

D2.1 Benchmarking Analysis of the clusters' current situation



This Project Report was funded by the European Union's COSME Programme.

Research work was published as a part of an international project co-financed from the programme of the Minister of Science and Higher Education entitled "PMW" in years 2020-2022; Grant Agreement no. 5097/COSME/2020/2.

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| Project | Strengthening clusters Management Activities and Running Trans-national for implementation of nearly Zero Energy Buildings – SMART4NZEB |
| Grant Agreement No. | 874425 |
| Version | 1.0 |
| Date | 30/07/2020 |
| Work Package (WP) | 2 |
| Task / Deliverable | D2.1 Benchmarking Analysis of the clusters' current situation |
| Work Package Leader | DUNDJER |
| Dissemination level | Internal (Only for SMART4NZEB Consortium Members) |
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| Reviewers | PRO-NZEB |
| Abstract | The document lays out (1) the outcome of activities carried out by all partners under WP2 in regard to the "Benchmarking Analysis of the clusters' current situation", including the associated specific "Individual Development Sheets" (IDS), as the main part of this deliverable. It also includes (2) some key findings of the "SWOT Analysis of target market for nZEB" in the participating countries, as these analyses should be read in conjunction with the IDS in future activities under this project. |
| Keywords | Benchmarking, SWOT, analysis |

History of Changes

| Version | Author(s) | Date | Summary of Changes |
|---------|-------------------|--------------|--|
| 1.0 | Biljana Avramovic | 30 July 2020 | First version (based on info provided by partners and relevant findings under WP2) |

Review History

| Reviewed by | Date | Summary of comments |
|----------------|--------------|--------------------------------------|
| Andrei Popescu | 31 July 2020 | Minor changes made before submission |

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1. Introduction

1.1 SMART4NZEB project

The aim of the SMART4NZEB project is to boost competitiveness and support the scaling-up of 577 SMEs active in construction, energy efficiency and renewable energy sectors through strengthening capacity-building of 5 representative clusters as drivers of innovation in Central and Eastern Europe (Poland, Romania, Serbia and Slovenia) and facilitating trans-national exchanges and strategic partnerships with a focus on sharing experience between different practices, skills gaps, policies, target goals and level of engagement related to nearly Zero Energy Buildings (nZEB).

The main objective of SMART4NZEB is to create a sustainable collaboration, co-learning and capacity building between the involved partners - cluster managers and cluster members and relevant stakeholders representative for the nZEB market in the selected Central and East-European countries, with a view to develop the involved clusters management excellence and to support interregional partnerships to facilitate the development of competitive products and technological solutions intended for new and existing buildings, which will lead to market penetration of nearly zero energy buildings, related to their production, use and reuse. The objective is to drive clusters towards innovative and modern clusters being able to address cross-sectoral and cross border

1.2 WP2

Objectives

This WP, mostly through the Benchmarking Analysis of the clusters' current situation represents the base of the project and its results will help the development of the most important activities of the project: implementation of a training and coaching programme, review/elaboration of clusters' development strategies, implementation of a ClusterXchange Programme and definition and implementation of a communication and dissemination campaign.

Also, the WP includes a SWOT Analysis of target market for nZEB and an Evaluation of clusters for Cluster Management Excellence certification in order to obtain five Bronze labels.

1.3 Aim of the document

The main objectives of the document are to:

- Evaluate the clusters' current situation in order to adjust their strategies in terms of innovation, internationalization, enhancing managers skills and growth potential;
- Evaluate the clusters' management performance for obtaining Cluster Management Excellence certification;
- Make recommendations for future development of the clusters;
- Gather relevant information for development of the other project activities (training, strategies, ClusterXchange, communication and dissemination).

2. Benchmarking Analysis of the clusters' current situation

Each cluster has been analyzed based on common evaluation criteria using benchmarking as a tool. For this, a questionnaire produced by the work package leader has been filled in by all project partnering clusters in order to identify the specifics of each cluster and to underline the strengths and / or potential areas for improvement that can be sought in their future activities. The Questionnaire is a tool for understanding the status of the clusters and the questionnaires filled in by the project partners can be used as Individual Development Sheets (**IDS**). More specifically:

- (1) if the response is “yes” (3 points attributed for overall assessment), then no action is required unless detailed areas for improvement are further defined by project partners;
- (2) if the response is “partly” (2 points) or “no” (0 points) and if applicable for the specifics of the cluster, the item concerned is taken into account as “recommendation for improvement” during the elaboration / implementation of the training and coaching programs, when reviewing the development and innovation strategies and / or for any other relevant activities.

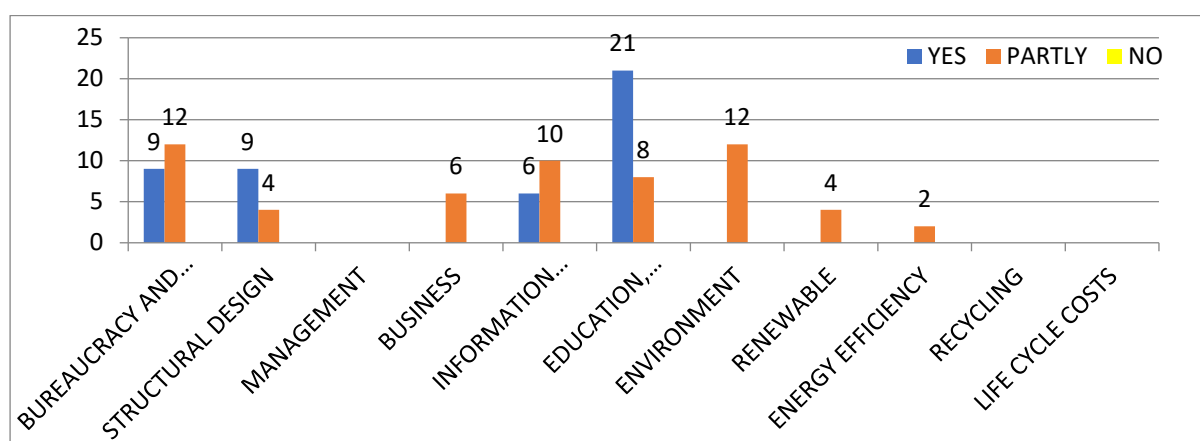
2.1 BENCHMARKING PROnZEB Romania

| QUESTIONNAIRE / IDS | | | |
|---|-----|--------|----|
| BUREAUCRACY AND STAFF | YES | PARTLY | NO |
| 1. Is your cluster Institutionalized? | 3 | | |
| 2. Have you adopted cluster legal acts? | 3 | | |
| 3. Have you established cluster bodies, sectors, boards, staff? | 3 | | |
| - Do you have a Board for research and development? | | 2 | |
| - Do you have a Board for export promotion? | | | 0 |
| - Do you have a Board for finance? | | | 0 |
| - Do you have a Board for marketing? | | 2 | |
| - Do you have a Board for education? | | 2 | |
| - Do you have a Board for international cooperation? | | 2 | |
| - Do you have a Board for information systems? | | | 0 |
| - Do you have a Board for state institutions relations? | | 2 | |
| 4. Does your cluster provide ON LINE Services (Business, Technical, Legal, Financial, Expert consultations) | | | 0 |
| 5. Have you established united bookkeeping? | | | 0 |
| 6. Have you established united or shared transportation? | | | 0 |
| 7. Have you established united suppliers and services? | | | 0 |
| 8. Have you established united or shared marketing? | | | 0 |
| 9. Is your Cluster well equipped? | | 2 | |
| 10. Have you established Legal Support (advocacy in Construction Law - Local and International – FIDIC)? | | | 0 |
| 11. Do you have memberships in national and international professional associations? | | | 0 |

