

Bulkley Valley-Lakes District Air Quality

Ambient Air Quality Assessment:
June 2006 AGM & Public Forum

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Ministry of
Environment



Overview

- ▶ Table 3-3, Goals Indicators and Strategies.
- ▶ Refresh of Micro-Emissions Inventory
- ▶ BVL D monitoring network update
- ▶ PM_{10} :
 - BVL D Annual average
 - % potential episode days (PED) where PM_{10} daily average $> 25 \mu\text{g}/\text{m}^3$
 - % days with average $PM_{10} > 50 \mu\text{g}/\text{m}^3$
- ▶ $PM_{2.5}$:
 - BVL D Annual Average
 - Potential Episode days where $PM_{2.5} > 15$
 - % days where average $PM_{2.5} > 30 \mu\text{g}/\text{m}^3$

Table 3-3 General Goals, Indicators and Strategies (page 3-8)

Goal	Indicators	Strategies
<p>1) Gain better understanding of air quality in plan area</p>	<p>Degree of agreement between modelled AQ and measured AQ during "episode scenarios"</p> <p>Comparison of PM₁₀ and PM_{2.5} concentrations at locations in BVLD</p>	<p>Gain experience through AQ modelling (CALPUFF)</p> <p>Expand AQ & meteorological modelling network</p>

Table 3-3 General Goals, Indicators and Strategies (page 3-8)

Goal	Indicators	Strategies
<p>2) Continuous improvement in air quality in the BVLD</p>	<p>Mean annual PM_{10} and $PM_{2.5}$ concentrations</p> <p>Reduce % of days where average daily PM_{10} concentration > 50 and $PM_{2.5}$ > 30 ug/m³. Interim goal = 1%</p> <p>% of PED "potential episode days" where PM_{10} 24 hour average is > 25 ug/m³ and $PM_{2.5}$ > 15 ug/m³ by year and/or season</p>	<p>Reduce/eliminate episodes via source specific emission strategies</p> <p>Education/operational changes to improve on AQ</p> <p>Bring forward emerging research & changing regulations and policies.</p>

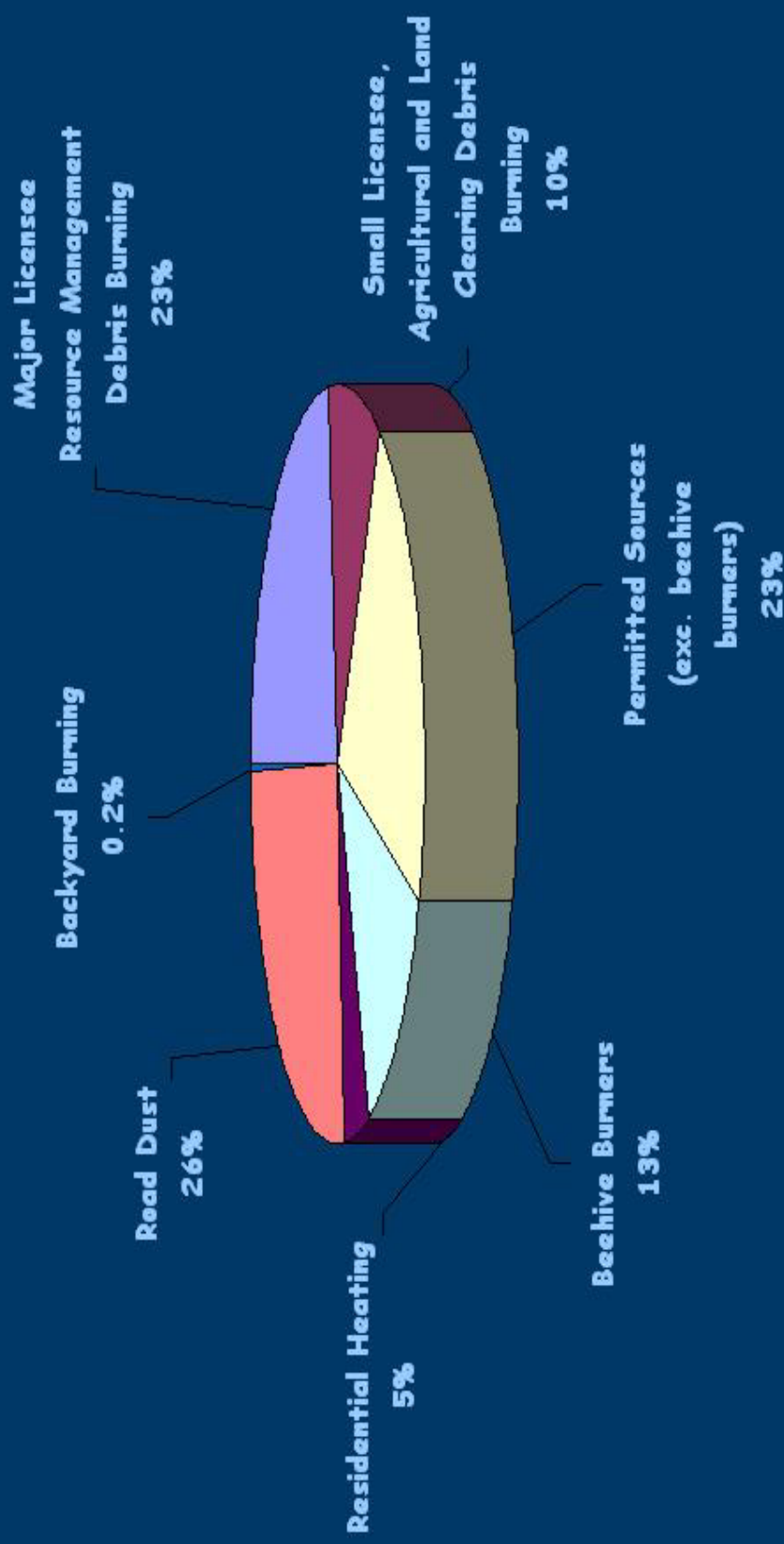
Table 3-3 General Goals, Indicators and Strategies (page 3-8) cont'd

