6-2011

Key Findings of 2011 ATRS Global Airport Performance Benchmarking Project

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Outline

- Objective of the ATRS Benchmarking Study
- Airports Included and ATRS Database
- Some Characteristics of Sample Airports
- Methodology
- Key Results on Efficiency and Costs
- User Charge Comparisons

Objective of the Benchmarking Study

- To provide a comprehensive, unbiased comparison of airport performance focusing on
  - **Productivity and Operating/Mgt Efficiency**
  - **Unit Cost Competitiveness**
  - **Comparison of Airport Charge Levels**

- Our study **does not treat service quality differentials** across airports

Airports Included in the study

Canada-US	63	airports
Europe	45	airports (2 New)
	14	airport groups
Asia	32	airports (5 New)
	5	airport groups
Oceania	9	airports
Latin America	7	airports (All New)
Total	**156**	**airports**
	19	**airport groups**

The ATRS Database

- The ATRS Database contains historic information (since FY 2001) including financial data, traffic and capacity data of the major airports and airport authorities (groups) in the following geographic regions:
  - **Asia Pacific**
  - **Europe**
  - **North America and Latin America** (non-financial data only)

- The data in each regions is segregated into:
  - **Airport Information** (capacity, type of ownership etc)
  - **Traffic**
  - **Aeronautical Revenue**
  - **Non-Aeronautical Revenue**
  - **Operating Expense**
  - **Balance Sheet**

Data Sources: FY 2001-2009

- Airport's Financial Statements, Annual Reports and direct data requests;
- US FAA, DOT statistics;
- Association of European Airlines (AEA) Statistics
- ICAO Digest of Statistics:
  - annual and monthly traffic data
  - annual financial data - not for all airports
- ACI; IATA
  - annual traffic statistics; capacity information; airport charges
  - general information surveys (Asia Pacific and Europe) occasional and not complete
- IMF and World Bank – various price indices including GDP deflators for service sectors and PPP
- US Census Bureau, Statistics Canada – regionally based Cost of Living Index

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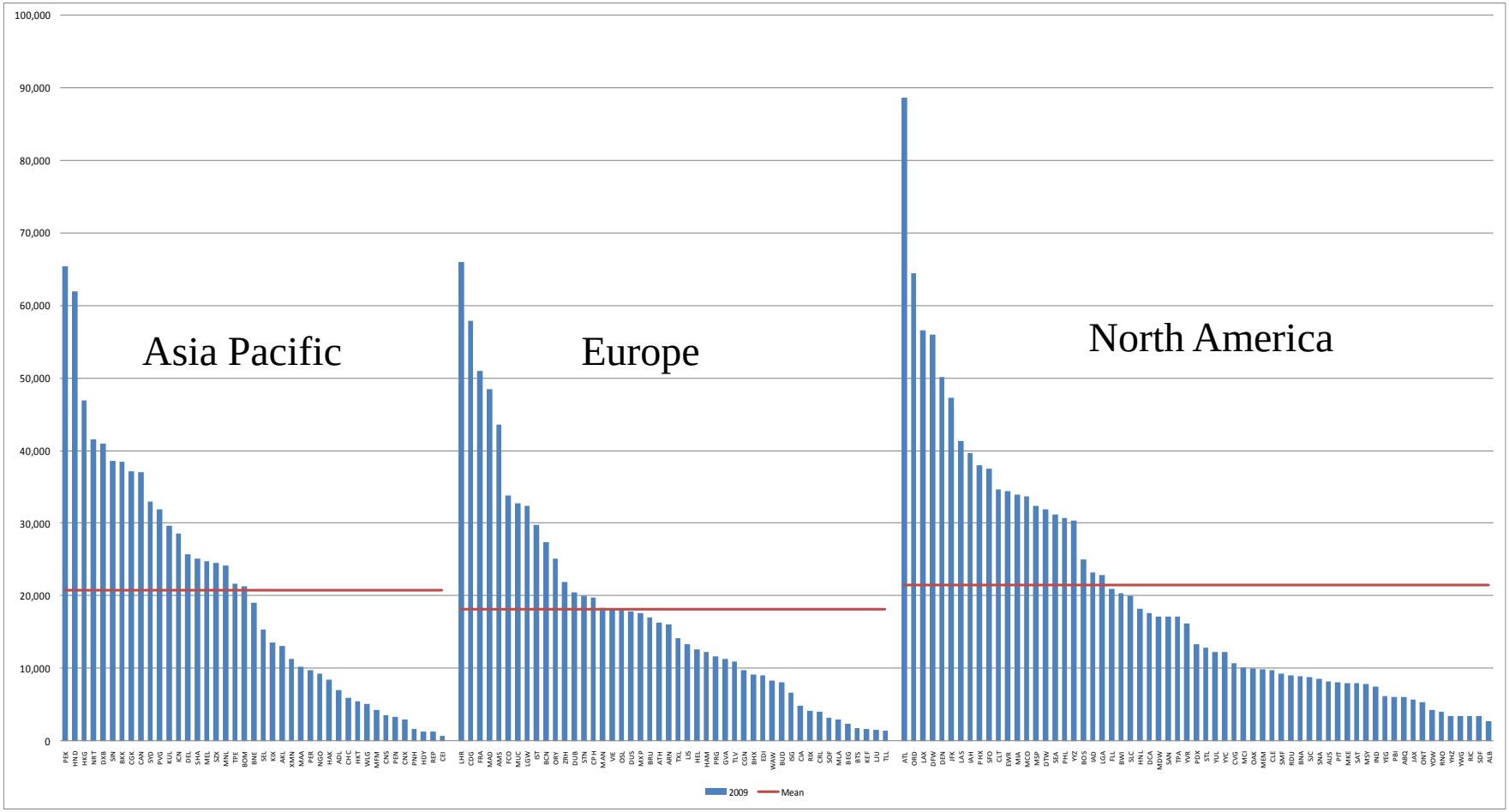
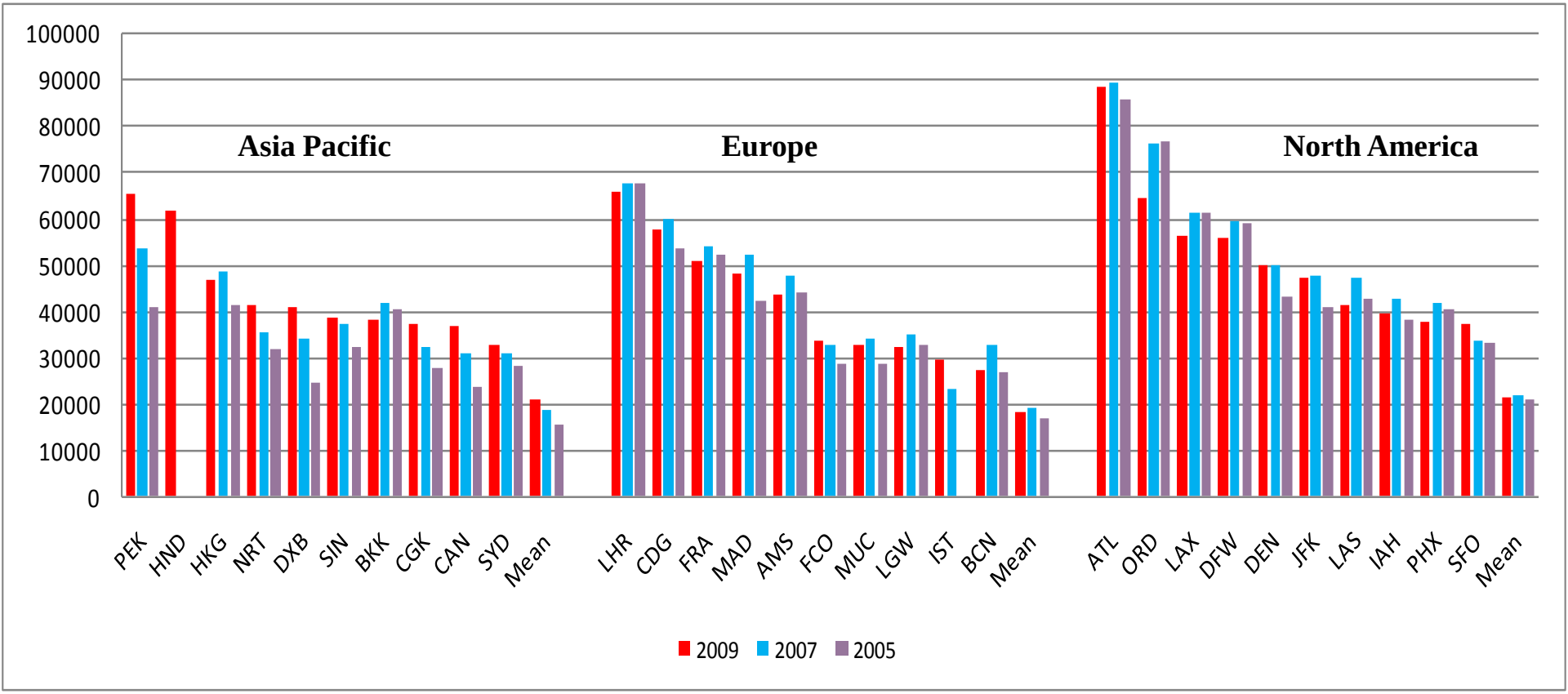
Passengers Volume, 2009

(in ’000 passengers)