| QUESTIONNAIRE / IDS | | | |
|---|------------|---------------|-----------|
| STRUCTURAL DESIGN | YES | PARTLY | NO |
| 1. Do you have collaboration between Specialized Design Bureaus? | | | |
| § Architecture (interior, urban, landscape) | 3 | | |
| § Statics | 3 | | |
| § Installations | 3 | | |
| § Computer design and animation | | | 0 |
| 2. Are you implementing Energy efficiency? | | 2 | |
| 3. Do you implement IT technology into residential and business buildings (internet, satellite)? | | | 0 |
| 4. Are you implementing Environmental engineering? | | | 0 |
| 5. Are you implementing Renewable energy sources (solar energy, heat pumps, rainwater)? | | 2 | |
| 6. Are you implementing Circular Economy? | | | 0 |
| 7. Are you implementing Recycling in construction industry? | | | 0 |
| MANAGEMENT | YES | PARTLY | NO |
| Do you use any software for project management? | | | 0 |
| § MS Project | | | 0 |
| § Nemetscheck My Office | | | 0 |
| § Primavera | | | 0 |
| § ERP | | | 0 |
| 1. Do you use SAP software for: Work organization, material control, manpower, time consumption, site management, work process and technical documentation (logbook)? | | | 0 |
| 2. Do you have experience with smart house design – SCADA, MSC... | | | 0 |
| 3. Do you have experience in Implementation of Building SMART (Building Information Modelling) | | | 0 |
| 4. Have you implemented ISO standards? | | | 0 |
| 5. Have you implemented Risk assessment? | | | 0 |
| 6. Have you implemented Maintenance of building facilities? | | | 0 |
| 7. Have you implemented OPEN HOUSE methodology? | | | 0 |
| BUSINESS | YES | PARTLY | NO |
| 1. Do you have representative offices in other cities? | | | 0 |
| 2. Do you have representative offices abroad? | | | 0 |
| 3. Are you competing for the most favorable credit conditions with banks for cluster members? | | | 0 |
| 4. Do you have an organized appearance before state bodies and institutions? | | 2 | |
| 5. Have you established public-private partnership? | | 2 | |
| 6. Are you finding sustainable sources of financing (EBRD, MMF, WB, EU funds)? | | 2 | |
| INFORMATION SYSTEM | YES | PARTLY | NO |
| 1. Do you have a Cluster website? | 3 | | |

| QUESTIONNAIRE / IDS | | | |
|---|------------|---------------|-----------|
| 2. Do you have a Page at Social Media (Twitter, FB, LinkedIn)? | 3 | | |
| 3. Do you have websites for all cluster members? | | | 0 |
| 4. Do you have a databases of: | | | |
| - Civil engineers | | 2 | |
| - Available workforce | | 2 | |
| - Building Materials | | 2 | |
| - Project bureaus | | 2 | |
| - Building Organizations | | 2 | |
| - Building Equipment (mechanization) | | | 0 |
| - Capital | | | 0 |
| - Residential and business real estate offers | | | 0 |
| 5. Do you have a digital map of region with locations for construction | | | 0 |
| 6. Do you have a real-time placement of cameras on construction sites | | | 0 |
| EDUCATION, TRAINING, R&D, INNOVATIONS | YES | PARTLY | NO |
| 1. Do you implement continuously R&D, education, and innovation in new technologies for cluster members | 3 | | |
| 2. Have you accomplished R&D projects in last 12 months | 3 | | |
| 3. Have you implemented trainings for basic skills in construction | 3 | | |
| 4. Have you experience in Distance learning in last 12 months | | | 0 |
| 5. Have you experience in Dual education in last 12 months | | | 0 |
| 6. Have you implemented Expert trainings in last 12 months | 3 | | |
| 7. Have you experience in Software training and development | | | 0 |
| 8. Have you organized Scholarships for cluster members | | | 0 |
| 9. Have you experience in Contracting (FIDIC) in last 12 months | | | 0 |
| 10. Have you organized international Conferences in last 12 months | | 2 | |
| 11. Have you organized Professional meetings in last 12 months | 3 | | |
| 12. Have you organized B2B meetings in last 12 months | 3 | | |
| 13. Have you organized Symposiums in last 12 months | | 2 | |
| 14. Have you organized Building Fairs in last 12 months | | | 0 |
| 15. Have you published papers in last 12 months | | 2 | |
| 16. Have you established collaboration with R&D institutions | 3 | | |
| 17. Have you experience in Lifelong education in last 12 months | | 2 | |
| DO YOU RESPECT FOLLOWING CRITERIA DURING THE DESIGN AND CONSTRUCTION PROCESS? | | | |
| ENVIRONMENT | YES | PARTLY | NO |
| 1. Global Warming Potential (GWP) | | 2 | |
| 2. Ozone Depletion Potential (ODP) | | | 0 |
| 3. Acidification Potential (AP) | | | 0 |
| 4. Eutrophication Potential (EP) | | | 0 |
| 5. Photochemical Ozone Creation Potential (POCP) | | | 0 |

| QUESTIONNAIRE / IDS | | | |
|---|-----|--------|----|
| 6. Risk from Materials | | | 0 |
| 7. Biodiversity and Depletion of Habitats | | | 0 |
| 8. Light Pollution | | | 0 |
| 9. Land Use | | | 0 |
| 10. Indoor Air Quality | | 2 | |
| 11. Water Quality | | | 0 |
| 12. Acoustic Comfort | | 2 | |
| 13. Visual Comfort | | 2 | |
| 14. Electro Magnetic Pollution | | | 0 |
| 15. Noise from Building and Site | | | 0 |
| 16. Responsible Material Sourcing | | | 0 |
| 17. Local Material | | 2 | |
| 18. Noise Protection | | 2 | |
| RENEWABLE | | | |
| | YES | PARTLY | NO |
| 1. Non-Renewable Primary Energy Demand (PE _{nr}) | | 2 | |
| 2. Total Primary Energy Demand and Percentage of Renewable Primary Energy | | 2 | |
| 3. Water and Waste Water | | | 0 |
| ENERGY EFFICIENCY | | | |
| | YES | PARTLY | NO |
| 1. Energy Efficiency of Building Equipment (lifts, escalators) | | | 0 |
| 2. Quality of the building shell | | 2 | |
| RECYCLING | | | |
| | YES | PARTLY | NO |
| 1. Waste treatment | | | 0 |
| 2. Ease of Deconstruction, Recycling, and Dismantling | | | 0 |
| LIFE CYCLE COSTS | | | |
| | YES | PARTLY | NO |
| 1. Building-related Life Cycle Costs (LCC) | | | 0 |



2.2 BENCHMARKING PSDik Poland

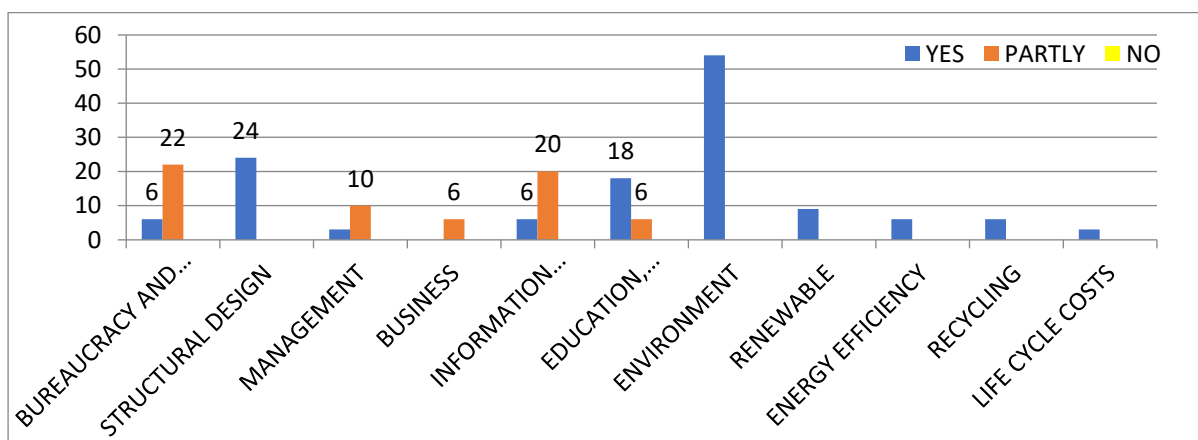
| QUESTIONNAIRE / IDS | | PSDik Poland | | |
|-----------------------|------------------------------------|--------------|--------|----|
| BUREAUCRACY AND STAFF | | YES | PARTLY | NO |
| 1. | Is your cluster Institutionalized? | | 2 | |

