BUILDING GOOD PRACTICE
Bardini Palace – Florence, Italy

GENERAL INFORMATION		
Name of the public building renovation:		**Renovation and practical reorganisation of Mozzi –Bardini Palace as Offices for Florentine Museums and Bardini Museum**
Building Good Practice number		HB n.1 - AFE
Historical building sub-group		
Description	Photo	   
	Address	Mozzi Square 1, Florence, Italy,
	Public sector contractor	Ministry for Culture, Florence Municipality (Owner)
	Architect	*Project Manager:* arch. Giancarlo Lombardi • Arch. Marzia Lanzoni, responsible of the service; • Arch. Gionata Rizzi, historic and monumental buildings renovation expert; • Arch. Paola Pesaresi, historic and monumental buildings renovation expert; • Arch. Francesca Ravetta, building site safety expert;
	Engineering	*Structures:* Ing. Giancarlo De Renzis Ing. Giovanni Vercelli, historic and monumental buildings strengthening expert ;

	consulting	*Plants* • Ing. Roberto Innocenti • Ing. Raffaele Viscomi • Ing. Giulio Boati, mechanical and electrical expert; *Energy consulting:* • prof. Arch. Marco Sala • arch. Paola Gallo
	Date of construction	1881
	Legal aspects (e.g.: level of protection of building)	Constrained Building According Law n. 42 del 22.01.2004 (Cultural Goods Code).
	Date of renovation	**Renovation** realised from 2002 to 2003.
	Nature of the work (short description)	The project was to strengthen the wood structures , renovate the golden surfaces , put new elevators, skylights and what else necessary for the modern use of the building. Moreover, renewable energies. Data: Number of floors: 3 Underground floors: 0 Heated surface: 3.200 m2 Cubic measure to be heated and/or conditioned: 15.000 m3 Building shell: 3.431 m2 Medium number of users: 150
	Budget and source of funding	Cost: € 4.934.643,30 Financed by : • Municipality of Florence, • European Program JOULE, Project "MUSEUMS", • Florence Saving Bank, • Toscana Region *Project costs:* *Architectonic:* € 42.000,00 Bio climate and energy saving strategies: € 47.000,00 Monitoring € 27.000,00

AVAILABLE RESULTS	
What were the big problems (in terms of energy efficiency) to tackle?	The fact that the building had to be a museum: the internal climate had to be suitable to art preservation. Because of the fact of that is a monumental building, it has been difficult to find out the suitable technologies, expecially to insert the elevators.
Has this building been already analysed and certified?	NO

What are the key innovative energy efficiency measures undertaken through the renovation?	• Upgrade of internal comfort with a High Efficiency Heat Pump HVAC (Heating Ventilation Air Conditioning). • Energy saving with integration of solar passive system and wall and roof insulation • Lighting with integration between the skylight and high efficiency lamps.
What are the measurable improvements in terms of energy efficiency in electricity and heating (kWh saved)?	53 % lighting 48 % heating/cooling 26% ventilation Medium energy saving 48%
• **kWh saved,** • **kWh before/after,** • **kWh given in the studies/real kWh)** • **carbonated energy kWh substituted by REN**	…… 280 kWh/mq/year 75 kWh/mq/year
• **kg CO2 saved**	283.200 Kg/year

ENERGY EFFICIENT MEASURES MISURE DI ENERGIA EFFICIENTE	
Energy efficient measures of the building envelope	Insulation from 1,90 W/mqK to 0,36 W/mqK (wooden insulating board 10 cm high) Lighting with integration between the skylight and high efficiency lamps
Energy efficient measures of the heating system	Upgrade of internal comfort with a High Efficiency Heat Pump HVAC (Heating Ventilation Air Conditioning).
Energy efficient measures of monitoring energy	To have a high comfort in the Museum, and low energy consumption, we have a computerised control system for energy consumption. This "smart" system has three components (monitoring, control, implementation) that can manage a high number of sensor to run the requested comfort. The control system is used to control and manage the thermal and visual (integration between natural and artificial lighting) comfort in the Museum, in reference to temperature, humidity, lighting and occupant percentage.
Energy efficient measures regarding behaviour	Reduction of energy consumption thanks to the integration of solar heat gain strategies and the use of low environmental impact technologies.

