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Sustainable buildings, equipment, and management. A checklist¹

Održiva gradnja, oprema i uprava. Kontrolni popis²

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For any construction project, just as for any complex undertaking in general, a checklist provides a useful means of confirming that everything has been considered. Although it cannot claim to be exhaustive, the following list of aspects of planning, construction, and also library operation, is designed to help ensure that everything has been considered.

Prilikom svakog projekta izgradnje, ili općenito već prilikom svakog složenijeg zahvata, kontrolni je popis korisno sredstvo potvrde da je sve uzeto u obzir. Premda se ne može reći da je u potpunosti iscrpan, ovaj popis aspekata planiranja, izgradnje kao i knjižničnog poslovanja oblikovan je kako bi pomogao osigurati da je sve uzeto u obzir.

1 Project planning, finance	1 Projektno planiranje, financiranje
<ul style="list-style-type: none">• Early discussion of sustainability goals with the client and the establishment of criteria• A sense of direction on the definition of a 'green building': economical, environmentally friendly, resource saving. High level of comfort for users, a healthy environment with optimal integration into their socio-cultural i. e. neighbourhood	<ul style="list-style-type: none">• Prethodna rasprava s naručiteljem o ciljevima održivosti i utvrđivanje kriterija• Određenje definicije „zelene gradnje“: ekonomičnost, usklađenost s okolišem, štedljivost. Visoka razina komfora za korisnike, zdrav okoliš s optimalnom integracijom u korisnikovo društveno-kulturno, odnosno postojeće okruženje.

¹ Transl. from German into English by Karen Latimer.

² Translation from English into Croatian by Dijana Machala and Edita Bačić.

<p>surroundings.</p> <ul style="list-style-type: none"> • Establishment of the environmental goals of the sponsors or clients • Preliminary consideration of the ecological balance of a building, construction, operation, maintenance, demolition and disposal, CO₂ balance • Targets for the calculation of operating costs • Comprehensive consideration of ROI (Return-on-Investment) • Life cycle costs • Creation of a list of sustainability desirables • Consideration of the increase in the value of the property (through certification) • Consideration of financial support available 	<ul style="list-style-type: none"> • Utvrđenje ciljeva zaštite okoliša nositelja projekta ili naručitelja • Unaprijed voditi računa o ekološkoj bilanci zgrade: izgradnji, radu, održavanju, rušenju i odlaganju, emisiji CO₂ • Ciljevi pri izračunu operativnih troškova • Voditi računa o sveobuhvatnom povratu uloženih sredstava (ROI - Return-on-Investment) • Troškovi životnog ciklusa • Izrada nacrt a bilježja održivosti • Uzeti u obzir povećanje vrijednosti imovine (kroz certificiranje) • Uzeti u obzir izvore financijske potpore
<p>2 Tendering</p>	<p>2 Natječaj</p>
<ul style="list-style-type: none"> • The public sector should be a role model, especially for an educational and cultural facility such as a library • Formulation of specific criteria for sustainability • Definition of the ecological footprint of the library • Statement of specific environmental objectives • Requirement for a holistic view of sustainability issues • Verification of certificates 	<ul style="list-style-type: none"> • Javni sektor mora biti uzorni model, posebice obrazovne i kulturne zgrade kao što je knjižnica • Oblikovanje specifičnih kriterija održivosti • Definiranje ekološkog otiska knjižnice • Navođenje konkretnih ciljeva zaštite okoliša • Promoviranje sveobuhvatnog pristupa pitanjima održivosti • Verifikacija certifikata
<p>3 Site / location</p>	<p>3 Zemljište/mjesto</p>
<ul style="list-style-type: none"> • Ecological criteria relating to the property and its surroundings (contamination legacy, climatic conditions, emissions, noise) • Resource use during construction • Infrastructure (connections to public transport) • Access (also costs for site clearance and maintenance) • Places for personal transport (bicycles) 	<ul style="list-style-type: none"> • Ekološki kriteriji zemljišta i njegovog okoliša (kontaminacijsko naslijeđe, klimatski uvjeti, emisija štetnih plinova, buka) • Korištenje prirodnih izvora prilikom izgradnje • Infrastruktura (povezanost s javnim prijevozom) • Pristupačnost (kao i troškovi čišćenja i održavanja) • Povezanost sa osobnim prijevozom (biciklom)

