Samferdselsdepartementet

Assessment of the cost of capital for Avinor AS

14. November 2011 – FINAL REPORT

Background and mandate

Background

- The Avinor Corporation is divided into Airport Operations and Air Navigation Services (“ANS”). ANS comprises Air Traffic Management (“ATM”) en-route and terminal, and Communication, Navigation and Surveillance (“CNS”).
- ATM (en-route) is subject to EU regulation in terms of the Single European Sky II performance scheme. Please refer to the appendix for details about the performance scheme.
- As a part of this performance improvement program, there is need for a measure of the cost of capital (WACC) for the ATM (en-route) in order to compute the cost base. This is to be used in a National Performance Plan.
- There is also a need for a market derived cost of capital measure for the whole corporation. This is to be used when Samferdselsdepartementet follow up Avinor’s performance.

Mandate

- This document describes the cost of capital (WACC) including an evaluation and specification of each parameter for the three following divisions:
  - ✓ ATM (en-route), including an assessment of appropriate capital structure, equity beta and other relevant variables that will change according to the equity ratio.
  - ✓ Airport Operations
  - ✓ Avinor Corporation
- The assessments is in line with IFRS and Commission Regulation (EC) No 1794/2006 – consolidated.
- The date of the cost of capital is set to 14. October 2011

Disclaimer

- In the course of our analysis, we have relied without independent verification on financial and operational data provided by managements of Samferdselsdepartementet and Avinor, together with information from public sources. We, as valuation consultants, have not audited these data and express no opinion or other form of assurance regarding their accuracy or fairness of presentation.
- We assume that managements of Samferdselsdepartementet and Avinor have not omitted or misstated any factors of relevance. Any such omissions or misstatements may materially affect our conclusions.

The weighted average cost of capital (WACC) for the Avinor Corporation and the sub-divisions ATM (en-route) and Airport Operations are respectively 6.1%, 5.5% and 6.1% after taxes

WACC calculation - Executive summary		
General assumptions		**Comments**
Risk free interest rate	2,77%	Norwegian 10Y gov bond 14. October 2011
Market risk premium	5,50%	Deloitte
Marginal tax rate	28%	Norwegian corporate tax
Cost of debt estimate	5,38%	10Y swap pr. 14. October + 150 bp
Cost of debt after tax	3,87%	
Company debt/equity	60% / 40%	Avinor management

Specific assumptions	**Airport operations**	**ATM (en-route)**	**Avinor corporation**
Unlevered beta	0,58	0,45	
Beta company	1,22	0,93	
Weight airport operation			94%
Weight ANS			6%
Cost of equity	9,5%	7,9%	9,4%
Cost of debt	3,9%	3,9%	3,9%
WACC post-tax	**6,1%**	**5,5%**	**6,1%**
WACC pre-tax equivalent	**8,5%**	**7,6%**	**8,4%**

Conclusion

- Based on the right-hand side assumptions the cost of capital for airport operations, ATM (en-route) and the Avinor corporation are respectively 6.1%, 5.5% and 6.1% after taxes.
- The lower cost of capital for ATM (en-route) is based the believe that this division holds less risk than airport operations. The arguments are based on the structure of losses, current absence of an alternative provider and volatility of earnings. In addition, previous research show that the risk level of ATM (en-route) is closer to more regulated industries, exhibiting a lower beta.
- The relevant cost of capital for ATM (en-route) that should be used in the National Performance Plan is the pre-tax measure of 7.6%.

Summary assumptions

- Based on a thorough analysis the following assumptions have been used to calculate the cost of capital through the method of weighted average cost of capital (WACC):
  - ✓ *Risk-free rate:* Based on Norwegian 10Y government bond.
  - ✓ *Market risk premium:* 5.5% based on the relevant literature and current surveys.
  - ✓ *Cost of debt:* 10Y swap rate + a spread of 150bp based on analyses conducted by Norwegian investment banks.
  - ✓ *Unlevered beta:*
    - *Airport operations:* Peer group calculations for the airport transportation industry.
    - *ATM (en-route):* Weighted average of the airport operations beta and the beta of the energy utility industry with weights 25% and 75% respectively.
    - *Weights Avinor corporation:* Management assumptions of capital employed in ANS and Avinor Corporation.

To calculate the required rate of return for Avinor, we use the weighted average cost of capital, based on estimations the risk free rate, the market risk premium…

General approach

- The cost of capital for Avinor is based on a weighted average of the cost of equity and the cost of debt. This is the weighted average cost of capital (WACC). As a company is financed with both equity and debt, the cost of capital has to reflect the capital structure within the firm.
- The cost of capital is the so-called alternative cost of capital, seeing that a firm can choose to invest in other financial instruments.
- The WACC blends the required rates of return for debt (K_d) and equity (K_e) based on their market based (D, E) values
  - $WACC = \left(\frac{E}{V} * K_e\right) + (\frac{D}{V} * K_d(1 - t_c))$
  - t_c: marginal tax
- To estimate the cost of equity, we use the capital asset pricing model (CAPM). CAPM is defined as a risk free rate(r_f) plus a risk premium, where the risk premium is a product of the market risk premium ($R_m - r_f$) and the equity beta (β_E).
  - $K_e = R_f + \beta_E(R_m - r_f)$

Risk free rate

- The risk free rate represents an investor's minimum alternative cost of capital when investing in a project or asset. The risk free rate applied is often a government default-free bond, ideally with maturity similar to the cash flow of the corporation.
- A current problem is the artificially low interest rates, making the cost of equity lower than under normal market conditions. An alternative is therefore to use a foreign long-term government bond adjusted for the spread of a domestic and foreign bond of shorter maturity.
- Seeing that the Norwegian Central Bank has indicated that the interest rates will be kept low for the nearest future, the analysis uses the interest on a 10 year government bond at 14. October 2011.