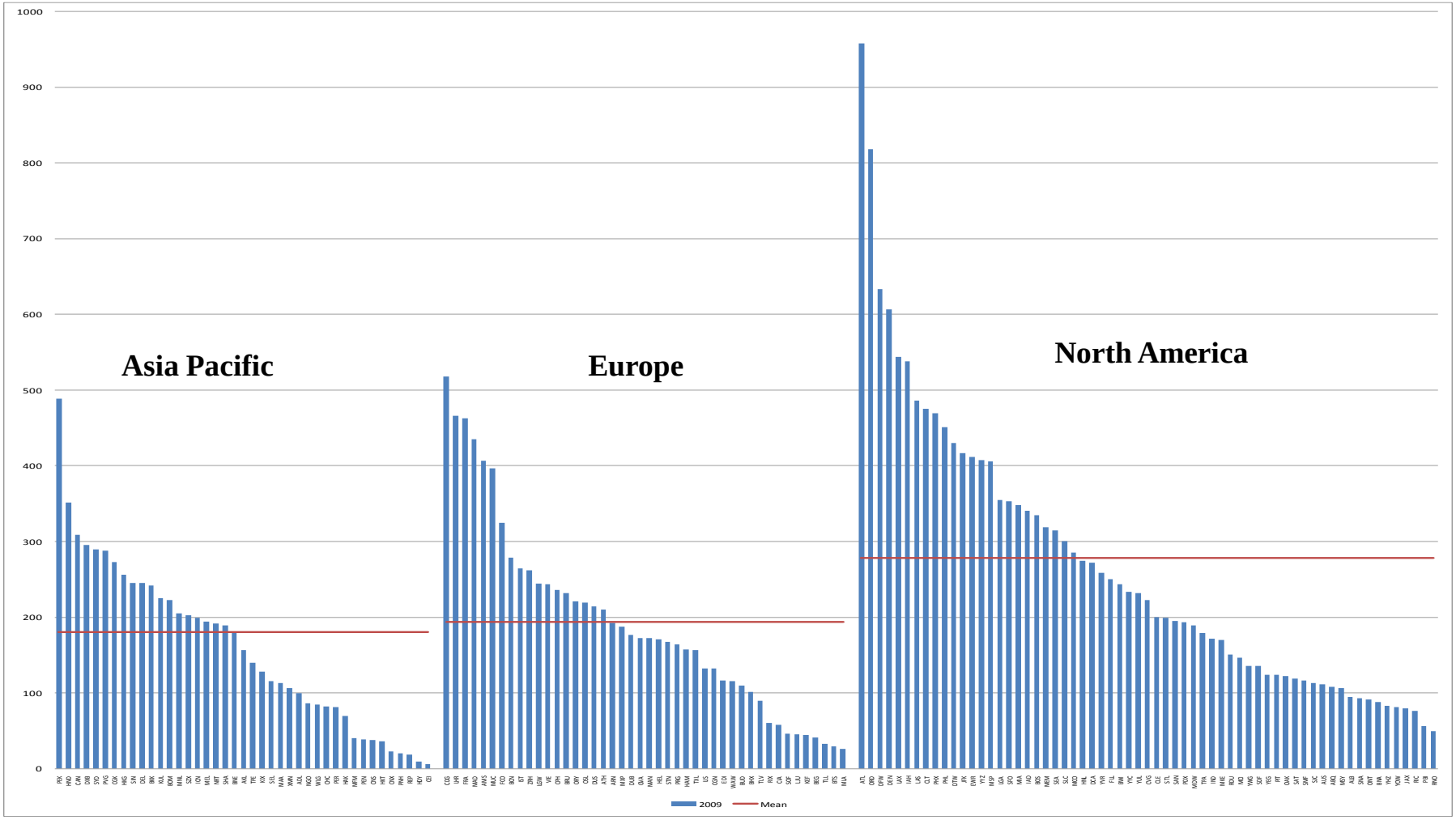


Passenger Traffic - Top 10 Airports

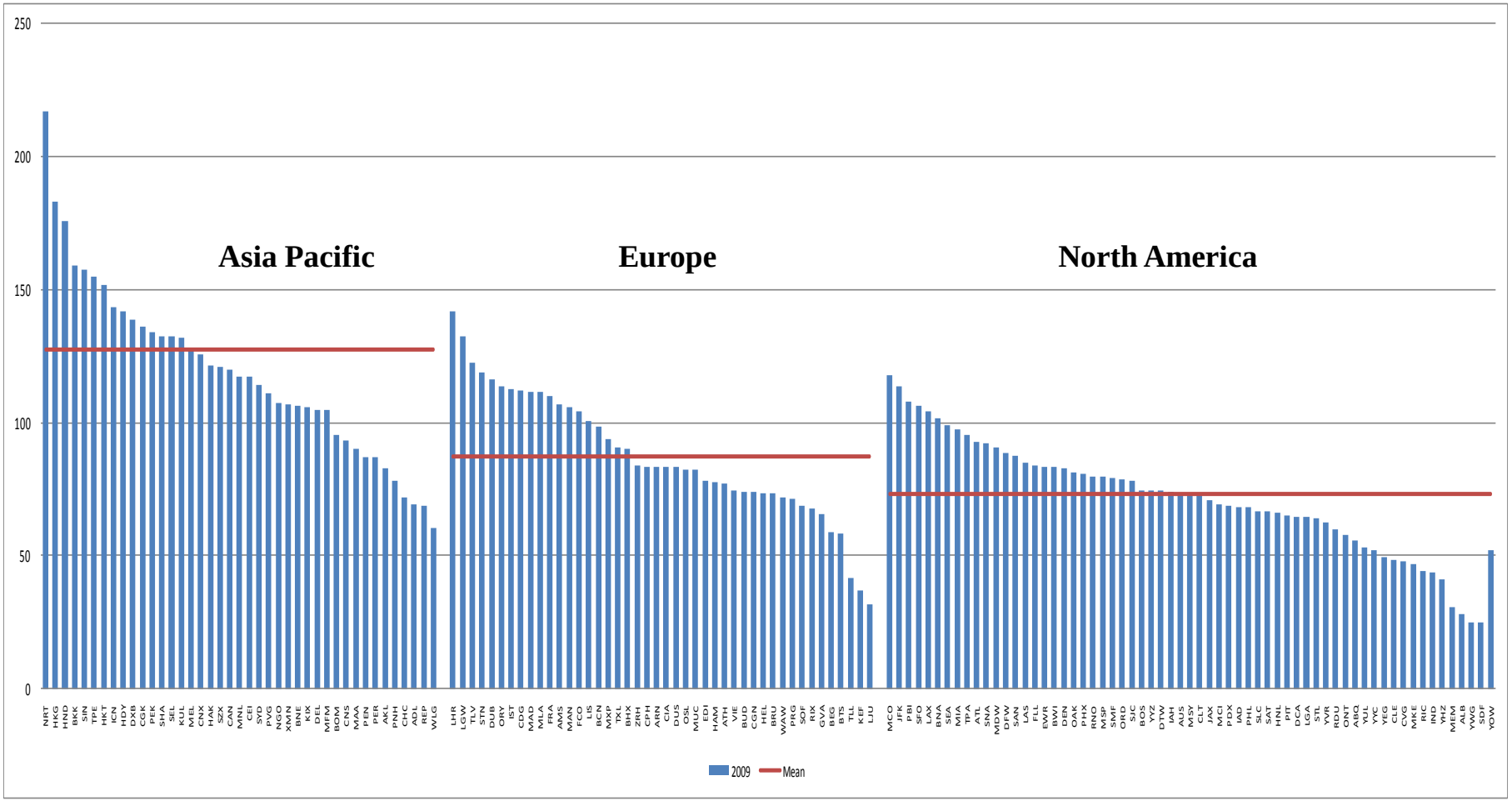
('000 passengers) :**2009, 2007, 2005**



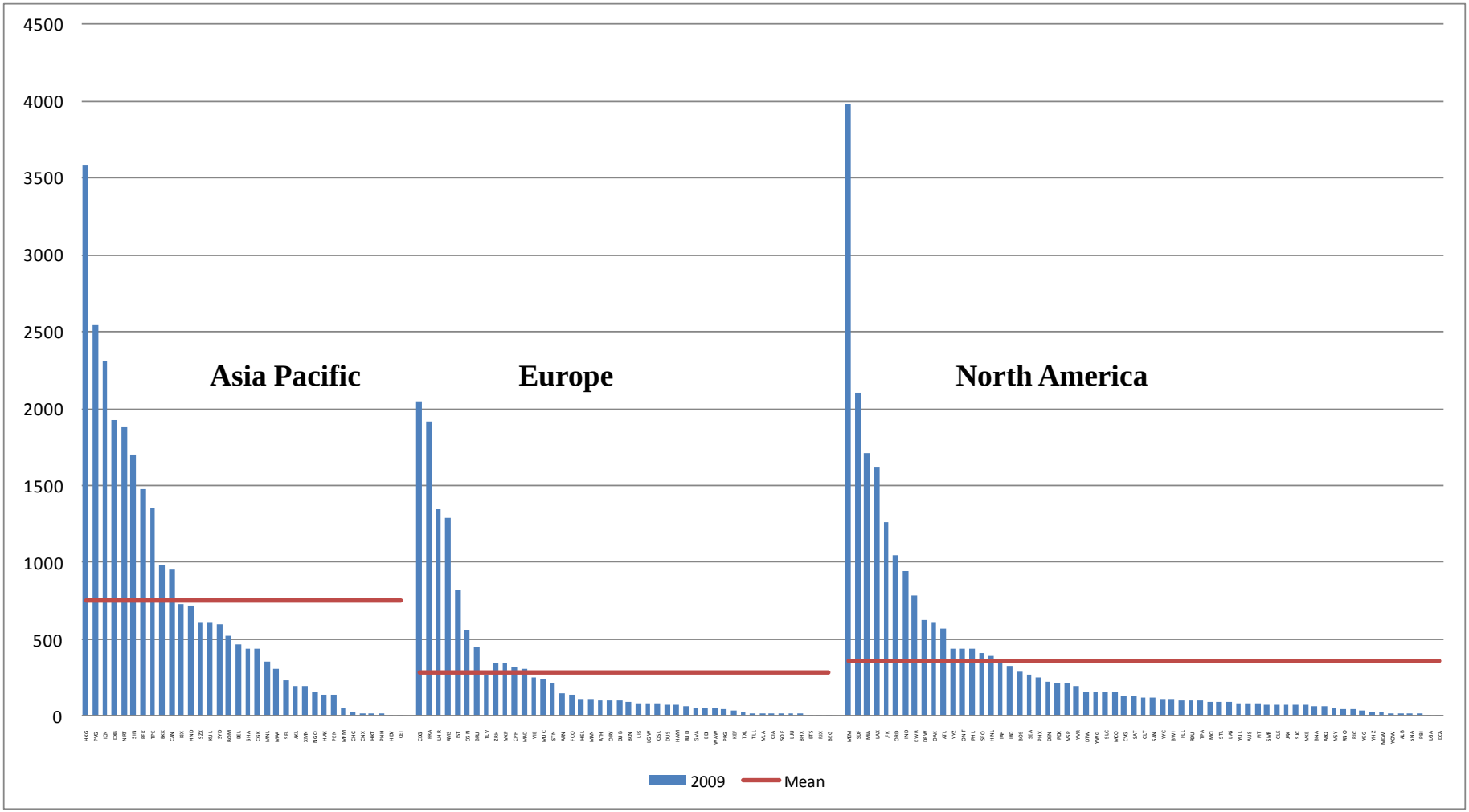
Aircraft Movements, 2009 (’000 ATM)



Passengers per Aircraft Movements, 2009

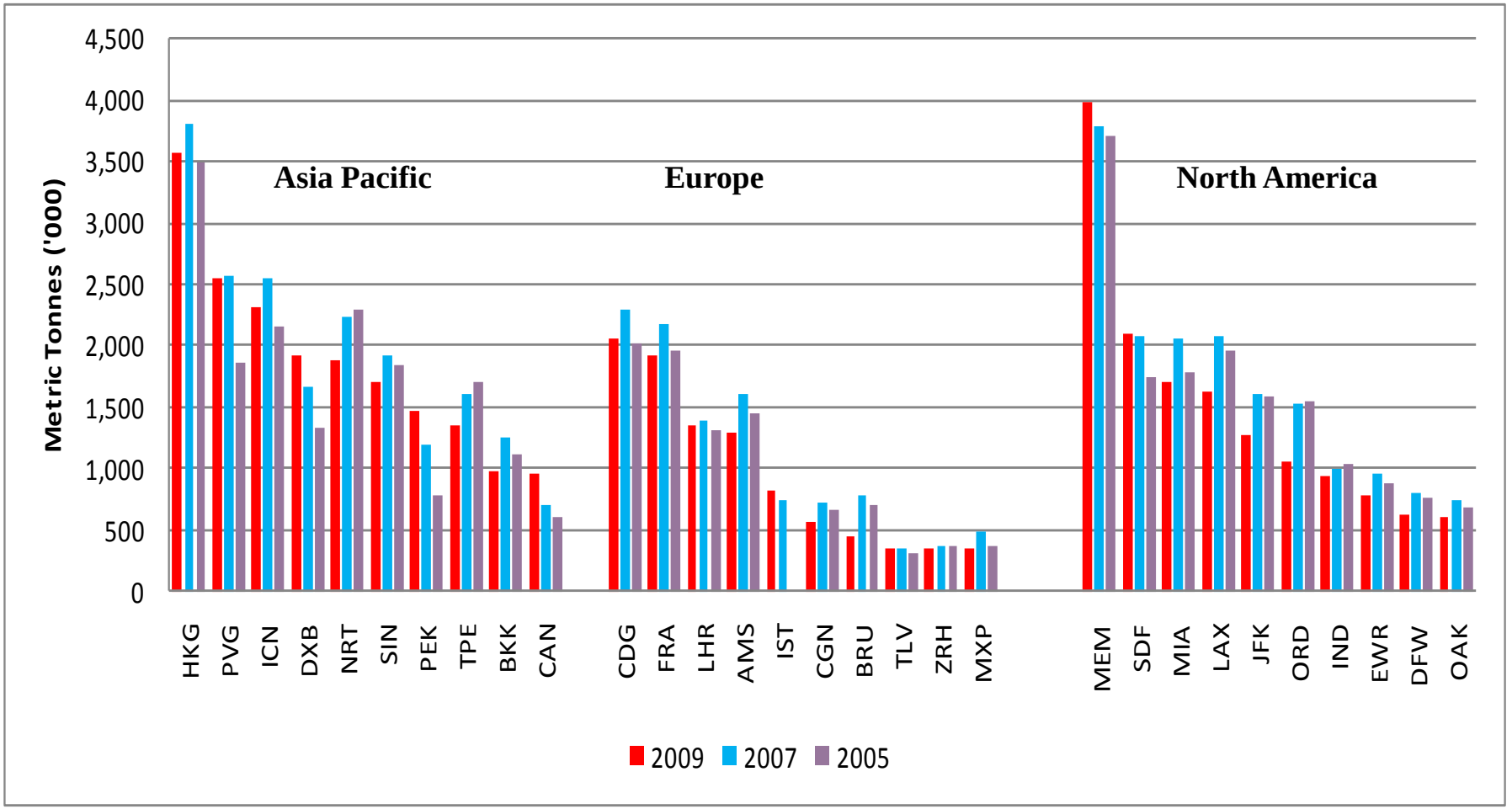


Air Cargo Traffic, 2009
(’000 metric tons)

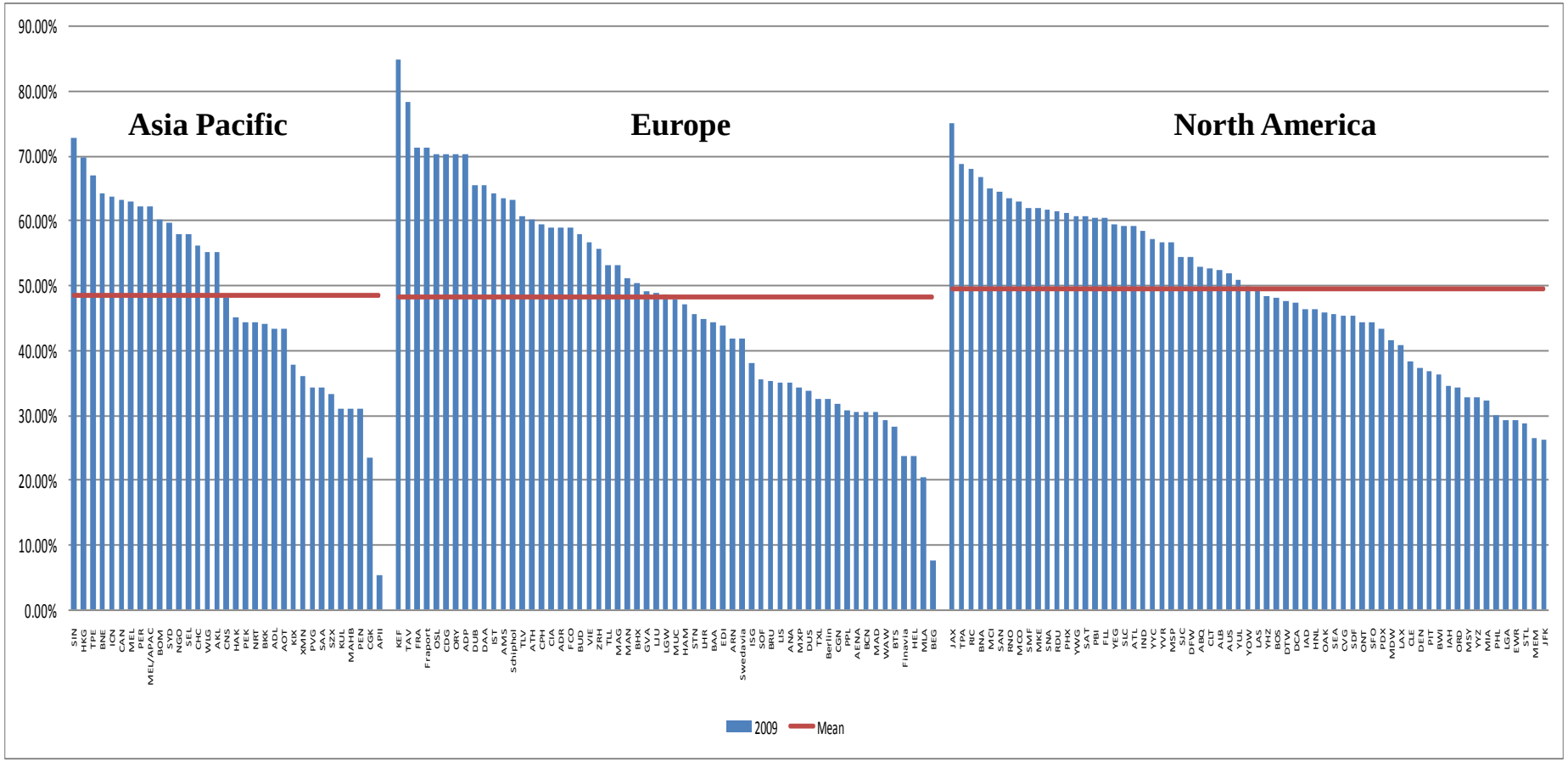


Air Cargo - Top 10 Airports (’000 metric tons)

2009, 2007, 2005



% Non-Aero Revenue, 2009



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Methodology:
Efficiency Measurement

- **Variable Factor Productivity (VFP) Index**
  - Total Factor Productivity (TFP) - Impossible because of capital input cost accounting problem
- VFP is essentially the ratio of **total (aggregate) output index** divided by **total (aggregate) variable input index**, namely labor and soft cost input (total non-labor variable inputs).
- In fact, we compute VFP using the **multilateral index** procedure proposed by Caves, Christensen and Diewert (1982).