Goal	Indicators	Strategies
<p>2) Continuous improvement in air quality in the BVLD</p>	<p>Improve AQ on all days (PED's and non-PED's) Average AQ on PED's Average AQ on other days</p> <p>Monitor statistics and human health risks</p>	<p>Reduce/eliminate episodes via source specific emission strategies</p> <p>Education/operational changes to improve on AQ</p> <p>Bring forward emerging research & changing regulations and policies.</p>

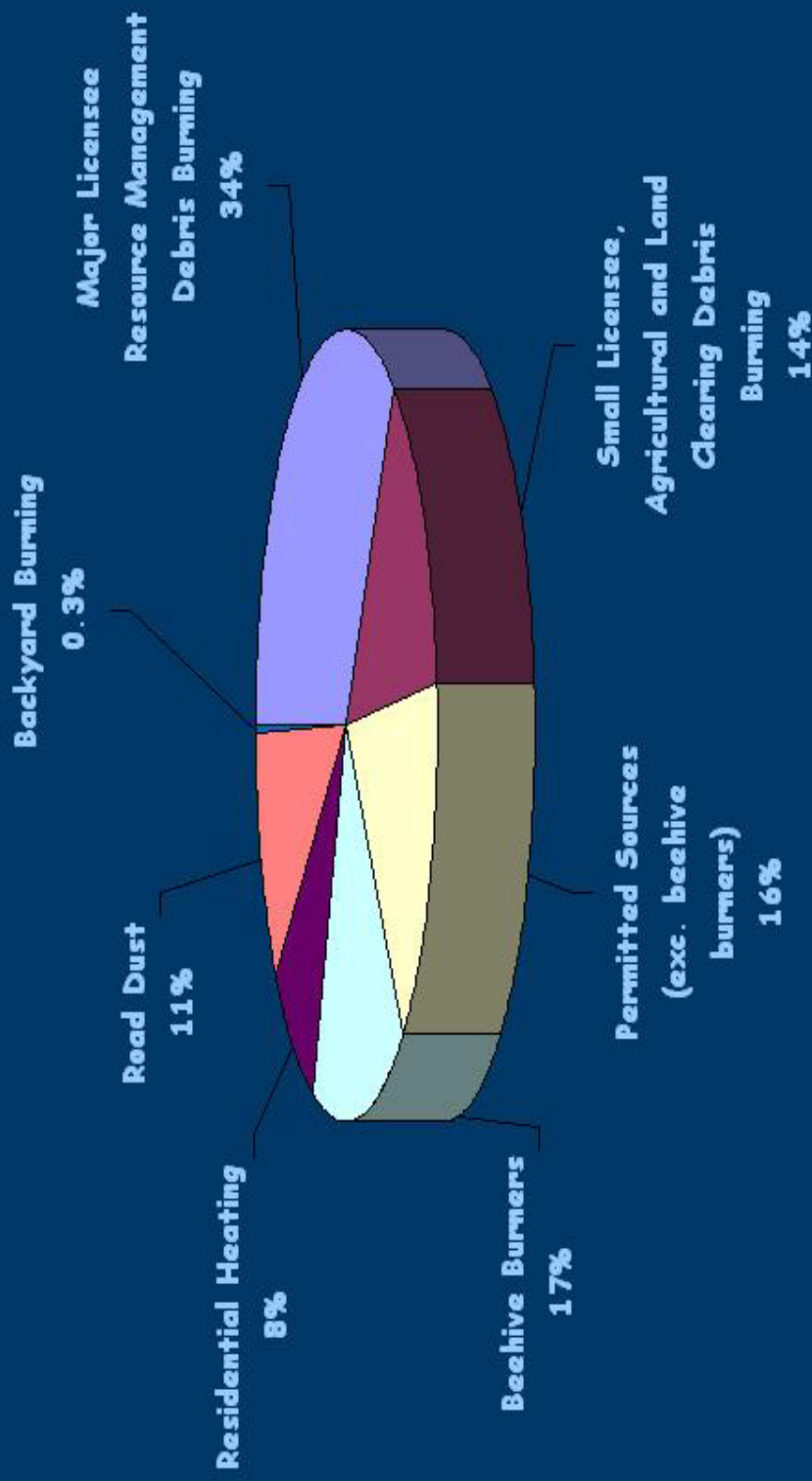
Goal 1- Understand Air Quality

- ▶ Micro-Emissions Inventory completed, dispersion modelling underway.
 - Quick refresher highlights
- ▶ In order to compare and contrast PM_{10} and $PM_{2.5}$ must expand monitoring network.

PM₁₀ Emission Source Breakdown for 2002

