

Estimating the Health Impacts of Air Pollution



地鐵公司
MTR Corporation

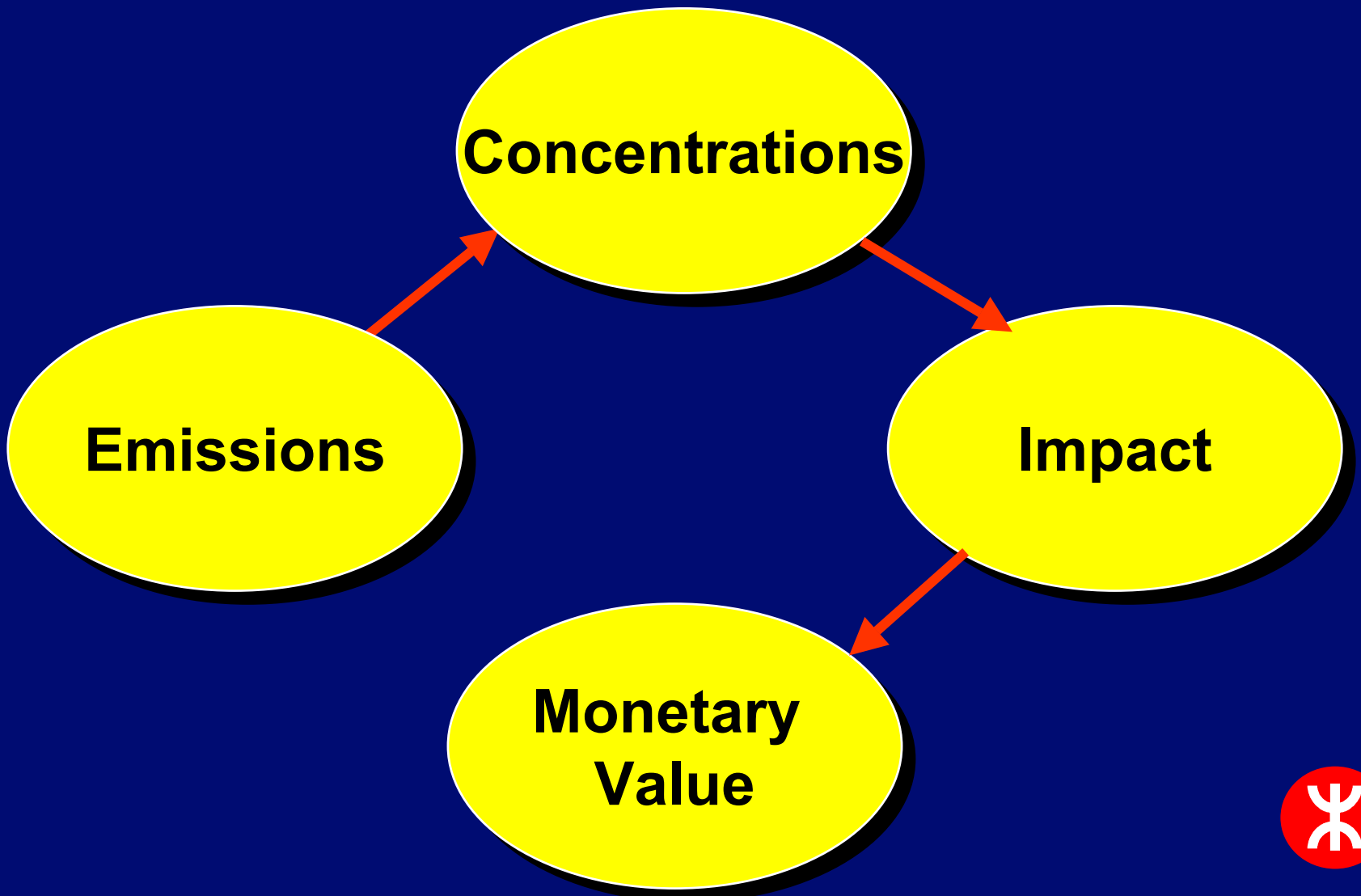
Dr Glenn Frommer, Environmental Manager

Agenda

- **Impact - Pathway Analysis**
- **Examine project appraisals**
- **Show an application in terms of mass transport**
- **Propose an alternative economic treatment**



Impact Pathway Analysis



Dose Response and Monetary Values

Impact Category	Case/person Yr/pollutant	Monetary Value HK\$
Bronchodilator	0.163	332
Cough	0.168	63
Wheeze	0.61	67



Appraisal Principals

- Financial

- Based on monetary transactions
- Potential investors
- Operators

- Economic

- Identifies value for money of project for the community as a whole
- Includes all impacts that are reliably quantified and valued in monetary terms
- All costs and benefits



