



# 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
- ▶ BVLD monitoring network update
- ▶  $PM_{10}$ :
  - BVLD Annual average
  - % potential episode days (PED) where  $PM_{10}$  daily average  $> 25 \mu\text{g}/\text{m}^3$
  - % days with average  $PM_{10} > 50 \mu\text{g}/\text{m}^3$
- ▶  $PM_{2.5}$ :
  - BVLD 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
1) Gain better understanding of air quality in plan area	<p>Degree of agreement between modelled AQ and measured AQ during "episode scenarios"</p> <p>Comparison of <math>PM_{10}</math> and <math>PM_{2.5}</math> concentrations at locations in BVLD</p>	<p>Gain experience through AQ modelling (CALPUFF)</p> <p>Expand AQ &amp; 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><b>Mean annual <math>PM_{10}</math> and <math>PM_{2.5}</math> concentrations</b></p> <p><b>Reduce % of days where average daily <math>PM_{10}</math> concentration &gt; 50 and <math>PM_{2.5}</math> &gt; 30 ug/m<sup>3</sup>. Interim goal = 1%</b></p> <p><b>% of PED "potential episode days" where <math>PM_{10}</math> 24 hour average is &gt; 25 ug/m<sup>3</sup> and <math>PM_{2.5}</math> &gt; 15 ug/m<sup>3</sup> by year and/or season</b></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 &amp; changing regulations and policies.</p>

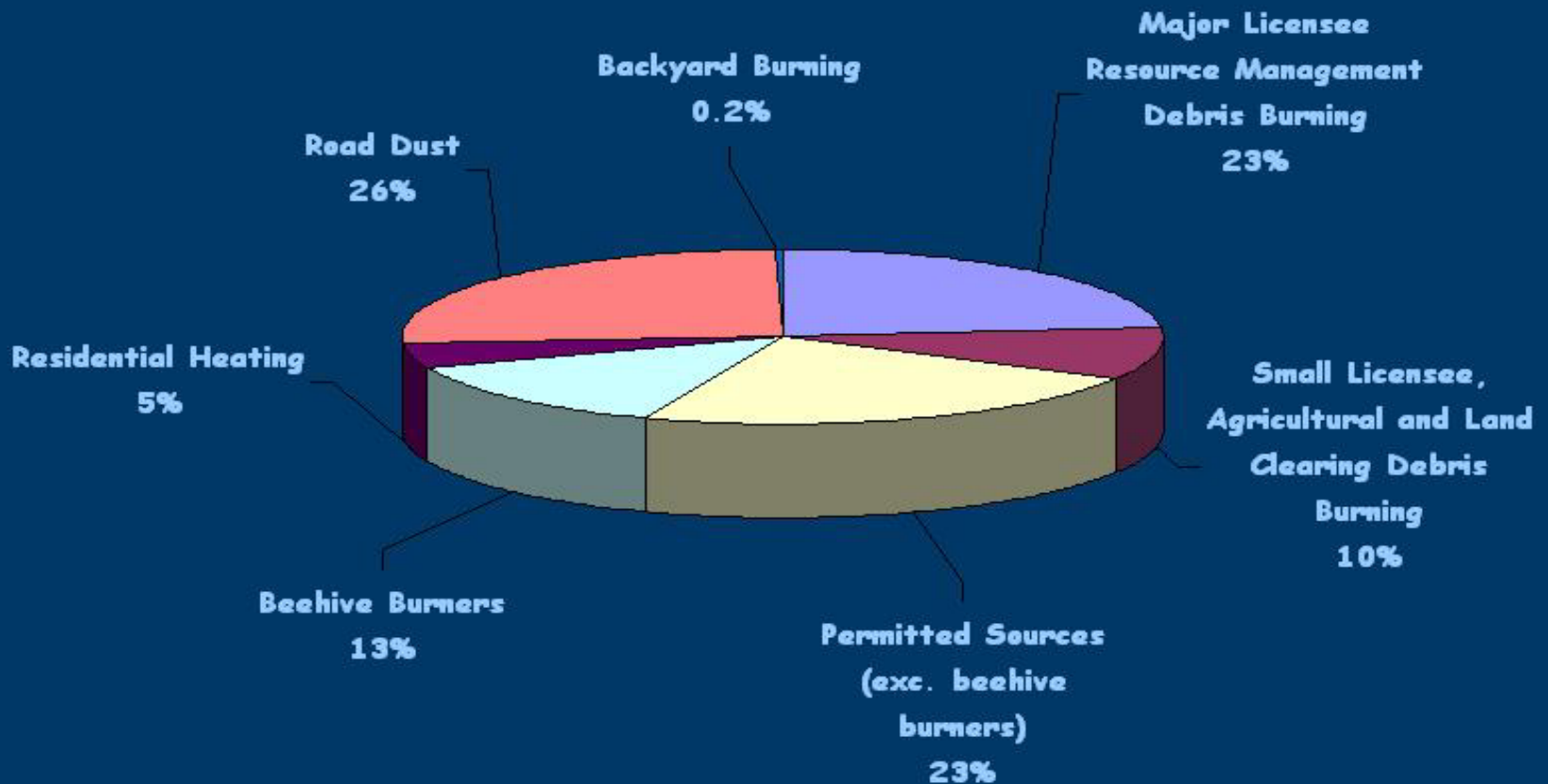
# Table 3-3 General Goals, Indicators and Strategies (page 3-8) cont'd