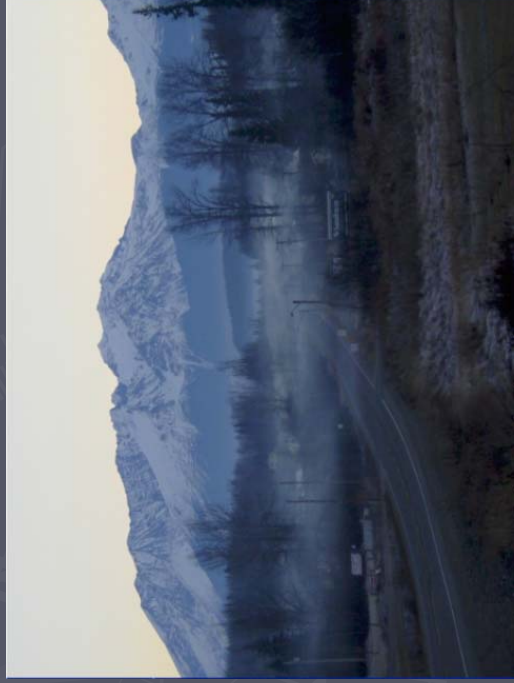


PM_{2.5} Emission Source Breakdown for 2002



Important Notice!

- ▶ Percentages are on an annual basis
- ▶ Do not always describe contributions at receptors
 - People
 - Monitors



Seasonality of Emissions

	Winter	Spring	Summer	Fall
ML Resource Management Debris Burning	-----	-----	-----	-----
SL, Agricultural and Land Development Debris Burning	-----	-----	-----	-----
Permitted Sources	-----	-----	-----	-----
Beehive Burners	-----	-----	-----	-----
Residential Home Heating	-----	-----	-----	-----
Road Dust	-----	-----	-----	-----
Back Yard Burning	-----	-----	-----	-----

► Potential Source Indicators:

- Venting conditions
- PM 2.5/10 split in Houston, Smithers (and soon Burns Lake)
- Looking outside

