

Lead Phase Out Case studies

North Africa Lead phase out workshop
Technical session
August 14th, 2008

Worldwide experience



- There were no major problems with lead phase-out in Hong Kong, Thailand, Singapore, Malaysia, Philippines and the Middle – Eastern countries
- The approaches taken were all different

Hong Kong: Lead removed April 1991



- Government directive to implement in 18 months; 95 RON ULG
- All fuel is imported; multiple supply sources not a problem
- Price differential by taxation encouraged use of unleaded
- Distribution system requirements:
 - dispensers for multiple products and tank cleaning if required

Hong Kong: continued



- Communication to consumers by industry/government
- Consumer acceptance only 50%; resulted in introduction of new grade 98 RON gasoline to convey “quality and power” of unleaded - this was a “desire” not a “need”

Australia: Unleaded introduced January 1986



- Government directive to tighten vehicle emissions standards; unleaded (91 RON) required for catalysts; lead phased down in steps
- Refinery investment not needed because pool octane fell ; leaded fuel octane dropped from 98 to 96 RON and unleaded was 91 RON
- Price differential by taxation to encourage leaded users to switch

Australia: continued



- Distribution system requirements - there was a long lead time
 - small nozzles for unleaded gasoline
 - dilution and tank cleaning both used
- Communication to public by oil & auto industries/government
- Lead replacement petrol (LRP) introduced in 2000, market 100% unleaded

Singapore:

Lead phase out 1991 - 1996



- Oil companies were given a specific deadline by which only unleaded could be sold at the pump
- Unleaded was supplied from the refinery well before the required date to correct the tank heel at the terminals and stations
- No significant problems

Malaysia:

Lead phase out 1991-1999



- Phase out started in 1991, completed in 1999
- Industry and the ministry worked closely, Petronas is the state oil company
- Environmental positioning of unleaded by government was a failure; poor volatility control of base gasoline led to perception of inferior quality
- “Super” unleaded introduced to overcome customer perceptions

Thailand: Lead phase out 1991-1996



- Government mandate to phase out leaded gasoline by 1996 because of a concern about health effects of lead
- In 1996, because of fears about valve seat recession (VSR), an extra grade of gasoline with additive was required by the government - later removed as fear subsided
- Because of specific phase-in program, problems in supply, logistics and distribution were minimal

Thailand: continued



- Public acceptance was fairly good, and phase in was quick, which allowed catalyst equipped cars to further improve air quality
- Base fuel formulation is important, initial cold start and driveability problems were overcome with reformulation using lighter blend stocks
- Comments: technically “unnecessary” grade with VSR additive introduced; need to be sure fuel is properly formulated for good operation

USA - for 1974 model year cars



- Demanded by the automobile manufacturers (GM) in response to vehicle emission requirements (needed catalysts)
- Various and significant refinery investment required; multiple grades of leaded maintained; multiple grades of unleaded evolved as well as a low-lead grade; different rules for small refiners; lead credits trading scheme
- Phase down in five steps; no leaded in 1996 (effectively gone in 1986)

USA: continued



- Segregated systems for leaded and unleaded; small nozzles for unleaded cars; dilution and tank cleaning both used
- No significant cost differential; driven by demand of new cars
- Widespread reports of “adapting” filler nozzles to take Leaded
- In hindsight, the transition was too long; education could have been better

Philippines: January 2001



- Government mandated a reduction from 0.6 to 0.15 g Pb/L by 1994
- Unleaded voluntarily introduced by oil companies in 1994; publicity campaign and price advantage did not result in a switch to unleaded
- 1999 Clean Air Act required unleaded nationwide by end 2000
- Government agencies conducted spot checks to ensure compliance

Philippines: continued



- Major refinery investment not undertaken - higher octane blending stocks imported; distribution system issues relatively minor
- Government Departments had problems with implementing all of the provisions of the Clean Air Act because of budget funding
- Comment: Asian Development Bank loans drove the unleaded process; there were initially no vehicle emission requirements; conclusion must be that attempting to improve air quality by fuel regulation alone is not cost effective