| QUESTIONNAIRE / IDS | PSDik Poland | | |
|---|--------------|---------------|-----------|
| 2. Have you adopted cluster legal acts? | 3 | | |
| 3. Have you established cluster bodies, sectors, boards, staff? | | 2 | |
| - Do you have a Board for research and development? | | 2 | |
| - Do you have a Board for export promotion? | | 2 | |
| - Do you have a Board for finance? | | 2 | |
| - Do you have a Board for marketing? | | 2 | |
| - Do you have a Board for education? | | 2 | |
| - Do you have a Board for international cooperation? | | 2 | |
| - Do you have a Board for information systems? | | | 0 |
| - Do you have a Board for state institutions relations? | | 2 | |
| 4. Does your cluster provide ON LINE Services (Business, Technical, Legal, Financial, Expert consultations) | | | 0 |
| 5. Have you established united bookkeeping? | 3 | | |
| 6. Have you established united or shared transportation? | | | 0 |
| 7. Have you established united suppliers and services? | | | 0 |
| 8. Have you established united or shared marketing? | | | 0 |
| 9. Is your Cluster well equipped? | | 2 | |
| 10. Have you established Legal Support (advocacy in Construction Law - Local and International – FIDIC)? | | | 0 |
| 11. Do you have memberships in national and international professional associations? | | 2 | |
| STRUCTURAL DESIGN | YES | PARTLY | NO |
| 1. Do you have collaboration between Specialized Design Bureaus? | | | |
| § Architecture (interior, urban, landscape) | 3 | | |
| § Statics | | | 0 |
| § Installations | 3 | | |
| § Computer design and animation | | | 0 |
| 2. Are you implementing Energy efficiency? | 3 | | |
| 3. Do you implement IT technology into residential and business buildings (internet, satellite)? | 3 | | |
| 4. Are you implementing Environmental engineering? | 3 | | |
| 5. Are you implementing Renewable energy sources (solar energy, heat pumps, rainwater)? | 3 | | |
| 6. Are you implementing Circular Economy? | 3 | | |
| 7. Are you implementing Recycling in construction industry? | 3 | | |
| MANAGEMENT | YES | PARTLY | NO |
| Do you use any software for project management? | | 2 | |
| § MS Project | | | 0 |
| § Nemetscheck My Office | | | 0 |
| § Primavera | | | 0 |
| § ERP | | | 0 |
| 1. Do you use SAP software for: Work organization, material control, manpower, time consumption, site management, work process and technical documentation (logbook)? | | | 0 |

| QUESTIONNAIRE / IDS | PSDik Poland | | |
|---|--------------|--------|----|
| 2. Do you have experience with smart house design – SCADA, MSC... | | 2 | |
| 3. Do you have experience in Implementation of Building SMART (Building Information Modelling) | | 2 | |
| 4. Have you implemented ISO standards? | 3 | | |
| 5. Have you implemented Risk assessment? | | 2 | |
| 6. Have you implemented Maintenance of building facilities? | | 2 | |
| 7. Have you implemented OPEN HOUSE methodology? | | | 0 |
| BUSINESS | YES | PARTLY | NO |
| 1. Do you have representative offices in other cities? | | | 0 |
| 2. Do you have representative offices abroad? | | | 0 |
| 3. Are you competing for the most favorable credit conditions with banks for cluster members? | | 2 | |
| 4. Do you have an organized appearance before state bodies and institutions? | | 2 | |
| 5. Have you established public-private partnership? | | | 0 |
| 6. Are you finding sustainable sources of financing (EBRD, MMF, WB, EU funds)? | | 2 | |
| INFORMATION SYSTEM | YES | PARTLY | NO |
| 1. Do you have a Cluster website? | 3 | | |
| 2. Do you have a Page at Social Media (Twitter, FB, LinkedIN)? | | 2 | |
| 3. Do you have websites for all cluster members? | 3 | | |
| 4. Do you have a databases of: | | 2 | |
| - Civil engineers | | 2 | |
| - Available workforce | | 2 | |
| - Building Materials | | 2 | |
| - Project bureaus | | 2 | |
| - Building Organizations | | 2 | |
| - Building Equipment (mechanization) | | 2 | |
| - Capital | | 2 | |
| - Residential and business real estate offers | | 2 | |
| 5. Do you have a digital map of region with locations for construction | | | 0 |
| 6. Do you have a real-time placement of cameras on construction sites | | | 0 |
| EDUCATION, TRAINING, R&D, INNOVATIONS | YES | PARTLY | NO |
| 1. Do you implement continuously R&D, education, and innovation in new technologies for cluster members | | 2 | |
| 2. Have you accomplished R&D projects in last 12 months | 3 | | |
| 3. Have you implemented trainings for basic skills in construction | 3 | | |
| 4. Have you experience in Distance learning in last 12 months | | | 0 |
| 5. Have you experience in Dual education in last 12 months | | 2 | |
| 6. Have you implemented Expert trainings in last 12 months | | | 0 |

| QUESTIONNAIRE / IDS | PSDik Poland | | |
|---|--------------|--------|----|
| 7. Have you experience in Software training and development | | | 0 |
| 8. Have you organized Scholarships for cluster members | | | 0 |
| 9. Have you experience in Contracting (FIDIC) in last 12 months | | | 0 |
| 10. Have you organized international Conferences in last 12 months | | | 0 |
| 11. Have you organized Professional meetings in last 12 months | 3 | | |
| 12. Have you organized B2B meetings in last 12 months | 3 | | |
| 13. Have you organized Symposiums in last 12 months | | | 0 |
| 14. Have you organized Building Fairs in last 12 months | | 2 | |
| 15. Have you published papers in last 12 months | 3 | | |
| 16. Have you established collaboration with R&D institutions | 3 | | |
| 17. Have you experience in Lifelong education in last 12 months | | | 0 |
| DO YOU RESPECT FOLLOWING CRITERIA DURING THE DESIGN AND CONSTRUCTION PROCESS? | | | |
| ENVIRONMENT | YES | PARTLY | NO |
| 1. Global Warming Potential (GWP) | 3 | | |
| 2. Ozone Depletion Potential (ODP) | 3 | | |
| 3. Acidification Potential (AP) | 3 | | |
| 4. Eutrophication Potential (EP) | 3 | | |
| 5. Photochemical Ozone Creation Potential (POCP) | 3 | | |
| 6. Risk from Materials | 3 | | |
| 7. Biodiversity and Depletion of Habitats | 3 | | |
| 8. Light Pollution | 3 | | |
| 9. Land Use | 3 | | |
| 10. Indoor Air Quality | 3 | | |
| 11. Water Quality | 3 | | |
| 12. Acoustic Comfort | 3 | | |
| 13. Visual Comfort | 3 | | |
| 14. Electro Magnetic Pollution | 3 | | |
| 15. Noise from Building and Site | 3 | | |
| 16. Responsible Material Sourcing | 3 | | |
| 17. Local Material | 3 | | |
| 18. Noise Protection | 3 | | |
| RENEWABLE | YES | PARTLY | NO |
| 1. Non-Renewable Primary Energy Demand (PE _{nr}) | 3 | | |
| 2. Total Primary Energy Demand and Percentage of Renewable Primary Energy | 3 | | |
| 3. Water and Waste Water | 3 | | |
| ENERGY EFFICIENCY | YES | PARTLY | NO |
| 1. Energy Efficiency of Building Equipment (lifts, escalators) | 3 | | |
| 2. Quality of the building shell | 3 | | |
| RECYCLING | YES | PARTLY | NO |
| 1. Waste treatment | 3 | | |
| 2. Ease of Deconstruction, Recycling, and Dismantling | 3 | | |

| QUESTIONNAIRE / IDS | PSDik Poland | | |
|--|--------------|--------|----|
| LIFE CYCLE COSTS | YES | PARTLY | NO |
| 1. Building-related Life Cycle Costs (LCC) | 3 | | |



