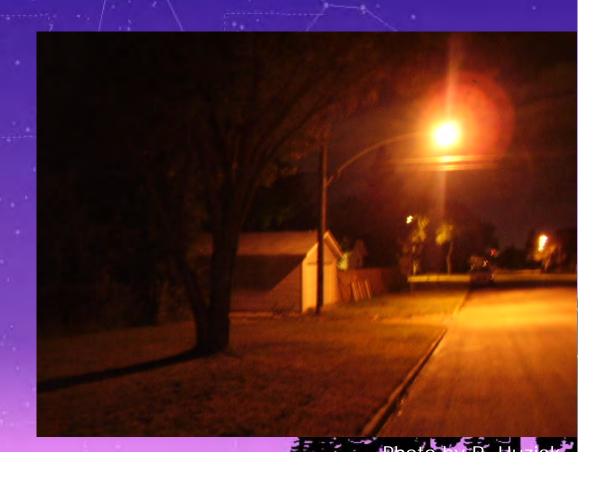
Myths

MYTH: Light at night prevents crime.

No it doesn't! Light by itself only prevents crime if it promotes human activity in the area. When people go home, crime comes out. Shut off lights and *stop* crime! Crooks who need flashlights look awfully suspicious! All-night lighting promotes crime because *they* are up, and you are not! Light shows the way! 85% of crime occurs during the day anyway, so why do we waste so much power lighting the way for crime at night?

Personal Experience: (6 years in the life of Rick at 127 Maple Street)

- 2 house break-ins
- 2 garages spray-painted
- Car break-in
- Car windows shot out
- Streetlight was on all the time and prevented nothing!



MYTH: Lights stop graffiti

(Lights promote it!)





Graffiti artists carry flashlights, anyway! Why help them?

MYTH: Light provides for good security.

Not necessarily! If this light provides security, why didn't anyone come out to ask me why I was crawling around amongst the cars at MIDNIGHT? CPTED principles promote GOOD lighting *AND* surveillance, and admits light



MYTH: More light improves visibility. Not necessarily!

At night your eyes switch from using their daytime cones to their low-light-sensitive nighttime rods. So your eyes work better in lower light that is free of glare. More light causes you eyes to try to use daylight cones again, which are not sensitive at night. This produces poor vision, eyestrain and poor contrast. Light should be subdued and *non-glaring*. Move from this view to a nearby darker area. Can you

see?





LIGHTING STORIES

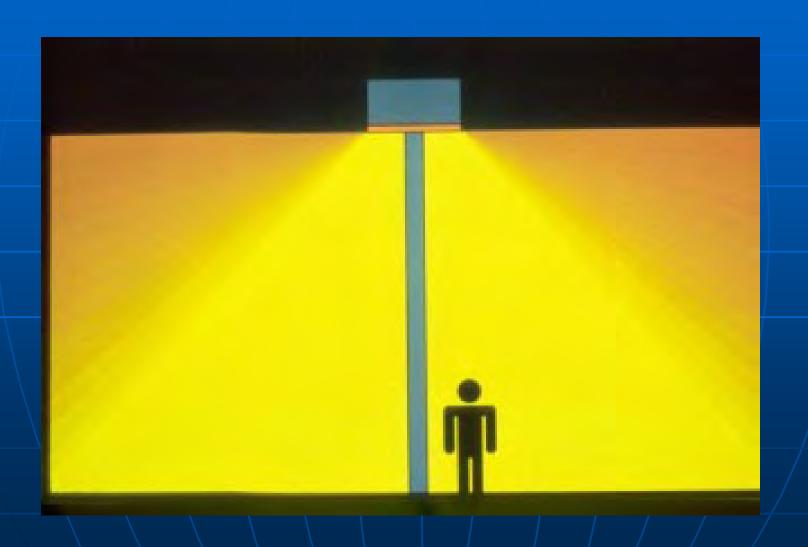
In 2010 a State College, PA councilor appeals to have a lighting upgrade in a public area, *intended to reduce crime* removed after violent crime (sexual assaults) increase by 350% over the three years since the upgrade.