Market risk premium

- The market risk premium is a measure of the return investors require to invest in an asset with the average risk. It measures the excess return an individual stock or the overall stock market provides over a risk-free rate. This excess return compensates investors for taking on the relatively higher risk of the equity market.
- An exact measure of the market risk premium does not exist and it will vary when the stock market as a whole changes. It is common to base assumptions of the historical market risk premium.
- Based on relevant literature and recent surveys, we estimate that the market risk premium is 5.5%. This is in the upper range, but will compensate for the low risk free rate.

…beta values, the cost of debt and the debt to equity ratio, stemming from management input, and relevant theory and experience

Beta values and peer group

- The equity beta measures the systematic risk, the market risk, of a company compared to the market as a whole. As opposed to company-specific risk, an investor will require a higher rate of return to compensate for the increased level of risk it handles.
  - $\beta > 1$ indicates greater market related risk than average
  - $\beta < 1$ indicates less market related risk than average
- For a limited company that is not public, it is not possible to derive the equity beta. The common approach is to use a peer group consisting of comparable companies, and use peer group beta as the basis for the cost of capital calculation. Comparable companies for Avinor is within the air transportation and transportation industry.
- The beta is affected by a company's capital structure and it therefore has to be adjusted for leverage. The observed beta is a levered beta reflecting the underlying risk of the cash flows of the company and the capital structure and the tax position.
- We assume that the beta of debt is zero because debt claims have first priority, thus the beta of debt tends to be low.
- To estimate the unlevered beta we use the Hamada method:
  - $\beta_U = \frac{Levered\ beta}{1+\left(\left(\frac{D}{E}\right)(1-t_c)\right)}$
- The beta is levered up based on the appropriate level of debt in Avinor.

Cost of debt

- The cost of debt is the market interest rate that the firm has to pay on its borrowing. It will predominantly depend on the level of interest rates, the perceived risk of the company defaulting on its debt, and the firm's marginal tax rate.
- A common approach to estimate the cost of debt is to use the risk premium method. Here the cost of debt is equal to swap rate (R) plus a premium based on the credit rating of the company or an estimated default spread (ds)
  - $K_d = R + ds$
- Indicative credit spreads for different time periods provided by investments banks in Norway will be emphasized in the evaluation of the most relevant spread for Avinor.

Debt and equity level

- The current level of equity in the Avinor corporation is approximately 46%, which is in line with statutes stating a minimum level of equity of 40%. Long-term it will more likely reach the limit, subsequent to new loans raised e.g. in connection with the new terminal at Oslo Airport. This 40%-60% level will found the basis for the cost of capital calculations.

Based on relevant assumptions we assume a cost of capital for the airport operations of 6.1% after taxes

WACC calculation		
Assumptions		**Comments**
Risk free interest rate	2,77%	Norwegian 10Y gov bond 14. October 2011
Market risk premium	5,50%	Deloitte
Marginal tax rate	28%	Norwegian corporate tax
Cost of debt estimate	5,38%	10Y swap pr. 14. October + 150 bp
Cost of debt after tax	3,87%	
Company debt/equity	1,50	Avinor management
Company debt/equity peer group	0,52	Estimated from peer group
Company unlevered beta	0,58	Estimated from peer group
Company beta of equity	1,22	Based on company debt/equity
Risk free interest rate	2,77%	
Market risk premium	5,50%	
Beta of equity	1,22	
+/- Size / company-specific adjustment		
Cost of equity	9,46%	
Equity to total capital	0,40	
Cost of debt after taxes	3,87%	$r_e = r_f + \beta_e(r_m - r_f) + \alpha$
Debt to total capital	0,60	
WACC	6,11%	
WACC (rounded) post-tax	**6,1 %**	$WACC = \frac{E}{V} * r_e + (1 - t_c)\frac{D}{V} * r_d$
WACC pre-tax equivalent	**8,5 %**	

Assumptions

- To calculate the cost of equity we utilize the capital assets pricing model (CAPM).
  - ✓ As Avinor is not a public company, the equity beta is not observable. The beta is estimated based on the monthly return (5 years) against the S&P500 index for comparable companies. The unlevered beta is based on the companies' debt ratio and corporate tax.
  - ✓ In addition to the beta from comparable companies, Damodaran's industry betas are collected. We have focused on the industries "Air transportation" (US and Europe) and "Transportation" (Europe).
  - ✓ We assume a market risk premium of 5.5%.
- The cost of capital is based on a 10Y swap plus a credit spread of 150bp. Investment banks indicate spreads in the range 120-150bp for respectively 5Y and 10Y bonds over the swap rate. To emphasize the long-term perspective, we assume that the relevant spread is 150bp.
- The equity and debt to total capital was provided by the management of Avinor.
- For more details about peer group and industry figures, please refer to the appendix.
- **The estimated cost of capital (WACC) for airport operations is 6.1% after taxes.**

