CEEDS Phase 3: Energy Saving Potential in Urban Passenger Transportation

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Ralph D. Samuelson

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Economic Cooperation

APEC's Urban Population is Expected to Increase Dramatically

(million people)	2010	2035	2050
Total APEC Urban Population	1,531	2,107	2,313
% Change from 2010		+38%	+51%
Total APEC Non-OECD Urban Population	868	1324	1492
% Change from 2010		+53%	+72%
Total APEC Non-OCED + Mexico and Chile Urban Population	969	1,451	1,624
% Change from 2010		+50%	+68%

Growing Cities + Growing Wealth = Growing Urban Transport Energy Use

- The consequences are likely to include growing oil security and oil price risks, traffic congestion, air pollution, and greenhouse gas emissions
- Under business-as-usual, by 2035 we expect road transport energy use to increase 250% in the participating CEEDs developing economies of China, Philippines, Thailand, Vietnam and Indonesia

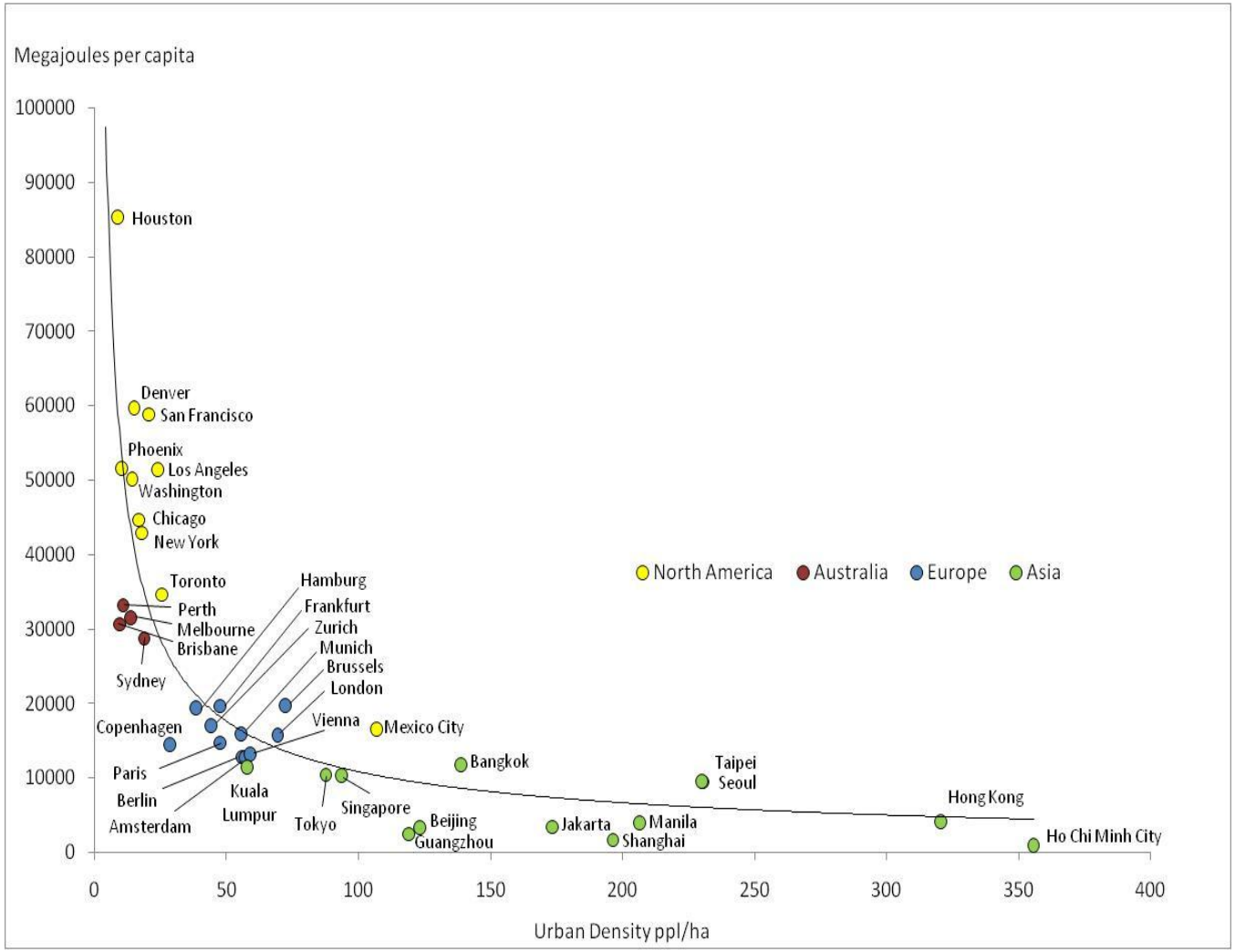
Urban Design Influences Transport Energy Use In A Number of Ways