In 2004 Chicago spent \$8 million to improve alley lighting downtown to prevent crime and crime soared upward by 21%! (75W >> 250W!)

In 2003 Des Moines could not afford their streetlight power bill. Over protests of increased crime, they turned off every 3rd streetlight. Overnight, the crime rate fell 7% (and they save 1/3 of their power bill).

In 2002 Calgary began spending \$7 million over 5 years to replace antiquated, wasteful, poorly-directed lighting and they are saving \$1 million per year.

Responsible Lighting



Good Neighbour (Responsible) Lighting

(hundreds of good fixtures available)

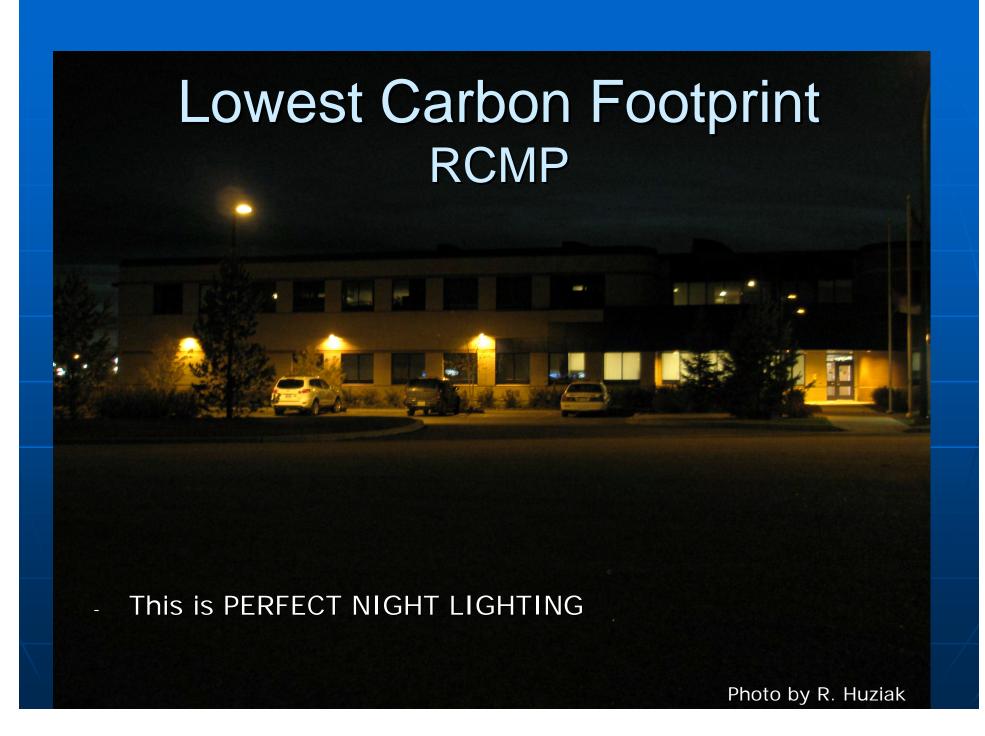


Strive for

Lowest Carbon Footprint RCMP Building (Circle Drive S)







Hampton Village

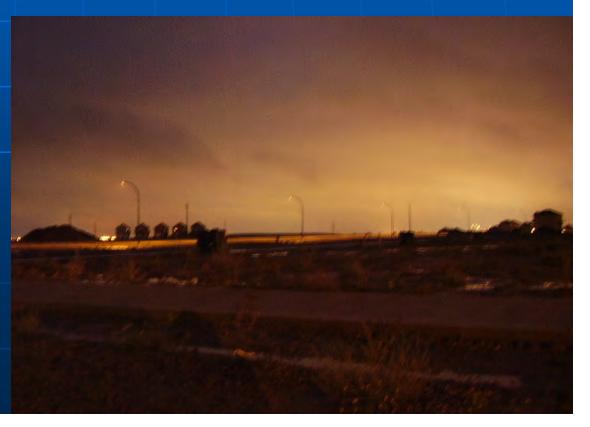
(This was a pilot project for LPA in Saskatoon)