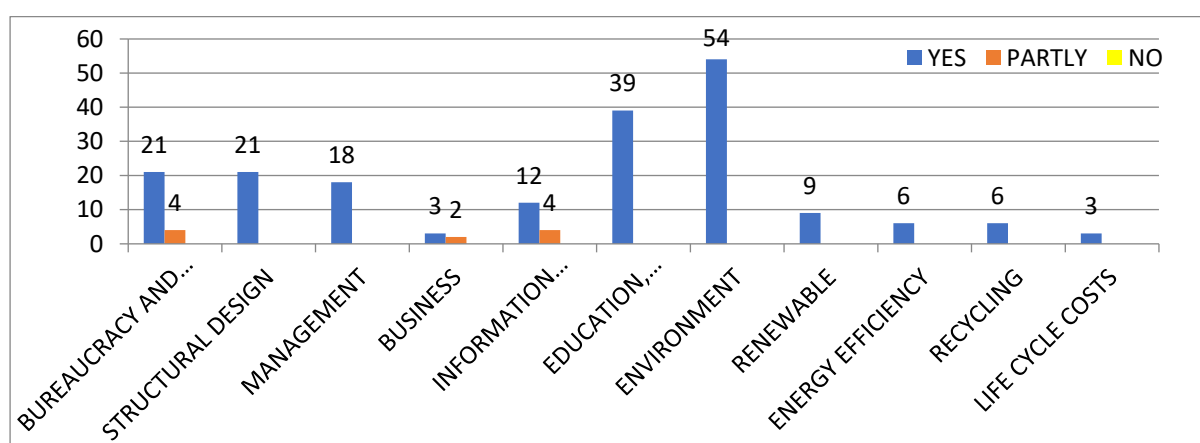
2.3 BENCHMARKING PRO-Akademia Poland

| QUESTIONNAIRE / IDS | Pro-Akademia Poland | | |
|---|---------------------|--------|----|
| BUREAUCRACY AND STAFF | YES | PARTLY | NO |
| 1. Is your cluster Institutionalized? | | | 0 |
| 2. Have you adopted cluster legal acts? | 3 | | |
| 3. Have you established cluster bodies, sectors, boards, staff? | 3 | | |
| - Do you have a Board for research and development? | 3 | | |
| - Do you have a Board for export promotion? | | | 0 |
| - Do you have a Board for finance? | | | 0 |
| - Do you have a Board for marketing? | 3 | | |
| - Do you have a Board for education? | 3 | | |
| - Do you have a Board for international cooperation? | 3 | | |
| - Do you have a Board for information systems? | | | 0 |
| - Do you have a Board for state institutions relations? | | | 0 |
| 4. Does your cluster provide ON LINE Services (Business, Technical, Legal, Financial, Expert consultations) | | 2 | |
| 5. Have you established united bookkeeping? | | | 0 |
| 6. Have you established united or shared transportation? | | | 0 |
| 7. Have you established united suppliers and services? | | | 0 |
| 8. Have you established united or shared marketing? | | | |
| 9. Is your Cluster well equipped? | | 2 | |
| 10. Have you established Legal Support (advocacy in Construction Law - Local and International – FIDIC)? | | | 0 |
| 11. Do you have memberships in national and international professional associations? | 3 | | |
| STRUCTURAL DESIGN | YES | PARTLY | NO |
| 1. Do you have collaboration between Specialized Design Bureaus? | | | |
| § Architecture (interior, urban, landscape) | 3 | | |

| QUESTIONNAIRE / IDS | Pro-Akademia Poland | | |
|---|---------------------|---------------|-----------|
| | | | |
| § Statics | | | 0 |
| § Installations | 3 | | |
| § Computer design and animation | | | 0 |
| 2. Are you implementing Energy efficiency? | 3 | | |
| 3. Do you implement IT technology into residential and business buildings (internet, satellite)? | 3 | | |
| 4. Are you implementing Environmental engineering? | 3 | | |
| 5. Are you implementing Renewable energy sources (solar energy, heat pumps, rainwater)? | 3 | | |
| 6. Are you implementing Circular Economy? | 3 | | |
| 7. Are you implementing Recycling in construction industry? | | | 0 |
| MANAGEMENT | YES | PARTLY | NO |
| Do you use any software for project management? | 3 | | |
| § MS Project | 3 | | |
| § Nemetscheck My Office | | | 0 |
| § Primavera | | | 0 |
| § ERP | | | 0 |
| 1. Do you use SAP software for: Work organization, material control, manpower, time consumption, site management, work process and technical documentation (logbook)? | | | 0 |
| 2. Do you have experience with smart house design – SCADA, MSC... | | | 0 |
| 3. Do you have experience in Implementation of Building SMART (Building Information Modelling) | 3 | | |
| 4. Have you implemented ISO standards? | 3 | | |
| 5. Have you implemented Risk assessment? | 3 | | |
| 6. Have you implemented Maintenance of building facilities? | 3 | | |
| 7. Have you implemented OPEN HOUSE methodology? | | | 0 |
| BUSINESS | YES | PARTLY | NO |
| 1. Do you have representative offices in other cities? | | | 0 |
| 2. Do you have representative offices abroad? | | | 0 |
| 3. Are you competing for the most favorable credit conditions with banks for cluster members? | | | 0 |
| 4. Do you have an organized appearance before state bodies and institutions? | | | 0 |
| 5. Have you established public-private partnership? | | 2 | |
| 6. Are you finding sustainable sources of financing (EBRD, MMF, WB, EU funds)? | 3 | | |
| INFORMATION SYSTEM | YES | PARTLY | NO |
| 1. Do you have a Cluster website? | 3 | | |
| 2. Do you have a Page at Social Media (Twitter, FB, LinkedIn)? | 3 | | |
| 3. Do you have websites for all cluster members? | | 2 | |

| QUESTIONNAIRE / IDS | Pro-Akademia Poland | | |
|---|---------------------|---------------|-----------|
| 4. Do you have a databases of: | 3 | | |
| - Civil engineers | | | 0 |
| - Available workforce | | | 0 |
| - Building Materials | | | 0 |
| - Project bureaus | 3 | | |
| - Building Organizations | | | 0 |
| - Building Equipment (mechanization) | | 2 | |
| - Capital | | | 0 |
| - Residential and business real estate offers | | | 0 |
| 5. Do you have a digital map of region with locations for construction | | | 0 |
| 6. Do you have a real-time placement of cameras on construction sites | | | 0 |
| EDUCATION, TRAINING, R&D, INNOVATIONS | YES | PARTLY | NO |
| 1. Do you implement continuously R&D, education, and innovation in new technologies for cluster members | 3 | | |
| 2. Have you accomplished R&D projects in last 12 months | 3 | | |
| 3. Have you implemented trainings for basic skills in construction | | | 0 |
| 4. Have you experience in Distance learning in last 12 months | 3 | | |
| 5. Have you experience in Dual education in last 12 months | 3 | | |
| 6. Have you implemented Expert trainings in last 12 months | 3 | | |
| 7. Have you experience in Software training and development | | | 0 |
| 8. Have you organized Scholarships for cluster members | 3 | | |
| 9. Have you experience in Contracting (FIDIC) in last 12 months | | | 0 |
| 10. Have you organized international Conferences in last 12 months | 3 | | |
| 11. Have you organized Professional meetings in last 12 months | 3 | | |
| 12. Have you organized B2B meetings in last 12 months | 3 | | |
| 13. Have you organized Symposiums in last 12 months | 3 | | |
| 14. Have you organized Building Fairs in last 12 months | | | 0 |
| 15. Have you published papers in last 12 months | 3 | | |
| 16. Have you established collaboration with R&D institutions | 3 | | |
| 17. Have you experience in Lifelong education in last 12 months | 3 | | |
| DO YOU RESPECT FOLLOWING CRITERIA DURING THE DESIGN AND CONSTRUCTION PROCESS? | | | |
| ENVIRONMENT | YES | PARTLY | NO |
| 1. Global Warming Potential (GWP) | 3 | | |
| 2. Ozone Depletion Potential (ODP) | 3 | | |
| 3. Acidification Potential (AP) | 3 | | |
| 4. Eutrophication Potential (EP) | 3 | | |
| 5. Photochemical Ozone Creation Potential (POCP) | 3 | | |
| 6. Risk from Materials | 3 | | |
| 7. Biodiversity and Depletion of Habitats | 3 | | |

| QUESTIONNAIRE / IDS | Pro-Akademia Poland | | |
|---|---------------------|--------|----|
| 8. Light Pollution | 3 | | |
| 9. Land Use | 3 | | |
| 10. Indoor Air Quality | 3 | | |
| 11. Water Quality | 3 | | |
| 12. Acoustic Comfort | 3 | | |
| 13. Visual Comfort | 3 | | |
| 14. Electro Magnetic Pollution | 3 | | |
| 15. Noise from Building and Site | 3 | | |
| 16. Responsible Material Sourcing | 3 | | |
| 17. Local Material | 3 | | |
| 18. Noise Protection | 3 | | |
| RENEWABLE | YES | PARTLY | NO |
| 1. Non-Renewable Primary Energy Demand (PEnr) | 3 | | |
| 2. Total Primary Energy Demand and Percentage of Renewable Primary Energy | 3 | | |
| 3. Water and Waste Water | 3 | | |
| ENERGY EFFICIENCY | YES | PARTLY | NO |
| 1. Energy Efficiency of Building Equipment (lifts, escalators) | 3 | | |
| 2. Quality of the building shell | 3 | | |
| RECYCLING | YES | PARTLY | NO |
| 1. Waste treatment | 3 | | |
| 2. Ease of Deconstruction, Recycling, and Dismantling | 3 | | |
| LIFE CYCLE COSTS | YES | PARTLY | NO |
| 1. Building-related Life Cycle Costs (LCC) | 3 | | |