Due to the characteristics of the ATM (en-route) division it is assessed as involving less risk than airport operations, resulting in a 20% reduction of the equity beta relative to airport operations

Characteristics of ATM (en-route)

- To calculate the cost of capital for the ATM (en-route) division a separate equity beta must be calculated. The equity beta for airport operations is not directly applicable as the characteristics of the divisions are different. There are no publicly traded ATM (en-route) companies, so the equity beta estimate is based on a qualitative assessment.
- There are three arguments that indicate that the ATM (en-route) division is less risky than airport operations, hence the equity beta should be lower:
  - ✓ *Structure of losses:* The Commission Regulation (EC) No 1794/2006 states that Avinor's losses/gains due to traffic volume variance will split with the airspace users. Thus, the risk of operating will partly be born by another party. Therefore, the risk should be less than the airport operations.
  - ✓ *Current absence of an alternative supplier:* Avinor is currently a monopolist in all segments of its operations in Norway. Nevertheless, airport operations are a more commercial focused business and is likely to be more exposed to competition. Seeing that the ATM (en-route) is more regulated, and therefore less likely to be exposed to competition, this division should hold less risk.
  - ✓ *Volatility of earnings:* Traffic flows determine the revenue of both airport operations and ATM (en-route). However, ATM (en-route) is likely to experience less volatility than the airport operations. A decrease in the general purchasing power will lead to both a reduced number of travelers and decreasing revenue from commercial business, which reinforces the downturn. As for the ATM (en-route), the division will only lose due to decreasing traffic.
  - ✓ *Based on these arguments the risk should be lower for ATM (en-route) relative to airport operations.*
- Furthermore, the ATM (en-route) industry is somewhat similar to the electric utility industry in Norway. Both of the industries have cost risk, however only the ATM (en-route) industry is exposed to volume risk. This implies a equity beta above the energy utility industry beta and below the airport operations beta. The unlevered equity beta of the energy utility industry is 0.40. Weighing airport operations beta and the energy utilities beta with respectively 25% and 75%, gives an unlevered beta of 0.45. This correspond to a 20% reduction of the equity beta relative to airport operations.
- See appendix for background information and comparison with previous research, as well as details and calculations regarding the energy utility industry.

Based on the reduced equity beta of ATM (en-route), we assume a cost of capital for ATM (en-route) of 5.5% after taxes, equivalent to 7.6% before taxes

WACC calculation		
Assumptions		**Comments**
Risk free interest rate	2,77%	Norwegian 10Y gov bond 14. October 2011
Market risk premium	5,50%	Deloitte
Marginal tax rate	28%	Norwegian corporate tax
Cost of debt estimate	5,38%	10Y swap pr. 14. October + 150 bp
Cost of debt after tax	3,87%	
Company debt/equity	1,50	Avinor management
Company debt/equity peer group	0,52	Estimated from peer group
Company unlevered beta - airport operations	0,58	Estimated from peer group
Unlevered beta energy utility industry	0,40	Estimated from peer group
Unlevered beta ATM (en-route) - weighted	0,45	Weighted average, airport operations (25%) and energy utilities(75%)
Company beta of equity	0,93	Based on company debt/equity
Risk free interest rate	2,77%	
Market risk premium	5,50%	
Beta of equity	0,93	
+/- Size / company-specific adjustment		
Cost of equity	7,87%	$r_e = r_f + \beta_e(r_m - r_f) + \alpha$
Equity to total capital	0,40	
Cost of debt after taxes	3,87%	
Debt to total capital	0,60	
WACC	5,47%	$WACC = \frac{E}{V} * r_e + (1 - t_c)\frac{D}{V} * r_d$
WACC (rounded) post-tax	**5,5 %**	
WACC pre-tax equivalent	**7,6 %**	

Assumptions

- To calculate the cost of equity we utilize the capital assets pricing model (CAPM).
  - ✓ The beta is based on the equity beta for the peer group presented under 'Airport operations'. After careful consideration of the risk of ATM (en-route), the beta of airport operations is weighted with the beta of the energy utility industry with weights 25% and 75% respectively, arriving at an unlevered beta of 0.45.
- Please refer to the section 'Airport operations' for details about remaining assumptions.
- The estimated cost of capital (WACC) for ATM (en-route) is 5.5% after taxes.
- **The relevant cost of capital for ATM (en-route) that should be used in the National Performance Plan is the pre-tax measure of 7.6%.**

To arrive at a cost of capital for the Avinor Corporation, we have weighted the sub-divisions based on capital employed, resulting in a cost of capital for the whole corporation of 6.1% after taxes

WACC calculation - Avinor corporation	
Calculation basis	
WACC post-tax airport operations	6,1%
WACC post-tax ATM (en-route)	5,5%
Capital employed Avinor corporation MNOK	18.000
Capital employed airport operations MNOK	17.000
Capital employed ANS MNOK	1.000
Weight Avinor airport operations	94%
Weight Avinor ANS	6%
WACC (rounded) post-tax	**6,1 %**
WACC pre-tax equivalent	**8,4 %**