37th Street abutting Hampton Village

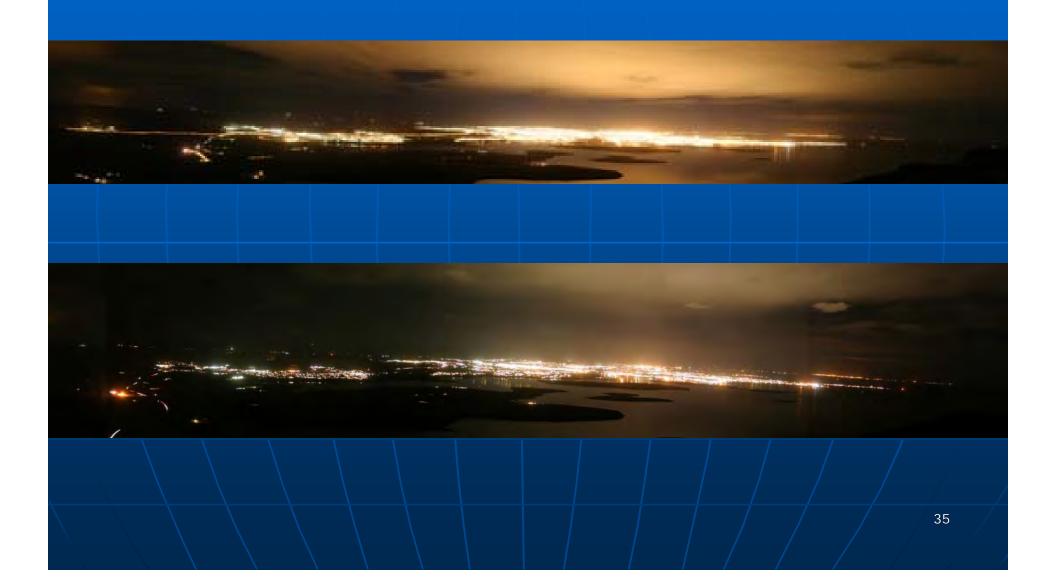
- glare
- waste side light

Hampton Village *no-waste* full cut-off lighting!
Aug. 2008 – Dark-sky policy.