Goal	Indicators	Strategies
<p>2) Continuous improvement in air quality in the BVLD</p>	<p><b>Improve AQ on all days (PED's and non-PED's)</b>  <b>Average AQ on PED's</b>  <b>Average AQ on other days</b></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 &amp; changing regulations and policies.</p>

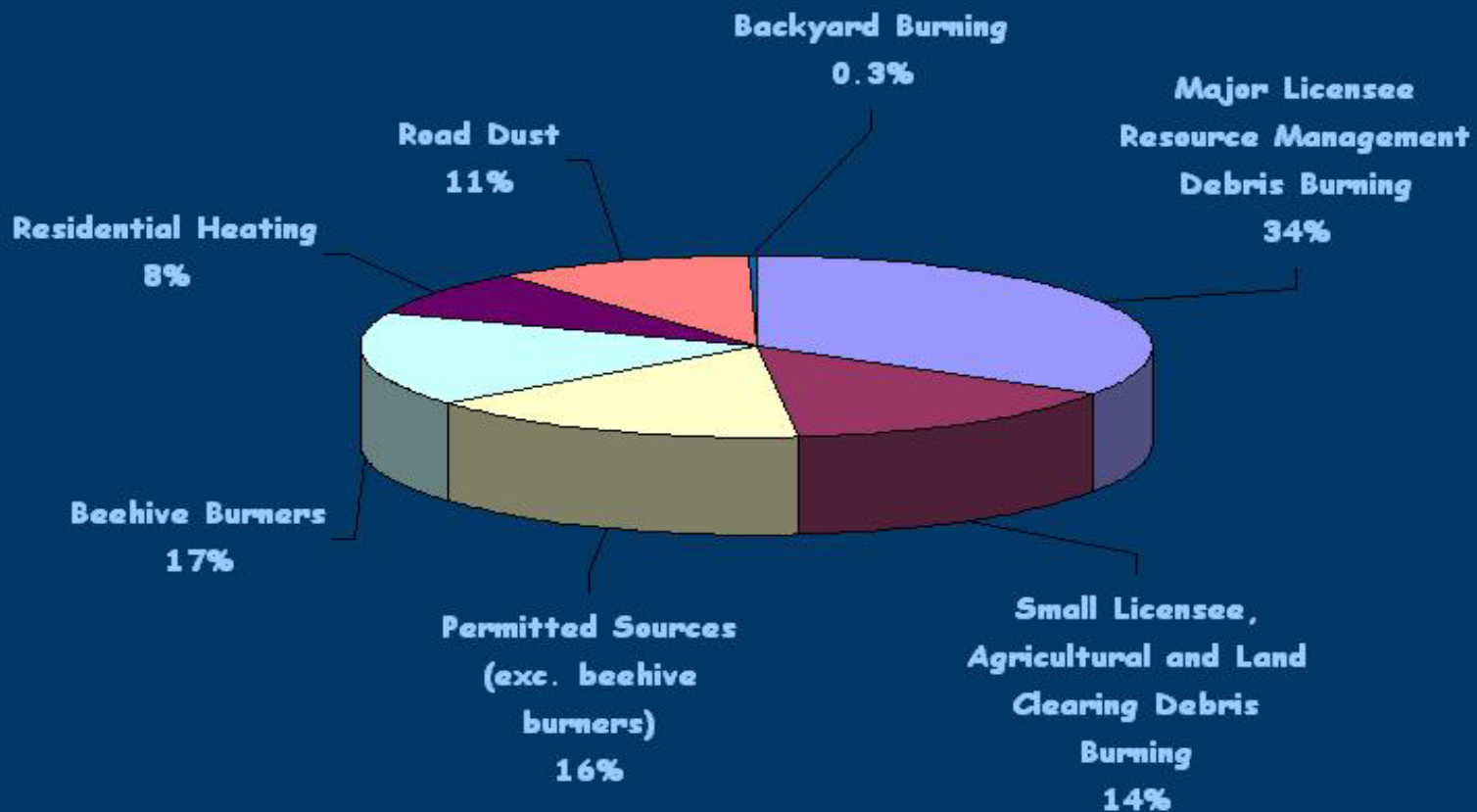
# Goal 1- Understand Air Quality

- ▶ 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.