Multilateral Aggregation Method

- This multilateral index procedure uses cost shares (revenue shares) to aggregate inputs (outputs).

$$ln\frac{X_i}{X_j} = \sum \frac{W_{ki} + \bar{W}_k}{2} ln\frac{X_{ki}}{\tilde{X}_k} - \sum \frac{W_{kj} + \bar{W}_k}{2} ln\frac{X_{kj}}{\tilde{X}_k}$$

Airport Productivity Index

Outputs	Inputs
• Aircraft movement • Passengers • Non-aeronautical revenues	• Labour • Other non-capital (soft cost) inputs

Potential Reasons for the Measured Productivity (gross VFP) Differentials

Factors Beyond Managerial Control:

- Airport size (Scale of aggregate output)
- Average aircraft size using the airport
- Share of international traffic
- Share of air cargo traffic
- Extent of capacity shortage - congestion delay
- Connecting/transfer ratio

We compute 'residual (Net) variable factor productivity (RVFP) measures after removing effects of these Factors

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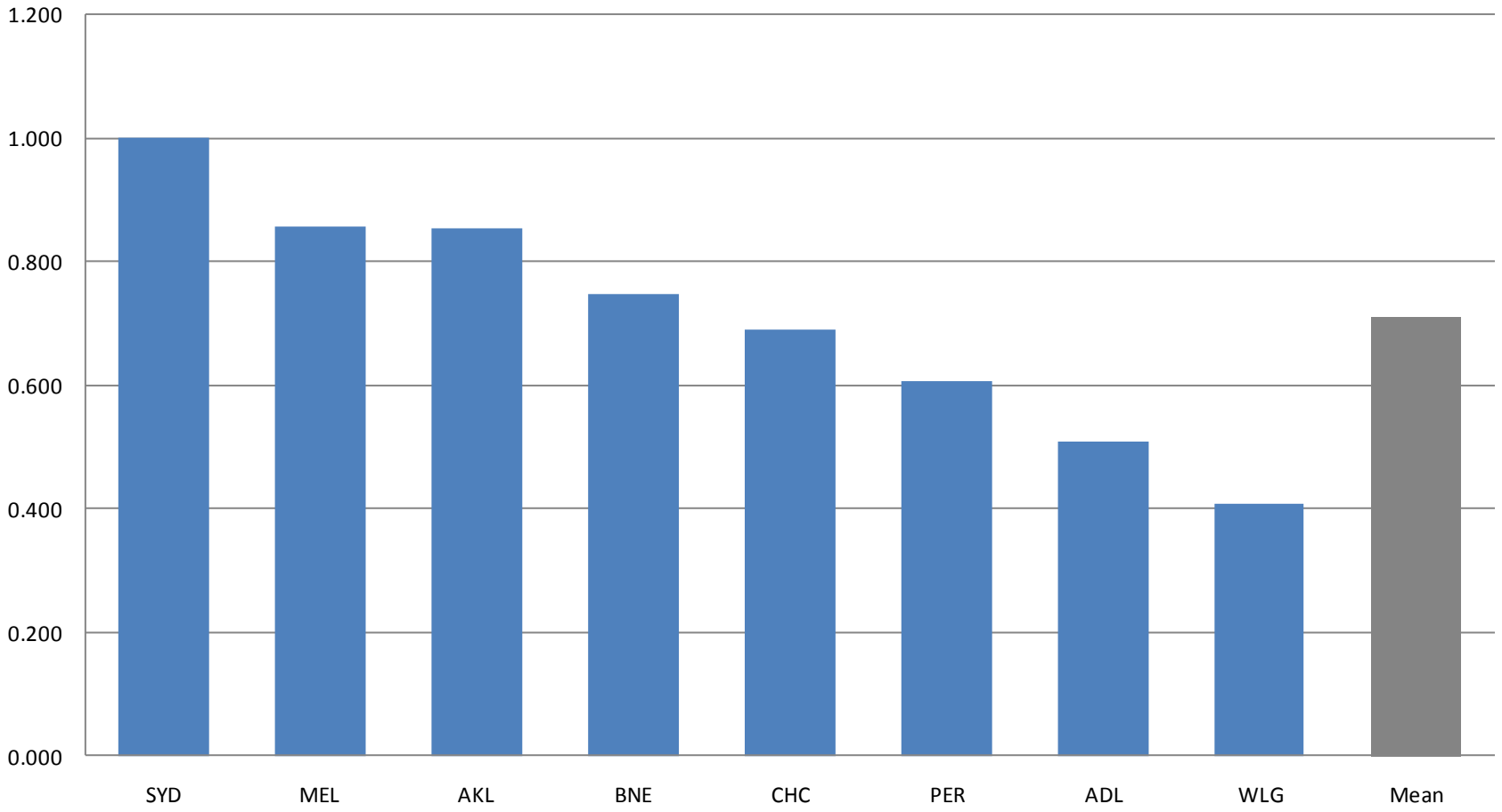
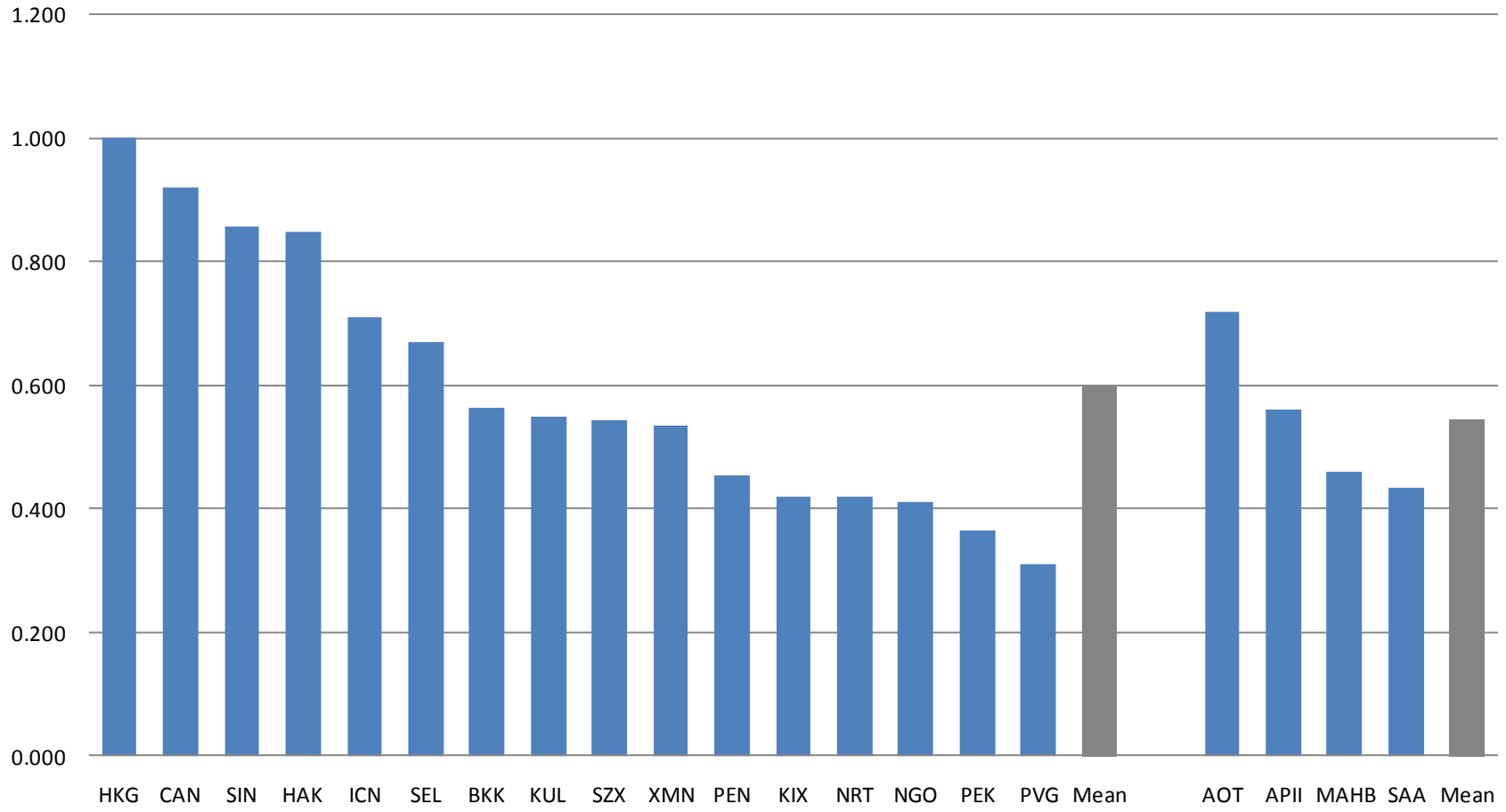
Gross Variable Factor Productivity(VFP)

Oceania (SYD=1.0), 2009

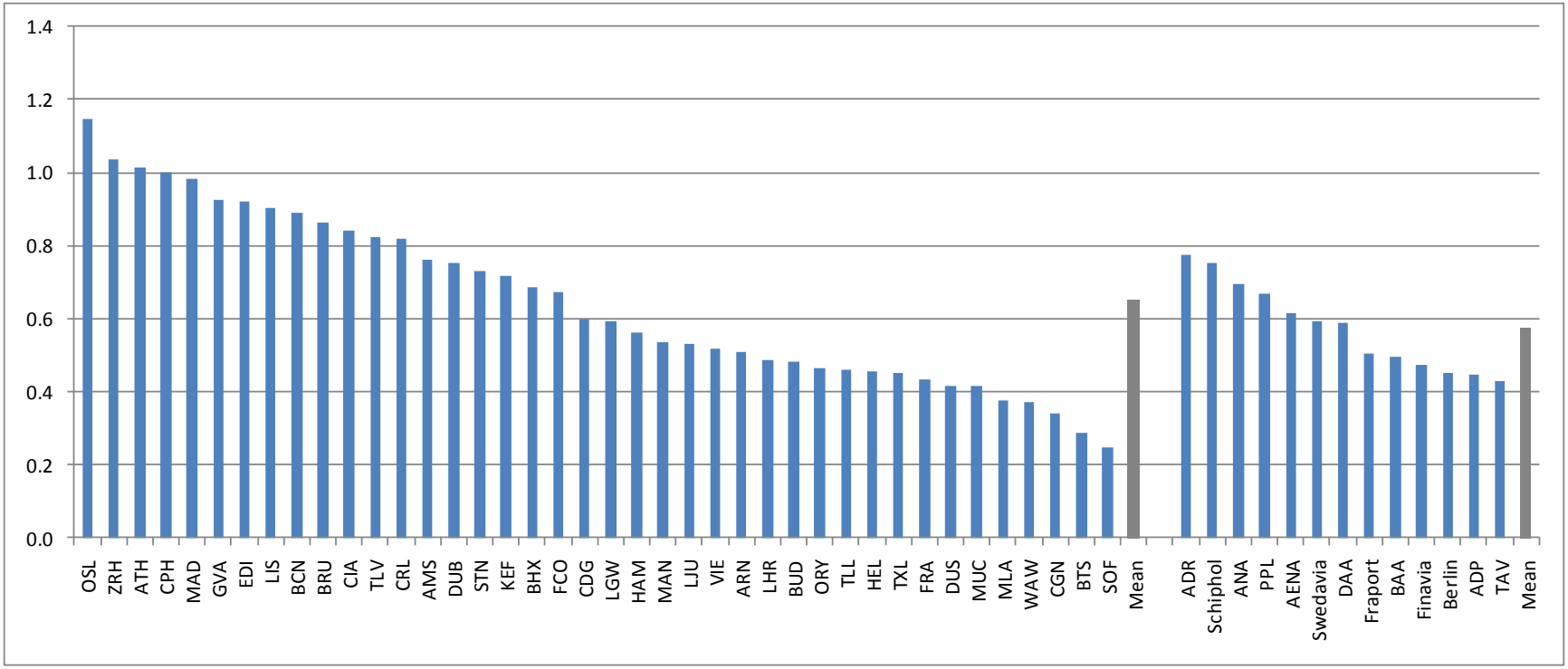


Gross Variable Factor Productivity(VFP)