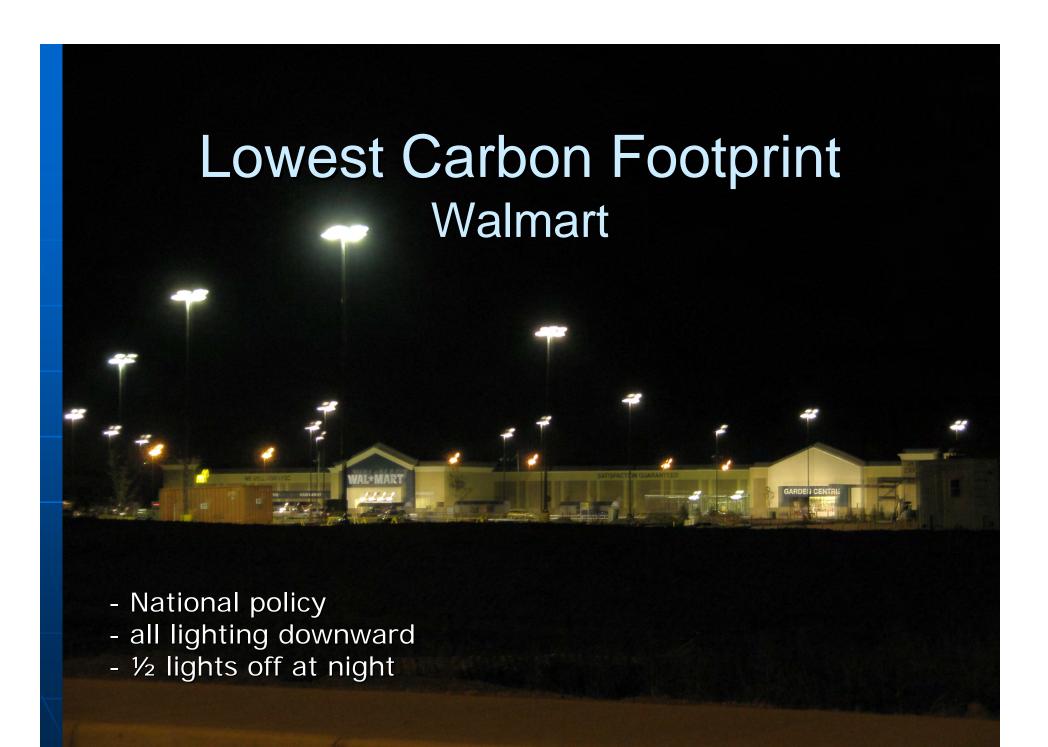
Reykjavik, Iceland Sept. 2006

(Streetlight contribution >30%)



Lowest Carbon Footprint Walmart



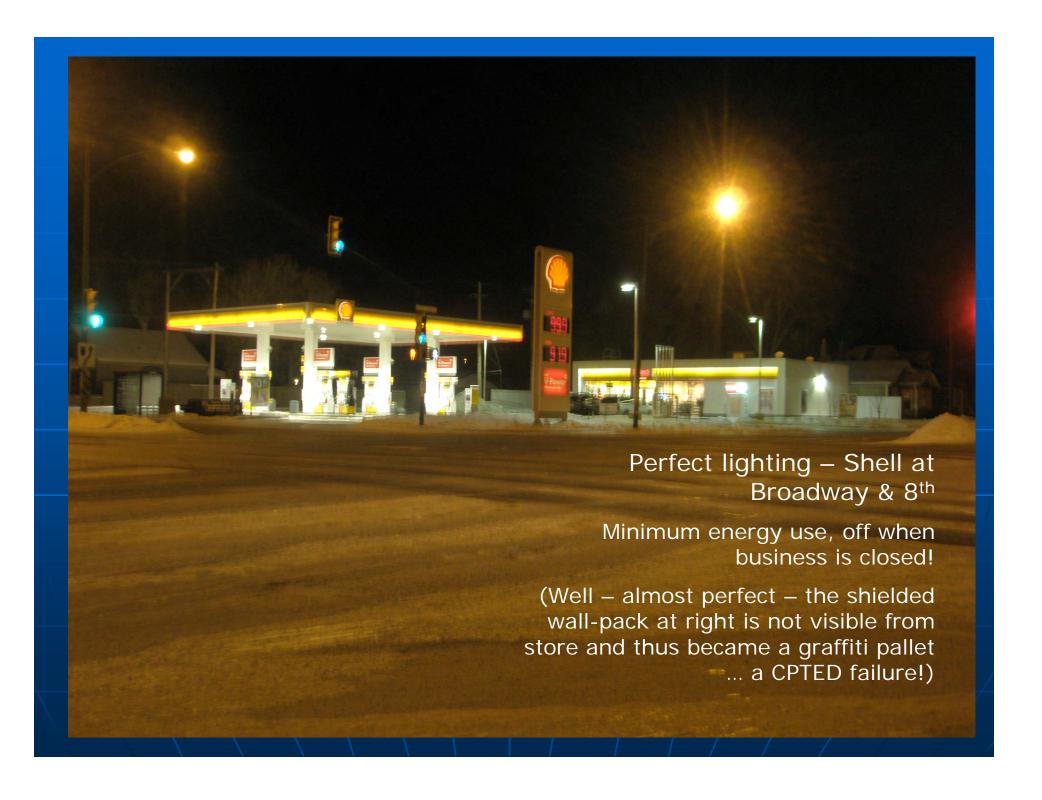


Strive for

Lowest Carbon Footprint Car dealer!





