Outside Air Free Cooling - A list of the issues typically faced in the Tokyo area

Item	Pros	Cons
Similar DC facilities operational	The use / acceptance by a major search engine must be viewed positively.	To the best of our knowledge, only one DCs exists in Japan that uses outside air cooling. The installation is in Kyushu, 800 km SW of Tokyo, in a rather remote area. This DC is owned by a Telephony company with a global search engine company their major client. (NS design)
		From a cursory examination, they seem to be using 80 ~ 85% filteration on the outside air. Activated carbon use is not know.
Client acceptability	Some acceptance may be fortcomming with the fact that the above user has accepted the free cooling concept.	Unknown factor at this time. Study by your marketing division is required.
Acceptable Condition of Temperature & Humidity	Typical conditions in the Data Center are set at 26.7C return at 40~55%RH	Need users to agree to a very wide temperature and RH range. E.G. 5.0 deg C ~ 40.0deg C & 5%~85%RH
Air quality	Chemically, the air quality in Jan 2009 was found to be quite acceptable.	From May through October, air quality deteriorates in Japan with chemical smog a common phenomenon.
Air borne particles		Known problem. May/June Chinese dessert sands are carried in by Southerlies and large sections of Japan are covered in fine yellow sand.
Air filters	Good quality activated charcoal filters can be procured in Japan	Most filters are of a disposable type and cannot be reused. Costs for new filters and cost for disposing of used filters.
Filter changes		Due to dust and grime in the air, filter changes will have to be done at frequent intervals (yet to be determined).
Manpower for changes	Contact labour can be used	Facility Manager will have to hire a contractor to have a team on site to change the filters periodically.
Filter storage	Outside or in house storage possible.	Storage space for filters will need to be provided.
Period available for Air Cooling	Usually available from the beginning of November to end March. 4 months per year.	Chilled water or other cooling systems will need to be installed to provide cooling during other months.
Temperature control		Tokyo Winter Temperature range is -2C ~ +14C. Adjust SA and RA volume by motorized damper Temperature control. Wider Temperature & Humidity levels are recommended. Heating of the air December through February will be required to provide consistency with SLA. Return air could be mixed with fresh air to obtain warmer conditions.
Humidity control	Ultrasonic humidifiers can be used to save on energy use.	Winter Rh range 10% ~ 25%. High degree of humidification is required.

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Shutoff dampers		All vents will need to closed prior to the Gas fire suppression systems coming on. Automated or remotely activated system will need to be installed for each individual vent.
Shutoff Fire damper seals		Seals will need to be checked and changed at pre set intervals.
Shutoff damper automation system		This system will need to be tested at a frequency that will be determined by the Fire Code. Probably at least twice a year.

Further action that is possible	Do a dust and SO2 survey for the area to cover all 4 seasons.
	Conduct a marketing survey of client accepatbility for Temperature & Humidity Level.
	Research the possibility of reuseable filters (probably not activated carbon type).
	Research the possibility of using return air heat to heat cold air.
	Do a total cost and feasibility study on Outside air Free cooling.
Alternate methods	Water side Free Cooling in the same winter period at the cooling towers.
	Use Air Cooled system in parallel with the Turbo chillers and save energy in the winter months.