Implications in Financial Terms

Costs

Increased Revenues

Financial Benefits to Govnmt

Capital Costs

Passenger Revenues

Land Prems and Rates

Operating Costs

Property Dev Revenues

Savings in Infrastr



Implications in Economic Terms

**Benefits other
Than to Rail**

**Highway
Users**

**Accident
Benefits**

**Air Quality
Benefits**

**Benefits to
Rail Users**

**Journey Time
Savings**

**Crowding
Benefits**





EKL / NIL

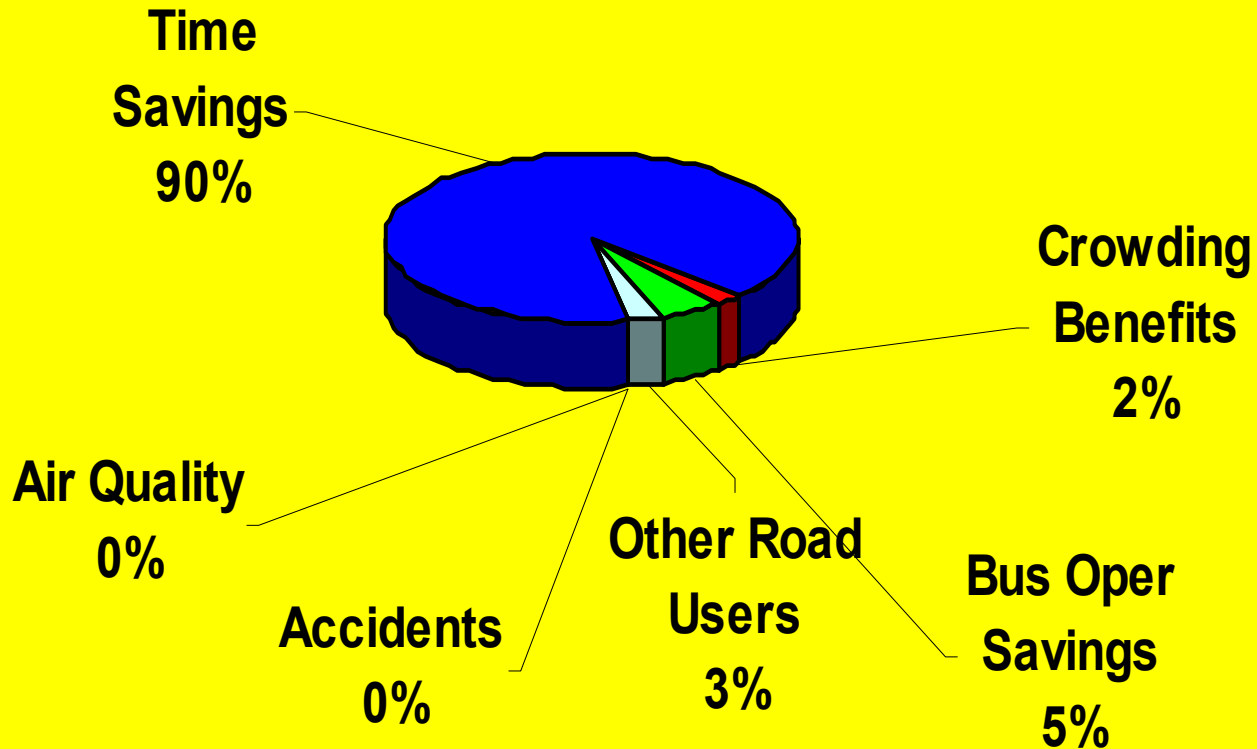


Economic Issues in 2006

- **Time Saving for Rail Users: HK\$ 5,030 million per year**
- **Time Savings for PVs and GVs: HK\$ 284 and 289 million per year**
- **Savings for buses: HK\$271 million per year**
- **Improvements from air quality: HK\$8 million per year**



Economic Benefit by Type



Years of Life Lost (YLL)

- **US: 135,000 lose 14.24 years, over lifespan of 76.7 years for 214 million or 0.69 YLL**
- **UK: 64,000 lose 14.24 years, over lifespan of 77.1 years for 52 million or 1.35 YLL**
- **HK: 2,000 lose 14.24 years over lifespan of 74 years for 6.8 million or 0.31 YLL**



Years of Life Lost (YLL)

- US population = 31 times HK
135,000 deaths due to AQ
- UK population = 8 times HK
64,000 deaths due to AQ
- HK should have 4 - 8,000 deaths due to AQ
- HK YLL should be 0.62 - 1.24 YLL assuming similar AQ



Air Quality

- **US: 20 micro gms/m³ PM10**
- **UK: 30 mirco gms/m³ PM10**
- **HK: 55 micro gms/m³ PM10**
- **PM2.5 = 50% PM10**
- **HK AQ 1.8 - 2.75 worse than US or UK**



Air Quality

- **HK 1.11 - 3.4 YLL for poor AQ**
- **EKL/NIL might save three days of everyone's life in HK**



Conclusions

- **Impact Pathway Analysis has little value regarding time savings**
- **Economic model may be in tact, but it benefits time savings not life or the environment**
- **YLL may be an alternative view**



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