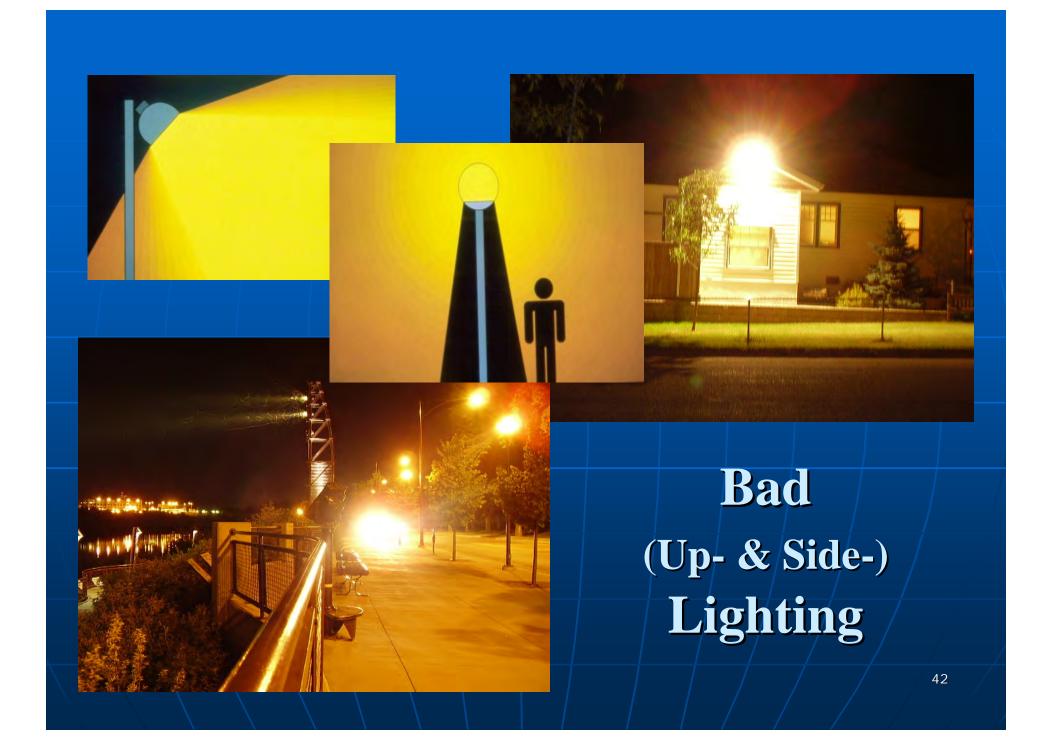


Saskatoon Soccer Centre

Attridge Drive – Awesome!

Perfect sports lighting on field, in parking lot and on building exterior.





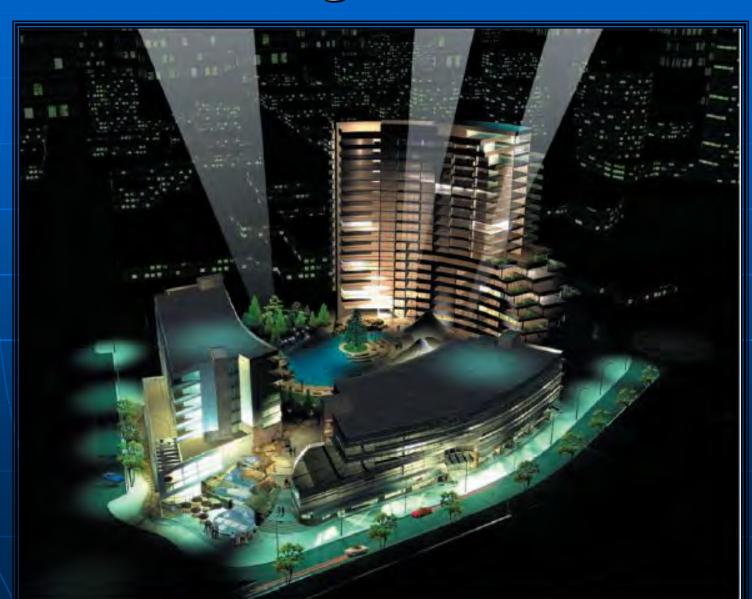
"Bad" Lighting

(Opportunity for elimination)