# PM<sub>10</sub> Emission Source Breakdown for 2002



# PM<sub>2.5</sub> 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									White		
February	White	Orange		Yellow			Yellow			White	Red
March	Orange	Yellow	Yellow	Red	Yellow	Orange	Orange	Yellow	Orange	Red	Yellow
April	Yellow		Red	Yellow	Orange		Orange	Yellow	White	White	
May	White								Yellow		
June											
July	Yellow			White							
August				Orange			White		Yellow		
September	Yellow										
October		White	Yellow	Orange				White	Yellow		
November	Yellow	White	Red		White	Yellow		Red	Orange		Yellow
December						White		White			White

1-3 days  
 4-6 days  
 7-9 days  
 10+ days

25
13
28
33
12
12
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 <sup>th</sup> Avenue	3382 11 <sup>th</sup> Street	4020 Broadway	1304 Birch Street
PM <sub>10</sub>	03 / 97-current	02 / 97-current	02 / 97-current	02 / 98-10 / 05
PM <sub>2.5</sub>	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 <sub>10</sub>	04 / 04 - current	04 / 04 - current
PM <sub>2.5</sub>	04 / 04 - current	
Meteorology <u>(continuous)</u>	08 / 05 – current (at New Hazelton Elementary School)	01 / 05 - current

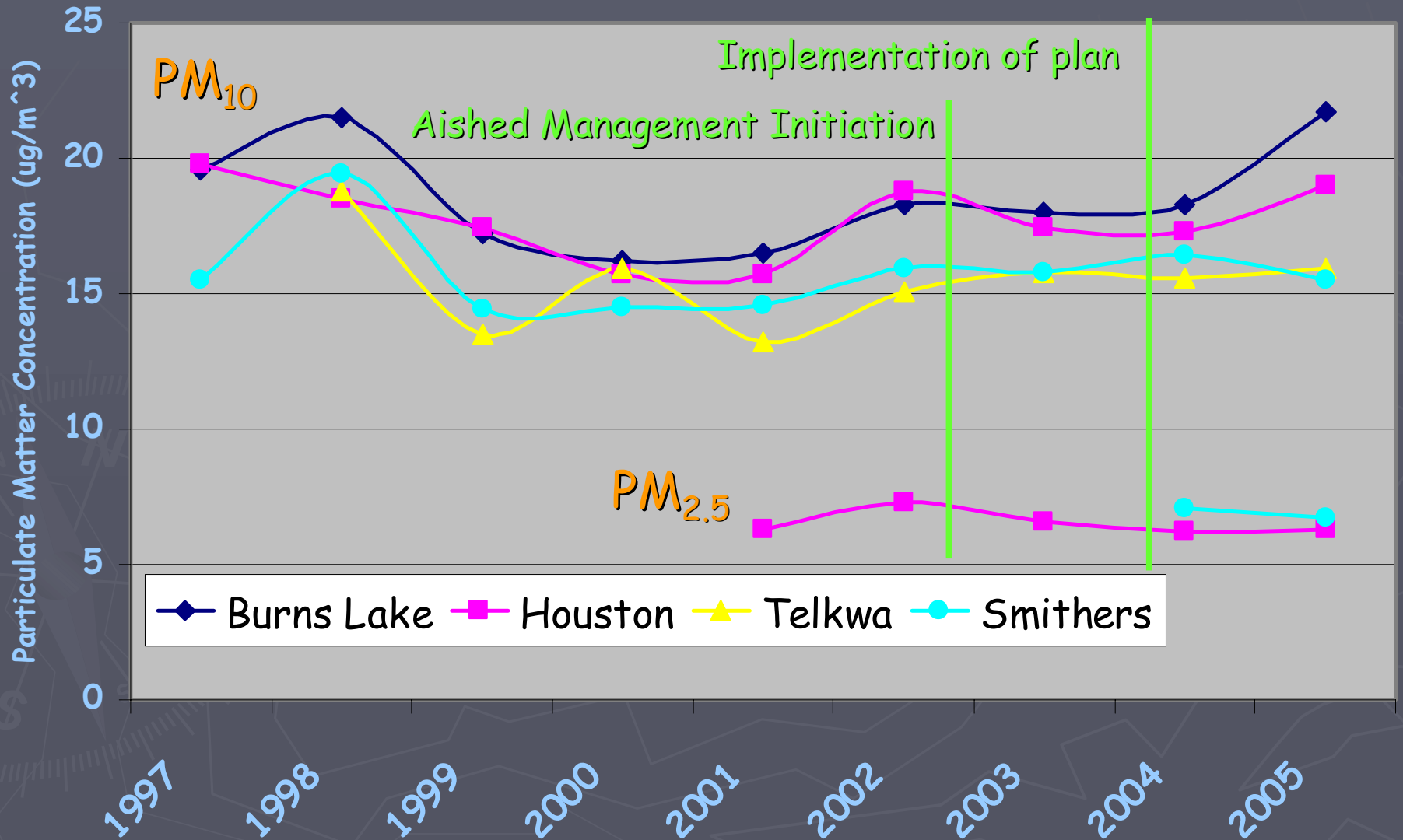
Summary of Active Non-Continuous Monitoring for Particulate Matter in the BVLD Airshed by the Ministry of Environment

Continuous Meteorological monitoring has now been installed in Kitwanga and Hazelton