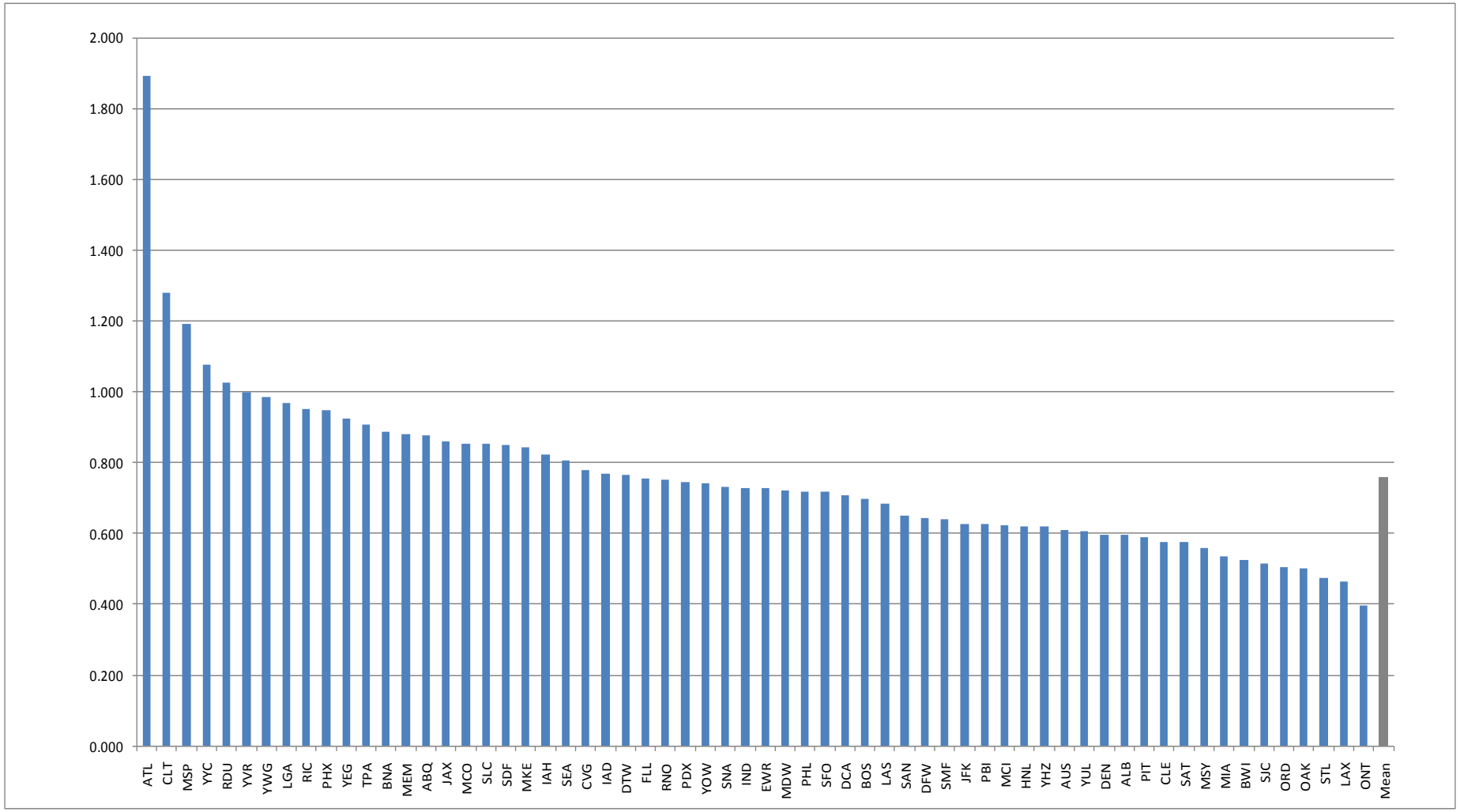
Asia (HKG=1.0), 2009



Gross Variable Factor Productivity(VFP)
Europe (CPH=1.0), 2009



Gross Variable Factor Productivity(VFP)
North America (YVR=1.0), 2009

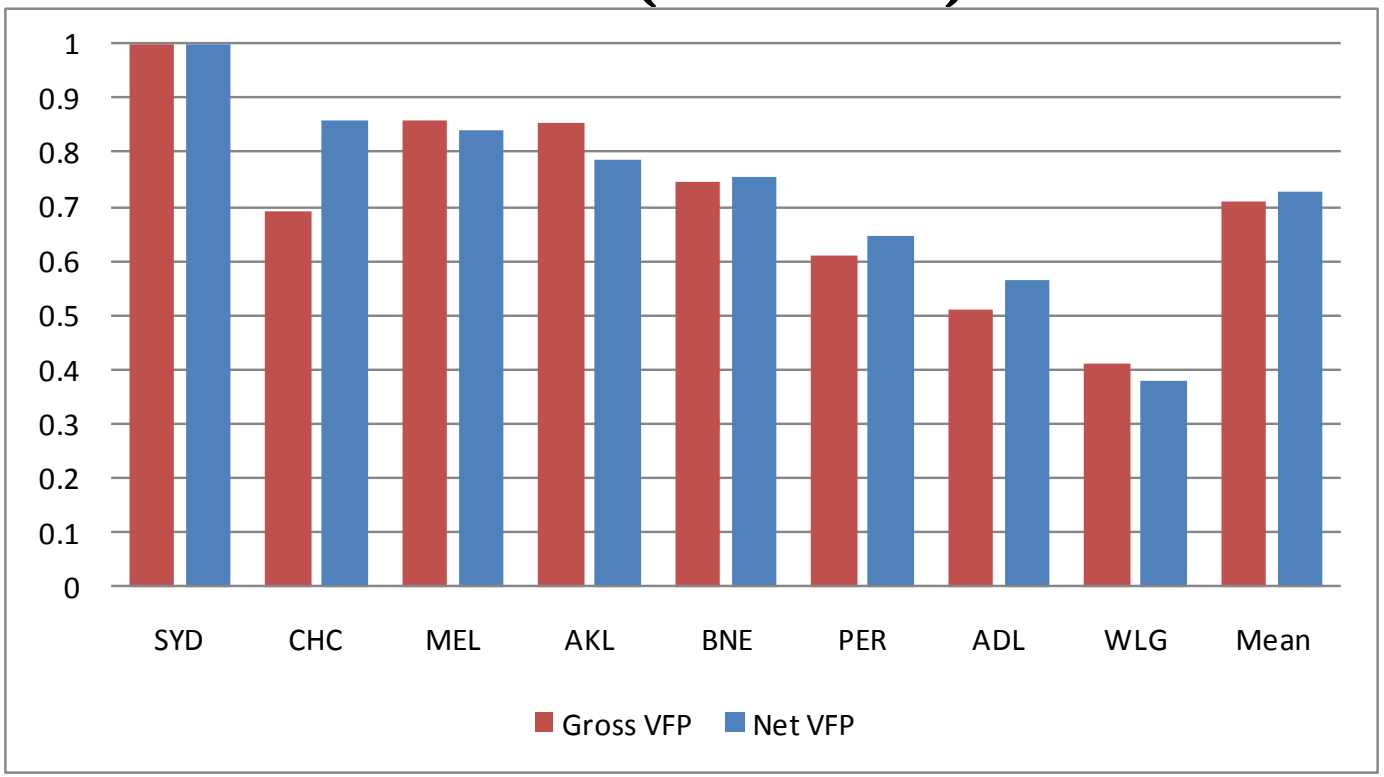


Past Airport Efficiency Excellence Top Performers, 2006-2010

	2006	2007	2008	2009	2010
North America	Hartsfield-Jackson Atlanta International Airport	Hartsfield-Jackson Atlanta International Airport	Hartsfield-Jackson Atlanta International Airport	Hartsfield-Jackson Atlanta International Airport	Large Airport Category Hartsfield-Jackson Atlanta International Airport Small/Medium Airport Category Raleigh-Durham International Airport
Europe	Copenhagen Kastrup International Airport	Oslo International Airport	Copenhagen Kastrup International Airport	Copenhagen Kastrup International Airport	Large Airport Category Oslo International Airport Small/Medium Airport Category Genève Aéroport
Asia-Pacific	Incheon International Airport	Hong Kong International Airport	Hong Kong International Airport	Hong Kong International Airport	Large Airport Category Hong Kong International Airport Small/Medium Airport Category Seoul Gimpo International Airport

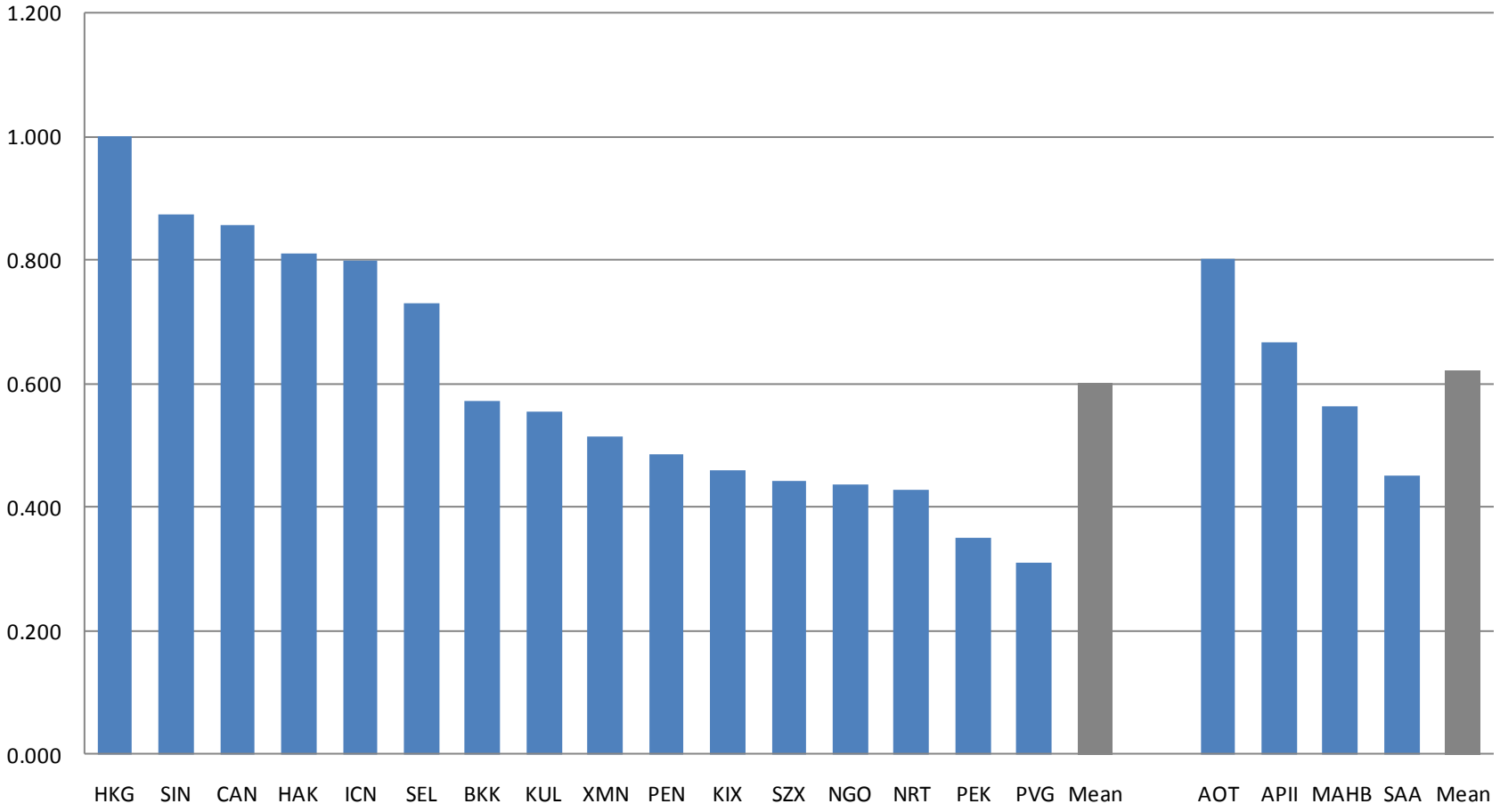
Gross VFP Vs Residual (Net) VFP(after removing factors beyond managerial control) :

Oceania (SYD=1.0)

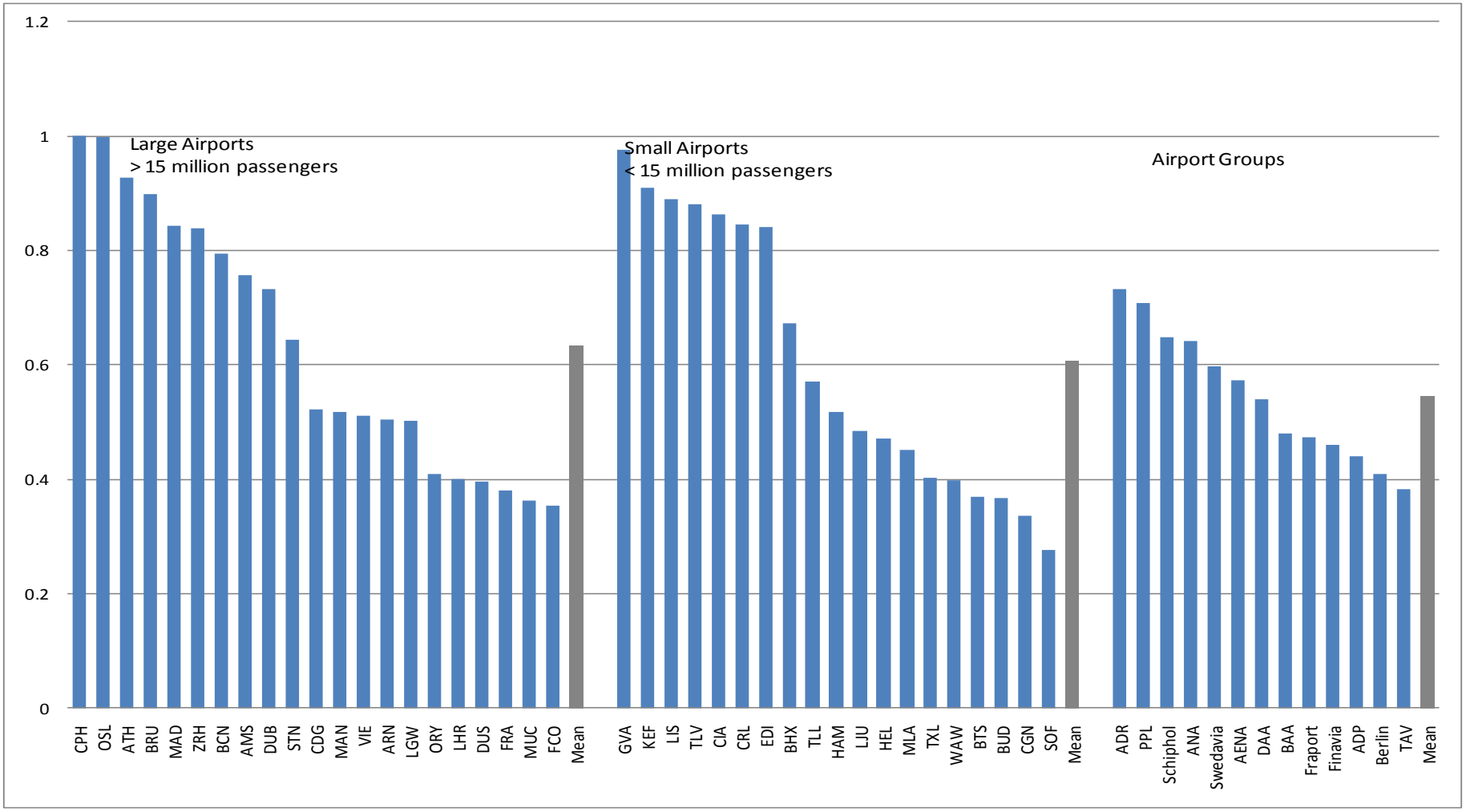


- After removing factors beyond managerial control such as capacity constraint, average aircraft size, % international traffic, etc, **CHC's relative performance in term of Net VFP improved significantly.**

Residual (Net) Variable Factor Productivity:
Asia (HKG=1.0)

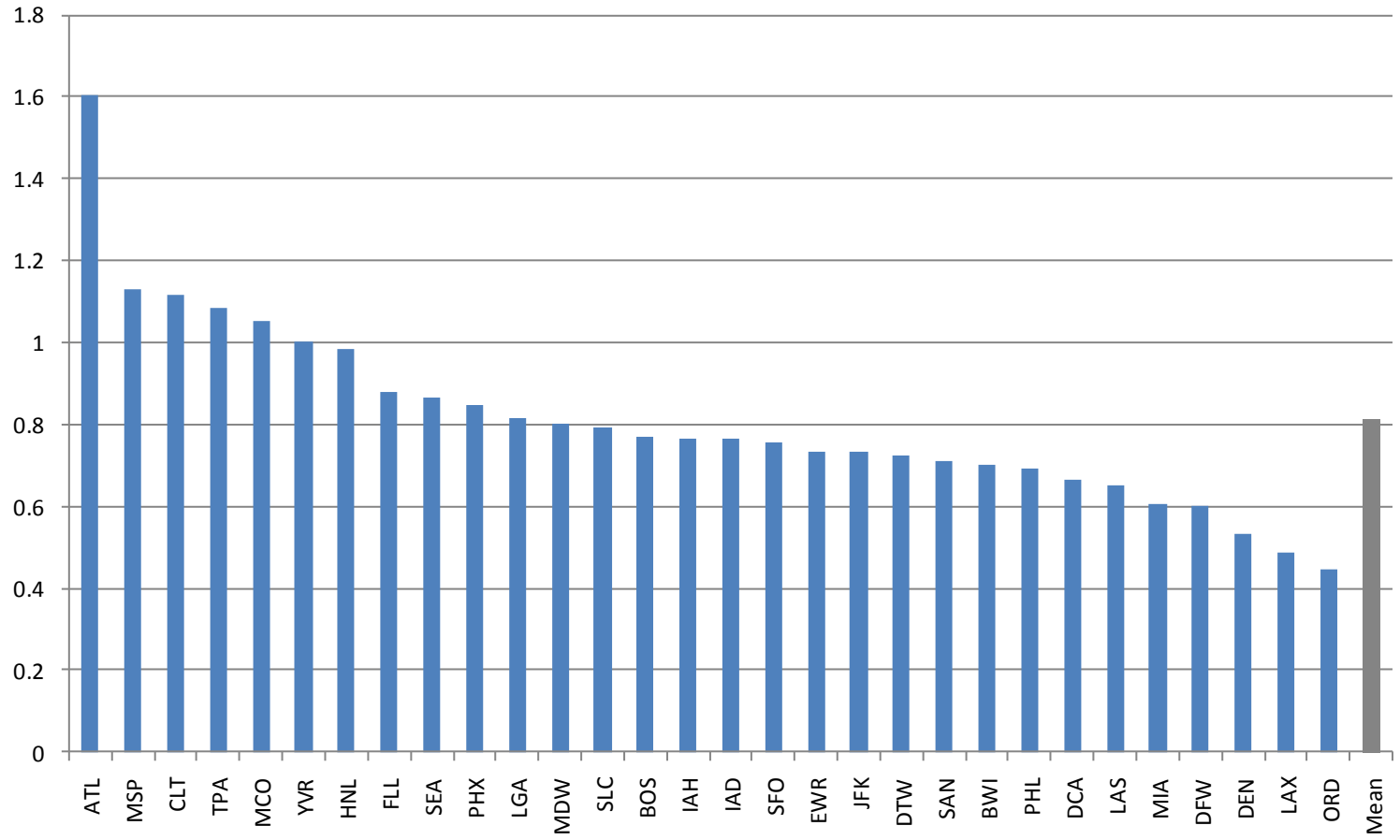


Residual (Net) Variable Factor Productivity: Europe (CPH=1.0)