BVLD Air Quality Episode History

Month	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
January											
February	1-3 days	4-6 days		4-6 days			4-6 days			1-3 days	7-9 days
March	4-6 days	4-6 days	4-6 days	7-9 days	4-6 days	4-6 days	4-6 days	4-6 days	4-6 days	7-9 days	4-6 days
April	4-6 days		7-9 days	4-6 days	4-6 days		4-6 days	4-6 days	1-3 days	1-3 days	
May	1-3 days								4-6 days		
June											
July	4-6 days			1-3 days							
August				4-6 days			1-3 days		4-6 days		
September	4-6 days										
October		1-3 days	4-6 days	4-6 days				1-3 days	4-6 days		
November	4-6 days	1-3 days	7-9 days		1-3 days	4-6 days		7-9 days	4-6 days		4-6 days
December						1-3 days		1-3 days			1-3 days



25 13 28 33 12 12 12 19 19 20 26 12 19

BVLD-Continuous Monitoring Network

Station Name	Burns Lake Fire Centre	Houston Firehall	Smithers-St. Josephs	Telkwa
Station Location	#8 4 th Avenue	3382 11 th Street	4020 Broadway	1304 Birch Street
PM ₁₀	03 / 97- current	02 / 97- current	02 / 97- current	02 / 98- 10 / 05
PM _{2.5}	Install by 09 / 06	03 / 01- current	04 / 07- current	Install by 09 / 06
Meteorology	03 / 97- Current	11 / 94- current	11 / 94- current	01 / 98- 10 / 05

Summary of active continuous monitoring for Particulate Matter and meteorology in the BVLD Airshed by the Ministry of Environment. *Telkwa Station was vandalized in Mid-October, 2005

BVLD Non-Continuous Monitoring

Station Name	Hazelton	Kitwanga
Station Location	Northwest Community College	Kitwanga School
PM ₁₀	04 / 04 - current	04 / 04 - current
PM _{2.5}	04 / 04 - current	
Meteorology <i>(continuous)</i>	08 / 05 – current (at New Hazelton Elementary School)	01 / 05 - current

Summary of Active Non-Continuous Monitoring for Particulate Matter in the BVLD Airshed by the Ministry of Environment

Continuous Meteorological monitoring has now been installed in Kitwanga and Hazelton

Goal 2: Improve Air Quality

- ▶ Many Strategies
 - How are we doing?



Indicators: BVLVD Annual Average PM₁₀ (top) and PM_{2.5} (bottom)



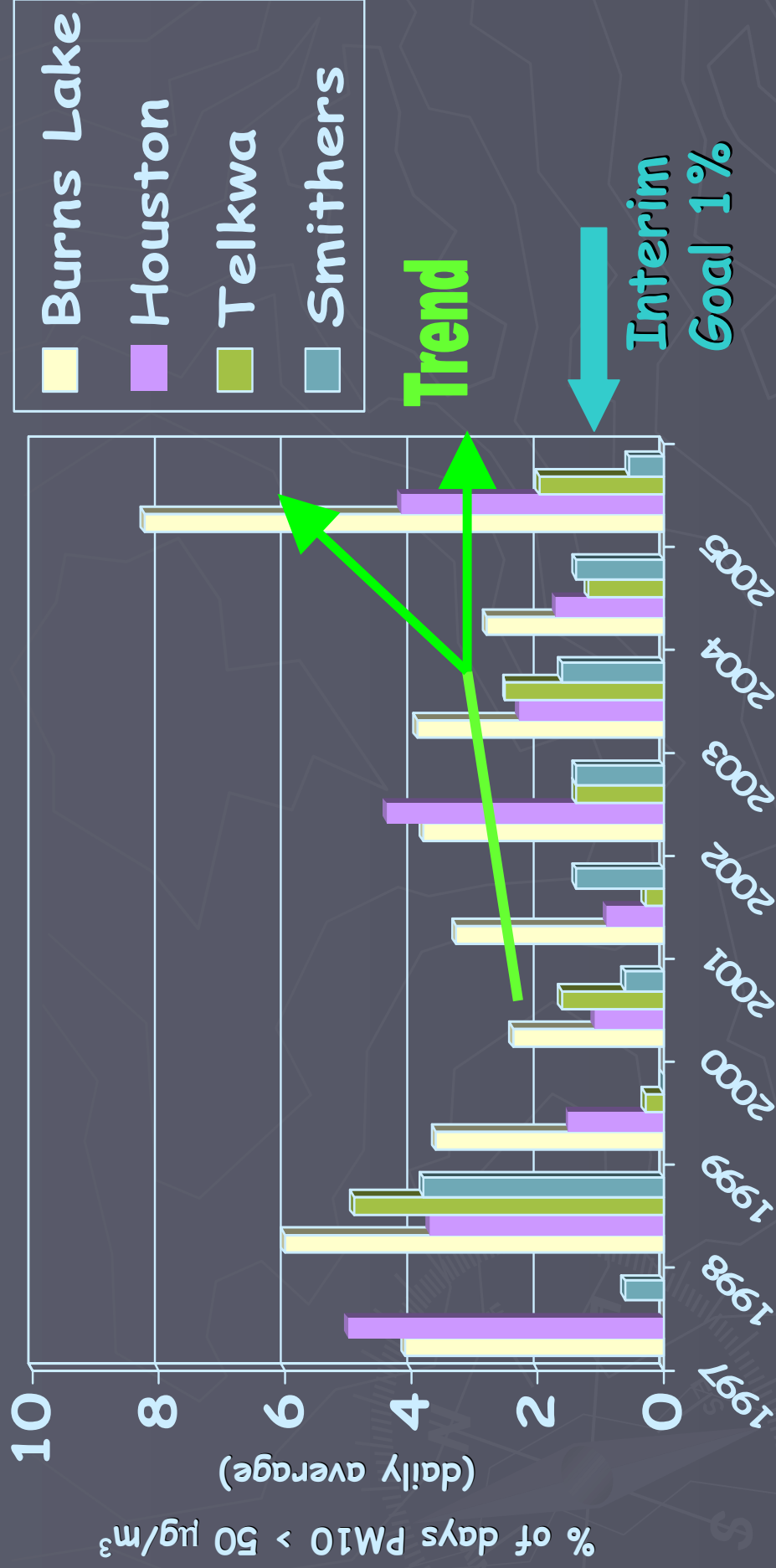
Indicator: BVLD % PED $PM_{10} > 25$ $\mu g/m^3$ (daily average)