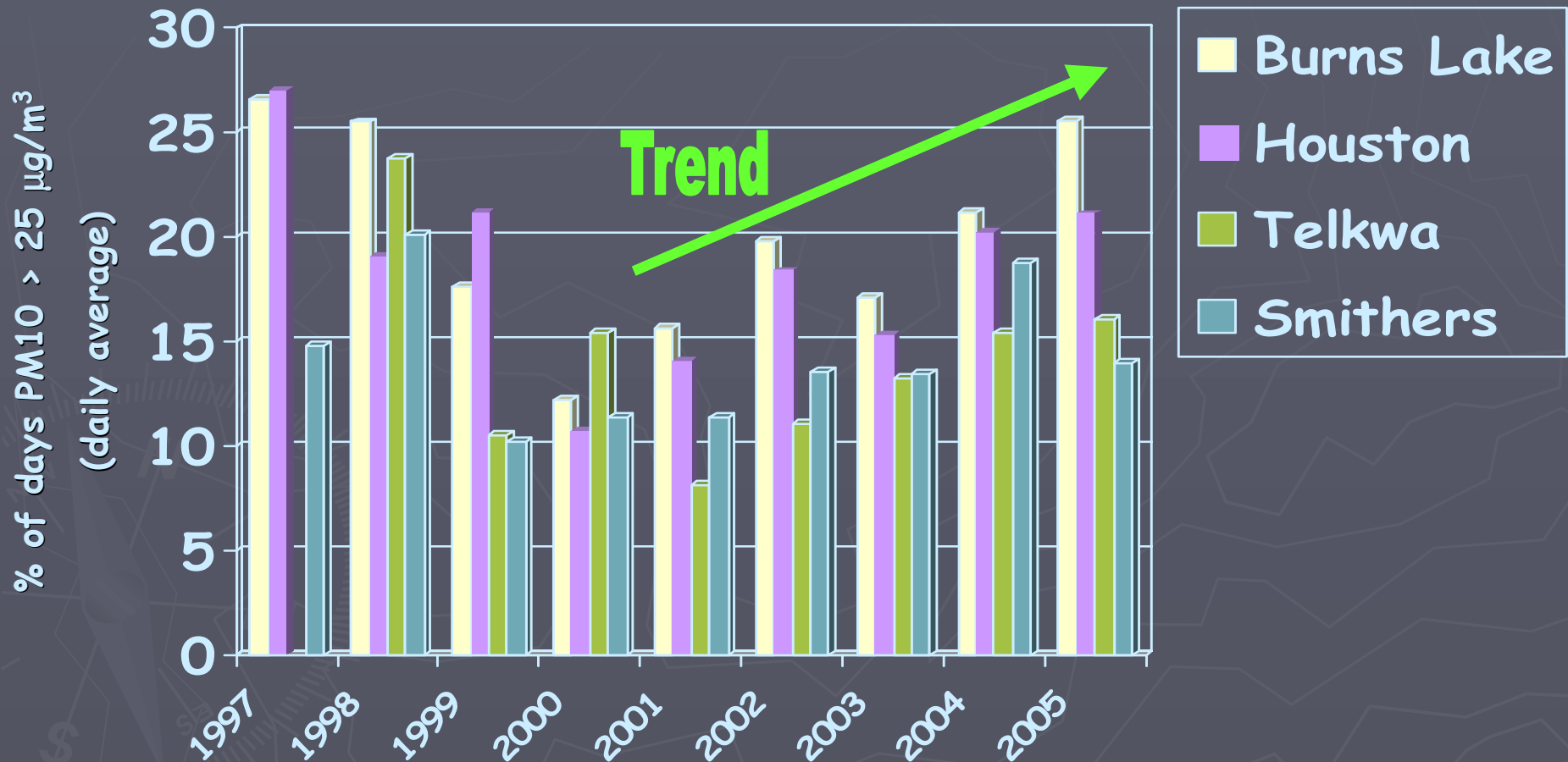
# Goal 2: Improve Air Quality

- ▶ Many Strategies
  - How are we doing?

