

Checklist of Opportunities to Upgrade Energy Efficiency with Building Security

Architectural Considerations			
Building Envelope	<i>Efficiency Opportunity</i>		<i>Security Issue*</i>
	Airtight barrier	Sealing appropriate to resist chem./bio. penetration also provides weather-tight seal	Air
	Insulation	Wall insulation may provide secondary barrier and provide thermal savings	Air, Ex
	Impact absorbing walls	Innovative walls systems (multiple layers, openings, crumple zones) designed to absorb blast effects can also reduce envelope heat transfer and control solar gain	Ex
	Thermal Mass	Earth berming for blast deflection can also provide thermal buffering	Ex
		High-mass (concrete) construction allows active or passive use of thermal mass to reduce heating/cooling loads	Ex
	Shading devices	Consider shading devices that can double as blast protection	Ex
	Vestibules	Consider vestibules to help control building access while reducing infiltration of unconditioned outside air	Con, Air
Windows	Laminate films	Apply blast-damage resistant laminate films to interior surface of windows with appropriate emissivity and visible light transmittance	Air
	Operable windows	Analyze appropriate response to threat (http://securebuildings.lbl.gov/)	Air, RR
	Protective screens	External protective screens may also control unwanted solar gain	Ex
	Storm Windows	Consider retrofit of storm window with efficient (low-e, solar control) films	Air, Ex
	Light shelves	Use light shelf integrated with blast wall	Ex

* Con = Control of access, Air = Airborne (Chem/bio) threat, Ex = Explosive threat, RR = Response and Recovery

HVAC Considerations			
Air Systems	System Design	Separate ventilation air systems from thermal distribution; use radiant cooling/heating for added efficiency	Air, RR
		Provide larger ducts and efficient fans for rapid venting and energy savings in normal operation	Air, RR
		Efficient ventilation systems (displacement ventilation, large ducts, etc.) reduce space and energy requirements for upgraded filters.	Air, RR
	Variable speed drives	Provide capability for normal operation and rapid venting. (VFDs also allow for dynamic braking to stop fans faster in an emergency.)	Air, RR
	Dedicated Exhaust	Provide separate additional exhaust for emergency venting or for economizer operation, especially in high-risk areas such as entry vestibules, loading docks, and mail rooms	Air, RR
	Whole-building ventilation	Consider dual use of building purging systems (for smoke and also chemical contaminants) to provide nighttime “free cooling” during normal building operation.	Air, RR
	Duct leakage	Specify, install, and commission (test) ductwork for low leakage	Air, RR
	Dampers	Provide dampers with rapid closure and low leakage	Air, RR
	Filtration	Provide low pressure drop filters, at the filtration level needed	Air, RR
		Provide tight seal around in-line filters	Air, RR
Security barriers	Review impact of security barriers, such as additional doors, on normal air distribution	Con, Air	
Water Systems	Physical layout	Provide secure enclosures and minimize run lengths of piping	Air, Ex
		Increase pipe size if making modifications	Air, Ex
Control System Considerations			
Windows	Operable window controls	Provide automatic and operator control for chem./bio isolation and thermal comfort	Air, RR
	Shading control	Provide automatic and operator control for blast protection and shading	Ex, RR
Integrated Systems	Interoperable systems	Integrate security controls with normal building controls using interoperable systems	Con, Air, Ex, RR
		Plan for future additions as new sensing capability is developed	Con, Air, Ex, RR
HVAC controls	Individual control of fans, dampers	Provide for pressurized safety zones when needed.	Air, RR

	Alternate filtration path	Provide parallel path through filter banks during chem./bio. attack.	Air, RR
Wireless systems	Remote monitoring and control	Provide secure and redundant control using wireless and web based systems.	Con, Air, Ex, RR
Monitoring	System status monitoring	Provide whole building system monitoring to improve maintenance, normal operation, and critical monitoring during events	Con, Air, Ex, RR
Elevator Controls	Integrate elevators with building systems	Integrate elevator controls for emergency response to fire or chem./bio events and provide for efficient operation, and controllable for peak load strategies.	Con, Air, Ex, RR
Lighting Considerations			
Interior/ Exterior Lighting	Security Lighting	Provide efficient lighting and lighting controls such as motion sensors.	Con
		Integrate lighting into overall building controls.	Con, RR
Interior	Daylight access	Minimize interior spaces without daylight access, to improve visibility in daytime emergency evacuations.	RR
Distributed Generation			
		For emergency back-up generation, consider upgrading from diesel to a gas turbine or other clean/renewable on-site power source with heat recovery to reduce power and fuel costs during non-emergency periods.	RR
Site Planning			
Building Site	Solar access, landscape to reduce heating + cooling loads	Added protective open space around buildings allows better solar access and building orientation. Trees and plantings can directly shade buildings, buffer or channel prevailing winds, and add evapo-transpiration cooling.	Con, Ex
Campus Layout	Sustainable site planning and management	Larger, multi-use sites to enhance security (e.g. Embassy compounds) create opportunities for efficient water use/recovery/recharge, ground-source heat pumps, better load matching for on-site combined heat and power, etc.	Con, Ex
Other			
Cyber Security	Computer standby energy	Physically shutting off power to PCs at night and during unoccupied periods saves energy even beyond low-power sleep modes, while reducing risk of unauthorized access to data and systems.	Con