Note: These data include the % days $PM_{10} > 50 \mu g/m^3$

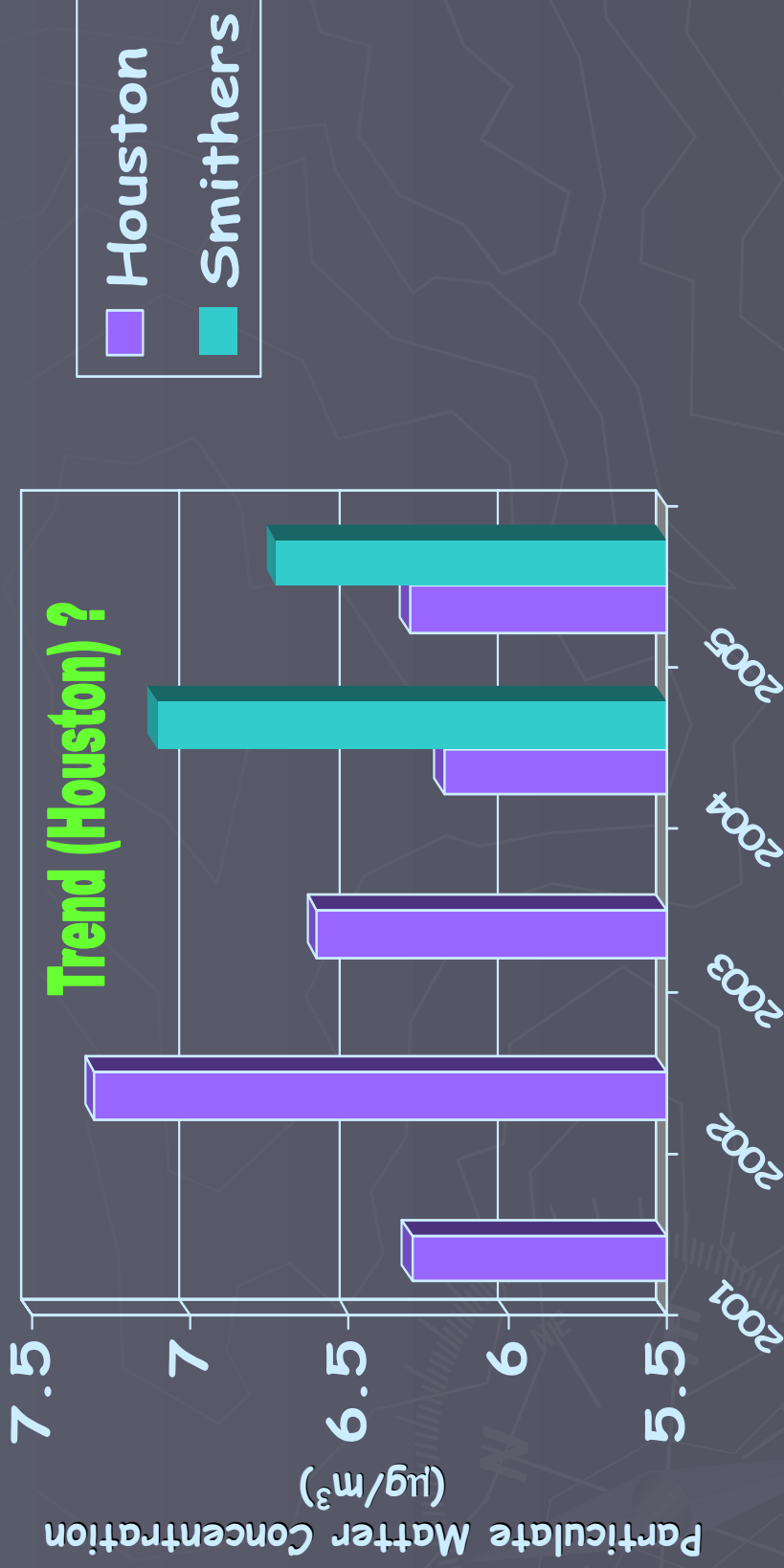
Note: Telkwa PM_{10} monitoring began in 1998 and ended in Oct 2005