# Indicators: BVLD Annual Average $PM_{10}$ (top) and $PM_{2.5}$ (bottom)



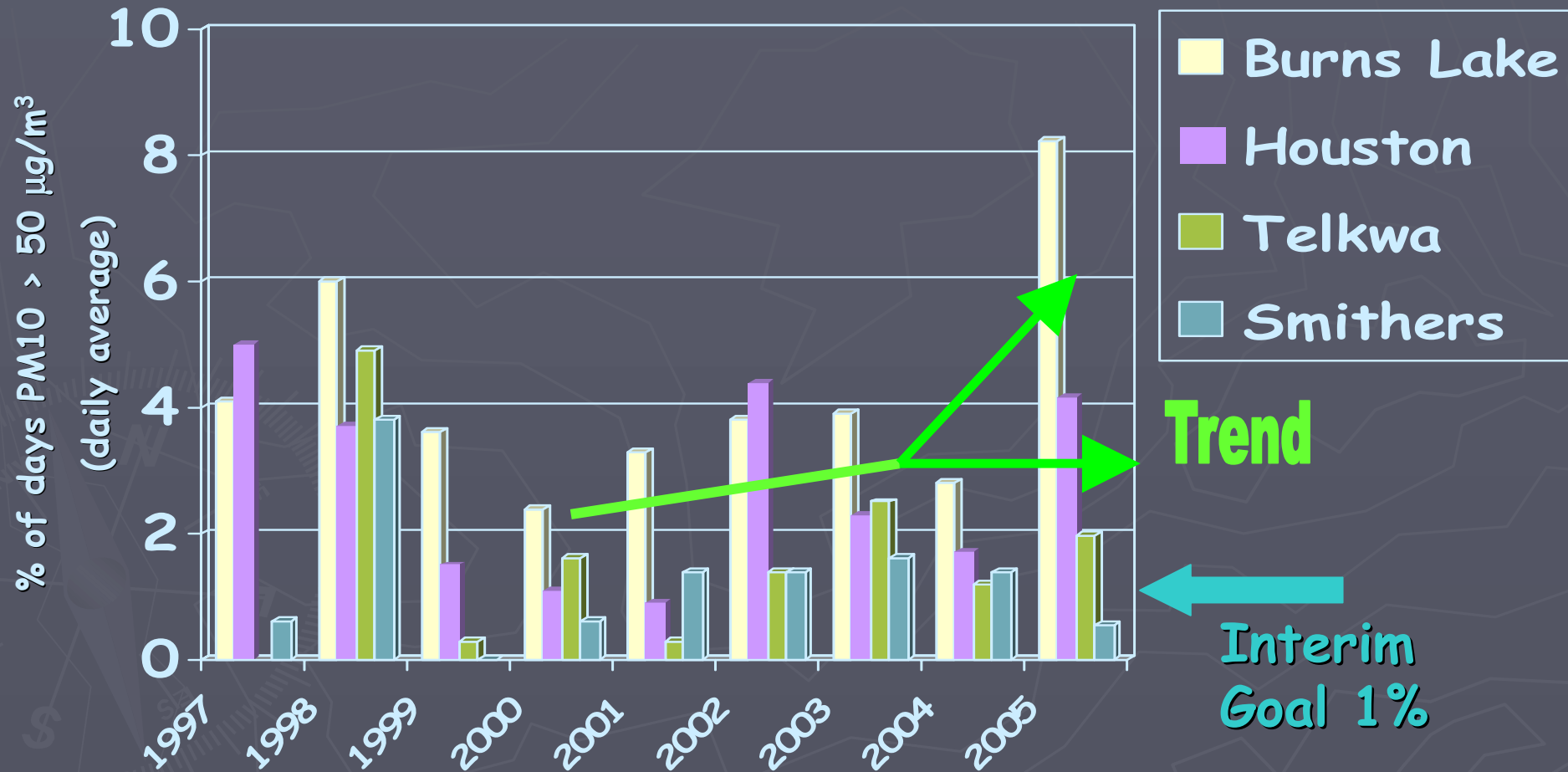
# Indicator: BVLD % PED $PM_{10} > 25 \mu\text{g}/\text{m}^3$ (daily average)



**Note:** These data include the % days  $PM_{10} > 50 \mu\text{g}/\text{m}^3$   
**Note:** Telkwa  $PM_{10}$  monitoring began in 1998 and ended in Oct 2005