- Diversity (land-use mix, jobs-housing balance)
- Design (street connectedness, pedestrian/bicycle friendliness)
- Transport Infrastructure (transit vs. motorway investment, parking)

Urban Population Density As an Energy Efficiency Indicator

- In general, more compact cities (those with a higher population density) tend to have lower energy use than less dense ‘sprawling’ cities
  - Direct effect: compact cities have shorter travel distances; and
  - Indirect effect: compact cities *tend* to have more of the low-energy design characteristics discussed above
  - Reverse effect: cities with the low-energy design characteristics discussed above *tend* to develop in a more compact way

Urban Design Has Dramatic Impact on Urban Transport Energy Use

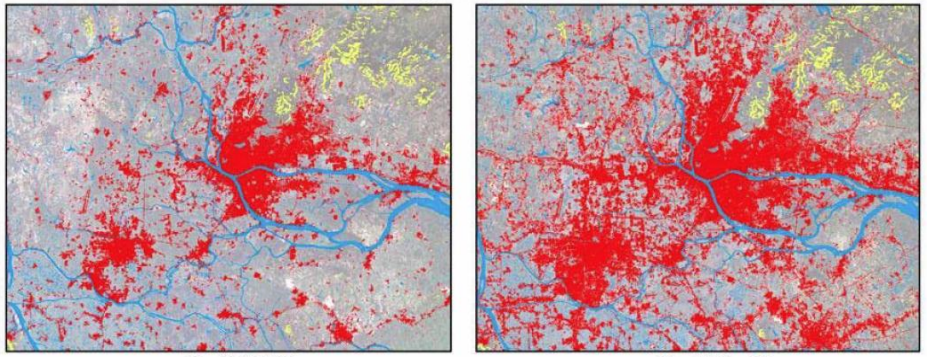


Our Methodology

- Our goal here is to roughly estimate the potential contribution of urban design to energy saving
  - We are not too concerned with exactly what design features drive this
- We ask, ‘What if cities in developing economies grow to be like the more compact cities in the developed world, rather than like the more sprawling cities in the developed world?’
- Note that we are not claiming that population density alone is the cause of low-energy urban design

Declining Trend in Urban Density

Guangzhou, China



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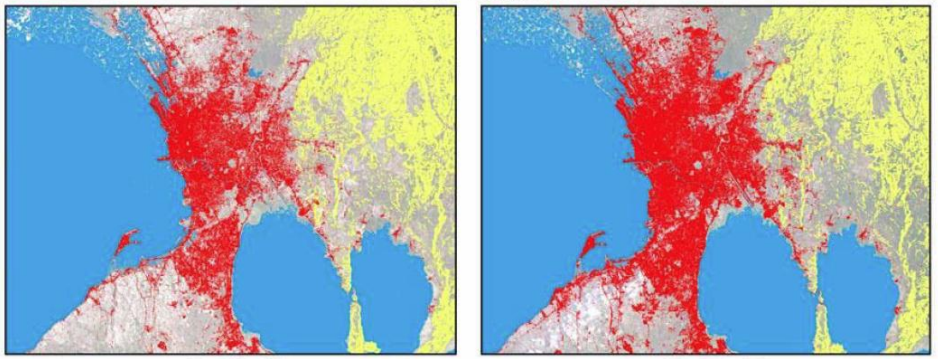
Manila, Philippines