Indicator: BVLD % days $PM_{10} > 50$
 $\mu g/m^3$ (daily average)



Note: Telkwa PM_{10} monitoring began in 1998 and ended in Oct 2005

Indicator: BVLD Annual Average PM_{2.5}



Note: Houston 2001 data covers July 26 onwards

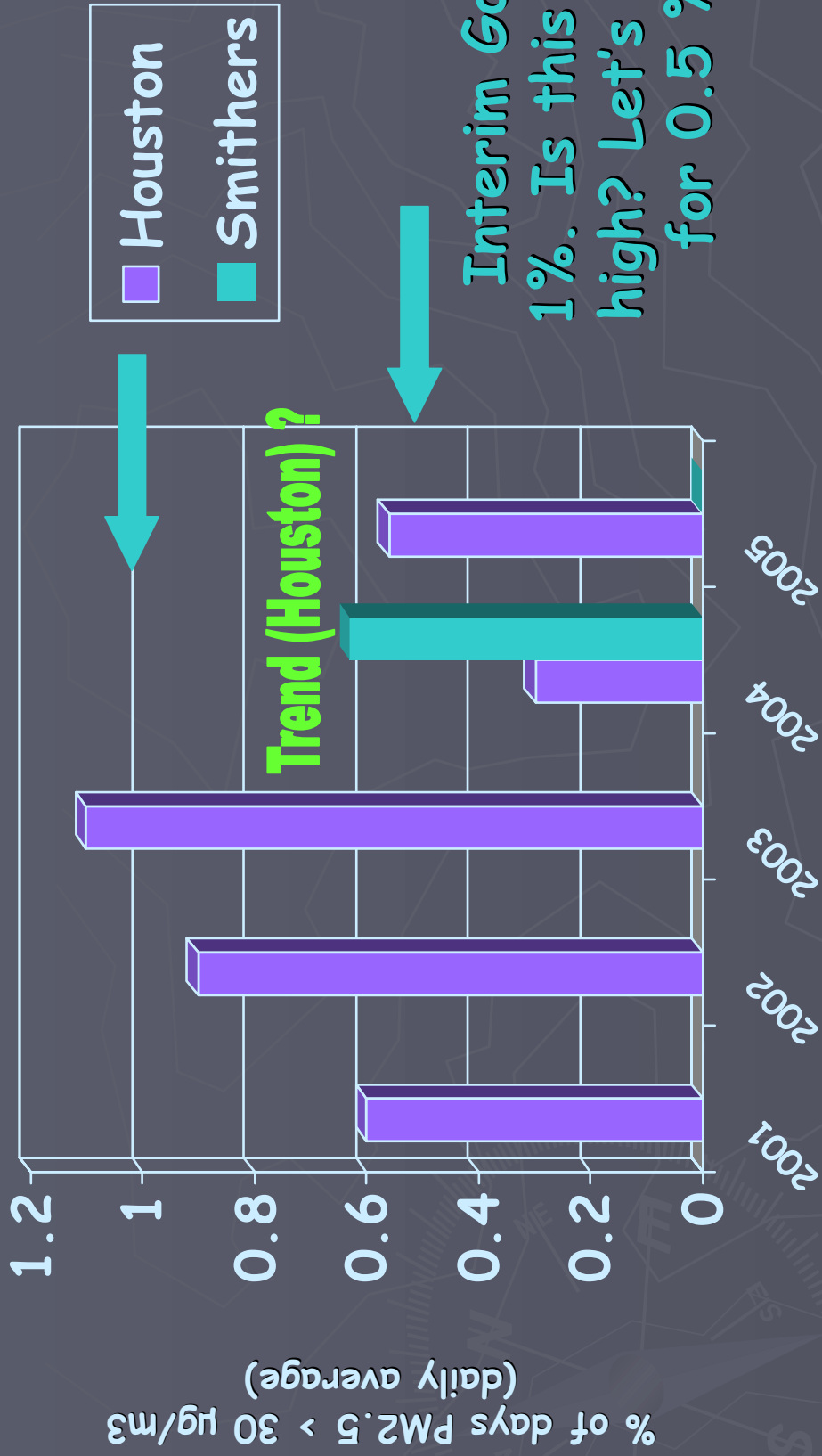
Smithers 2004 data covers August 20 onwards