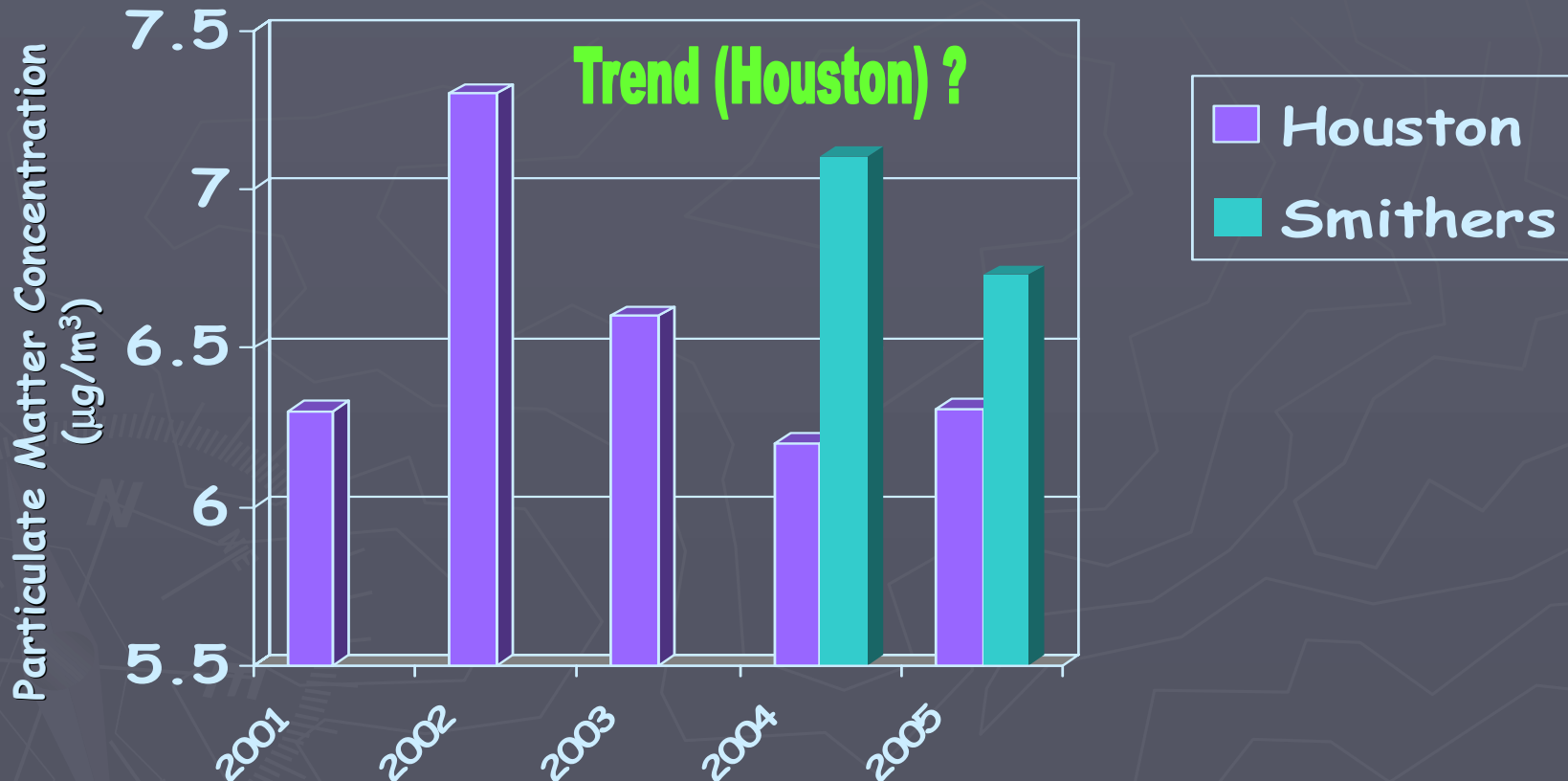


# Indicator: BVLD % days $PM_{10} > 50 \mu\text{g}/\text{m}^3$ (daily average)



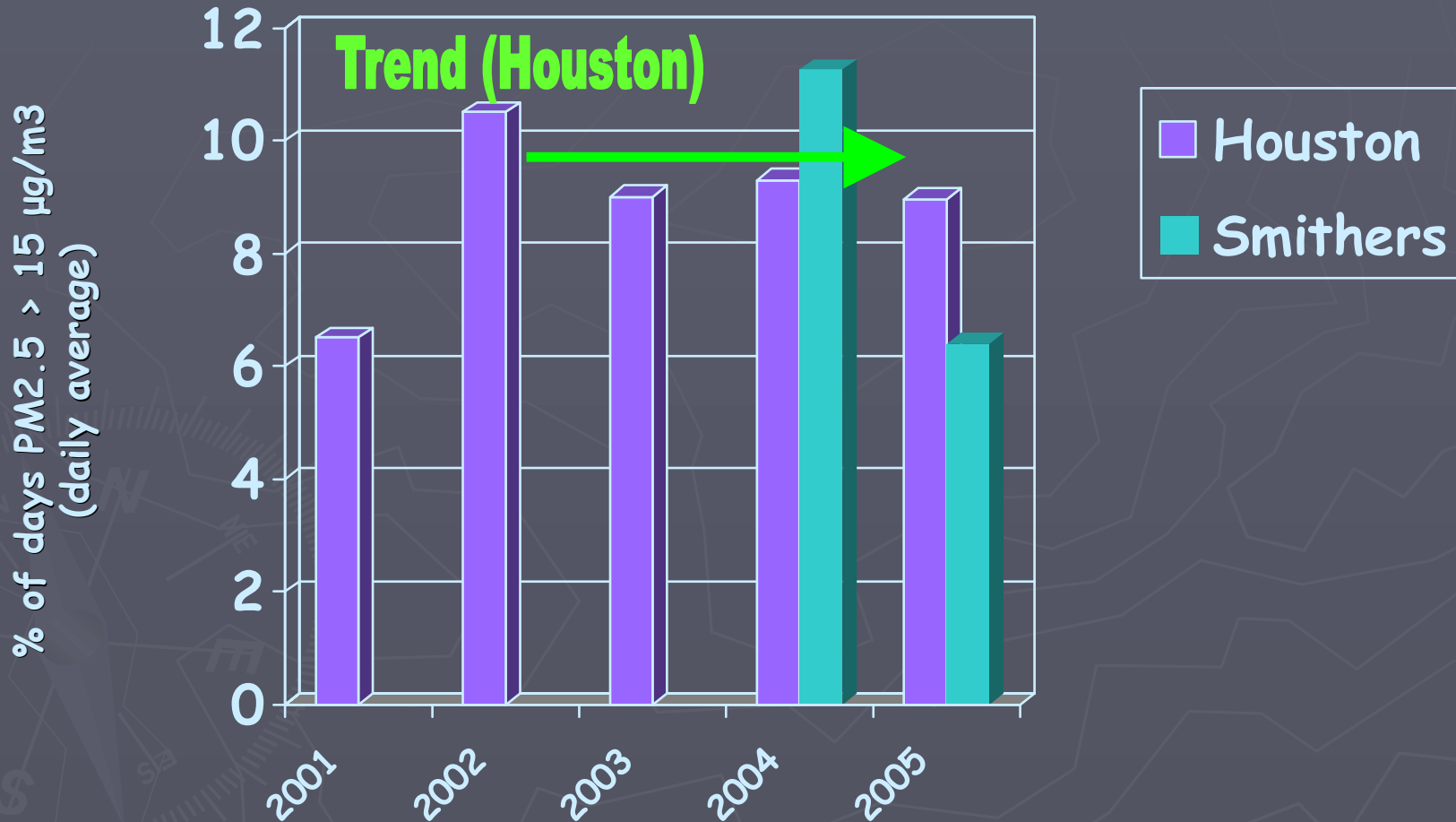
Note: Telkwa  $PM_{10}$  monitoring began in 1998 and ended in Oct 2005