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General Density Trends

- World Bank density assessment of 120 cities globally diverse cities
- Satellite imaging captured at two discrete times 10 years apart
- Conclusion: urban density has been declining on average 1.7% per year
- Higher decline rates noticeable in developed cities

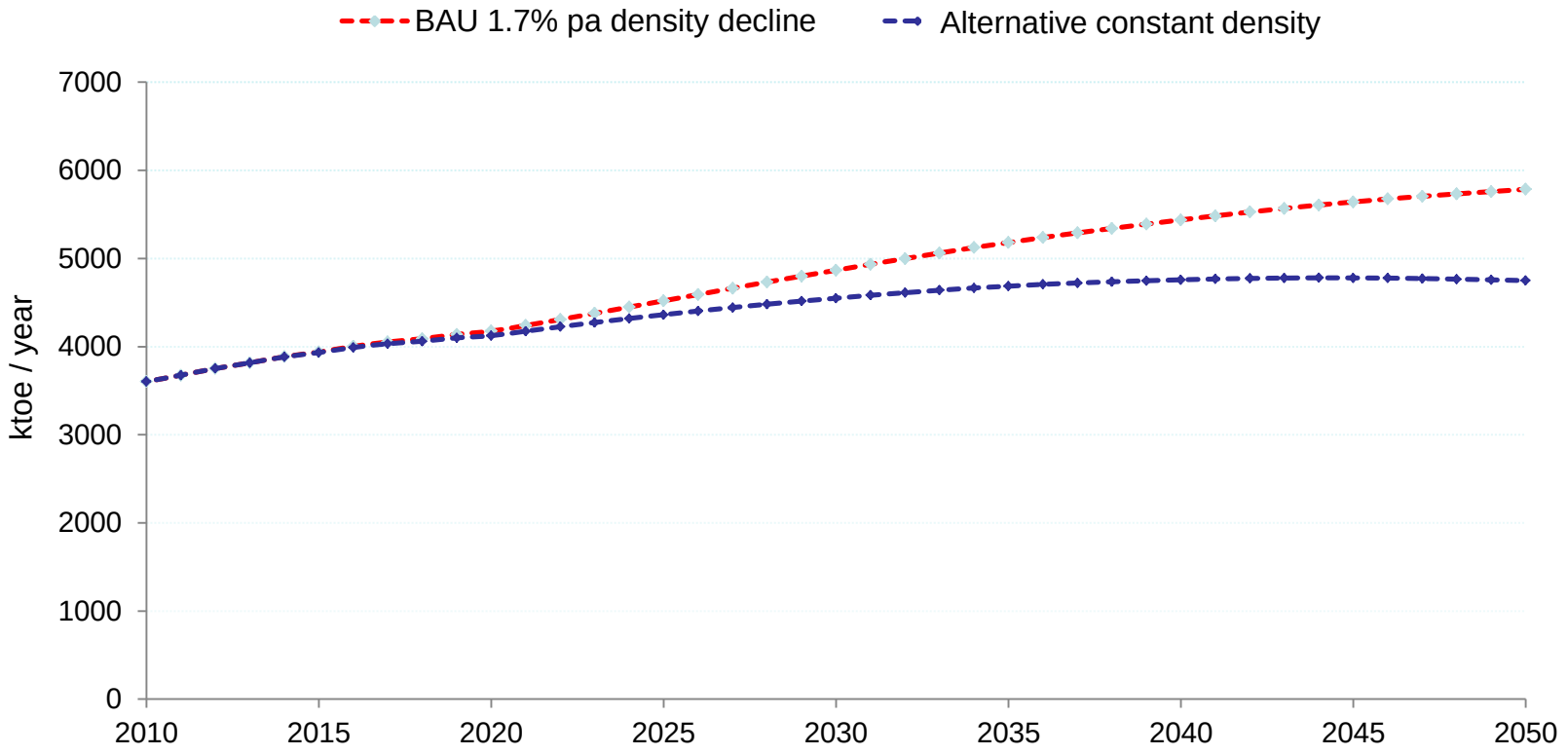
History of Rapid Density Decline in Major CEEDS Cities