Indicator: BVLD % PED $PM_{2.5} > 15$
 $\mu g/m^3$ (daily average)



Note: These data include the % days $PM_{2.5} > 30 mg/m^3$

Indicator: BVLD % days $PM_{2.5} > 30$
 $\mu g/m^3$ (daily average)



Summary

- ▶ **Goal 1: Understand**
- ▶ CALPUFF dispersion modelling to continue through next year.
- ▶ Air quality and meteorological monitoring program in BVL D airshed is growing.
- ▶ **Goal 2: Improve**
- ▶ Indicators going both ways when comparing 2004 AQ to 2005, though 2005 was not a banner year for AQ
- ▶ From 2000 onwards indicators sending strong message
 - ▶ Increased annual average PM_{10}
 - ▶ Increased % days where $PM_{10} > 50 \mu\text{g}/\text{m}^3$
 - ▶ Increased PED, where $PM_{10} > 25 \mu\text{g}/\text{m}^3$
- $PM_{2.5}$ trends beginning to show in Houston but getting mixed messages. Too early to talk about Smithers.

Recommendations

Dive into strategies that will affect indicators. Road dust and wood burning appliance emissions still need more attention.

Add road dust to list of active sources in the Fall. In 2005 this was a factor

Set interim goal for % days $PM_{2.5}$ average $> 30 \mu g/m^3$ to 0.5%.

Forward thinking: Include Canada Wide Standard (CWS) as an indicator for $PM_{2.5}$. Houston data exists and soon will Smithers (Long term vision for Telkwa and Burns Lake).

More on Potential Episode Days

- ▶ What really is a Potential Episode Day?
 - "A day where, based on meteorological variables (still air, poor venting) the potential for an air quality episode exists, dependant on emissions".
- ▶ Currently PED indicator is where
 - PM_{10} 24 hour average is $> 25 \text{ ug}/\text{m}^3$ and
 - $PM_{2.5}$ 24 hour average is $> 15 \text{ ug}/\text{m}^3$ (by year and/or season)
 - ▶ This makes assumptions about meteorological conditions.

Average AQ on PED's

▶ What about **still air**?

- How do you define still?