<ul style="list-style-type: none"> • Greening of site and surrounding area • Optimisation of site specific construction and energy concepts 	<ul style="list-style-type: none"> • Ozelenjivanje dvorišta i okolnog prostora • Optimizacija zgrade i energetske koncepcije
4 Construction	4 Izgradnja
<ul style="list-style-type: none"> • Infrastructure: entrances and exits, storage of materials • Noise and environmental impact on the immediate surroundings • Choice of building contractors and equipment from the surrounding region • Tendering for materials and processes: demand sustainability criteria and take certificates into account 	<ul style="list-style-type: none"> • Infrastruktura: ulazni i izlazni prostor, odlaganje materijala • Buka i utjecaj okoliša na susjedne zgrade • Izbor izvođača radova i opreme iz regije • Natječaj za nabavu materijala i građevinskih radova: zahtijevati kriterije održivosti i uzeti u obzir certifikate
5 The building 5.1 Structure	5 Zgrada 5.1 Struktura
<ul style="list-style-type: none"> • Sustainability through compactness ('fat buildings') • Economic exteriors/ building skin, intelligent building design and zoning • The atrium as a typical feature of libraries • Using appealing sense of space to minimise space use • Minimizing the space consumption of building technology through intelligent arrangement • Minimisation of energy use through zoning of areas according to different requirements of each individual library function (with regard to climate control, lighting and acoustics) • Use of roof areas (green roofs and solar energy) • Extensive resource saving compact storage (including use in public areas) • Maintenance-friendly construction 	<ul style="list-style-type: none"> • Održivost kroz kompaktnost ('fat buildings') • Ekonomični eksterijeri / izolacija zgrade, inteligentni dizajn zgrade i prostornih zona • Atrij kao tipično obilježje knjižnice • Ušteda prostora uz osjećaj udobnosti prostora • Inteligentnim rasporedom smanjiti utrošak prostora potrebnog za građevinsku tehnologiju • Smanjenje potrošnje energije utvrđivanjem prostornih zona sukladno potrebama pojedinačnih knjižničnih funkcija (u smislu upravljanja klimom, osvjetljenjem i akustikom) • Korištenje krovnih površina (zeleni krovovi i solarna energija) • Kompaktni spremni prostor za sveobuhvatnu uštedu (uključujući i smještaj u javnim prostorima) • Lako održiva konstrukcija
5.2 Facades	5.2 Fasade
<ul style="list-style-type: none"> • Sustainable use of the facade (greening, solar energy) • Energy criteria (thermal insulation) 	<ul style="list-style-type: none"> • Održivo korištenje fasada (ozelenjivanje, solarna energija) • Kriterij energetske učinkovitosti