Urban Metropolitan	1995 Actual [ppl/ha]	2010 Estimate [ppl/ha]	2010 Actual [ppl/ha]	Annual Decline in Urban Density
Bangkok, Thailand	139	107	39	8.1%
Manilla, Philippines	206	160	147	2.3%
Jakarta, Indonesia	150	116	79	4.2%
Mexico City, Mexico	107	83	97	0.7%
Ho Chi Minh City, Vietnam	356	269	92	8.6%
Guangzhou, China	119	92	56	4.9%

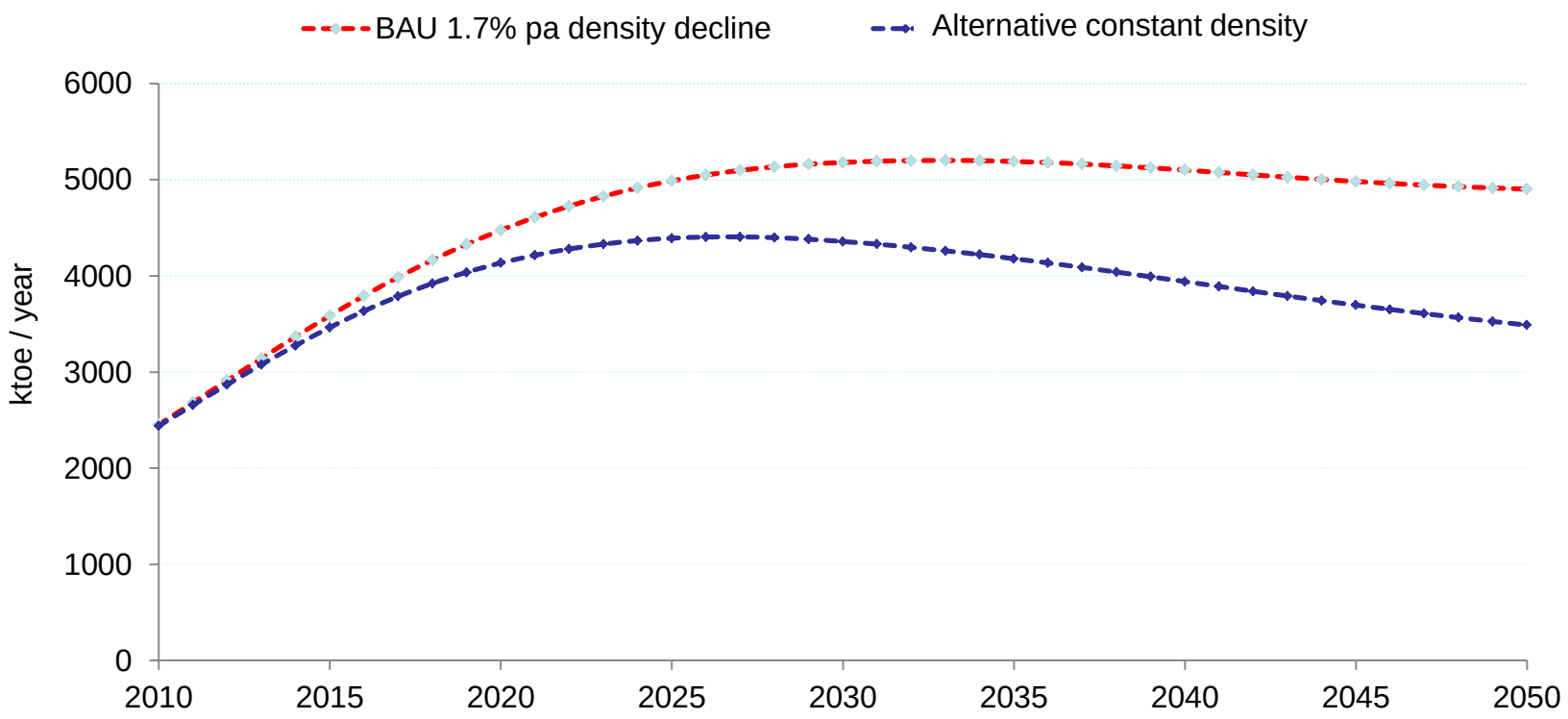
Three Scenarios Considered

- Business-as-Usual (BAU) - Density declines at the global average of 1.7% per annum from 2010 data
- Alternative – Density remains constant from 2008

