Closing the EE knowledge Gaps in Sri Lanka
Transport Sector

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OUTLINE

- Introduction
  - Transport Sector
  - Education Sector
- Methodology
- Key Findings
- Recommendations.
Overview of the Transport Sector in Sri Lanka

Historical growth of the active vehicle fleet (Road)

Active Vehicle Fleet
- Road vehicles: 6 million
- Railway: Locomotives – 75
- Inland water/air: Insignificant
- Bicycles: 3 million.

Mobility
- 200 billion passenger-km/yr
  - 94.0% road; 6.0% rail
- 15.0 billion freight ton-km/yr
  - 99% road; 1% rail.

Accelerated growth of private vehicles (2W, 3W & Cars).
Heavy dependence of imported petroleum fuels
Deterioration of energy efficiency.

Source: CBSL (2020); DMT (2019)

Sector governance
- Primarily, transport is a subject of national government.
- Characterized by multiple agencies and stakeholders in transport, energy, environment, development, infrastructure, education & skill development.
Overview of the Formal Education Sector in Sri Lanka:

- Early childhood development
  - Nursery
  - Pre-school, Montessori

Primary & Secondary School Education:
- Primary Education
- Junior Secondary Education
- Senior Secondary Education
  - GCE-O/L
  - GCE-A/L

Tertiary & University Education:
- University Undergraduate Education
- Professional & Non-university Tertiary Education
- Postgraduate Education

Technical & Vocational Education:
- Vocational Training
- Vocational Education
- Advanced Technical Education

Other modes of education:
- Professional education / CPD
- Non-formal: Workplace-based “In-service” and “On-the-job” training.
- Informal: Media, Self-learning.
METHODOLOGY

- The Overall Approach

- Energy Efficiency in the Transport Sector
- Context Setting
- Education for Sustainable Development
  - Institutions, Assigned subjects and Staff
  - Sector Appraisal
  - Institutions, Programmes, Curricula and Staff
  - Stakeholder analysis and Competency gaps
  - Gap Analysis
  - Stakeholder analysis and Competency framework

- Recommendations for Bridging the Knowledge Gaps
Energy Efficiency of Transport Systems

- **System Efficiency**: Organize land use, social and economic activities in such a way that the need for transport and the use of fossil fuels is reduced.
- **Trip Efficiency**: Make use of energy-efficient modes like public transport and non-motorized modes to reduce energy consumption per trip.
- **Vehicle Efficiency**: Consuming as little energy as possible per vehicle-km by using advanced technologies & cleaner fuels and by optimizing vehicle operation.

**Avoid/Reduce**
- Reduce or avoid travel or the need to travel.

**Shift**
- Shift to more energy efficient modes.

**Improve**
- Improve the efficiency through vehicle technology.

**AVOID/REDUCE**

**SHIFT**

**IMPROVE**

**Source:** GIZ (2012)
METHODOLOGY

- Competency Framework
  - Core-competencies.

- Cognitive Competencies (Knowledge) → Leaning to know
- Methodological Competencies (Skills) → Leaning to do
- Attitudinal Competencies (Behavioural) → Leaning to be

<table>
<thead>
<tr>
<th>Cognitive Competencies</th>
<th>Functional Competencies</th>
<th>Attitudinal Competencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information</td>
<td>Anticipatory</td>
<td>Normative</td>
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<tr>
<td>Systems thinking</td>
<td>Strategic</td>
<td>Collaboration</td>
</tr>
<tr>
<td>Critical thinking</td>
<td>Integrated problem-solving</td>
<td>Self-awareness</td>
</tr>
</tbody>
</table>

- Functional Competencies
  - Anticipatory
  - Strategic
  - Integrated problem-solving

- Attitudinal Competencies
  - Normative
  - Collaboration
  - Self-awareness
KEY FINDINGS

- Educational Programmes
  - Transport related educational & training programmes.

Key EE areas covered

- None/Not Clear: 12.3%
- System Efficiency: 24.7%
- Travel Efficiency: 11.1%
- Vehicle Efficiency: 51.9%

Emphasis given on competencies

<table>
<thead>
<tr>
<th>Competency Category</th>
<th>Percentage Emphasis (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive</td>
<td>High: 40, Medium: 30, Low: 20, None: 10</td>
</tr>
<tr>
<td>Functional</td>
<td>High: 40, Medium: 30, Low: 20, None: 10</td>
</tr>
<tr>
<td>Attitudinal</td>
<td>High: 40, Medium: 30, Low: 20, None: 10</td>
</tr>
<tr>
<td>All</td>
<td>High: 40, Medium: 30, Low: 20, None: 10</td>
</tr>
</tbody>
</table>
KEY FINDINGS

- Transport Sector Actors
  - Competency gap analysis.