<ul style="list-style-type: none"> • Window installation • Structural protection from sunlight using deep lying windows • Absorbent facades (double facades) 	<p>(termička izolacija)</p> <ul style="list-style-type: none"> • Ugradnja prozora • Strukturna zaštita od sunčeve svjetlosti korištenjem uvučenih prozorskih okvira • Izolacijske fasade (duple fasade)
<p>5.3 Building materials</p> <ul style="list-style-type: none"> • Ecological quality of the materials • Materials and construction conducive to good health (non-hazardous materials) • Maintenance characteristics, building servicing • Durability/Longevity • Repairability • Ease of recycling and cleaning • Proportion of recycled material used, e. g. aluminium, steel 	<p>5.3 Građevinski materijali</p> <ul style="list-style-type: none"> • Ekološka kvaliteta materijala • Materijali i konstrukcije koji ne štete zdravlju (neopasni materijali) • Obilježja održavanja, servisiranja zgrade • Otpornost / Izdržljivost • Obnovljivost • Jednostavnost recikliranja i čišćenja • Udio upotrebe recikliranog materijala (npr. aluminija, čelika)
<p>5.4 Building climate</p> <ul style="list-style-type: none"> • Avoid major use of air-conditioning • Differentiation of the climate concept according to library function • Use of concrete: core temperature of concrete • Natural ventilation • Interior air quality: Sickbuildingsyndrome: harmful materials and gases • Re-use of air from print/copy rooms and air conditioning • Window glazing quality (thermal insulation) • Library entrance and interior climate: revolving doors, vestibules • Avoid artificial humidification • Solar protection • Structural aspects of solar protection: low-lying windows 	<p>5.4 Klima zgrade</p> <ul style="list-style-type: none"> • Izbjegavati značajniju upotrebu klimatizacijskog sustava • Diferenciranost klimatizacijskog koncepta sukladno knjižničnim funkcijama • Iskoristivost betona: jezgrene temperature betona • Prirodno prozračivanje • Kvaliteta unutarnjeg zraka: sindrom bolesne zgrade: opasni materijali i plinovi • Odvod zraka iz prostorija za printanje/kopiranje i klimatizacijskog sustava • Kvaliteta prozorskog stakla (toplinska izolacija) • Klima u ulaznom i unutarnjem dijelu knjižnice: kružna vrata i vestibuli • Izbjegavati umjetno ovlaživanje zraka • Zaštita od sunčeve svjetlosti • Strukturni aspekti zaštite od sunčeve svjetlosti: uvučeni prozorski okviri
<p>5.5 Energy, light</p> <ul style="list-style-type: none"> • Daylight/artificial light 	<p>5.5 Energija, svjetlo</p> <ul style="list-style-type: none"> • Danje svjetlo / umjetno svjetlo