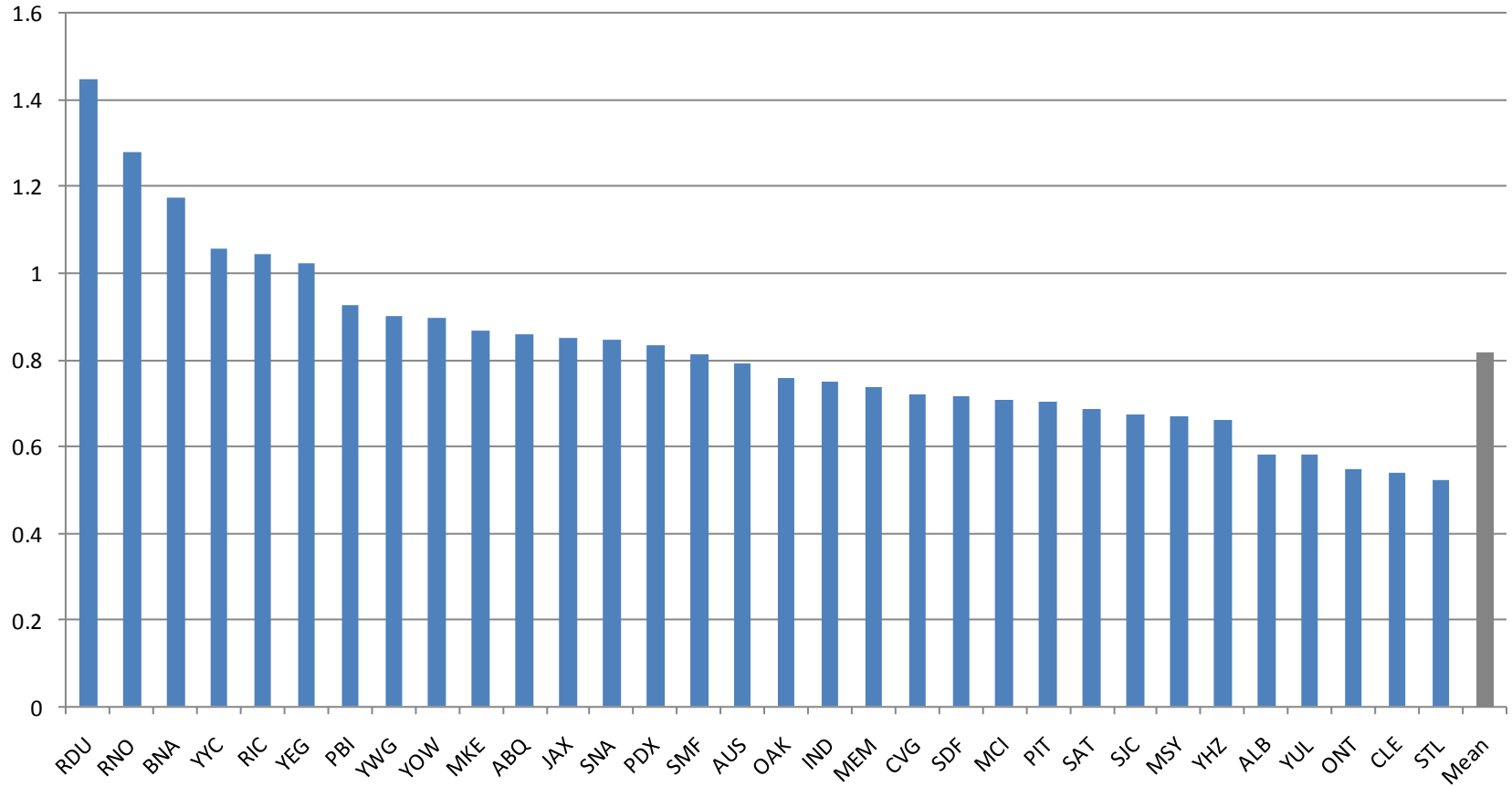
Residual (Net) Variable Factor Productivity:

N. America – Passengers > 15 million (YVR=1.0)



Residual (Net) Variable Factor Productivity:

N. America – Passengers < 15 million (YVR=1.0)



Top Efficiency Performers (2011)

(based on Net VFP index=operating/management efficiency)

Asia Pacific:

- Oceania Airports: **Sydney, Christchurch**
- Asian Airports: **Hong Kong, Singapore**

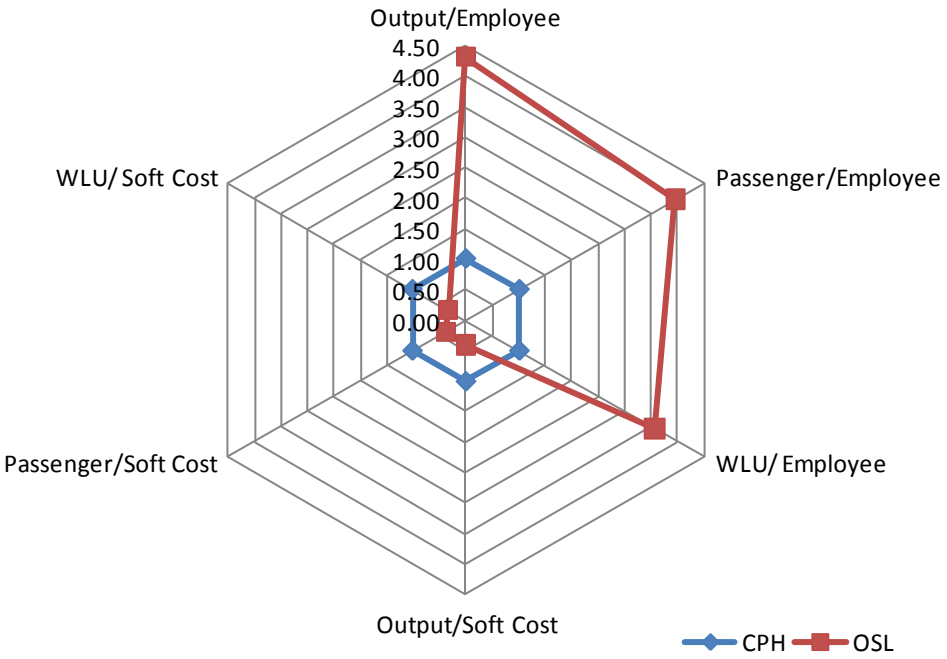
Europe:

- Large Airports (> 15 million pax): **Copenhagen and Oslo**
- Small/Medium Airports (< 15 millions Pax): **Geneva, Reykjavik-Keflavik**

North America (Canada/US):

- Large Airports (> 15 million pax): **Atlanta, Minneapolis/St Paul**
- Small/Medium Airports (< 15 millions Pax): **Raleigh-Durham, Reno**

Labour and Soft Cost Input Productivity Indices for CPH and OSL

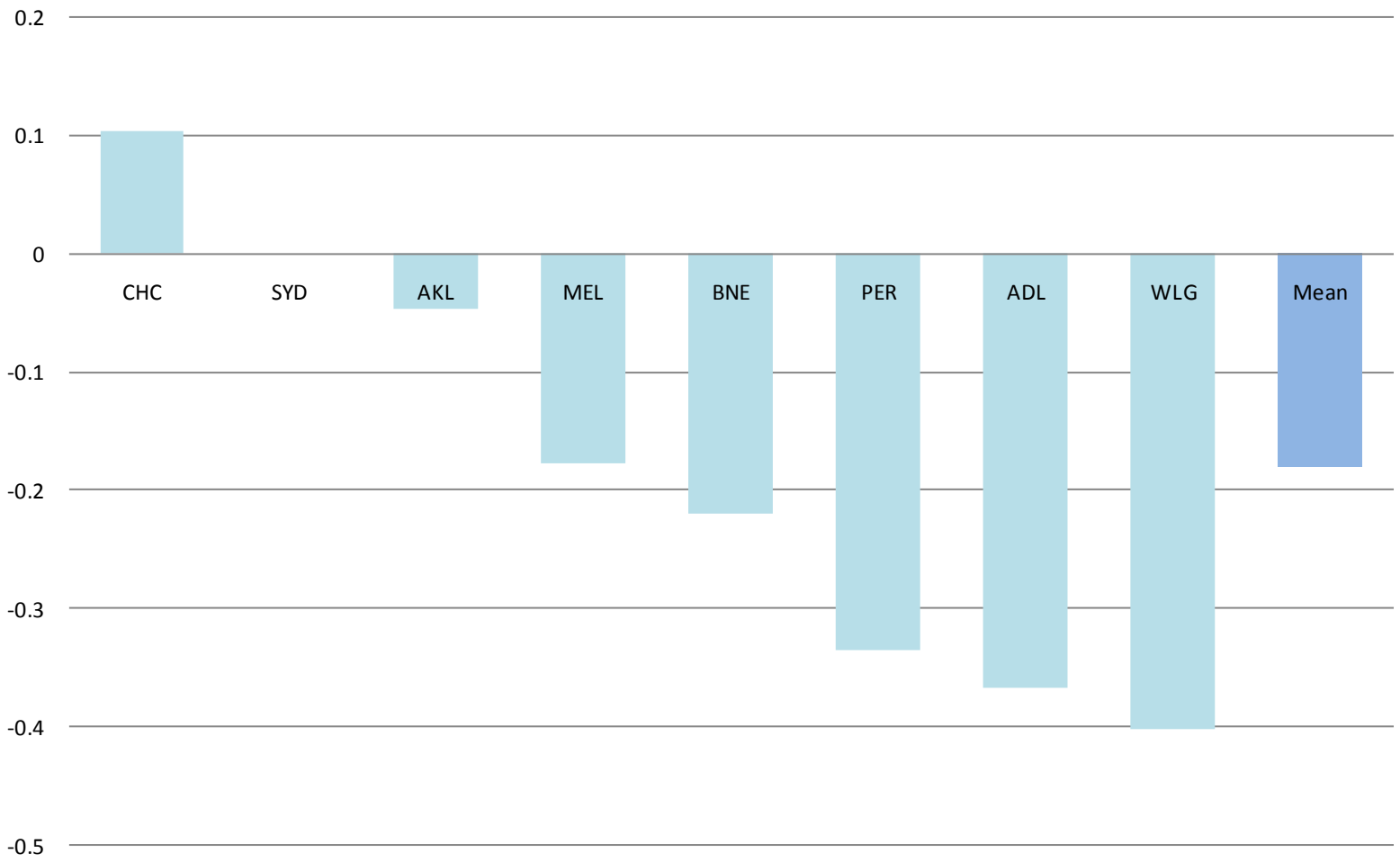


	CPH	OSL
Labour Productivity		
Output/Employee	1.00	4.31
Passenger/Employee	1.00	3.96
WLU/ Employee	1.00	3.57
Soft Cost Productivity		
Output/Soft Cost	1.00	0.41
Passenger/Soft Cost	1.00	0.38
WLU/ Soft Cost	1.00	0.34

- **Oslo** is more efficient in terms of **Labor Productivity.** The figure implies that CPH handles most of the airport operation in-house as compared with OSL.
- **CPH** is more efficient in terms of **Soft-Cost Input Productivity.** (soft cost =operating expenses-labor cost, divided by SC input price index)
- Despite the difference in their business strategy, both airports achieved same level of operating efficiency.