- Glare
- Light trespass
- Too bright
- Waste light (up-light, side, over-light)
- All-night
- Unnecessary (erected for wrong reason)
- Advertising & Decorating!

River Landing Parcel Y

Are we seriously going to have wasteful, annoying spotlights coming out of this?



<25% of this light is useful



Source: IDA



No one is using these loading bays. Why aren't these lights off or on motion sensors to conserve power?

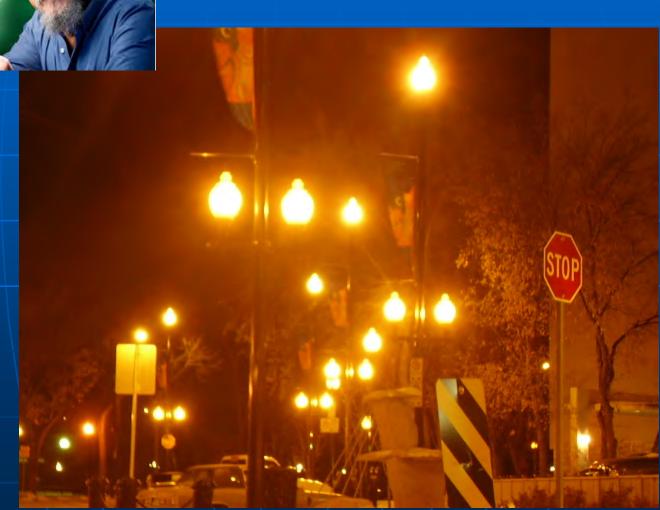
(BTW - they do not accept shipments after 5 PM!)





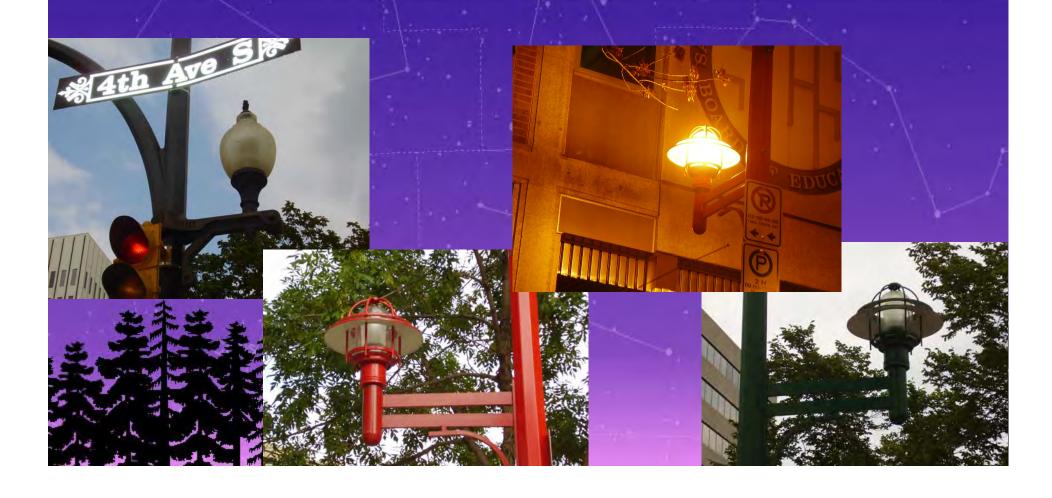
^^^ Indoor realization

Outdoor unshielded light >>>





Globe & acorn luminaires splay light upward unimpeded. Power consumption on some blocks went from 900W to 2400W in some areas. Chosen to *look good in the daytime*!!