<ul style="list-style-type: none"> • Power supply: proportion of electricity from renewable energy sources • Energy-efficient heating • Electricity saving – electricity generation (photovoltaics) • Make energy use visible in order to reduce usage levels: energy meters • Heat recovery • Solar or geothermics • District heating • Cooling: night cooling, the thermal activation of building structures • Heat exchangers • Ventilation: natural ventilation • Bring natural light into the building • Translucent materials for light transmission • Efficient lighting controls (control panels) • Lighting system with movement sensors • Individual light control of reading places • Electric light switches, also for reader places • Light as needed: step switching, dimmer switches • Light source (energy-efficiency, life cycle costing, recycling) • Reduction of warm water use • Use of grey and rainwater (toilets, irrigation) • Water saving features (WCs, wash basin equipment) 	<ul style="list-style-type: none"> • Izvor napona: udio električne energije dobiven iz obnovljivih izvora energije • Energetski učinkovito zagrijavanje • Ušteda električne energije – proizvodnja električne energije (fotonaponski sustav) • Iskazivanje potrošnje energije kako bi se smanjio utrošak: energija je važna • Povrat topline • Solarna ili geotermalna energija • Javna ili područna toplana • Hlađenje: noćno hlađenje, termalna aktivnost betona • Izmjenjivači topline • Prozračivanje: prirodno prozračivanje • Unos prirodnog svjetla u zgradu • Odražavajući materijali za prijenos svjetlosti • Učinkoviti upravljači za svjetlo (upravljački paneli) • Sustav osvjjetljenja sa sensorima kretanja • Pojedinačni upravljači za svjetlo na čitalačkim mjestima • Električni prekidači svjetla na čitalačkim mjestima • Svjetlo po potrebi: podni prekidači, orijentacijska rasvjeta • Izvor svjetla (energetska učinkovitost, troškovi životnog ciklusa, reciklaža) • Ušteda potrošnje tople vode • Iskoristivost sive vode i kišnice (toaleti, štednja vode za pranje ruku) • Regulatori uštede vode (WC, oprema za umivaonike)
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<p>6 Interior fittings: source, durability, cleaning capabilities, recycling</p>	<p>6 Unutarnja oprema: porijeklo, trajnost, mogućnosti čišćenja, recikliranje</p>
<ul style="list-style-type: none"> • Floor finishes and carpets • Acoustic baffles • Wood: origin, how cultivated, certificates • Library furniture • Office furniture • Eco-balance • Use of renewable and reusable materials 	<ul style="list-style-type: none"> • Podneobloge i tepisi • Akustične pregrade • Drvo: podrijetlo, uzgoj, certifikat • Knjižnični namještaj • Uredski namještaj • Eko-bilanca • Korištenje obnovljivih i recikliranih materijala
<p>7 Green information and communication technology (Green IT)</p>	<p>7 Zelena informacijska i komunikacijska tehnologija (Green IT)</p>
<ul style="list-style-type: none"> • Power consumption, production, recycling • Thin clients instead of PCs (power-saving, longer lifespan) • Remote management • Hardware certificates: "Energy Star" • Printers: power usage, use of ink • Switchable sockets for PCs and printers • Software solutions to optimize energy consumption (Stand-by) • Reduction in the use of paper, waiver for thermal paper 	<ul style="list-style-type: none"> • Potrošnja energije, proizvodnja, recikliranje • Tanki klijenti umjesto osobnih računala (ušteta energije, duži vijek trajanja) • Upravljanje na daljinu • Certifikat za hardver: „Energy Star“ • Pisači: potrošnja energije i tinte • Utičnice sa sklopkom za računala i pisače • Programska rješenja za optimizaciju potrošnje energije (Stand-by) • Smanjenje potrošnje papira, odustajanje od termo-papira
<p>8 User services</p>	<p>8 Usluge za korisnike</p>
<ul style="list-style-type: none"> • Reprographic services (scanning instead of printing), the primacy of digital, double-sided printing • Hot desking (flexible information desks usable as workplaces outside of information desk times) • Alternatives to plastic bags in the library • Library café: china not plastic, Fairtrade products etc. • Lending of 'other' non-book-materials: things not needed daily (from laptops) 	<ul style="list-style-type: none"> • Reprografske usluge (skeniranje umjesto kopiranja), prvenstveno digitalne, obostrani ispis • Višenamjenski pultovi (informacijski pultovi upotrebljivi i kao radna mjesta izvan redovitog radnog vremena pulta) • Alternativna rješenja umjesto plastičnih vrećica u knjižnici • Knjižnični kafić: porculan umjesto plastike, proizvodi „pravedne trgovine“ i sl. • Posudba „ostalih“ ne-knjižnih materijala: stvari koje nisu u