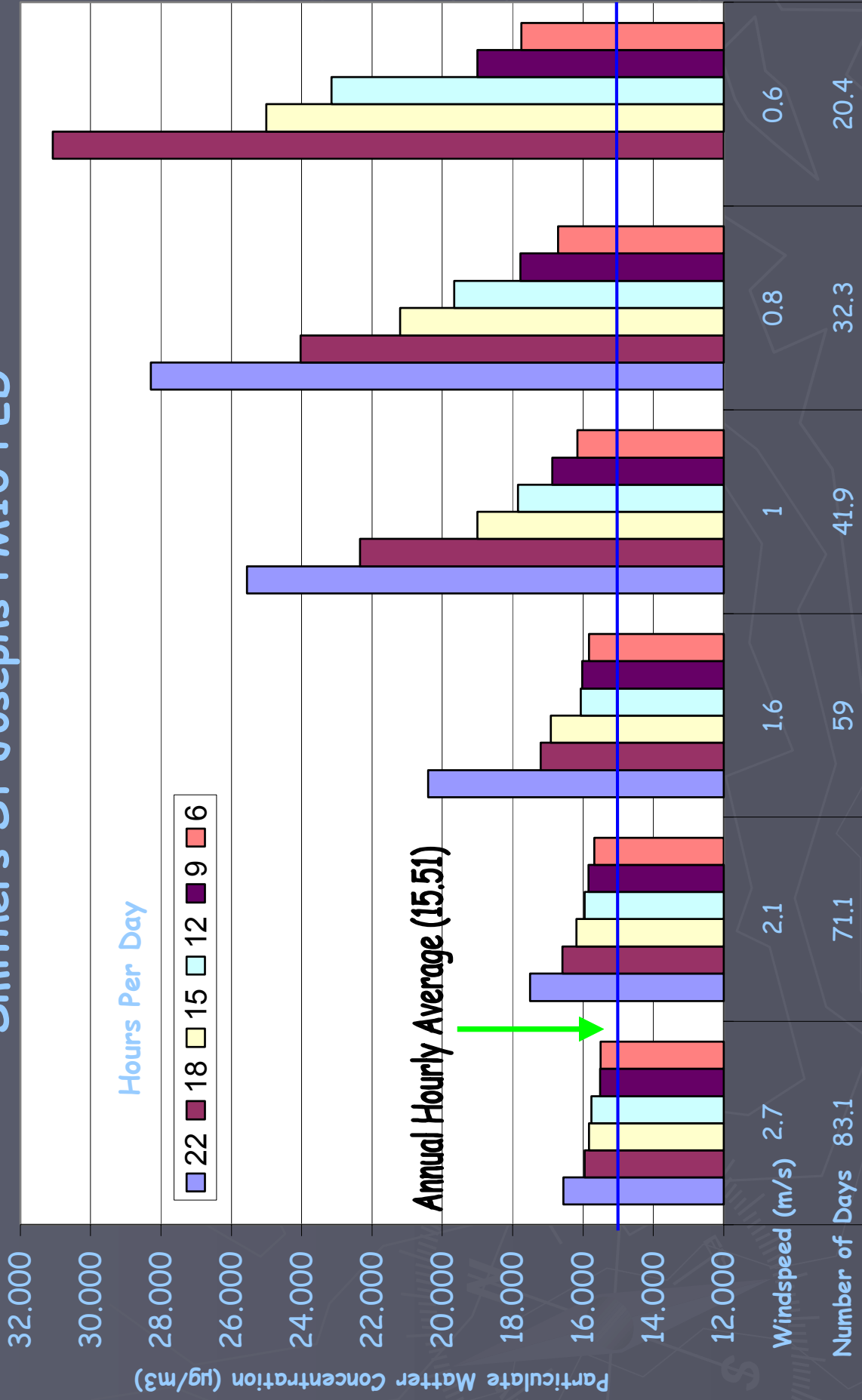
How much of the day must be still for it to be a 'still air day'?

▶ Our approach - look at:

- Wind speed
- Hours of the day where wind was below certain speed.

Average AQ on PED Results

Smithers St Josephs PM10 PED



2005 PED Results (PM₁₀ only)

- ▶ For Smithers:
 - Annual Average PM₁₀ 15.51 µg/m³
 - # Still air PEDs = 40
 - Annual Average PED PM₁₀ = 22.35 µg/m³
 - Annual Average Non PED PM₁₀ = 14.66 µg/m³
- ▶ For Houston:
 - Annual Average PM₁₀ 19.00 µg/m³
 - # Still air PEDs = 4
 - Annual Average PED PM₁₀ = 35.31 µg/m³
 - Annual Average Non PED PM₁₀ = 18.82 µg/m³

2005 PED Results (PM₁₀ only)

- ▶ For Burns Lake:
 - Annual Average PM₁₀ 21.72 µg/m³
 - # Still air PEDs = 28
 - Annual Average PED PM₁₀ = 36.58 µg/m³.
 - Annual Average Non PED PM₁₀ = 20.49 µg/m³.

Recommendations

- ▶ Continue to refine definition of PED
 - Some areas are have less incident of calm winds
 - Attempt to link 'still air' PED's with PM_{10} 24 hour average PED's and see if there's more common ground.
 - Early stages, more to come.