# Indicator: BVLD Annual Average PM<sub>2.5</sub>



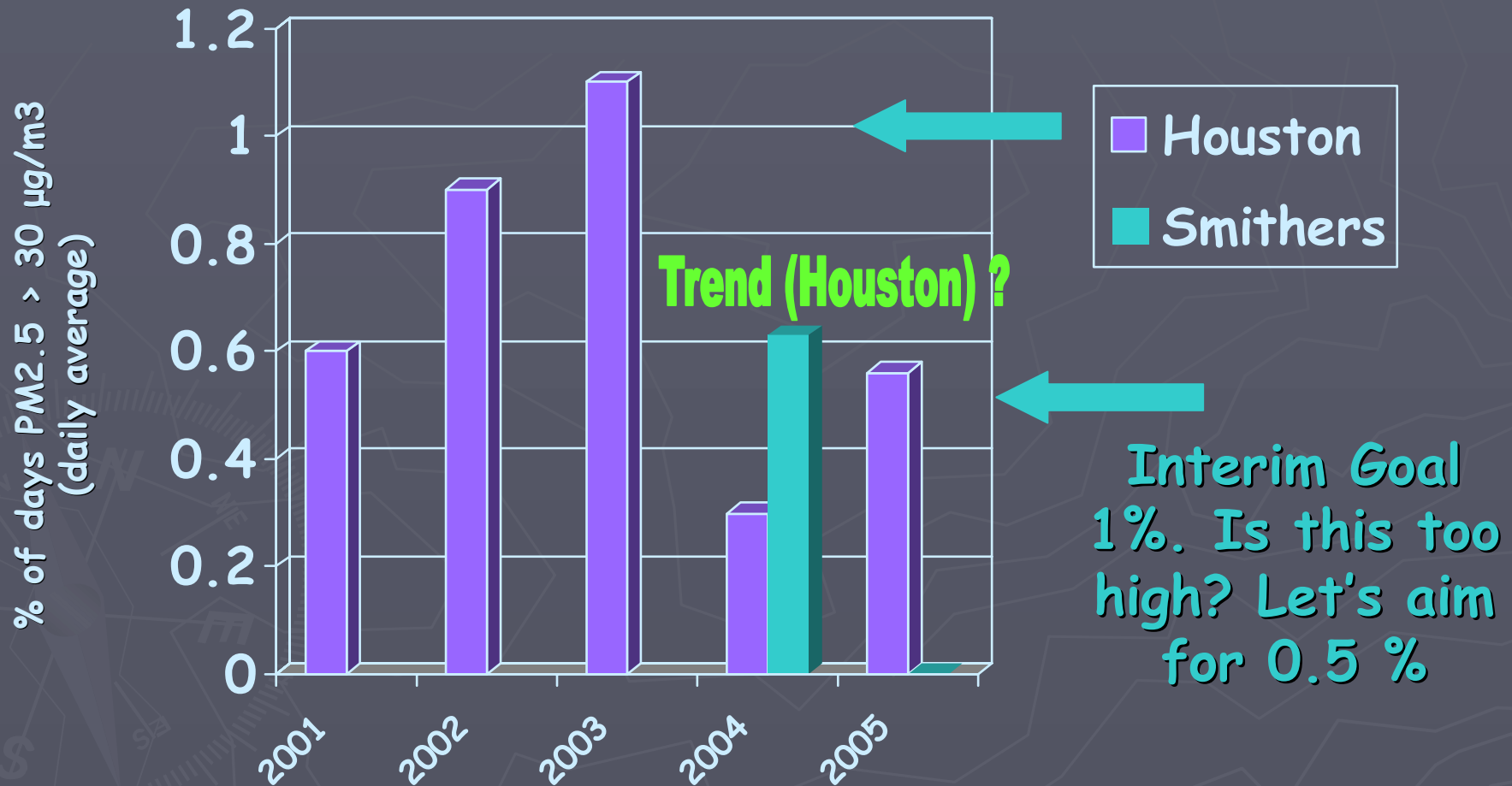
**Note:** Houston 2001 data covers July 26 onwards  
Smithers 2004 data covers August 20 onwards

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



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

# 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 BVLD 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  $> 25 \text{ ug/m}^3$  and
  - $PM_{2.5}$  24 hour average is  $> 15 \text{ ug/m}^3$  (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'?

