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SCALING UP CITY-LEVEL CLEAN TRANSPORT INVESTMENTS INTO NATIONAL PROGRAMMES: PROMOTING CLEAN URBAN PUBLIC TRANSPORT IN KAZAKHSTAN

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GREEN ACTION PROGRAMME

OECD BETTER POLICIES FOR BETTER LIVES

Evolution of OECD work on environmental public finance

- OECD supports EECCA countries to improve the management of public resources allocated to support environmental investments
- OECD has developed a number of practical tools that can be used in the preparation of public investment programmes
  - OECD Council Recommendation for environmental public environmental expenditure programmes (PEEM)
  - Handbook for appraisal of environmental projects financed from public funds
- Developing green public investment programmes supported with public funds – investment programme design and costing model
  - Kommunalkredit Public Consulting is OECD contractor implementing the project

Why green public investment programmes?

- There are significant investment needs in the countries, including at a city level
- The private sector needs to play a crucial role in financing green investments, however, not all types of investments are interesting for the private sector
- Economic conditions (small and financially weak service providers, low tariffs) often make private sector reluctant to invest without clear incentives
- Public support can be used to stimulate green public investments

Economics of using public funds

Project characteristics		Economic efficiency	
		Yes (ERR>r)	No (ERR<r)
Commercial viability	Yes (IRR>r)	Project should be implemented but no subsidy necessary	Project should not be implemented even if private sector wants to support it
	No (IRR<r)	Project should be implemented but market alone will not do the job (subsidy from a public source justified or creating a new market required)	Project should not be implemented and market will not support it (no intervention necessary)

Programme objectives and focus of the clean urban transport programme in Kazakhstan

- **Starting point:**
  - High air pollution in Kazakh cities; transport not a major polluter but makes significant contribution
  - Very old bus fleet in the cities (majority of buses are more than 15 years old and often more than 25 years)
  - Public transport provided by small private operators (except in the cities of Astana and Almaty)
  - Relatively low tariff, problems to increase tariffs – private operators alone not willing to make investments in clean transport and fuel
- **Programme objective and focus:** Reduce air pollution from urban public transport sector by replacing old bus fleet in urban centres with modern buses powered by clean fuels such as:
  - Compressed Natural Gas (CNG), where available
  - Liquefied Petroleum Gas (LPG) in other cities
  - Alternatively, diesel but considering the import of EURO6 fuel

Scope of the investment programme

- **2-stage investment programme:**
  - **Phase 1 (Pilot phase)** – covers the cities of Kostanay and Shymkent
  - **Phase 2:** the Programme is extended to cover all major urban centres in Kazakhstan
- **Two scenarios for Phase 2 of the Programme were costed:**
  - Scenario 1 – covers buses older than 15 years
  - Scenario 2 – includes also buses older than 10 years

Modelling the costs and the environmental effects of the two scenarios

Excel-based model developed to support programme design:

- Calculates optimal level of subsidy for bus replacement to incentivise investment by a typical private operator of public transport in Kazakhstan
- Uses assumptions on average passenger-km, investment and operating costs of new, clean buses and old buses
- Takes into account the existing bus fleet in Kazakhstan
- Calculates costs and emission reductions (CO_2, CO, NOx, PM, SO_2) per dollar spent
- Users may define target parameters to optimise the programme, including programme budget and emission reduction targets (only one emission reduction parameter at a time can be set as a target: CO_2, CO, NOx, PM, SO_2)

Modelling costs and environmental effects of two scenarios

Algorithm used:

- The model reviews information on public transport for each city. The review is done in four iterations, starting from the oldest buses (>15 years) and then respectively >10 years, > 5 years and 0-5 years
- The model checks first if the city has potential to run CNG buses, if yes it proposes a replacement of an old bus with a CNG bus
- If the city does not have potential for CNG buses, the model follows the same steps with LPG/modern diesel-powered buses
- The costs of new CNG stations are also taken into account. If the number of replaced buses is higher than 100, it is assumed that a CNG station is a commercial project and a subsidy is not required
- These steps repeated until the target is reached or all old buses in a given iteration are replaced

Results of modelling

City	Investment costs (including loans)	Public co-financing							
		Total	Year						
			1	2	3	4	5	6	7
	million USD								
Scenario 1									
Preparation costs (including fundraising)	0,03	0,03	0,03						
Pilot phase	29	14		14					
Implementing Unit (operating costs)	0,22	0,22			0,04	0,04	0,04	0,04	0,04
Programme promotion	0,09	0,09			0,03	0,03	0,01	0,01	
Second phase	149	74			15	15	15	15	15
Total scenario 1	178	88	0	14	15	15	15	15	15
Scenario 2									
Preparation costs (including fundraising)	0,03	0,03	0,03						
Pilot phase	29	14		14					
Implementing Unit (operating costs)	0,22	0,22			0,04	0,04	0,04	0,04	0,04
Programme promotion	0,09	0,09			0,03	0,03	0,03	0,03	0,00
Second phase	244	121			24	24	24	24	24
Total scenario 2	274	135	0	14	24	24	24	24	24

Results of modelling

	New buses			Emission reduction per year				
	Diesel	**CNG**	**LPG**	**CO_2 (t)**	**CO (kg)**	**NO_x (kg)**	**PM 2.5 (kg)**	**SO_2 (kg)**
Pilot phase	0	100	200	7 840	35 250	190 164	5 507	4 363
Scenario 1	0	**369**	**1 441**	47 301	189 851	1 122 519	33 512	25 582
Scenario 2	*0*	***928***	***1 830***	*67 648*	*314 901*	*1 705 288*	*49 717*	*39 300*