Assumption

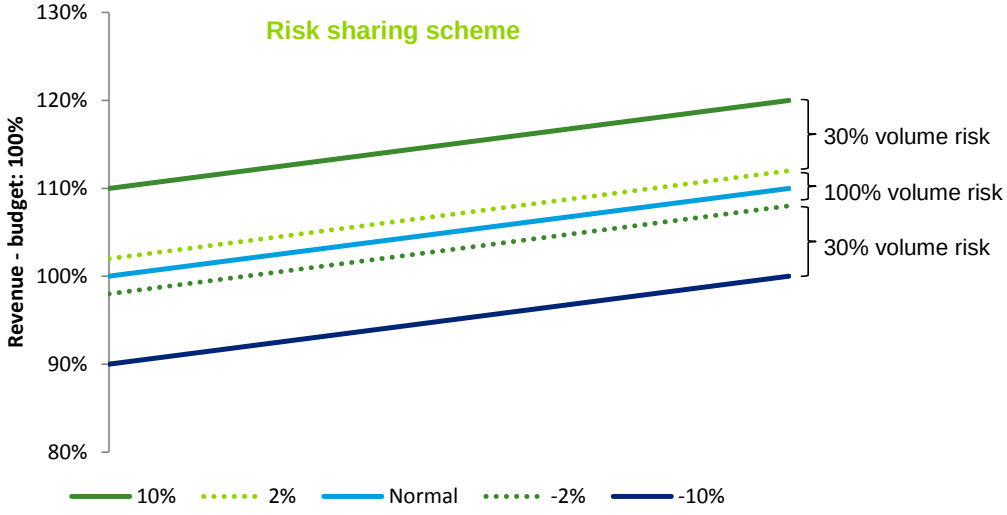
- In order to calculate a joint cost of capital measure for the whole Avinor corporation, the cost of capital for airport operations and ANS must be weighted.
- The management of Avinor has provided a rough estimate of capital employed for the whole Air Navigation Services, while the capital employed for the Avinor corporation is publicly available.
- As there is no cost of capital estimate available for the ANS division, we assume that the estimate for ATM is an appropriate proxy for the cost of capital for ANS.
- Based on the information, airport operations and ANS should be weighted with 94% and 6% respectively.
- **This gives us an estimated cost of capital (WACC) of 6.1% after taxes for the Avinor corporation.**

Annex	No.
Performance scheme	**1**
Peer group and WACC calculation	2
Beta estimation ATM (en-route)	3

The performance scheme of the ATM (en-route) industry results in a limited volume risk around 30%

Performance scheme

- The performance scheme in article 11a in Commission Regulation (EC) No 1794/2006 lays down the traffic (volume) and cost risk sharing mechanisms:
  - ✓ The base for the scheme is a service rate calculated as the ratio between a calculated cost base and forecasted service units.
  - ✓ Where the actual number of service units is not more than 2% above or below the forecasted level, the additional revenue or loss in revenue is carried by Avinor.
  - ✓ Where the actual number of service units it more than 2% and less than 10% *above* the forecasted level, a minimum of 70% of the additional revenue shall be returned to airspace users the next period. This means that Avinor carries 30% of the volume risk.
  - ✓ Where the actual number of service units is between 2% and 10% *below* the forecasted level, a maximum of 70% of the loss in revenue shall be born by airspace users. Here, Avinor also carries 30% of the volume risk.
  - ✓ Avinor carries the total cost risk, unless the difference between actual and determined costs are deemed as out of the control of Avinor.
- This leads to risk sharing scheme illustrated below.



Similarities with the energy utility industry

- Companies in the energy utility industry carries many of the same characteristics as the air service industry. It carries all of the cost risk, but have limited volume risk. Whereas the air service industry mostly has 30% volume (traffic) risk, the energy utility industry carries very low or zero volume risk. E.g. in Norway, customers carries all of the volume risk.
- This leads to the believe that the air service industry holds a risk level somewhere in between the risk level of the airport operations and the energy utility industry.
- See further details regarding applying the energy utility industry as a proxy in section 'Beta estimation ATM (en-route)'

Based on market data from the peer group the unlevered beta for airport operations is 0.58

Industry Industry group	Region	#Firms	Beta	D/E ratio	Tax rate	Unlev. Beta	Cash/EV	Unlev. beta corr. for cash
Air Transport	US	40	1,21	0,53	22,30%	0,86	9,70%	0,95
Air Transport	Europe	32	0,97	0,94	13,38%	0,53	15,17%	0,63
Transportation	Europe	34	0,73	0,87	23,25%	0,44	7,93%	0,48
Median				0,87				0,63