to garden tools)	svakodnevnoj upotrebi (od prijenosnih računala do vrtnog alata)
9 Library management	9 Upravljanje knjižnicom
9.1 Environmental management certificates (ISO 14000)	9.1. Certifikati za upravljanje okolišem (ISO 14000)
<ul style="list-style-type: none"> Motivated and involved employees Legal compliance Continual improvement Responsibility for sustainable goals Transparency of cost and use Competitive advantage 	<ul style="list-style-type: none"> Motivirani i angažirani zaposlenici Pravna usklađenost Trajno napredovanje Odgovornost za ciljeve održivosti Transparentnost cijene koštanja i potrošnje Konkurentna prednost
9.2 Facilities management	9.2 Upravljanje objektima
<ul style="list-style-type: none"> Waste separation and recycling Cleaning firms Cleaning materials: economic usage Cleaning ("Green Cleaning": floors, sanitary facilities) Avoidance of chemical products for cleaning the building Use of non-toxic, water-based rather than oilbased, products; perfume-free, biodegradable Sanitary supplies (towels, etc.) Recycling of containers and packaging Recycling of batteries, electrical devices and components Noise during cleaning routines – vacuum cleaning Lightbulb use Lightbulb recycling: fluorescent and energy saving lamps, also LED 	<ul style="list-style-type: none"> Odvajanje otpada i recikliranje Tvrtke za čišćenje Sredstva za čišćenje: ekonomična upotreba Čišćenje („Green Cleaning“: podovi, sanitarije) Izbjegavanje kemijskih sredstava za čišćenje zgrade Korištenje netoksičnih proizvoda, radije na bazi vode nego na bazi nafte, korištenje bezmirisnih i biorazgradivih proizvoda Sanitarni potrošni materijal (ručnici, i sl.) Recikliranje ambalaže Recikliranje baterija, električnih uređaja i komponenti Buka tijekom čišćenja (usisavanje) Upotreba sijalica Recikliranje sijalica: fluorescentne i štedne sijalice, također i LED
9.3 The green library office	9.3 Zeleni knjižnični ured
<ul style="list-style-type: none"> Green procurement Greenshipping Use of local bookbinders (CO₂ balance re transport) Office supplies and equipment (origin, energy consumption, recycling) Local suppliers 	<ul style="list-style-type: none"> Zelena nabava Zelena otprema i dostava pošiljaka Korištenje lokalnih knjigovežnica (CO₂bilancatransporta) Uredski materijal i oprema (podrijetlo, energetska potrošnja, recikliranje) Lokalni dobavljači

<ul style="list-style-type: none"> • Certified suppliers • Book suppliers and delivery (CO₂ balance, packing materials) • Hot-desking • Reduction in use of paper • Digital archiving • Green office supplies • Waste reduction and separation of waste (paper, plastic, glass, batteries, digital storage media) • Recycling printer cartridges • Avoidance of products with poisonous, harmful, or difficult to recycle contents • Heating that can be turned down during periods of absence • Staff kitchens: energy-saving electrical appliances, energy-efficient hot water production, fairtrade products etc. • Awareness training for employees 	<ul style="list-style-type: none"> • Certificirani dobavljači • Dobavljači knjiga i dostavljači (CO₂bilanca, materijali za pakiranje) • Višenamjenskipult(Desk shering) • Smanjenje potrošnje papira • Digitalno arhiviranje • Zeleni uredski potrošni materijal • Smanjenje količine otpada i odvajanje otpada (papir, plastika, staklo, baterije, digitalni mediji za pohranu) • Recikliranje tonera za pisače • Izbjegavanje proizvoda s otrovnim, opasnim ili drugim sastojcima koje nije lako reciklirati • Grijanje koje se može isključiti za vrijeme odsutnosti • Kuhinja za zaposlenike: štedljivi električni aparati, štedljivo i učinkovito zagrijavanje vode, proizvodi „pravedne trgovine“ i sl. • Podizanje svijesti i edukacija zaposlenika
<p>10 Strategic goals</p>	<p>10 Strateški ciljevi</p>
<ul style="list-style-type: none"> • Transparency of energy costs: transparency creates savings • Controlling for reducing • Agreed targets for energy saving • Reward and incentive schemes • Influencing business partners (publishers, booksellers, suppliers) • Addressing new target audiences • Strategic partnerships 	<ul style="list-style-type: none"> • Transparentnost troškova energije: transparentnost je put do uštede! • Kontrolom do smanjivanja troškova • Zacrtni ciljevi za uštedu energije • Nagrade i poticaji • Utjecaj na poslovne partnere (izdavači, knjižari, dobavljači) • Apeliranje na nove ciljane skupine • Strateška partnerstva
<p>11 Marketing and PR</p>	<p>11 Marketing i odnosi s javnošću</p>
<ul style="list-style-type: none"> • Sustainability and corporate identity • Motto: "A green image is a good image" • Libraries should lead by example (proactive and exemplary) • Win library customers/users over to sustainability • Win wider stakeholders over to sustainability (supporting/funding agencies, Friends of the Library etc.) 	<ul style="list-style-type: none"> • Održivost i korporativni identitet • Moto: „Zeleni image je dobar image“ • Knjižnice moraju biti vodeći primjer (proaktivne i uzorne) • Pridobiti knjižnične korisnike za strategiju održivosti • Pridobiti za strategiju održivosti šire zainteresirane snage (donatore, agencije za financijere, Prijatelje knjižnica itd.)