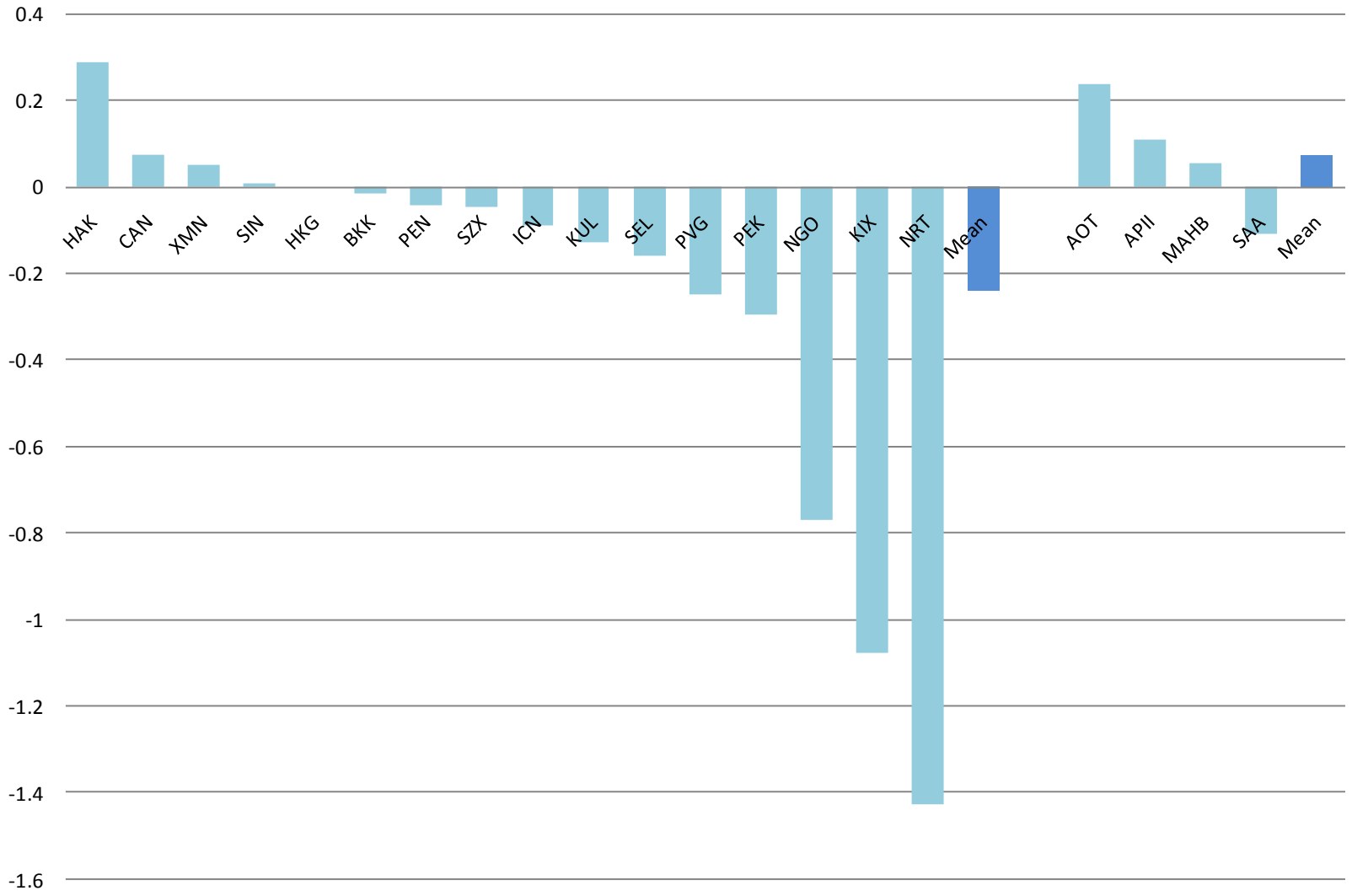
Cost Competitiveness = Net VFP and Input Price Effect

Oceania (SYD=0.0) - *the higher the better*



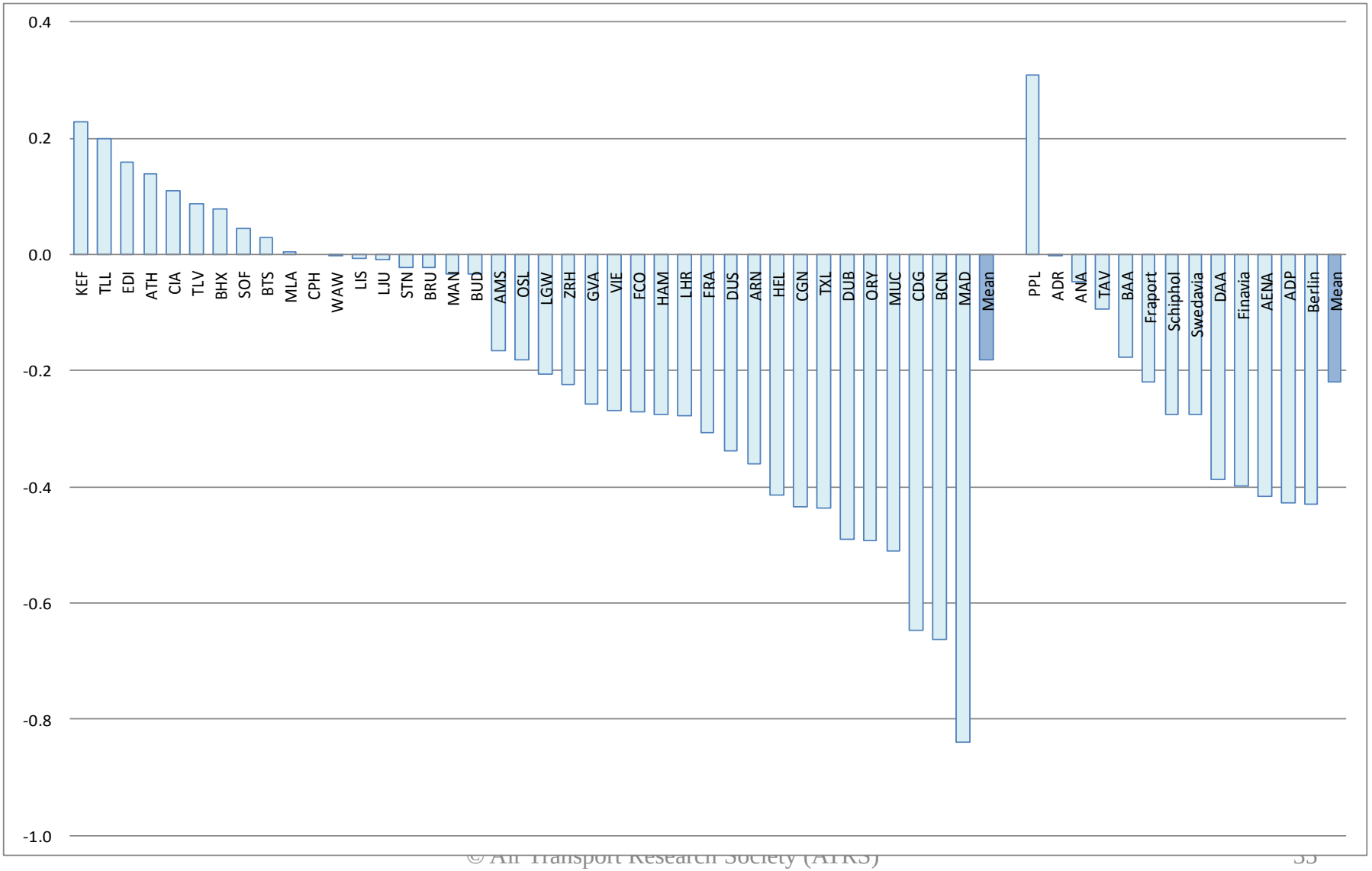
Cost Competitiveness: = Net VFP and Input Price Effect

Asia (HKG=0.0) – *the higher the better*



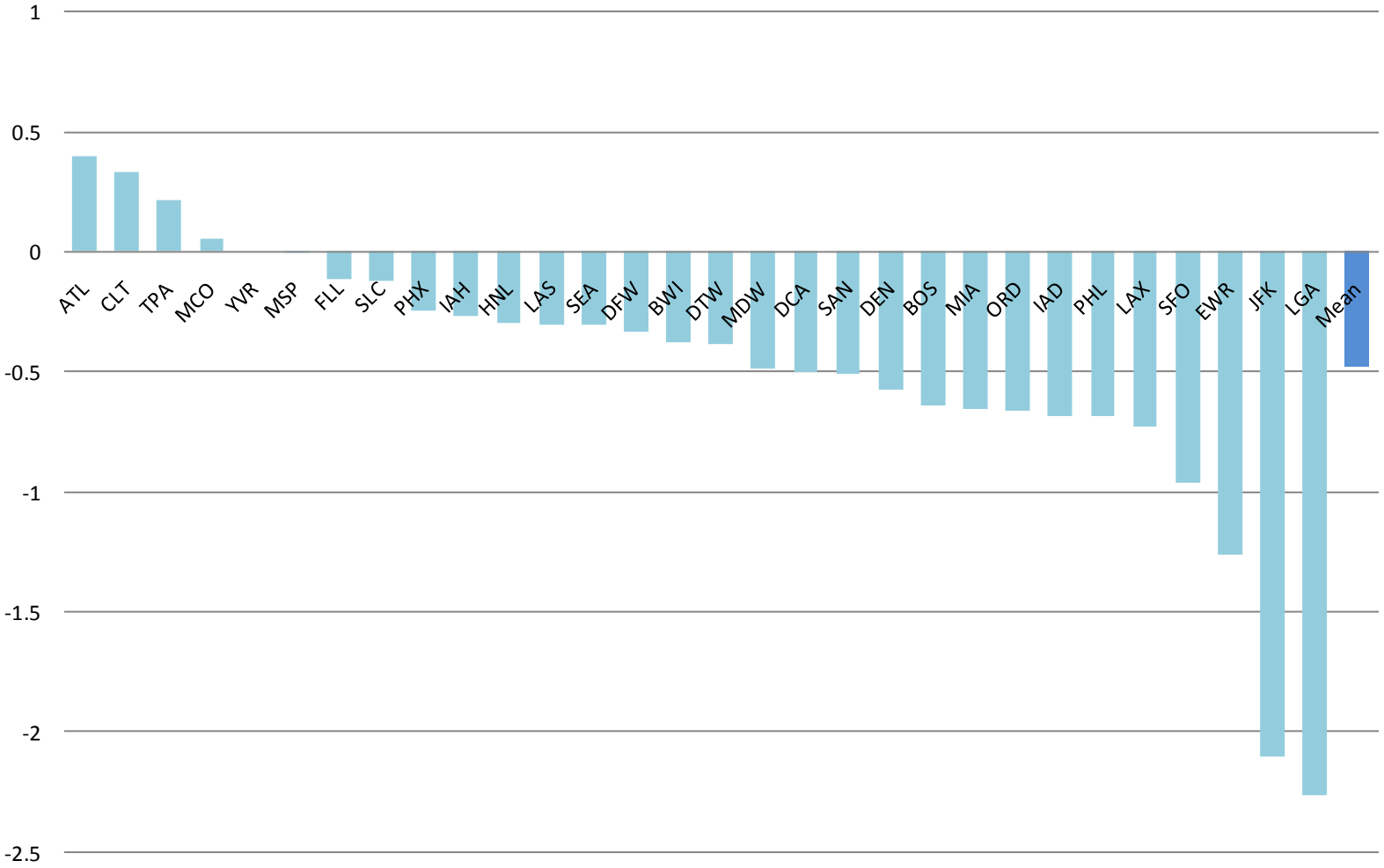
Cost Competitiveness = Net VFP and Input Prices Effect

Europe (CPH=0.0) - *the higher the better*



Cost Competitiveness = Net VFP and Input Price Effect

N. America – Passengers > 15 million (YVR=0.0)



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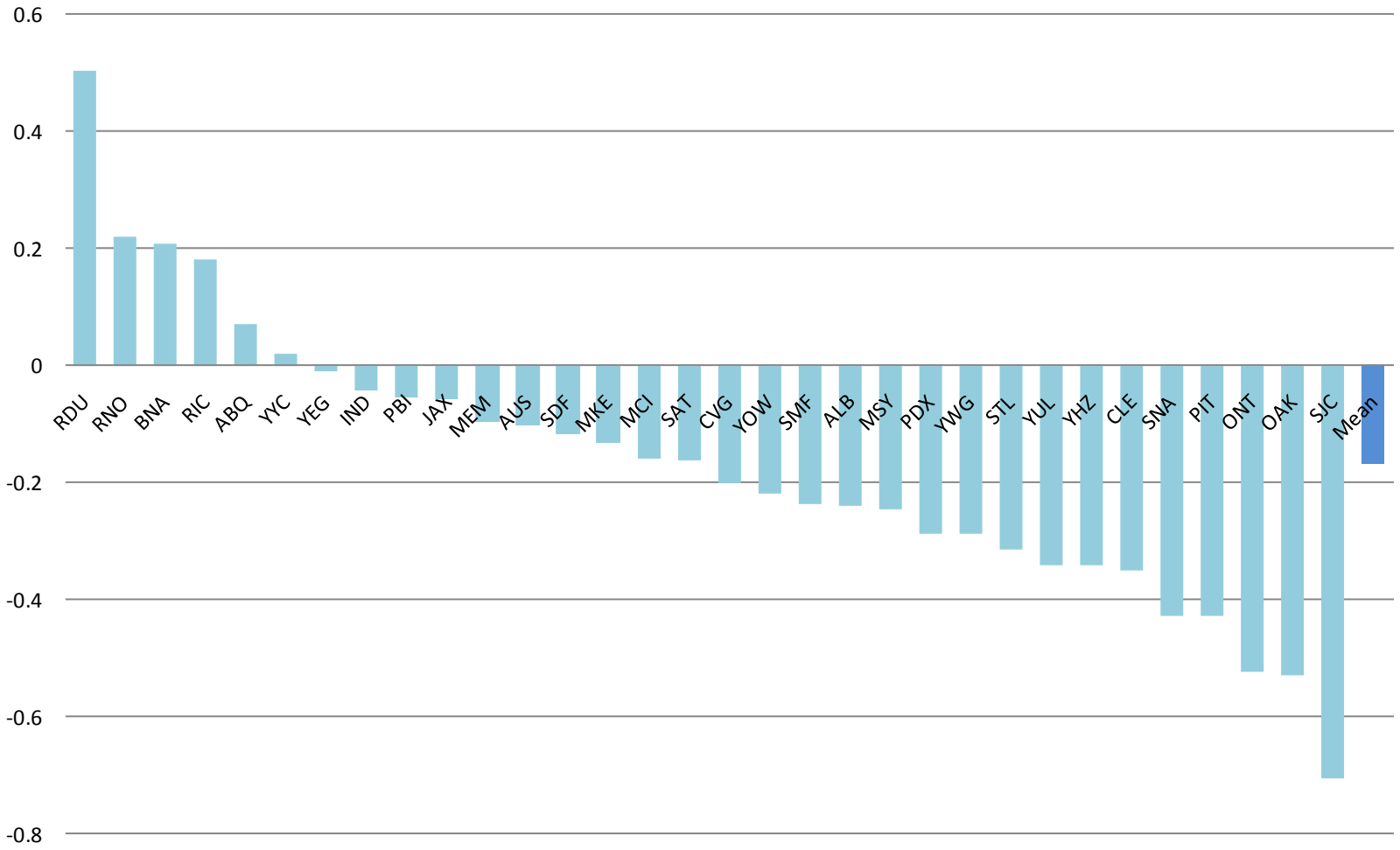

Top Unit Cost Competitiveness Performers

- **Asia-Pacific**:
  - Oceania: **Christchurch**, Sydney
  - Asia: **Haikou**, AOT (Airport Authority of Thailand), APII (Angkasa Pura II, Indonesian Group)

- **Europe:**
  - **Polish Airports**, Reykjavik-Keflavik, Tallinn

- **N. America:**
  - Large Airports (> 15 million Pax): **Atlanta,** Charlotte, Tampa
  - Small/Med Airports (< 15 million Pax): **Raleigh-Durham**, Reno, Nashville