2.4 BENCHMARKING DUNDJER Serbia

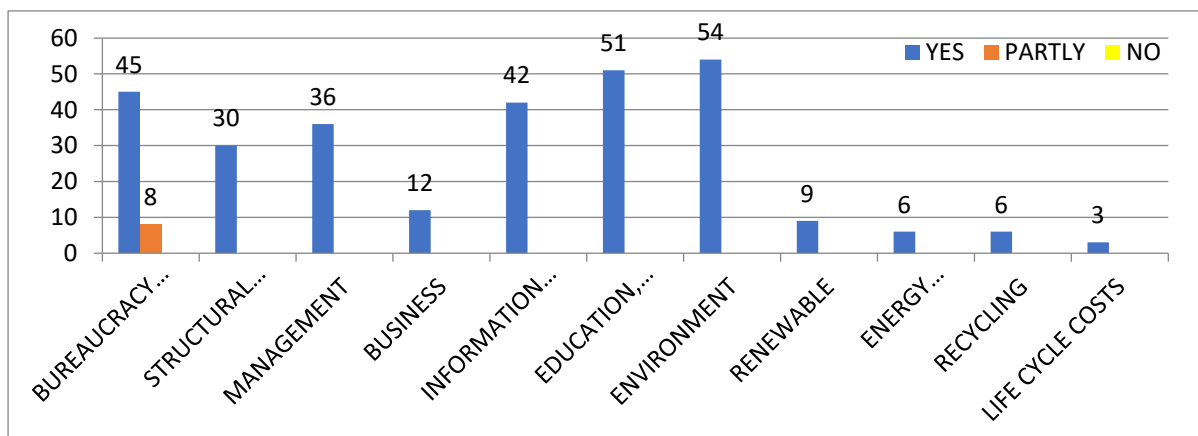
| QUESTIONNAIRE / IDS | DUNDJER Serbia | | |
|-----------------------|----------------|--------|----|
| BUREAUCRACY AND STAFF | YES | PARTLY | NO |

| QUESTIONNAIRE / IDS | DUNDJER Serbia | | |
|--|----------------|---------------|-----------|
| 1. Is your cluster Institutionalized? | 3 | | |
| 2. Have you adopted cluster legal acts? | 3 | | |
| 3. Have you established cluster bodies, sectors, boards, staff? | 3 | | |
| - Do you have a Board for research and development? | 3 | | |
| - Do you have a Board for export promotion? | 3 | | |
| - Do you have a Board for finance? | 3 | | |
| - Do you have a Board for marketing? | 3 | | |
| - Do you have a Board for education? | 3 | | |
| - Do you have a Board for international cooperation? | 3 | | |
| - Do you have a Board for information systems? | 3 | | |
| - Do you have a Board for state institutions relations? | 3 | | |
| 4. Does your cluster provide ON LINE Services (Business, Technical, Legal, Financial, Expert consultations) | 3 | | |
| 5. Have you established united bookkeeping? | | 2 | |
| 6. Have you established united or shared transportation? | | 2 | |
| 7. Have you established united suppliers and services? | | 2 | |
| 8. Have you established united or shared marketing? | | 2 | |
| 9. Is your Cluster well equipped? | 3 | | |
| 10. Have you established Legal Support (advocacy in Construction Law - Local and International – FIDIC)? | 3 | | |
| 11. Do you have memberships in national and international professional associations? | 3 | | |
| STRUCTURAL DESIGN | YES | PARTLY | NO |
| 1. Do you have collaboration between Specialized Design Bureaus? | | | |
| § Architecture (interior, urban, landscape) | 3 | | |
| § Statics | 3 | | |
| § Installations | 3 | | |
| § Computer design and animation | 3 | | |
| 2. Are you implementing Energy efficiency? | 3 | | |
| 3. Do you implement IT technology into residential and business buildings (internet, satellite)? | 3 | | |
| 4. Are you implementing Environmental engineering? | 3 | | |
| 5. Are you implementing Renewable energy sources (solar energy, heat pumps, rainwater)? | 3 | | |
| 6. Are you implementing Circular Economy? | 3 | | |
| 7. Are you implementing Recycling in construction industry? | 3 | | |
| MANAGEMENT | YES | PARTLY | NO |
| Do you use any software for project management? | 3 | | |
| § MS Project | 3 | | |
| § Nemetscheck My Office | 3 | | |
| § Primavera | 3 | | |
| § ERP | 3 | | |
| 1. Do you use SAP software for: Work organization, material control, manpower, time consumption, site management, work | 3 | | |

| QUESTIONNAIRE / IDS | DUNDJER Serbia | | |
|---|----------------|---------------|-----------|
| process and technical documentation (logbook)? | | | |
| 2. Do you have experience with smart house design – SCADA, MSC... | 3 | | |
| 3. Do you have experience in Implementation of Building SMART (Building Information Modelling) | 3 | | |
| 4. Have you implemented ISO standards? | 3 | | |
| 5. Have you implemented Risk assessment? | 3 | | |
| 6. Have you implemented Maintenance of building facilities? | 3 | | |
| 7. Have you implemented OPEN HOUSE methodology? | 3 | | |
| BUSINESS | YES | PARTLY | NO |
| 1. Do you have representative offices in other cities? | | | 0 |
| 2. Do you have representative offices abroad? | | | 0 |
| 3. Are you competing for the most favorable credit conditions with banks for cluster members? | 3 | | |
| 4. Do you have an organized appearance before state bodies and institutions? | 3 | | |
| 5. Have you established public-private partnership? | 3 | | |
| 6. Are you finding sustainable sources of financing (EBRD, MMF, WB, EU funds)? | 3 | | |
| INFORMATION SYSTEM | YES | PARTLY | NO |
| 1. Do you have a Cluster website? | 3 | | |
| 2. Do you have a Page at Social Media (Twitter, FB, LinkedIn)? | 3 | | |
| 3. Do you have websites for all cluster members? | 3 | | |
| 4. Do you have a databases of: | 3 | | |
| - Civil engineers | 3 | | |
| - Available workforce | 3 | | |
| - Building Materials | 3 | | |
| - Project bureaus | 3 | | |
| - Building Organizations | 3 | | |
| - Building Equipment (mechanization) | 3 | | |
| - Capital | 3 | | |
| - Residential and business real estate offers | 3 | | |
| 5. Do you have a digital map of region with locations for construction | 3 | | |
| 6. Do you have a real-time placement of cameras on construction sites | 3 | | |
| EDUCATION, TRAINING, R&D, INNOVATIONS | YES | PARTLY | NO |
| 1. Do you implement continuously R&D, education, and innovation in new technologies for cluster members | 3 | | |
| 2. Have you accomplished R&D projects in last 12 months | 3 | | |
| 3. Have you implemented trainings for basic skills in construction | 3 | | |
| 4. Have you experience in Distance learning in last 12 months | 3 | | |
| 5. Have you experience in Dual education in last 12 months | 3 | | |