Stakeholders' involvement in the energy efficient measures	NO
Others?	NO

SUSTAINABILITY OF THE RENOVATION	
Design and choice of sustainable materials?	NO
Sustainable building site management? (sorting waste, water…)	NO
Application of a valuation method (BREAM? HQE? Others?)	NO
Carrying out consultation process with dwellers? Concerted choice on the work program? Which external partners?	NO

BUILDING MAINTENANCE: life of the building after the renovation	
Is the building following an energy monitoring? Is there a responsible manager?	To have a high comfort in the Museum, and low energy consumptiom, we have a computerised control system for energy consumption. This "smart" system has three components (monitoring, control, implementation) that can manage a high number of sensor to run the requested comfort.
Who is in charge of the maintenance of the heating system of the building?	**To be completed**
Who is in charge of the day to day energy management?	Arch. Marcello Cocchi Energy Manager Municipality of Florence
Are there some specific measures to raise energy awareness and to implicate users in energy efficiency?	**To be completed**

FUNDING

What is the financing plan?	Total Cost € 4.934.643,30 financed by : Municipality of Florence, European Program JOULE, Project "MUSEUMS", Florence Saving Bank, Toscana Region
Innovative or specific aspects in the method of financing (European funds or loan, energy performance contract,...)	According European Plan JOULE 2000 – 2004 and V° Plan, European Community financed 35% of project MUSEUMS: Energy Efficiency & Sustainability in Retrofitted & New Museum Buildings,
What is the balanced budget for each stakeholder • **Energy costs for tenant before /after** • **Increase in the rent**	-------
Is there any specific economical indicators (payback time on investment, global cost, ...)	NO

TRANSFERABILITY	
Transferable aspects according to the partner in charge of this example of good practice	Transferability of planning (forming a partnership, choosing priorities, setting up a renovation building teams, etc.)? **To be completed**
	Transferability of the process of renovation (management structure, monitoring system, implication of end users, participation, etc.)? **To be completed**
	Transferability of results (good solutions, adaptability, change of behaviour, etc.)? **To be completed**
Transferable aspects according to all the partners of Serpente project	The other partners will analyse and validate these good practices. During the process of validation the partners will take on the role of auditors because they will assess and improve the effectiveness and portability of good practices in their context. **To be completed**
	The validation process will promote a systemic approach in local competent public administrations. Moreover, this process of selection and validation is a peer review and entails the mutual role of experts and auditors depending on typology of buildings and partner's expertise. **To be completed**

SOURCES	
Publications	• Fiorenza Scalia (a cura di), Il Museo Bardini a Firenze, 2 vol., Cassa di Risparmio di Firenze, Firenze 1984. • Everett Fahy (a cura di), Dipinti, disegni, miniature e stampe, in L'archivio storico fotografico di Stefano Bardini, Alberto Bruschi editore, Firenze 2000. • Bruna Maria Tomasello, Il Museo di Stefano Bardini, in Museografia italiana negli anni Venti: il museo di ambientazione, atti del convegno di Feltre del 2001, edizioni Carlo Rizzarda, Feltre 2003. • Il Porcellino (vero) è dentro il museo blu. A marzo riapre il Bardini con tutti i suoi tesori, articolo del Corriere Fiorentino del 5 dicembre 2008, pag. 14. • Guia Rossignoli, "Cuoi d'oro. Corami da tappezzeria, paliotti e cuscini del Museo Stefano Bardini", Noèdizioni, Firenze 2009 • Valerie Niemeyer Chini, "Stefano Bardini e Wilhelm Bode. Mercanti e connaisseur fra Ottocento e Novecento", Polistampa, Firenze 2009.
Website	http://www.museicivicifiorentini.it/bardini/
Interviews	**To be completed**