Peer group Ticker	Company name	Country	MCAP	NIB debt	D/E ratio Last obs	D/E ratio 5 y avr	Tax rate	Beta 5Y monthly	Unlev. Beta 5Y monthly	Equity beta points
BIT:AFI	Aeroporto di Firenze SpA ADF	Italy	146	8	0,05	0,04	31%	0,21	0,20	60
SET:AOT	Airports of Thailand Public Company Limited	Thailand	1.570	1.351	0,86	0,90	30%	0,85	0,53	60
NZSE:AIA	Auckland International Airport Ltd.	New Zealand	2.223	852	0,38	0,39	28%	0,21	0,17	60
SEHK:694	Beijing Capital International Airport Co. Ltd.	China	2.245	2.696	1,20	0,54	25%	1,19	0,63	60
IBSE:CLEBI	Celebi Hava Servisi AS	Turkey	394	56	0,14	0,14	20%	0,46	0,42	60
WBAG:FLU	Flughafen Wien AG	Austria	1.408	940	0,67	0,55	25%	0,90	0,60	60
SWX:FHZN	Flughafen Zuerich AG	Switzerland	2.489	1.234	0,50	0,60	19%	0,79	0,56	60
XTRA:FRA	Fraport AG	Germany	6.446	3.580	0,56	0,40	30%	0,88	0,63	60
SEHK:357	Hainan Meilan International Airport Company Limited	China	526	-144	-0,27	-0,25	25%	1,40	1,76	60
TSE:9706	Japan Airport Terminal Co., Ltd.	Japan	1.259	557	0,44	0,26	41%	0,49	0,39	60
CPSE:KBHL	Københavns Lufthavne A/S	Denmark	2.256	527	0,23	0,24	25%	0,51	0,44	60
SGX:S58	SATS Ltd.	Singapore	2.269	-22	-0,01	-0,09	17%	0,67	0,67	60
SHSE:600009	Shanghai International Airport Co., Ltd.	China	4.271	163	0,04	0,07	25%	0,56	0,54	60
SZSE:000089	Shenzhen Airport Co., Ltd.	China	1.528	-129	-0,08	-0,11	25%	0,40	0,42	60
NYSE:ASR	Grupo Aeroportuario Del Sureste SA de CV	Mexico	1.643	-45	-0,03	-0,07	28%	1,28	1,31	60
SHSE:600004	Guangzhou Baiyun International Airport Co. Ltd.	China	1.540	129	0,08	0,11	25%	0,54	0,51	60
KLSE:AIRPORT	Malaysia Airports Holdings Bhd	Malaysia	2.172	368	0,17	-0,08	25%	0,56	0,50	60
BIT:GEM	Gemina SpA	Italy	1.157	1.769	1,53	1,65	31%	1,40	0,68	60
BIT:SAVES	SAVE SpA (Aeroporto Marco Polo)	Italy	516	82	0,16	0,18	31%	1,05	0,95	60
Median					0,17	0,18			0,54	
Average					0,35	0,29			0,63	

Unlevered beta and D/E	Weights	Unlevered beta	D/E
Median industry	50%	0,63	0,87
Median peer group	50%	0,54	0,17
Average industry/peer		0,58	0,52

$$\beta_u = \frac{\beta_l}{1 + (1 - t_c) * \frac{D}{E}}$$

The peer group for airport operations is based on comparable companies within the air service and air transportation industry