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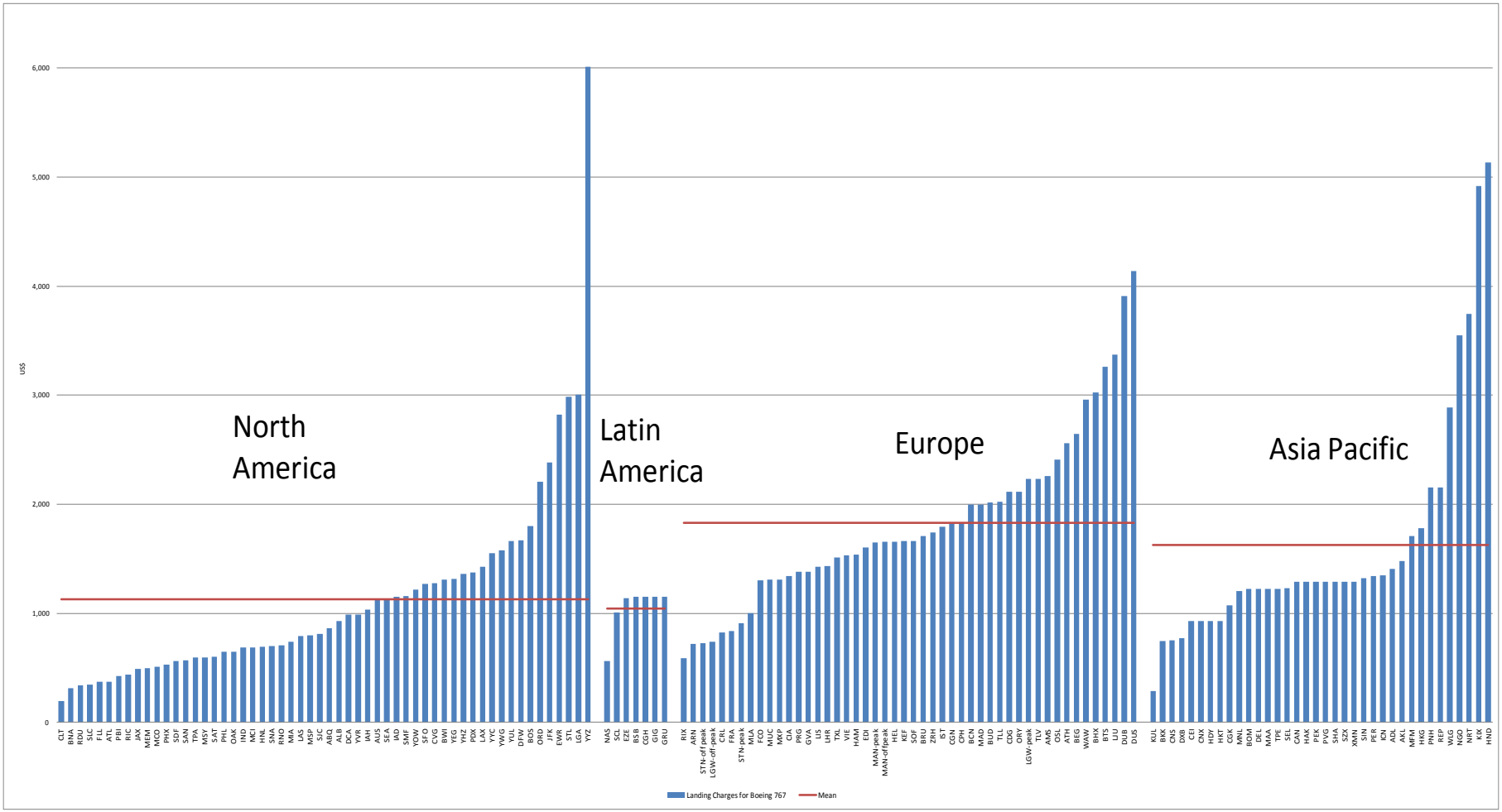
Landing Charges: Basis for computing

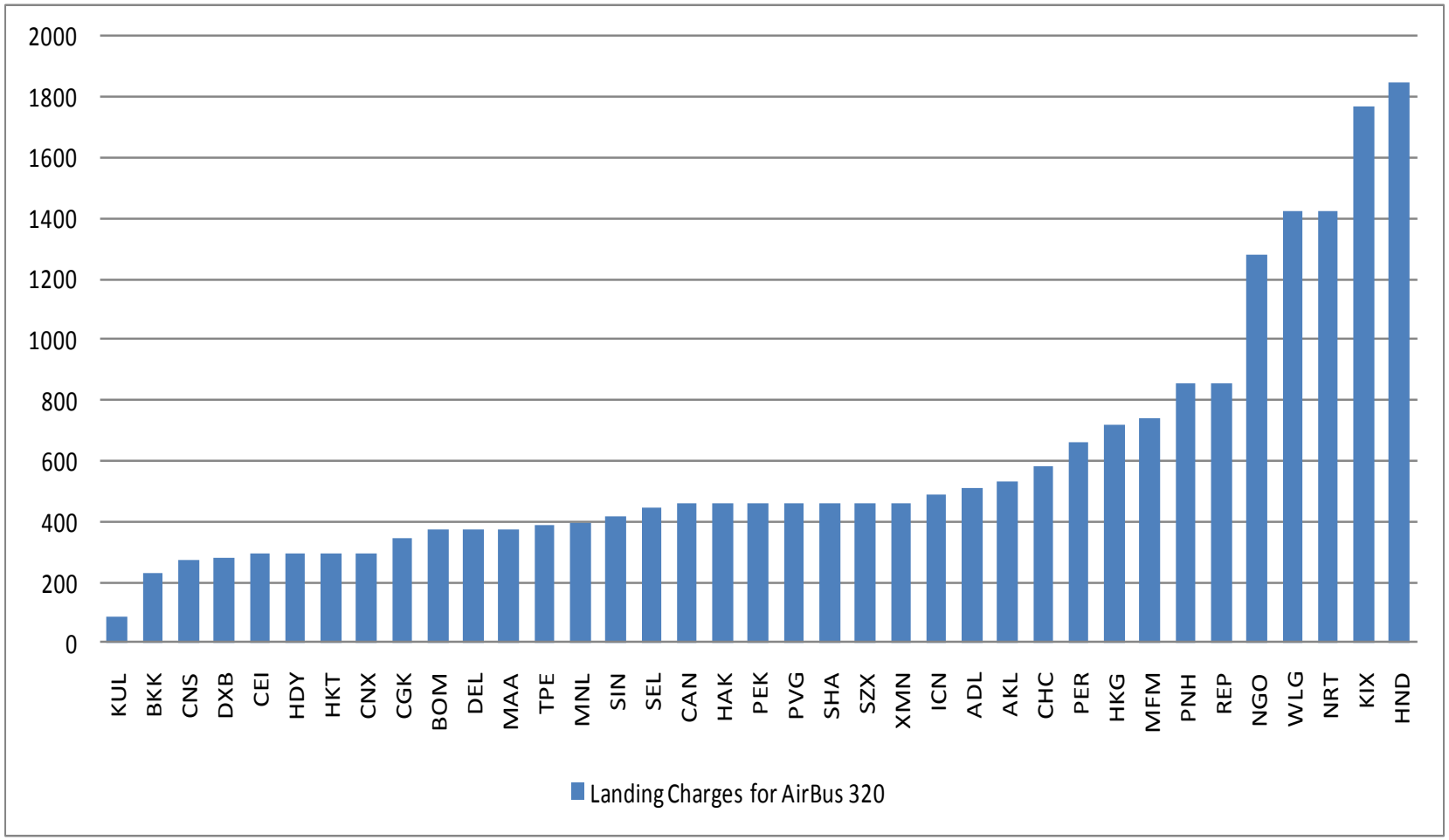
- **Assumptions:**
  - (Use of signatory airlines)
  - Passenger aircraft
  - Peak and off-peak charges separately treated
  - International flights
  - Some airports have summer/winter rates – **these are averaged**
  - Assumed 2 hours aircraft parking

- **Exclusion**: Tax, Noise charges, lighting surcharge

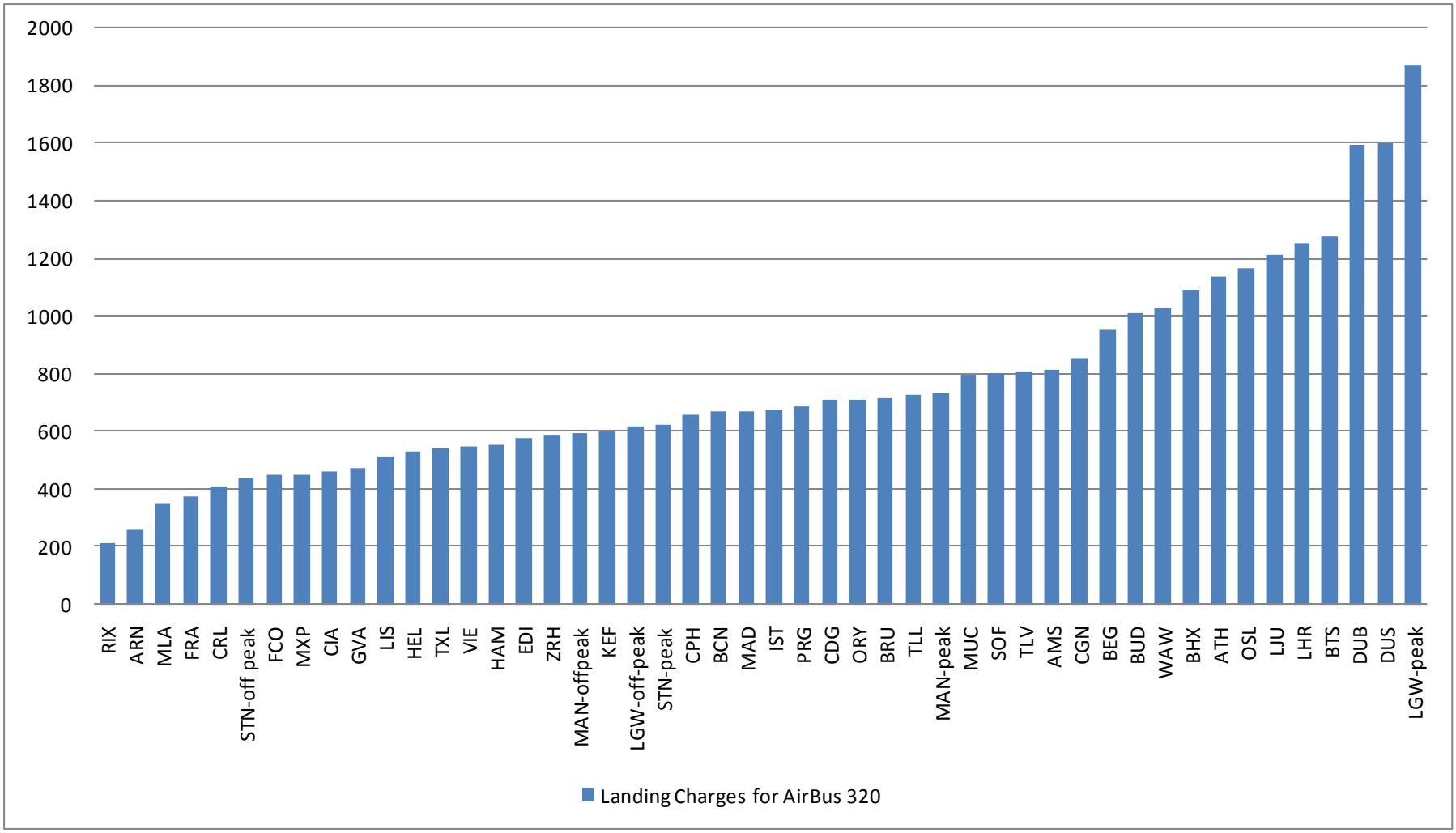
Landing Charges for Boeing 767-400, 2010 (in US$)



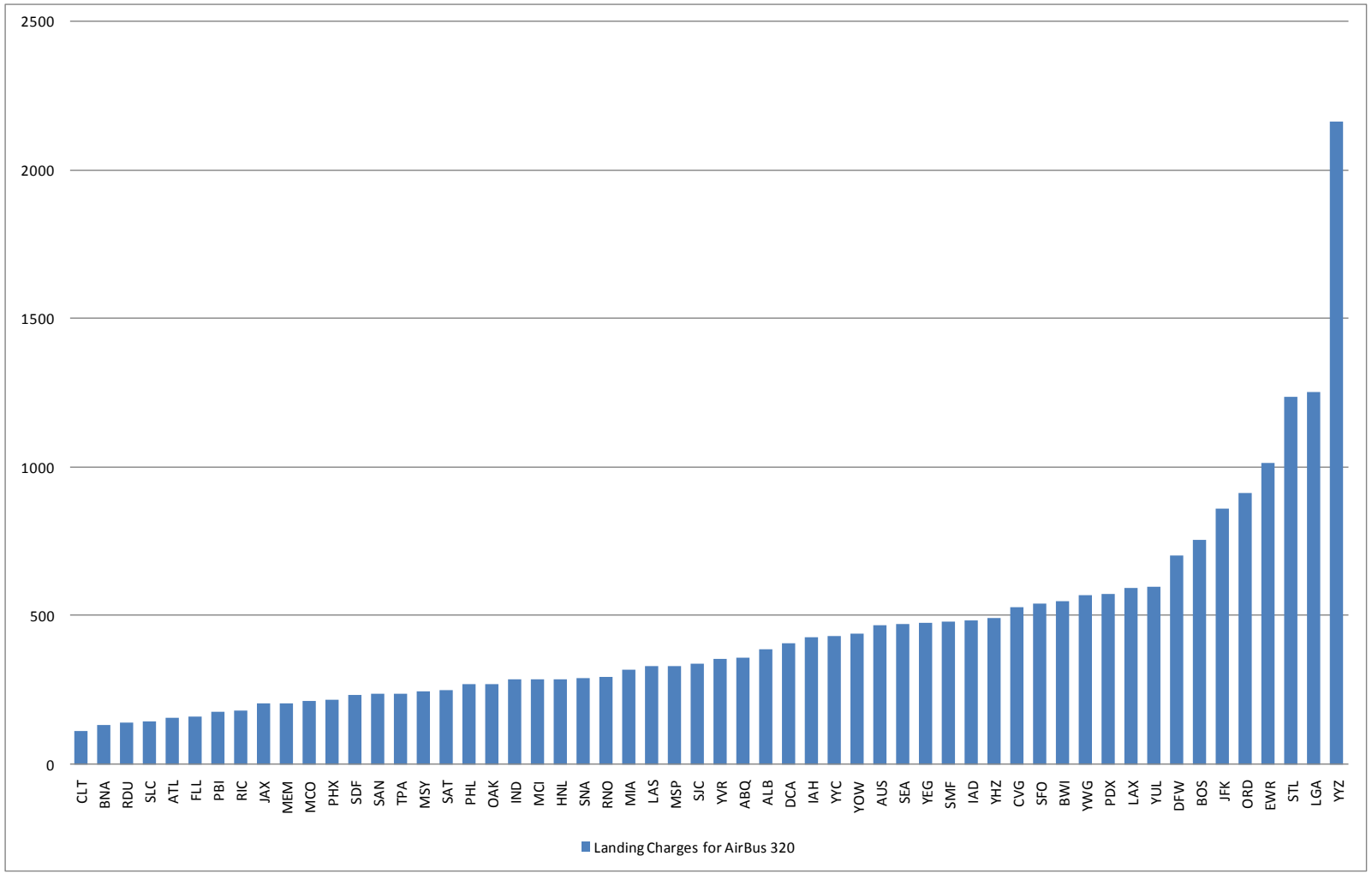
Asia Pacific: Landing Charge for Airbus 320, 2010 (in US$)