Advertising - "opportunity lost"

The spotlights at all 6 casinos will produce 242,433 kg (242 tonnes)* of GHG CO2 atmospheric emissions annually. Estimated cost of operation is \$112,375* annually.

Could eliminate spot lights and sponsor \$100K more programs.

(*estimated from manufacturer's specs and current SaskPower energy rates)

Cypress Hills Dark-sky Preserve

- Has ~180 streetlights (campground and residential)
- ~80 comply with dark-sky (were retrofitted to FCO)
- ~100 SaskPower lights are drop lens cobras (polluting) lights and are wired to be on 365 nights a year – campgrounds are closed for 7 months!
- Medicine Hat (130km away) is threatening our Preserve.

Lack of Legislation

- No nuisance bylaws
- No city bylaw for business or residential to provide minimum standard for light levels or GHG targets
- No provincial or national minimum standards law for LPA or GHG targets
- It means you can pollute if you can simply afford to pollute.
- But Saskatoon has a Dark-Sky Policy now!

Who is Already Doing This?

Saanich, BC

Calgary, AB

Okotoks, AB

Canmore, AB

Edmonton, AB

Saskatoon, SK

Richmond Hill, ON

Toronto, ON

La Salle, QC

Davis, CA

Tucson, AZ (master!) << home of IDA

Flagstaff, AZ (master!)

State of Indiana (ICOLE) (master!)

State of New Mexico (and at last 14 other states)

US National Park Service

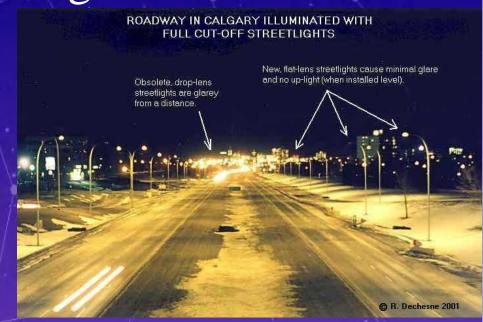
Cypress Hills Interprovincial Park & Dark-Sky Preserve

Grasslands National Park & Dark Sky-Preserve

Beaver Hills Dark-Sky Preserve (Alberta) (11 preserves in Canada)

Czech Republic, United Kingdom

... many more are already saving energy!



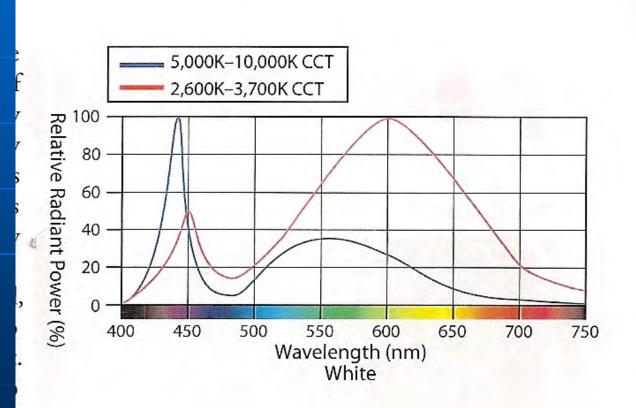
Creative Solutions for Cities

- turn lights off when they are not being used (LISTEN to your mother!)
- use motion sensors to turn light on when light is needed (including security lights)
- do not install unnecessary lighting
- reduce the number of lights used
- do not buy or install any lights that do not have side- and up-shields
- light from the top down, not bottom up (soffits, accent, etc)
- do not light up parks & playgrounds at night; or limit access duration with timers
- set traffic lights in non-critical areas to blink after certain hours to save energy
- stop lighting up alleyways
- use reflective paint for overhead signs instead of lighting them
- turn off office tower lighting when not in use
- light to minimum standards (not mid or max)
- if decorating with light energy, minimize the intensity, use and duration
- bylaw for LED sign placement and requirement for reduced light at night
- bylaws for residential, business for shielded lighting, time-of-use, advertising.
- financial ability to waste is not a good enough excuse to waste.