Aeroporto di Firenze SpA ADF (BIT:AFI) - Airport Services	Airports of Thailand Public Company Limited (SET:AOT) - Airport Services	Auckland International Airport Ltd. (NZSE:AIA) - Airport Services
Aeroporto di Firenze SpA. manages the Florence Amerigo Vespucci Airport in Italy. It provides various handling services, such as ground services and supervision, passenger services, luggage services, postage and cargo services, runway operations, cleaning and terminal services, aircraft operating services, crew management, and ground service and transport. It serves domestic and international regular/charter airline carriers connecting to various destinations.The company was founded in 1984 and is based in Firenze, Italy.	Airports of Thailand Public Company Limited, together with its subsidiaries, engages in the management, operation, and development of airports in Thailand. The company operates six international airports, including Don Mueang, Chiang Mai, Hat Yai, Phuket, Chiang Rai, and Suvarnabhumi providing services for Thailand and international flights. It also leases spaces at the airports to conduct airport-related activities. In addition, the company offers hotel services and various services, such as landing, parking, passenger, and aircraft services. The company was founded in 1979 and is headquartered in Bangkok, Thailand.	Auckland International Airport Limited provides airport facilities and supporting infrastructure in Auckland, New Zealand. The company serves approximately 22 international airlines. It offers airfield landing, passenger, terminal, and car parking services. The company also operates duty free and specialty stores, foreign exchange, and food and beverage outlets, as well as engages in the rental of space in facilities, such as terminals and cargo buildings, and stand-alone investment properties. It has a strategic alliance with Queenstown Airport Corporation Limited. The company was founded in 1988 and is based in Auckland, New Zealand.
Beijing Capital International Airport Co. Ltd. (SEHK:694) - Airport Services	**Celebi Hava Servisi AS (IBSE:CLEBI) - Airport Services**	**Flughafen Wien AG (WBAG:FLU) - Airport Services**
Beijing Capital International Airport Company Limited engages in the ownership and operation of the international airport in Beijing; and the provision of related services in the People's Republic of China. The company offers aeronautical services, which consists of aircraft landings and take-offs, passenger service facilities, ground support services, and fire-fighting services for domestic and foreign airlines. The company was founded in 1958 and is based in Beijing, the People's Republic of China. Beijing Capital International Airport Company Limited is a subsidiary of Capital Airports Holding Company.	Celebi Hava Servisi A.S. provides ground handling services and supplies fuel to private cargo companies and airlines in Turkey and internationally. The company's ground handling services include representation, passenger traffic, ramp, cargo and mail, flight operations, aircraft maintenance, load control and communication, aircraft security, executive aviation and air taxi, airport terminal construction and management, and warehouse and terminal operations.The company was founded in 1958 and is headquartered in Istanbul, Turkey. Celebi Hava Servisi A.S. is a subsidiary of Celebi Holding A.S.	Flughafen Wien Aktiengesellschaft, together with its subsidiaries, engages in the construction and operation of civil airports and related facilities in Europe and the Middle East. It manages Vienna International Airport and Voslau-Kottingbrunn Airport. The company operates in four segments: Airport, Handling, Retail and Properties, and Other.The company is headquartered in Schwechat, Austria.
Flughafen Zuerich AG (SWX:FHZN) - Airport Services	**Fraport AG (XTRA:FRA) - Airport Services**	**Hainan Meilan International Airport Company Limited (SEHK:357) - Airport Services**
Flughafen Zurich AG operates Zurich Airport in Switzerland. The company operates in four segments: Aviation Flight Operations, Aviation Security, Aviation Aircraft Noise, and Non-Aviation. The Aviation Flight Operations segment engages in the construction, operation, and maintenance of the airport operating infrastructure. . The Aviation Security segment involves in the installation, operation, and maintenance of security infrastructureThe Aviation Aircraft Noise segment offers aircraft noise reduction services. The Non-Aviation segment develops, markets, and operates commercial infrastructure at Zurich Airport. This segment involves in retail operations at the airport, rental of premises, and parking services, as well as other commercial services. Flughafen Zurich AG was founded in 2000 and is based in Zurich, Switzerland.	Fraport AG engages in the ownership and operation of Frankfurt Airport in Germany. It operates through four segments: Aviation, Ground Handling, Retail & Real Estate, and External Activities & Services. The Aviation segment involves in flight and terminal, airport security, and airport expansion activities. This segment also provides runways, taxiways, and VIP services. The Ground Handling segment offers handling services to passengers, freight, and aircraft. The Retail & Real Estate segment engages in retailing activities, parking facility management, and the rental and marketing of real estate properties. The External Activities & Services segment provides real estate and facility management, as well as information and telecommunications services. The company was founded in 1924 and is headquartered in Frankfurt am Main, Germany.	Hainan Meilan International Airport Company Limited operates an airport and provides related services in the Peoples Republic of China. The company's aeronautical business consists of the provision of terminal facilities, ground handling services, passenger, and cargo handling services. Its non-aeronautical businesses include leasing commercial and retail spaces at the Hainan Meilan Airport; airport-related business franchising; leasing advertising space; operating car parking places; providing tourism services; and selling duty-free and consumable goods. The company was founded in 2000 and is headquartered in Haikou City, the People's Republic of China.

The peer group for airport operations is based on comparable companies within the air service and air transportation industry

Japan Airport Terminal Co., Ltd. (TSE:9706) - Airport Services

Japan Airport Terminal Co., Ltd. engages in the construction and management of passenger terminal facilities at Tokyo International Airport (Haneda). The company also rents offices and stores to airline companies and airport concessionaires; operates shops, information counters, parking lots, rental hall and conference rooms, and travel insurance agencies; and provides hotel reservations, international and domestic travel sales, and ticket sales for transportation and events at this airport. In addition, it operates commissioned duty-free shops and involves in the wholesale of duty-free goods at Narita International Airport, Kansai International Airport, and Central Japan International Airport. The company was founded in 1953 and is headquartered in Tokyo, Japan.

Københavns Lufthavne A/S (CPSE:KBHL) - Airport Services

Copenhagen Airports A/S owns and operates the airports at Kastrup and Roskilde in Denmark. It operates in three segments: Traffic, Commercial, and International. The Traffic segment includes the operations and functions, which the airports at Kastrup and Roskilde make available so that airlines can operate their flights, including facilities required for the passengers' traffic through the airports. The Commercial segment provides facilities and services at the airports to passengers and others, including parking facilities, shops, restaurants, resting areas, lounges, and hotel. This segment also engages in leasing the company's buildings, premises, and land. The International segment offers consulting services concerning airport operation, as well as invests in foreign airports primarily in Mexico and the United Kingdom. The company is based in Kastrup, Denmark.

SATS Ltd. (SGX:S58) - Airport Services

SATS Ltd., an investment holding company, provides gateway services and food solutions primarily in Singapore and the United Kingdom. The company's gateway services include airfreight and ground handling services, such as apron, passenger, and baggage handling services; technical ramp handling; aviation security; and aircraft interior and exterior cleaning services; and food solutions comprise airline catering, food distribution and logistics, industrial catering, chilled and frozen food manufacturing, and airline linen and laundry services. It manufactures and sells chilled soups, freshly squeezed juices, smoothies, and prepared fruitsSATS Ltd. serves the aviation, hospitality, food, healthcare, freight, and logistics industries, as well as government. SATS Ltd. was founded in 1972 and is based in Singapore, Singapore.