| QUESTIONNAIRE / IDS | DUNDJER Serbia | | |
|--|----------------|---------------|-----------|
| 6. Have you implemented Expert trainings in last 12 months | 3 | | |
| 7. Have you experience in Software training and development | 3 | | |
| 8. Have you organized Scholarships for cluster members | 3 | | |
| 9. Have you experience in Contracting (FIDIC) in last 12 months | 3 | | |
| 10. Have you organized international Conferences in last 12 months | 3 | | |
| 11. Have you organized Professional meetings in last 12 months | 3 | | |
| 12. Have you organized B2B meetings in last 12 months | 3 | | |
| 13. Have you organized Symposiums in last 12 months | 3 | | |
| 14. Have you organized Building Fairs in last 12 months | 3 | | |
| 15. Have you published papers in last 12 months | 3 | | |
| 16. Have you established collaboration with R&D institutions | 3 | | |
| 17. Have you experience in Lifelong education in last 12 months | 3 | | |
| DO YOU RESPECT FOLLOWING CRITERIA DURING THE DESIGN AND CONSTRUCTION PROCESS? | | | |
| ENVIRONMENT | YES | PARTLY | NO |
| 1. Global Warming Potential (GWP) | 3 | | |
| 2. Ozone Depletion Potential (ODP) | 3 | | |
| 3. Acidification Potential (AP) | 3 | | |
| 4. Eutrophication Potential (EP) | 3 | | |
| 5. Photochemical Ozone Creation Potential (POCP) | 3 | | |
| 6. Risk from Materials | 3 | | |
| 7. Biodiversity and Depletion of Habitats | 3 | | |
| 8. Light Pollution | 3 | | |
| 9. Land Use | 3 | | |
| 10. Indoor Air Quality | 3 | | |
| 11. Water Quality | 3 | | |
| 12. Acoustic Comfort | 3 | | |
| 13. Visual Comfort | 3 | | |
| 14. Electro Magnetic Pollution | 3 | | |
| 15. Noise from Building and Site | 3 | | |
| 16. Responsible Material Sourcing | 3 | | |
| 17. Local Material | 3 | | |
| 18. Noise Protection | 3 | | |
| RENEWABLE | YES | PARTLY | NO |
| 1. Non-Renewable Primary Energy Demand (PE _{nr}) | 3 | | |
| 2. Total Primary Energy Demand and Percentage of Renewable Primary Energy | 3 | | |
| 3. Water and Waste Water | 3 | | |
| ENERGY EFFICIENCY | YES | PARTLY | NO |
| 1. Energy Efficiency of Building Equipment (lifts, escalators) | 3 | | |
| 2. Quality of the building shell | 3 | | |
| RECYCLING | YES | PARTLY | NO |
| 1. Waste treatment | 3 | | |

| QUESTIONNAIRE / IDS | DUNDJER Serbia | | |
|---|----------------|--------|----|
| 2. Ease of Deconstruction, Recycling, and Dismantling | 3 | | |
| LIFE CYCLE COSTS | YES | PARTLY | NO |
| 1. Building-related Life Cycle Costs (LCC) | 3 | | |



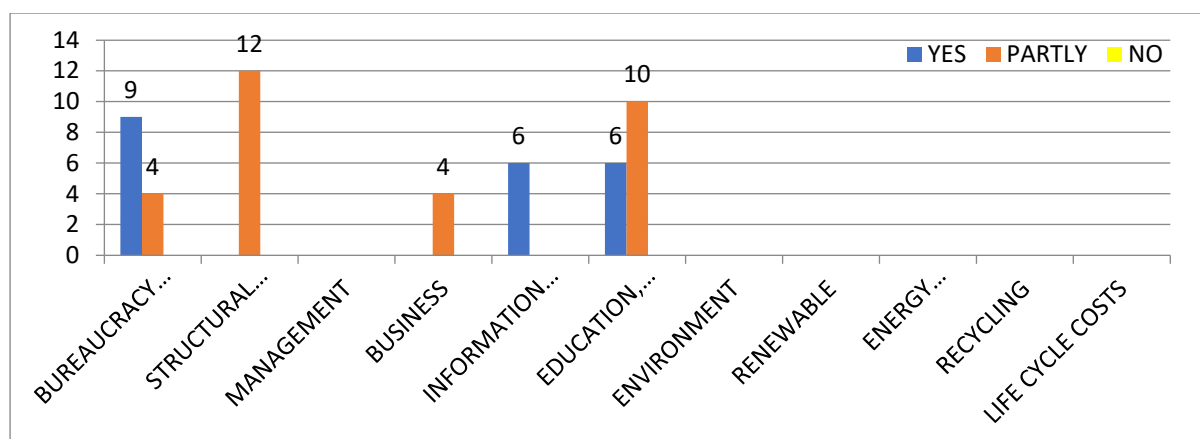
2.5 BENCHMARKING SGG Slovenia

| QUESTIONNAIRE / IDS | SGG Slovenia | | |
|---|--------------|--------|----|
| BUREAUCRACY AND STAFF | YES | PARTLY | NO |
| 1. Is your cluster Institutionalized? | 3 | | |
| 2. Have you adopted cluster legal acts? | 3 | | |
| 3. Have you established cluster bodies, sectors, boards, staff? | | | |
| - Do you have a Board for research and development? | | | 0 |
| - Do you have a Board for export promotion? | | | 0 |
| - Do you have a Board for finance? | | | 0 |
| - Do you have a Board for marketing? | | | 0 |
| - Do you have a Board for education? | | | 0 |
| - Do you have a Board for international cooperation? | | | 0 |
| - Do you have a Board for information systems? | | | 0 |
| - Do you have a Board for state institutions relations? | | | 0 |
| 4. Does your cluster provide ON LINE Services (Business, Technical, Legal, Financial, Expert consultations) | | 2 | |
| 5. Have you established united bookkeeping? | | | 0 |
| 6. Have you established united or shared transportation? | | | 0 |
| 7. Have you established united suppliers and services? | | | 0 |
| 8. Have you established united or shared marketing? | | | 0 |
| 9. Is your Cluster well equipped? | | 2 | |
| 10. Have you established Legal Support (advocacy in Construction Law - Local and International – FIDIC)? | | | 0 |
| 11. Do you have memberships in national and international professional associations? | 3 | | |
| STRUCTURAL DESIGN | YES | PARTLY | NO |
| 1. Do you have collaboration between Specialized Design Bureaus? | | 2 | |
| § Architecture (interior, urban, landscape) | | 2 | |

| QUESTIONNAIRE / IDS | SGG Slovenia | | |
|---|--------------|---------------|-----------|
| § Statics | | 2 | |
| § Installations | | 2 | |
| § Computer design and animation | | 2 | |
| 2. Are you implementing Energy efficiency? | | | 0 |
| 3. Do you implement IT technology into residential and business buildings (internet, satellite)? | | | 0 |
| 4. Are you implementing Environmental engineering? | | | 0 |
| 5. Are you implementing Renewable energy sources (solar energy, heat pumps, rainwater)? | | | 0 |
| 6. Are you implementing Circular Economy? | | 2 | |
| 7. Are you implementing Recycling in construction industry? | | | 0 |
| MANAGEMENT | YES | PARTLY | NO |
| Do you use any software for project management? | | | |
| § MS Project | | | 0 |
| § Nemetscheck My Office | | | 0 |
| § Primavera | | | 0 |
| § ERP | | | 0 |
| 1. Do you use SAP software for: Work organization, material control, manpower, time consumption, site management, work process and technical documentation (logbook)? | | | 0 |
| 2. Do you have experience with smart house design – SCADA, MSC... | | | 0 |
| 3. Do you have experience in Implementation of Building SMART (Building Information Modelling) | | | 0 |
| 4. Have you implemented ISO standards? | | | 0 |
| 5. Have you implemented Risk assessment? | | | 0 |
| 6. Have you implemented Maintenance of building facilities? | | | 0 |
| 7. Have you implemented OPEN HOUSE methodology? | | | 0 |
| BUSINESS | YES | PARTLY | NO |
| 1. Do you have representative offices in other cities? | | | 0 |
| 2. Do you have representative offices abroad? | | | 0 |
| 3. Are you competing for the most favorable credit conditions with banks for cluster members? | | | 0 |
| 4. Do you have an organized appearance before state bodies and institutions? | | 2 | |
| 5. Have you established public-private partnership? | | | 0 |
| 6. Are you finding sustainable sources of financing (EBRD, MMF, WB, EU funds)? | | 2 | |
| INFORMATION SYSTEM | YES | PARTLY | NO |
| 1. Do you have a Cluster website? | 3 | | |
| 2. Do you have a Page at Social Media (Twitter, FB, LinkedIn)? | 3 | | |
| 3. Do you have websites for all cluster members? | | | 0 |
| 4. Do you have a databases of: | | | 0 |