<ul style="list-style-type: none"> • High multiplier effect • The energy performance certificate displayed at the library entrance (PR) • PR with and for the ecological activities of the library • Co-operation with sponsor initiatives • Environmental news e.g. a green section in annual reports 	<ul style="list-style-type: none"> • Visok multiplikativni učinak • Energetski certifikat izložiti na ulazu u knjižnicu (PR) • PR s ekološkim aktivnostima knjižnice i za njih • Suradnja pri inicijativama nositelja projekta • Novosti o održivosti okoliša kao npr. zeleni odjeljak ili poglavlje u godišnjim izvješćima
12 Certificates 12.1 Green building certificates	12 Certifikati 12.1 Certifikati - Zelena zgrada
<ul style="list-style-type: none"> • LEED (US standard)³ • BREEAM (UK standard)⁴ • Green Star Rating System⁵ • DGNB Deutsches Gütesiegel Nachhaltiges Bauen e.V.⁶ • Energieausweis nach EnEV⁷ • European Energy Award®⁸ • Solarbundesliga⁹ 	<ul style="list-style-type: none"> • LEED (SAD standard)² • BREEAM (UK standard)³ • Green Star Rating System⁴ • DGNB Deutsches Gutesiegel Nachhaltiges bauen e.V.⁵ • Energieausweis nach EnEV⁶ • European Energy Award®⁷ • Solarbundesliga⁸
12.2 Environmental management	12.2 Upravljanje okolišem
<ul style="list-style-type: none"> • ISO 14000 (commercial, international, without legal nature)¹⁰ • EMAS (Eco-Management and Audit Scheme) of the EU¹¹ 	<ul style="list-style-type: none"> • ISO 14000 (komercijalne, međunarodne, bez pravne naravi)⁹ • EMAS (Eco-Management i Audit Scheme) tj. sustav upravljanja okolišem u EU¹⁰
12.3 Product certificates	12.3 Certifikati za proizvode
<ul style="list-style-type: none"> • Gütesiegel für Papier (FSC¹², PEFC¹³, IPR¹⁴ u. a.) • Der Blaue Engel¹⁵ 	

³ <http://new.usgbc.org/leed> (2013/2/19).

⁴ www.breeam.org/ (2013/2/19).

⁵ www.gbca.org.au/green-star/rating-tools/ (2013/2/19).

⁶ www.dgnb.de/(2013/2/19).

⁷ www.enev-online.de/ (2013/2/19).

⁸ www.european-energy-award.org (2013/2/19).

⁹ www.solarbundesliga.de (2013/2/19).

¹⁰ www.iso.org/iso/home/standards/management-standards/iso14000.htm (2013/2/19).

¹¹ www.emas.de/ (2013/2/19).

¹² www.fsc-papier.de/ (2013/2/19).

¹³ www.deutsche-papier.de/de/pefc.html (2013/2/19).

¹⁴ www.initiative-papier.de/ (2013/2/19).

¹⁵ www.blauer-engel.de (2013/2/19).

<ul style="list-style-type: none"> • EU Energy Star¹⁶ • etc. • According to specifically German product certificates there are national product certificates in many other countries. 	<ul style="list-style-type: none"> • Sukladno specifičnim njemačkim certifikatima za proizvode postoje i nacionalni certifikati za proizvode u mnogim drugim zemljama
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¹⁶ www.eu-energystar.org/ (2013/12/30).