

# Executive Summary of Senior Thesis Final Report

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*Cheuk Tsang, 04/12/2013*

After analyzing the mechanical system of American Art Museum (AAM), two proposed ideas are conducted a further and detail analyses. The overall report is focused on the cost effectiveness of mechanical system.

## ***Mechanical Depth – Hybrid Cooling System***

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Today, the price of No.2 oil is increasing. And, the utility company, ConEd, which is contracted with AAM, generates electricity by fueling oil. As other fuels, the applications provide either attractive incentive and/or rebate programs or relatively lower price. Therefore, a hybrid cooling system is suggested to seek for further saving with the highly energy efficient mechanical system. After conducting an exhaust search of the best hybrid system, it found that the best system is two natural gas-fired single stage absorption chillers and one electric centrifugal chiller with 5 year payback period.

## ***Structural and Acoustical Breadths – New Ductwork layouts***

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AAM will consist of 3 mechanical floors. Two out of three floors will hold ventilation systems, which will serve different floor levels. The ventilation system on cellar level will serve conditioned air from cellar level to 7<sup>th</sup> floor, and the ventilation system on 9<sup>th</sup> floor will deliver air to 8<sup>th</sup> floor only. So, the proposed idea is to bring more AHU closer to the load with the consideration of minimizing the structural impact and acoustical impact. Overall, the result shows that the proposed duct work layout will save about \$36,000 by reducing the amount of ducts.

After conducting the studies of two ideas, it shows that there are more potential savings of AAM mechanical system. For example, the fuel type of AAM should be more toward natural gas. And, the area of 9<sup>th</sup> floor would be increased and more AHUs can be put on 9<sup>th</sup> floor to be closer to the load, if the aesthetics of AAM is not affected.