Europe: Landing Charge for Airbus 320, 2010 (in US$)



North America: Landing Charge for Airbus 320, 2010 (in US$)



Summary – Landing/Takeoff Charges (Airbus 320)

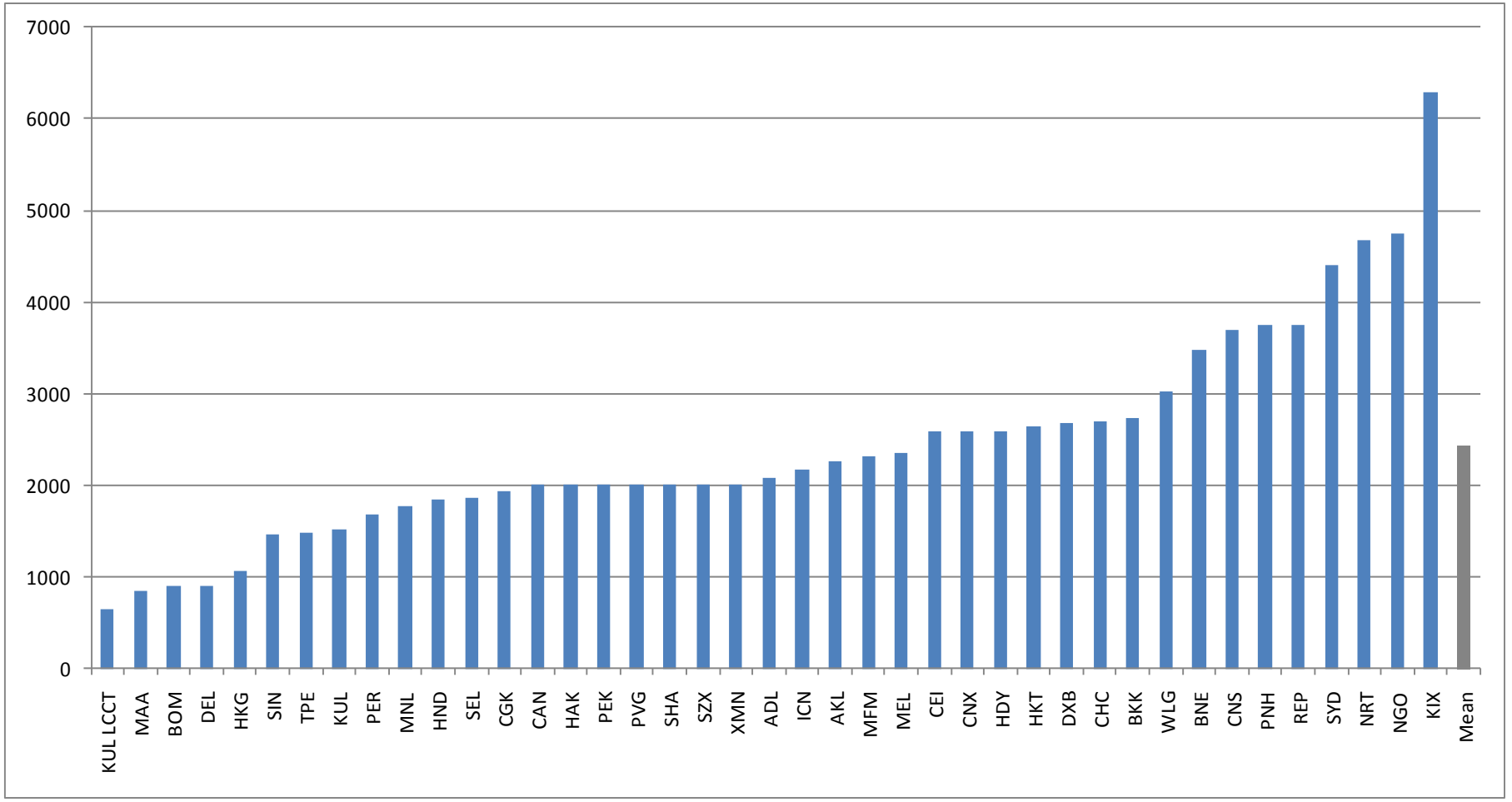
- **Asia-Pacific Results:**
  - Highest charges: **Haneda,** Kansai, Narita
  - Lowest charges: **Kuala Lumpur,** Bangkok, Cairns
- **European Results:**
  - Highest charges: **London Gatwick peak,** Dusseldorf, Dublin
  - Lowest charges: **Riga(Latvia),** Stockholm, Malta
- **North American Results**:
  - Highest charges: **Toronto,** LaGuardia, St. Louis
  - Lowest charges: **Charlotte,** Nashville, Raleigh-Durham,

Combined Landing and Passenger Charges

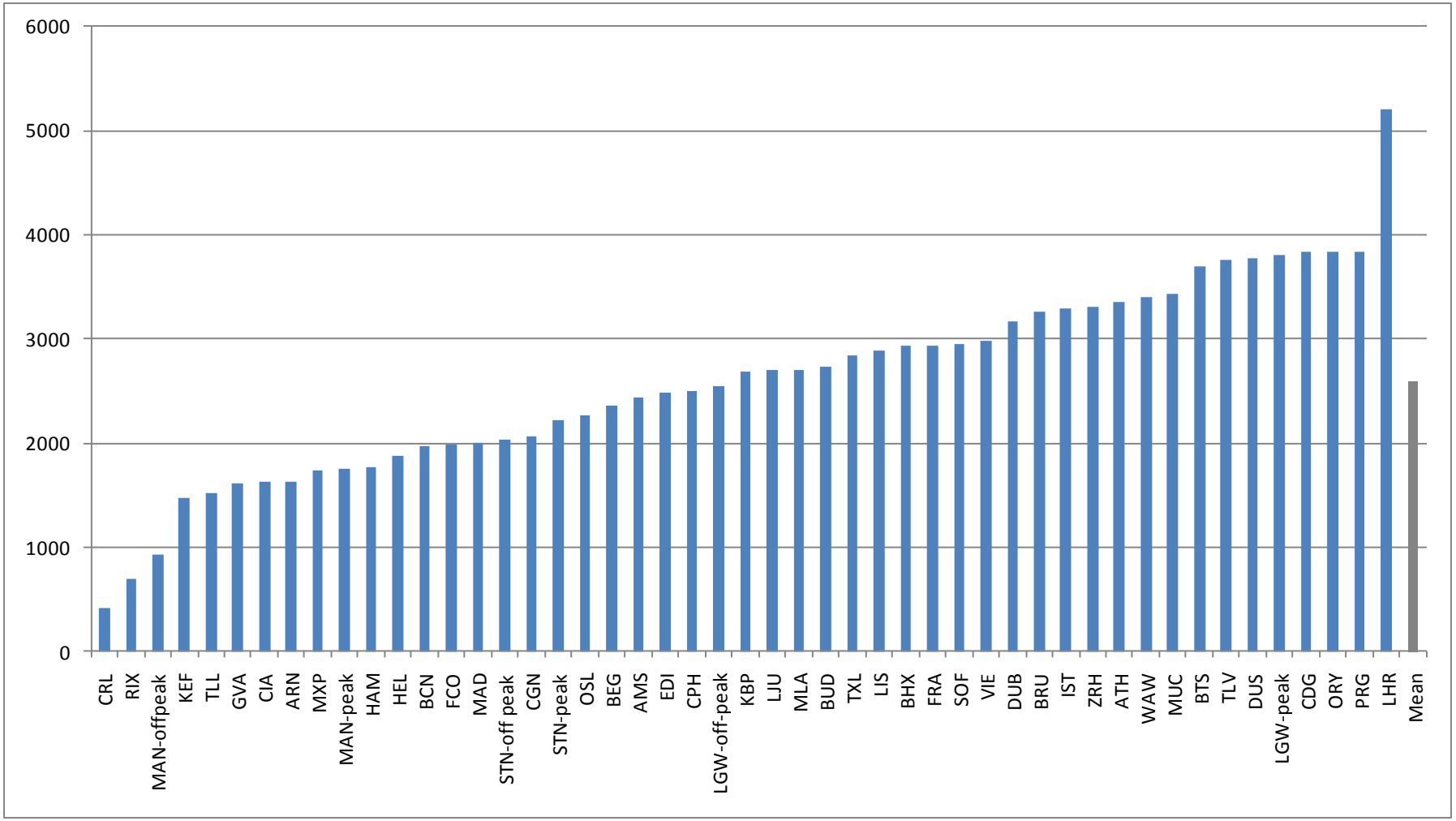
Given that it is difficult to separate landing and passenger charges for some airports, the ***combined landing and passenger charge*** may reflect a better picture.

Asia Pacific: Combined Landing and Passenger Charge

for Airbus 320, 2010 (in US$)



Europe: Combined Landing and Passenger Charge for Airbus 320, 2010 (in US$)



Summary – Combined Landing and Passenger Charges (Airbus 320)

- **Asia-Pacific Results:**
  - Highest charges: **Kansai,** Nagoya, Narita
  - Lowest charges: **Kuala Lumpur Low Cost Carrier Terminal,** Chennai (India), Mumbai (India)

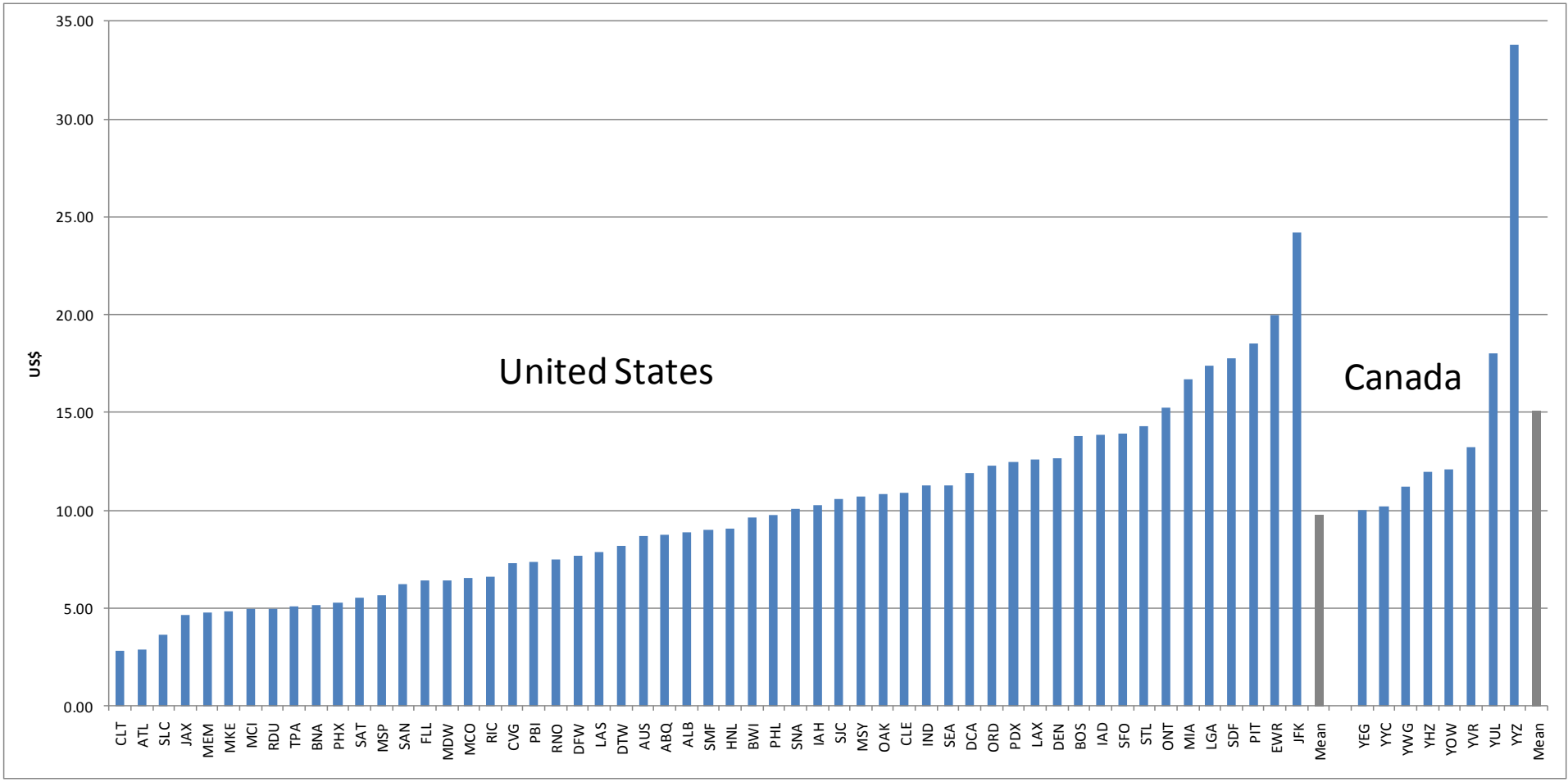
- **European Results:**
  - Highest charges: **London Heathrow,** Prague (Czech Rep.), Paris Orly
  - Lowest charges: **Brussels South Charleroi,** Riga(Latvia), Manchester (Off-Peak)

Cost per Enplanement for Airlines (CPE)

- For N. American airports, the data allows us to compute ***Cost per enplanement (CPE)***.

- CPE = ***sum of landing fees, terminal arrival fee, rents and utilities, terminal apron charges/tiedowns, and passengers other aeronautical payments to airports divided by enplaned passengers***

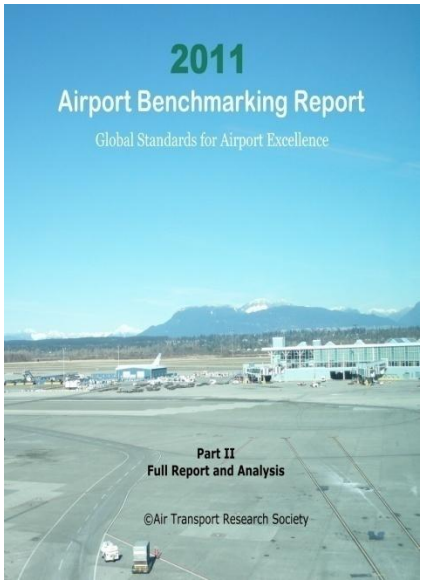
North America: Total Charges per Enplaned Passenger, 2009 (in US$)



Summary – Cost per Enplaned Passenger (CPE)

- **North American Results**:
  - Highest charges: **Toronto,** New York JFK, Newark
  - Lowest charges: **Charlotte,** Atlanta, Salt Lake City

ATRS Airport Benchmarking Report



- The ATRS Global Airport Performance Benchmarking Report : 3 volumes, over 500 pages of valuable data and analysis
- Can be purchased by visiting **www.atrsworld.org**
- **Report sale finances our annual benchmarking research project**

Thank You

2012 ATRS World Conference
(Taiwan in late June, 2012)