| QUESTIONNAIRE / IDS | SGG Slovenia | | |
|---|--------------|--------|----|
| - Civil engineers | | | 0 |
| - Available workforce | | | 0 |
| - Building Materials | | | 0 |
| - Project bureaus | | | 0 |
| - Building Organizations | | | 0 |
| - Building Equipment (mechanization) | | | 0 |
| - Capital | | | 0 |
| - Residential and business real estate offers | | | 0 |
| 5. Do you have a digital map of region with locations for construction | | | 0 |
| 6. Do you have a real-time placement of cameras on construction sites | | | 0 |
| EDUCATION, TRAINING, R&D, INNOVATIONS | YES | PARTLY | NO |
| 1. Do you implement continuously R&D, education, and innovation in new technologies for cluster members | | 2 | |
| 2. Have you accomplished R&D projects in last 12 months | 3 | | |
| 3. Have you implemented trainings for basic skills in construction | | 2 | |
| 4. Have you experience in Distance learning in last 12 months | | | 0 |
| 5. Have you experience in Dual education in last 12 months | | | 0 |
| 6. Have you implemented Expert trainings in last 12 months | | 2 | |
| 7. Have you experience in Software training and development | | | 0 |
| 8. Have you organized Scholarships for cluster members | | | 0 |
| 9. Have you experience in Contracting (FIDIC) in last 12 months | | | 0 |
| 10. Have you organized international Conferences in last 12 months | | | 0 |
| 11. Have you organized Professional meetings in last 12 months | | | 0 |
| 12. Have you organized B2B meetings in last 12 months | | 2 | |
| 13. Have you organized Symposiums in last 12 months | | | 0 |
| 14. Have you organized Building Fairs in last 12 months | | | 0 |
| 15. Have you published papers in last 12 months | | 2 | |
| 16. Have you established collaboration with R&D institutions | 3 | | |
| 17. Have you experience in Lifelong education in last 12 months | | | 0 |
| DO YOU RESPECT FOLLOWING CRITERIA DURING THE DESIGN AND CONSTRUCTION PROCESS? | | | |
| ENVIRONMENT | YES | PARTLY | NO |
| 1. Global Warming Potential (GWP) | | | 0 |
| 2. Ozone Depletion Potential (ODP) | | | 0 |
| 3. Acidification Potential (AP) | | | 0 |
| 4. Eutrophication Potential (EP) | | | 0 |
| 5. Photochemical Ozone Creation Potential (POCP) | | | 0 |
| 6. Risk from Materials | | | 0 |
| 7. Biodiversity and Depletion of Habitats | | | 0 |
| 8. Light Pollution | | | 0 |
| 9. Land Use | | | 0 |

| QUESTIONNAIRE / IDS | SGG Slovenia | | |
|---|--------------|--------|----|
| 10. Indoor Air Quality | | | 0 |
| 11. Water Quality | | | 0 |
| 12. Acoustic Comfort | | | 0 |
| 13. Visual Comfort | | | 0 |
| 14. Electro Magnetic Pollution | | | 0 |
| 15. Noise from Building and Site | | | 0 |
| 16. Responsible Material Sourcing | | | 0 |
| 17. Local Material | | | 0 |
| 18. Noise Protection | | | 0 |
| RENEWABLE | YES | PARTLY | NO |
| 1. Non-Renewable Primary Energy Demand (PE _{nr}) | | | 0 |
| 2. Total Primary Energy Demand and Percentage of Renewable Primary Energy | | | 0 |
| 3. Water and Waste Water | | | 0 |
| ENERGY EFFICIENCY | YES | PARTLY | NO |
| 1. Energy Efficiency of Building Equipment (lifts, escalators) | | | 0 |
| 2. Quality of the building shell | | | 0 |
| RECYCLING | YES | PARTLY | NO |
| 1. Waste treatment | | | 0 |
| 2. Ease of Deconstruction, Recycling, and Dismantling | | | 0 |
| LIFE CYCLE COSTS | YES | PARTLY | NO |
| 1. Building-related Life Cycle Costs (LCC) | | | 0 |



3. SWOT Analysis of target market for nZEB

Apart from the IDS, in order to better understand each clusters' existing environment, a detailed SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis of the domain of high performance buildings in the context of existing challenges in the construction sectors in all the involved countries has highlighted local (at regional and national level) strengths and constraints, as well as opportunities and threats has been performed.

The SWOT analysis was driven by DUNDJER cluster with information provided by all the partners and is intrinsically multi-dimensional addressing specific market segments that will be chosen and described based on a competitive assessment of related initiatives. It also addresses the related risks and threat and it comes up with solutions to face them.

Based on the results of the SWOT performed in WP2, the cluster development action plans for nZEB will be developed in WP4.

3.1 SWOT Analysis for Poland

3.1.1 Strengths

1. Large number of construction materials and products manufacturers of on the Polish market, including large Polish companies providing their products worldwide (e.g. Drutex – windows producer, Blachy Pruszyński – roof and elevation steel claddings, Wienerberger – bricks and tiles).
2. R&D institutes in the field of construction and construction materials, e.g. Institute of Ceramics and Building Materials, Instytut Techniki Budowlanej (Building Research Institute)
3. Experience in recruiting personnel from abroad, e.g. from Ukraine – in the beginning of 2020 there were over 440 thousand employees from abroad (Migracje.gov.pl, 2020)
4. Innovativeness of companies – in 2017 91% of construction companies declared that they have introduced innovations in their activities (Madyda, 2018)
5. High and growing construction capacity of the sector – in 2019 construction of over 160 thousand new flats was completed (as compared to 2009: 130 thousand flats) (Polska Agencja Prasowa, 2019)
6. Growing export value of Polish construction companies and share of foreign contracts (Sosna, 2019). In 2019 27% of construction companies exported their products or services (Rozkrut, Kowalczyk, & Boguszewski, 2020)
7. A wide offer of construction-oriented higher education.
8. Large commitment of the construction industry companies to invest in own development in the field of training (new technologies, Industry 4.0).

3.1.2 Weaknesses

1. Lack of experience in constructing nZEBs.
2. Lack of cross-sectoral links between companies providing complementary solutions for nZEB.
3. Lack of qualified workers. There is a need to hire foreigners from Ukraine, Belarus, and even from Asia (Nepal, Bangladesh, Philippines). In 4th quarter of 2019 there were 20,600 free jobs in the construction sector (Główny Urząd Statystyczny, 2020).
4. Other sources indicate a shortage of approx. 120,000 employees in the sector (Śmietana, 2019). In 2019 69% of construction companies have experienced problems in recruitment or resignations of employees (Rozkrut et al., 2020).
5. Limited access to financing – 83% of Polish construction companies find this as a barrier for introducing innovations (Madyda, 2018).
6. Profit margins in the construction sector are lower than in the other economic sectors in Poland (BIG InfoMonitor; Polski Związek Pracodawców Budownictwa, 2019). 56% of Polish construction companies find low margins as a barrier for introducing innovations (Madyda, 2018). In 2019, large construction companies improved their net profitability from -0.7

percent to 1.2 percent, but it is still lower compared to SMEs (profitability of approx. 5-9%) (BIG InfoMonitor; Polski Związek Pracodawców Budownictwa, 2019).

7. Overdue payments frequent in the sector. In 2019 the number of companies with overdue financial commitments increased compared to 2018 by over 10 percent (up to 44,894 enterprises). Overall, approx. 6% of companies have problems in this field (BIG InfoMonitor; Polski Związek Pracodawców Budownictwa, 2019)
8. High competition among manufacturers means lowering prices and smaller margins.