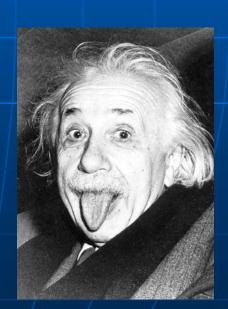
Take care to choose (blue-white light is poor choice for night vision)
NEMA LSD-55
2010 states more research is needed.

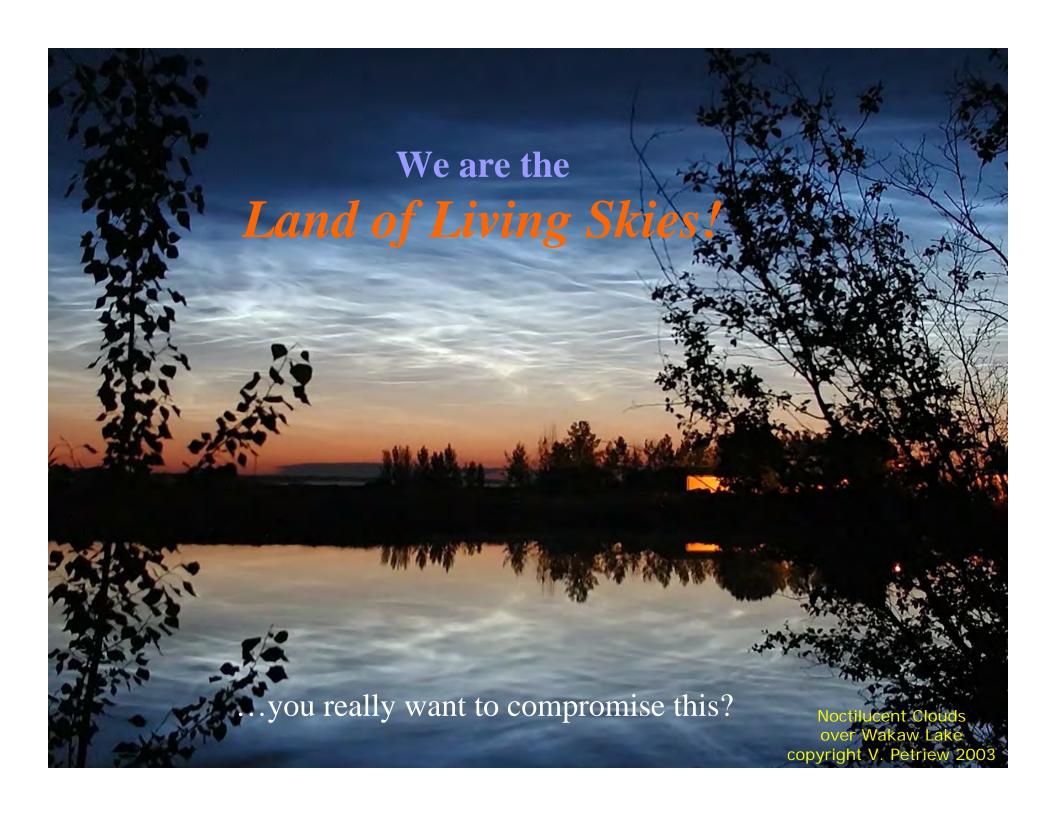
We suggest to use "warmer" LED lights to redder end to produce smaller issue in "transition zones"

LED streetlights



We can't solve problems by using the same kind of thinking we used when we created them." - Albert Einstein





More Information

- www.ras.sk.ca/lpc/lpc.htm
- www.repas-inc.ca
- www.darksky.org

Rick Huziak (SLPAC, REPAS, Saskatoon) e-mail: rickhuziak@shaw.ca

Questions?