Shanghai International Airport Co., Ltd. (SHSE:600009) - Airport Services

Shanghai International Airport Co., Ltd. provides ground handling services to domestic and foreign airlines and passengers. The company also engages in leasing aviation business space, commercial space, and offices inside the airports. It also involves in advertising; and operating other logistics business related to airfreight, as well as engages in the comprehensive development, and operating other investment projects allowed by policies of government. Shanghai International Airport Co., Ltd. is based in Shanghai, the People's Republic of China.

Shenzhen Airport Co., Ltd. (SZSE:000089) - Airport Services

Shenzhen Airport Co., Ltd. engages in the operation of Shenzhen Baoan International Airport located in China. The company was founded in 1989 and is based in Shenzhen, China.

Grupo Aeroportuario Del Sureste SA de CV (NYSE:ASR) - Airport Services

Grupo Aeroportuario del Sureste, S.A.B. de C.V., through its subsidiaries, holds concessions to operate, maintain, and develop airports in the southeast region of Mexico. The company operates nine airports located in the cities of Cancun, Cozumel, Merida, Huatulco, Oaxaca, Veracruz, Villahermosa, Tapachula, and Minatitlan. It offers aeronautical services, such as landing services, aircraft parking, passenger walkways, and the provision of airport security services. The company also provides various non-aeronautical services, including the lease of space in airports to retailers, restaurants, airlines, and other commercial tenants; and complementary services, such as catering, handling, and ground transport services. Grupo Aeroportuario del Sureste, S.A.B. de C.V. was founded in 1998 and is headquartered in Mexico City, Mexico.

Guangzhou Baiyun International Airport Co. Ltd. (SHSE:600004) - Airport Services

Guangzhou Baiyun International Airport Co. Ltd. operates as a hub airport in the People's Republic of China. It provides ground handling and other extended services for airline companies, passengers, and cargo owners. The company was founded in 2000 and is based in Guangzhou City, the People's Republic of China.

Malaysia Airports Holdings Bhd (KLSE:AIRPORT) - Airport Services

Malaysia Airports Holdings Berhad engages in the development, operation, management, and maintenance of airports primarily in Malaysia. It operates and manages 39 airports, which comprise international, domestic, and short take-off and landing ports. The company also offers airport related services; operates duty free and non duty free outlets; and provides management services in respect of food and beverage outlets at airports, as well as mechanical, electrical, and civil engineering services. In addition, it provides operations, maintenance, and technical services to the airport industry; cultivates and sells oil palm and other agricultural products, as well as engages in the horticulture activities; owns a hotel; and undertakes information and communication technology business ventures. The company is based in Sepang, Malaysia.

SAVE SpA (Aeroporto Marco Polo) (BIT:SAVES) - Airport Services

SAVE SpA, together with its subsidiaries, engages in the management of airports in Italy. The company manages and develops the infrastructure in the airports, which include the movement of aircraft, passengers, and goods inside the airports, as well as the granting of spaces on airport premises for commercial activities. It provides airport management services for Venice Marco Polo Airport, Treviso Sant'Angelo Airport, Padua Airport, Venice Lido Airport, and Pantelleria Airport. The company also involves in designing infrastructural works, and mechanical and electrical installations related to mobility infrastructures. Further, the company involves in various food and beverage operations. As of December 31, 2009, it operated 159 stores. The company was incorporated in 1987 and is based in Tessera, Italy.

Gemina SpA (BIT:GEM) - Airport Services

Gemina S.p.A. engages primarily in the airport infrastructure business in Italy. The company operates the Leonardo da Vinci airport of Fiumicino and the G.B. Pastine airport of Ciampino in Rome; and provides airport related services. It also offers air traffic control and communications systems, as well as involves in electricity production business. In addition, the company provides information technology and fiduciary services. Gemina S.p.A. was founded in 1961 and is headquartered in Milan, Italy.

Based on market data for energy utility industry, the peer group unlevered beta is 0.40