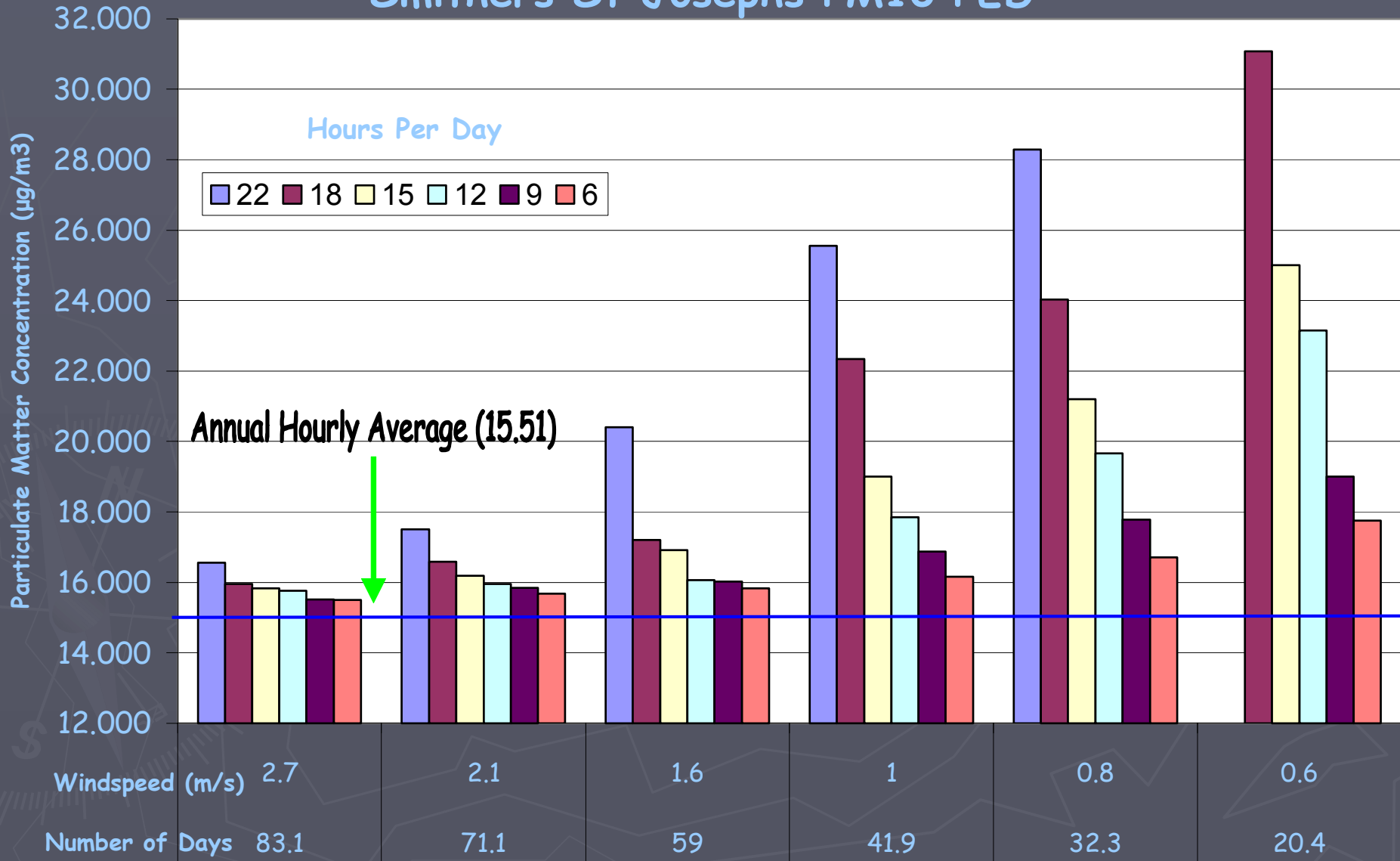
## ► Our approach - look at:

- 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 (PM<sub>10</sub> only)

## ► For Smithers:

- Annual Average PM<sub>10</sub> 15.51 µg/m<sup>3</sup>
- # Still air PEDs = 40
- Annual Average PED PM<sub>10</sub> = 22.35 µg/m<sup>3</sup>
- Annual Average Non PED PM<sub>10</sub> = 14.66 µg/m<sup>3</sup>

## ► For Houston:

- Annual Average PM<sub>10</sub> 19.00 µg/m<sup>3</sup>
- # Still air PEDs = 4
- Annual Average PED PM<sub>10</sub> = 35.31 µg/m<sup>3</sup>
- Annual Average Non PED PM<sub>10</sub> = 18.82 µg/m<sup>3</sup>

# 2005 PED Results (PM<sub>10</sub> only)

## ► For Burns Lake:

- Annual Average PM<sub>10</sub> 21.72 µg/m<sup>3</sup>
- # Still air PEDs = 28
- Annual Average PED PM<sub>10</sub> = 36.58 µg/m<sup>3</sup>.
- Annual Average Non PED PM<sub>10</sub> = 20.49 µg/m<sup>3</sup>.

# 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.