**Academic and Professional Qualifications**

- **Highest academic qualification**
  - Undergraduate, 26.8%
  - Postgraduate, 54.2%
  - Diploma, 16.3%
  - Other, 2.6%

- **Possessing of professional qualification**
  - Yes, 43.1%
  - No, 56.9%

**Modes of awareness and education**

**Role of Informal/Non-formal Education**
KEY FINDINGS

Transport Sector Actors

- Competency gap analysis.

Competency Levels of All Staff in Relevant Areas

- Overall Efficiency
- System Efficiency
- Trip Efficiency
- Vehicle Efficiency
## RECOMMENDATIONS

### Education Plan for Bridging the Knowledge Gaps:

- In line with global initiatives on Education for SD
  - Across six broader stages within formal education system

### Education Plan Programme for Sustainable Transport

<table>
<thead>
<tr>
<th>Informal Forms of Education</th>
<th>Formal Education System</th>
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</thead>
<tbody>
<tr>
<td>Early Childhood</td>
<td>Primary School</td>
</tr>
<tr>
<td>Non-formal Forms of Education</td>
<td></td>
</tr>
</tbody>
</table>

- Non-formal and informal forms of education are treated as integral parts providing complementary learning tools for enhancing lifelong learning.
- Sustainable transport themes/topics in each level; irrespective of the field of study or the level of academic progression.
### RECOMMENDATIONS

#### Thematic Areas/Topics of Sustainable Transport

<table>
<thead>
<tr>
<th>Theme</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theme 1:</td>
<td>Development of mobility &amp; transport</td>
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<tr>
<td>Theme 2:</td>
<td>Historical change of mobility &amp; traffic</td>
</tr>
<tr>
<td>Theme 3:</td>
<td>Environment dimensions of transportation</td>
</tr>
<tr>
<td>Theme 4:</td>
<td>Megacities – new urban challenges</td>
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<tr>
<td>Theme 5:</td>
<td>Transport planning: Avoid-Shift-Improve principle</td>
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<tr>
<td>Theme 6:</td>
<td>Transport sector &amp; local air pollution</td>
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<tr>
<td>Theme 7:</td>
<td>Transport sector &amp; climate change</td>
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<td>Theme 8:</td>
<td>Transport safety</td>
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<tr>
<td>Theme 9:</td>
<td>Sustainable transport infrastructures</td>
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<tr>
<td>Theme 10:</td>
<td>Transport sector &amp; land use change</td>
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<tr>
<td>Theme 11:</td>
<td>Environmentally sustainable transportation</td>
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<td>Theme 12:</td>
<td>Transport demand management</td>
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<td>Theme 13:</td>
<td>Mass transit options &amp; public transport</td>
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<td>Theme 14:</td>
<td>Non-motorized transportation</td>
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<td>Theme 15:</td>
<td>Intelligent transport systems (ITS)</td>
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<td>Theme 16:</td>
<td>Sustainable urbanization &amp; mobility</td>
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<td>Theme 17:</td>
<td>Cleaner fuels and vehicles</td>
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<td>Theme 18:</td>
<td>Transport and SCP linkage</td>
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<td>Theme 19:</td>
<td>Intermodal Transport systems</td>
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<td>Theme 20:</td>
<td>Eco-driving</td>
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<td>Theme 21:</td>
<td>Sustainable freight transport</td>
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<tr>
<td>Theme 22:</td>
<td>Aviation, ports and environment</td>
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<tr>
<td>Theme 23:</td>
<td>Ships, ports and environment</td>
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<tr>
<td>Theme 24:</td>
<td>Inland water transport &amp; environment</td>
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<tr>
<td>Theme 25:</td>
<td>Diversity and inclusion in transport</td>
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<tr>
<td>Theme 26:</td>
<td>Street design, streetscape &amp; traffic calming</td>
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<tr>
<td>Theme 27:</td>
<td>Social Equity &amp; Gender Perspectives</td>
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<tr>
<td>Theme 28:</td>
<td>Consumer rights &amp; responsibilities</td>
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<tr>
<td>Theme 29:</td>
<td>Life-cycle assessment in transport</td>
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RECOMMENDATIONS

Education Plan for Bridging the Knowledge Gaps:

- **Curriculum Framework**
  
  ✓ Should be formulated in an overarching framework covering all levels:

  - **Cognitive Competencies (Knowledge)** → Leaning to Know
  - **Methodological Competencies (Skills)** → Leaning to do
  - **Attitudinal Competencies (Behavioural)** → Leaning to be

  - **Core Competencies**
  - **Programme Outcomes**

  - **Sustainable Transport Thematic Areas and Subject Topics**
  - **Specific Modules for the selected Education Sector**
  - **Sector-relevant Subject Topics within the Sustainable Transport Thematic Areas**
  - **Specific Competencies**
  - **Learning Outcomes**

Acknowledgements

Copenhagen Centre on Energy Efficiency (C2E2);
UNEP DTU Partnership; Ceylon Chamber of Commerce (CCC)