Peer group Ticker	Company name	Country	MCAP	NIB debt	D/E ratio	Tax rate	Beta 5Y monthly	Unlev. Beta 5Y monthly	Equity beta points
SWX:ALPH	Alpiq Holding AG	Switzerland	10.530	4.270	0,41	19,00%	0,68	0,51	60
SWX:BKWN	BKW FMB Energie AG	Switzerland	4.196	-69	-0,02	19,00%	0,40	0,40	60
SWX:CKWN	Centralschweizerische	Switzerland	2.004	-112	-0,06	19,00%	0,19	0,19	60
DB:EOAN	E.ON AG	Germany	63.712	33.055	0,52	29,80%	0,87	0,64	60
ENXTLS:EDP	EDP-Energias de Portu	Portugal	13.717	21.917	1,60	25,00%	0,63	0,29	60
ENXTPA:EDF	Electricite de France S	France	77.885	40.626	0,52	33,30%	0,84	0,62	60
ENXTPA:ELEC	Electricite de Strasbou	France	1.153	-479	-0,42	33,30%	0,52	0,72	60
DB:EBK	EnBW Energie Baden-'	Germany	13.600	6.184	0,45	29,80%	0,45	0,34	60
CATS:ELE	Endesa SA	Spain	31.034	20.668	0,67	27,50%	0,72	0,49	60
SWX:EDHN	Energiedienst Holding /	Switzerland	2.259	-47	-0,02	19,00%	0,35	0,36	60
WBAG:EVN	EVN AG	Austria	2.963	2.001	0,68	25,00%	0,74	0,49	60
HLSE:FUM1V	Fortum Oyj	Finland	26.508	9.751	0,37	26,00%	0,74	0,58	60
OB:HNB	Hafslund ASA	Norway	2.340	1.899	0,81	28,00%	0,92	0,58	60
CATS:IBE	Iberdrola SA	Spain	46.661	39.383	0,84	27,50%	0,86	0,54	60
DB:LEC	Lechwerke AG	Germany	2.981	-939	-0,31	29,80%	0,28	0,36	60
ATSE:PPC	Public Power Corporati	Greece	3.759	5.675	1,51	23,50%	0,72	0,33	60
SWX:REPI	Repower	Switzerland	1.493	192	0,13	19,00%	0,30	0,28	60
SWX:SOPN	Società Elettrica Sopra	Switzerland	266	67	0,25	19,00%	0,12	0,10	60
LSE:SSE	SSE plc	United Kingdc	17.790	3.920	0,22	24,50%	0,35	0,30	60
OM:ELV	Vallentuna Elverk AB	Sweden	40	-10	-0,26	26,30%	0,32	0,39	60
WBAG:VER	VERBUND AG	Austria	13.408	5.406	0,40	25,00%	0,85	0,66	60
Median					0,40			0,40	
Average					0,39			0,44	

Based on previous research conducted, the unlevered beta for ATM (en-route) should lie in the range between 0.5 and 0.6

Report	Report description	Relevant points	Applied beta estimates
Report for the CAA by Europe Economics **Cost of capital for NATS (En Route) plc for CP3 (2010)**	• National Air Traffic Services (NATS) provides air traffic control services for aircraft flying in UK airspace and the eastern part of the North Atlantic. • Europe Economics was commissioned by the Civil Aviation Authority (CAA) to advise on the appropriate cost of capital that NATS is allowed to charge over the third price control period CP3.	• Compares the asset beta of airports, airlines and regulated utilities. Considers volume risk, the extent price control arrangements exposed or shielded companies from volume risk, and the sensitivity of out-turn profits to shocks. • Concluded that there should be a premium to the betas of regulated utilities, because it is a more risky business due to exposure to sizeable volume risk and higher operational gearing.	• $\beta_A = 0.5 - 0.6$
UK CAA NATS price control review 2006-2010 (2004)	• The document sets out the CAA's final decision on the modifications to the charge control conditions in the air traffic services licenses held by NATS.	• Based on analysis conducted by hired consultants, they conclude that if NATS has little or no volume risk it will have a beta similar to a water or energy distribution company. If it were to bear full traffic volume risk, the beta should be closer to the airport sector.	• $\beta_A = 0.5 - 0.6$
Airservices Australia – Review of the Weighted Average Cost of Capital for Regulated Services (2003)	• Airservices Australia (AsA) is a Commonwealth Government owned monopoly business with a core responsibitility to provide safe air traffic management services to the aviation industry in the Australian Flight Information Region • The report provides a detailed discussion about issues and risks in the industry.	• Based on volatility of earnings, duration of pricing and less carry-forward of under and over recoveries, AsA holds less risk that Australian airports. • The assets beta should be lower than 1, since intuitively AsA would appear less risky than the market. • Infrastructure and utility companies can be used as an appropriate proxy for companies that faces limited systematic risk.	• $\beta_A = 0.55 - 0.75$

Based on previous research conducted, the unlevered beta for ATM (en-route) should lie in the range between 0.5 and 0.6

Report	Report description	Relevant points	Applied beta estimates
NATS Public – Private Partnership – setting charges for the first five years (1999)	• The Government announced its intention to take NATS into a public-private partnership. Under the proposals the Civil Aviation Authority (CAA) would become the economic regulator of NATS. • CAA Economic Regulation Group (ERG) gives advice about the appropriate level of initial charges; and the structure of the charge control during the period before the first review.	• To estimate the beta one should use the betas of companies with similar properties to NATS regulated business. Possible candidates are: airlines, rail tracks, other absolute monopolies and privatized utilities.	• Does not provide specific estimates.
Report from consulting firm: NATS - Cost of Capital for CP2 (2004)	• This report was prepared for the CAA in connection with cost of capital in the context of a forthcoming NATS price review.	• Should identify businesses that have similar risk characteristics to NATS e.g. utility companies, airports and airlines. • NATS' main similarity to utility companies is that it is a regulated business. It will be more risky than standard utilities, because the key driver of demand (air travel) is likely to have a higher income elasticity than essential services. • NATS is in the same industry as airlines, but will not be as exposed to the same magnitude of systematic risk faced by airlines.	• $\beta_A: 0.5 - 0.6$
Concluding remarks		• Based on this, we use the energy utility industry as a point of comparison. • Please refer to the section about the 'Performance Scheme' for a closer review of the industry characteristics.	• Our estimate of an asset beta of 0.45 below the range of other reports. • However, our professional assessment of the performance scheme conclude that the lower beta is justifiable.