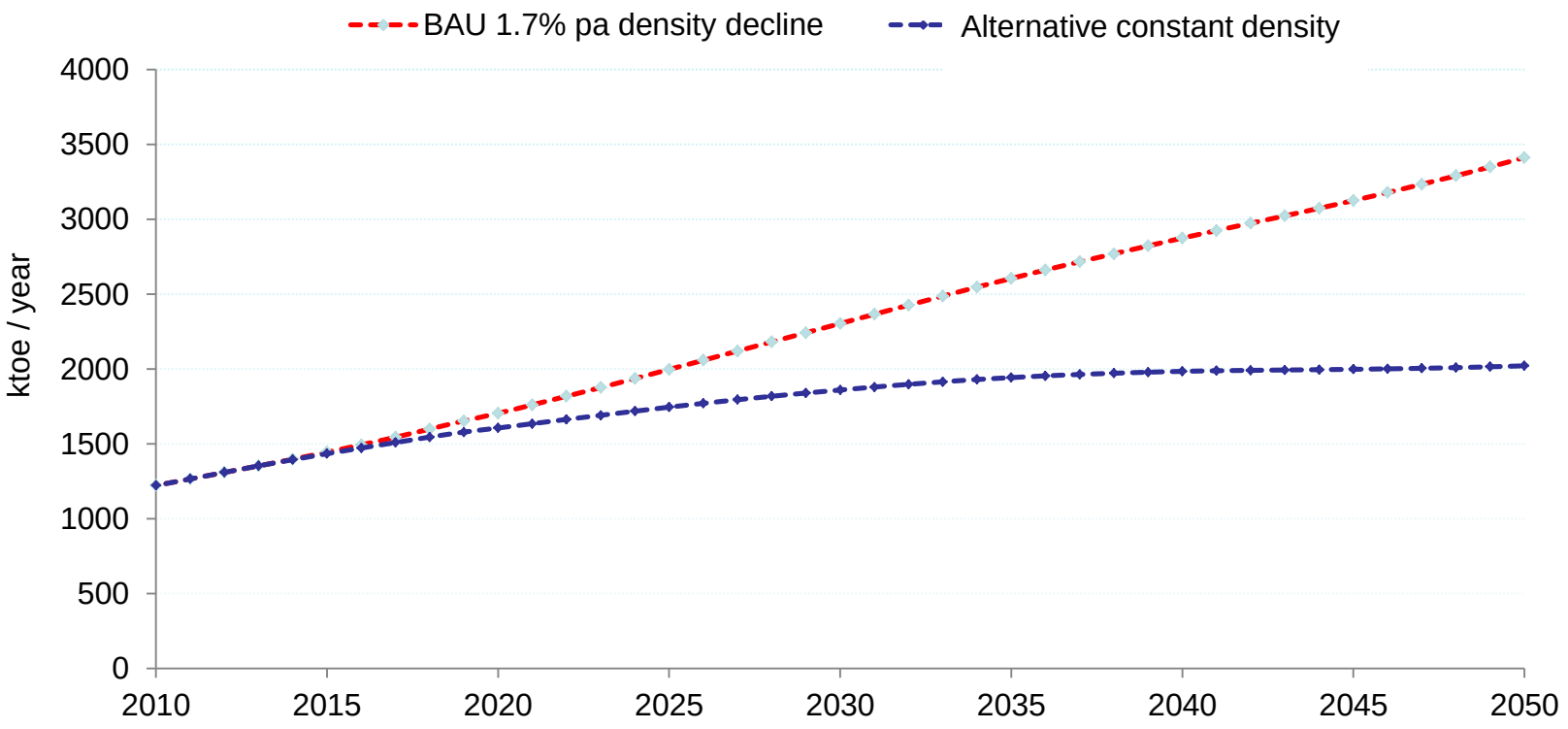
Fuel Use Projection – Bangkok, Thailand



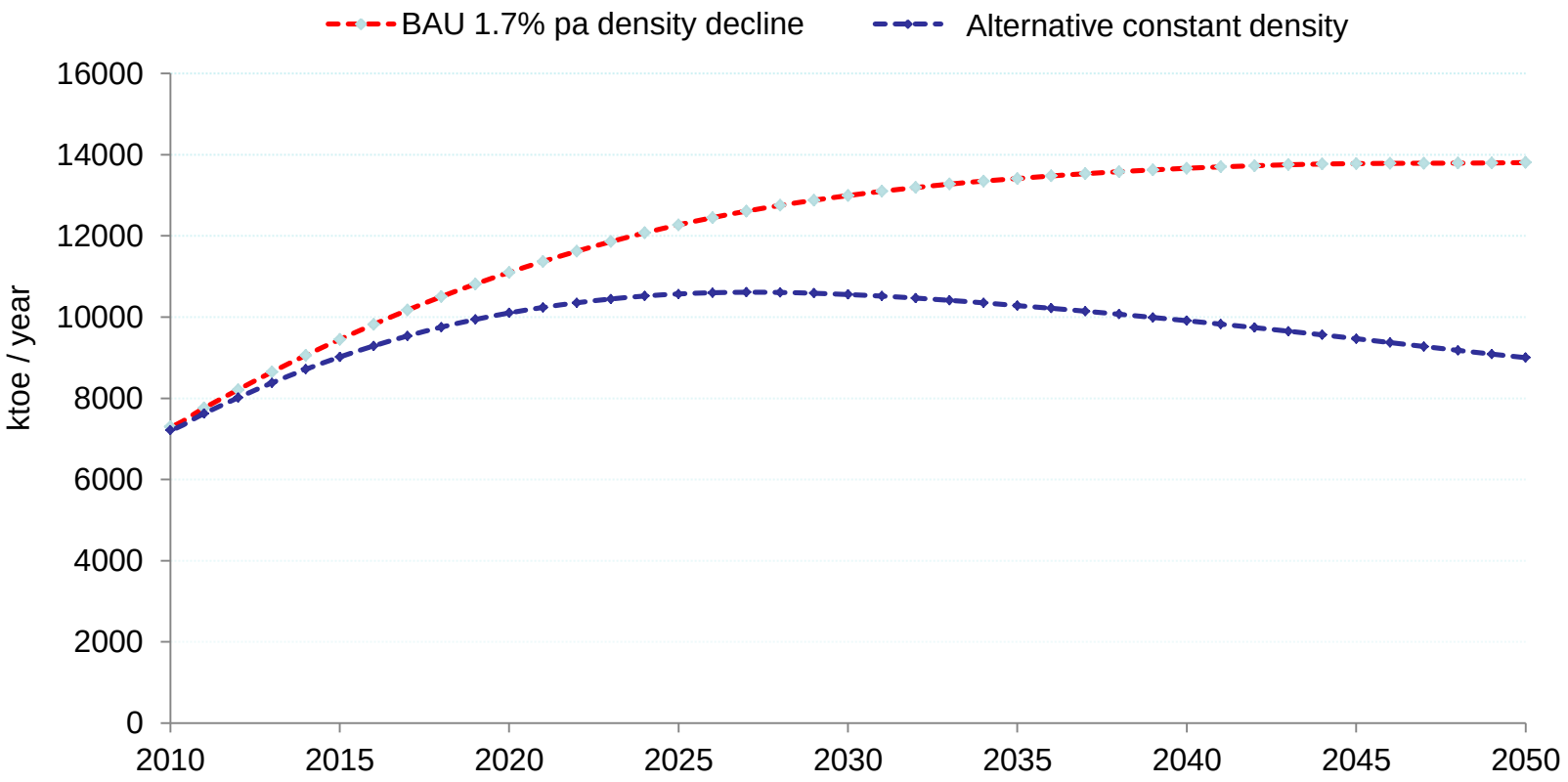
Fuel Use Projection – Guangzhou, China



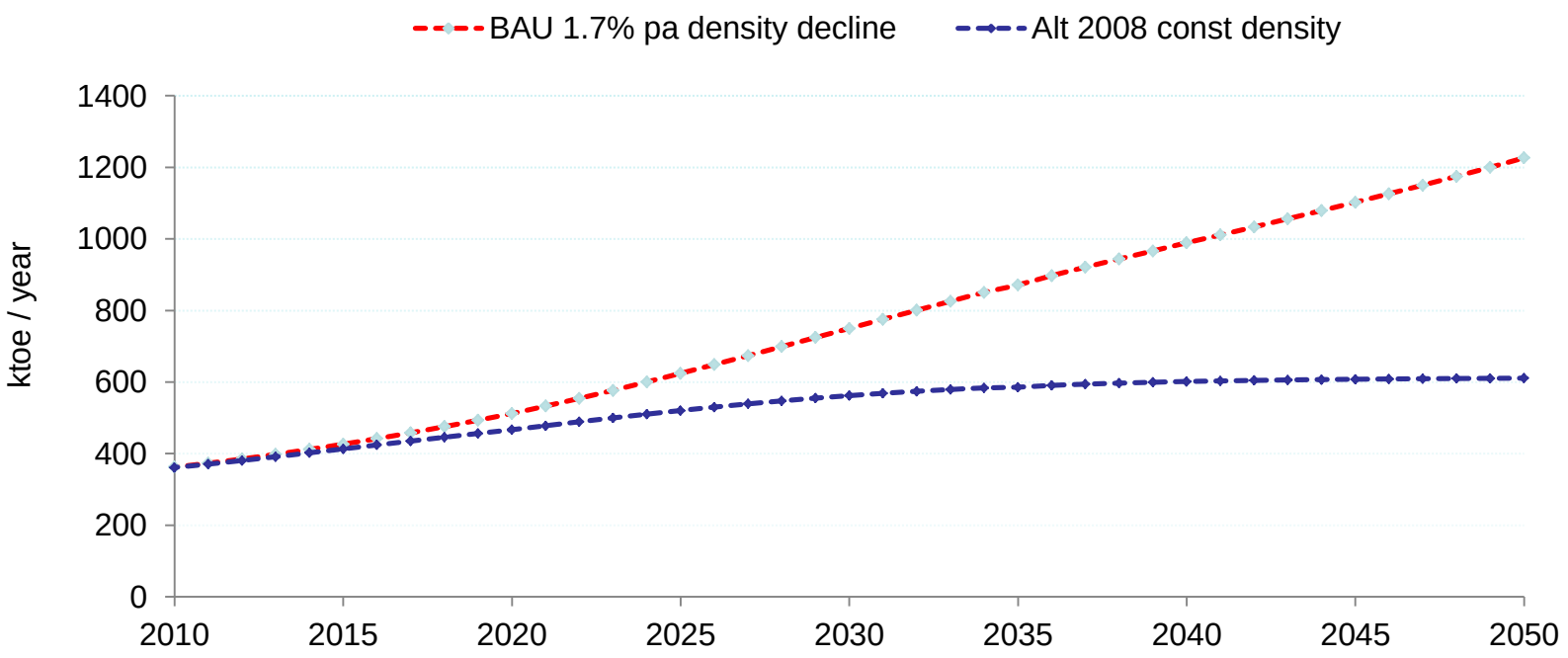
Fuel Use Projection – Manila, Philippines



Fuel Use Projection – Jakarta, Indonesia



Fuel Use Projection – Ho Chi Minh City, Vietnam



Conclusions

- How cities are designed will strongly impact the patterns of urban transport and transport energy use
- Business-as-usual is likely to lead to sprawling cities with high energy demand
- Our analysis suggests the potential energy savings from better urban design in the 5 CEEDS participating economy cities examined ranges from 30-50% by 2050 compared to business-as-usual

Time for Action is Now!

- How these growing cities are designed will strongly impact the patterns of urban transport and transport energy use
- But once the cities are built, these patterns become very hard to change
- Given the rapid urban growth expected in the APEC region, a unique window of opportunity exists for a long-term reduction in APEC's energy demand

Thank you for your kind attention

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