3.1.3 Opportunities

1. High demand for new buildings. There are 371 dwellings per 1000 citizens in Poland, while the OECD average is 460-480. 40% of Polish citizens live in overcrowded dwellings (Business Insider Polska, 2019; EUROSTAT, 2020)
2. Rising awareness of Polish citizens in terms of energy consumption in buildings, in particular related to air quality. Rising demand for ecological heating sources. 88% of Polish citizens would decide to build an energy-saving home (Danfoss, H+H, Rockwool, 2019).
3. Rising demand for small-scale renewable energy sources, PV in particular.
4. Governmental programme “Mój prąd” (“My electricity”) offering a donation of up to 5000 PLN (~1150 EUR) for installation of PV in households. Significant R&D and innovation funding is also available (e.g. Smart Growth Operational Programme - ERDF).
5. The revised Energy Performance of Buildings Directive (EU) 2018/844 requires from MS to set cost-optimal minimum energy performance requirements for new buildings.
6. Since 2021, all new buildings must be nearly-zero energy ones, according to the EPBD directive. Furthermore, 70% of residential buildings require renovation (Energia Press, 2020)
7. Availability of regional programs focused on the international promotion of a construction company (e.g. GoToBrand program, cluster internationalization).
8. A large number of buildings erected using traditional methods requires modernization.
9. “Clean Air” program (PL: “Czyste Powietrze”) aimed at improving air quality and greenhouse emissions by co-financing heat exchange and improving the efficiency of single-family housing factors in the period 2018-2029.

3.1.4 Threats

1. Germany is going to open its labour market for Ukrainian workers in March 2020, when the new Skilled Immigration Act for qualified professionals from non-EU countries comes into force. There is a threat that better employment conditions will encourage Ukrainian economic migrants to leave Poland (Khrebet, 2020; Michalska, 2020). However, less than 25% of Ukrainians living in Poland would like to look for a new job in Germany, when it becomes possible (Rynek Infrastruktury, 2020)
2. Rising costs of construction materials, fuels and land decrease investment potential of citizens. (Alebank.pl, 2019; Gazeta Prawna, 2019).
3. Lack of qualified and experienced staff in constructing highly energy efficient or nearly-zero energy buildings.
4. COVID-19 epidemic crisis affecting negatively investment decisions (Polski Związek Pracodawców Budownictwa, 2020)
5. Growing costs of labour on the market are considered as a major barrier to the sector’s development (Rozkrut et al., 2020)
6. Underegistered employment and payment of part of employees' salaries without

7. taxes and social security contributions. In 2019 56% of construction companies have observed that this type of illegal activities take place at least to some extent (Rozkrut et al., 2020)
8. Possibility of economic emigration of highly qualified staff.

3.2 SWOT Analysis for Romania

3.2.1 Strengths

1. Projects related to nZEB already Implemented (e.g. Fit-to-nZEB, Train-to-nZEB) in Romania
2. Existing & increasing number of professionals in the field of energy performant buildings
3. Community already formed around PRO-nZEB (including Public Authorities, Research & Innovation Institutes, University, Businesses)
4. Existing potential for a direct transfer of technical solutions into the market to support the implementation of nZEB
5. New legislation for nZEB at national level
6. Requirements for Energy Performance Certification of Buildings

3.2.2 Weaknesses

1. Not enough qualified workforce to face the current construction works (including renovation) and the nZEB challenge
2. Extensive private ownership of residential dwellings prevents investments in buildings stock refurbishment (incl. to nZEB standards).
3. Apparently high interest rates & unattractive bank loans for private individuals.
4. General public interest in “low-cost” against quality.
5. Political inconsistency and discontinuity in the definition and implementation of relevant strategies
6. Competition between stakeholders may prevent them from putting efforts in promoting their common interests related to high performance buildings stock development.
7. Lack of a more coherent and organized cross-sectorial initiative (that should include research institutions and high-level authorities) for medium- and long-term impact.
8. General negligence of Quality Control within the Construction Sector & particularly some negligence of some aspects related to Control Phases of important constructive elements (e.g. thermal insulation) that are not perceived as determinant by construction companies.
9. No clear and engaged Policy to encourage research & innovation within businesses.

3.2.3 Opportunities

1. New stakeholders on the market (e.g. design companies for passive houses; Passive House Association of Romania etc.).
2. New financing opportunities that may be used for buying a “green house” (Transilvania Bank provides “Green Credit” for “buying Green Buildings”) or to start a new business which may indirectly help develop new local businesses dealing with high performance buildings (e.g. Startup Nation – a 200.000 RON~45000 EUR grant from the government for new businesses funded after 2017; Diaspora Start-up ~45000 EUR for expats returning to start a new business;).

3. State Funded Programme “Casa Verde” (Green House) – 20000 RON (~4500 EUR) for buying & installing photovoltaic panels (up to 90% of the actual costs).
4. Growing interest on the matter of sustainability & circular economy.
5. Vast offer for quality materials.
6. Roundtables on financing energy efficiency in Romania (e.g. 2nd National Roundtable on Financing Energy Efficiency in Romania 6 June 2019, Bucharest, Romania).
7. Existing National Strategy & National Integrated Climate and Energy Action Plan (2020-2030) will be supported by the financial package within the New EU Green Deal.
8. EU legislation that may influence change (e.g. revision of EU 2010/31 Directive).
9. New Long-term Renovation Strategy – draft Strategy framework for 2030-2040-2050.

3.2.4 Threats

1. Limited political action for finding ways to encourage the development of high-performance buildings due to political instability and apparently different priorities in the political agenda.
2. Most state funded refurbishments of residential dwellings are currently being done all much lower performance than nZEB levels. This means money are spent without reaching a satisfactory level of high energy efficiency in the residential buildings stock and buildings are considered as “renovated” (leading to lock-in effects).
3. Attractive funding / financing opportunities for private individuals (to help them retrofitting buildings) are inexistent and the financial crises expected in the current context (i.e. covid-19 outbreak) may prevent any short-term / medium-term changes.
4. Lack of interest for funding research and innovation activities at national level & within the industry.
5. Improper energy certification of buildings provided by “low-cost” service providers (corruption).
6. Frequent policy changes and coherent approach may scare off investors.
7. The spread of the general idea that high performance buildings are expensive – may decrease any form of interest in the matter.

3.3 SWOT Analysis for Serbia

3.3.1 Strengths

Organizational

5. Local Energy Agency
6. Municipal Energy plan
7. Energy manager (within the city council)
8. Introduced energy efficiency managers in every municipality
9. Energy passport for buildings

Economical

10. Good natural resources to generate solar, hydro and biogases energy
11. Energy efficient household devices
12. Good environmental performance of firewood
13. Interest-free loans for energy efficiency for houses and apartments

14. Available resources and potentials
15. Established Energy Community at national level
16. Signing of the Stabilization and Association Agreement between Serbia and the EU

Political-Legal

17. Introduction of energy requirements in the buildings' regulations
18. Legal framework for implementing EE

Public involvement and awareness raising

19. Sufficient grid capacity
20. Use of solar thermal and PV systems in schools
21. Changing lifestyle in respect to the environment
22. Promotion of public involvement through Changing lifestyle
23. Raised level of citizens' awareness of the importance of energy efficiency

Activities

24. Implementation of some EE measures in public buildings and public lighting
25. Installation of PV panels in public buildings

3.3.2 Weaknesses

Organizational

1. No energy working group
2. High external energy dependence
3. Non-economic energy prices and disparities in prices of energy and fuels
4. Non-economic use of energy
5. Small scale of renewable energy economy
6. Subsidized electricity tariffs

Economical

7. Absence of a local finance scheme to support the incorporation of renewables and EE measures in buildings
8. Poor insulation of building envelopes (thermal, acoustic...)
9. Doors and windows do not breathe well
10. Roofs and foundations in poor condition
11. Outdated lighting system
12. Less than 1/3 of buildings connected to district heating
13. Negligible percentage of use of renewable energy sources
14. Lack of use of recycled materials
15. Lack of ICT use in buildings

Political-Legal

16. Absence of a local Energy policy
17. Absence of a municipal ordinance to promote the use of renewables

18. Technological obsolescence of existing and the lack of new facilities
19. Inefficiency of public energy companies
20. The legacy of nature devastation and excessive pollution

Public involvement and awareness raising

21. Insufficient awareness of social and environmental benefits of renewables
22. Weak institutions at both policy and operational level
23. Lack of technical and commercial skills in renewables

Activities

24. No EE measures implemented in old buildings
25. Inefficient utilization of domestic resources

3.3.3 Opportunities

Organizational

1. Implementation of the actions based on the Municipality Energy Plan
2. Introduction of cleaner production principles in the energy sector

Economical

3. Creation of local support scheme for RE/EE
4. Favorable climatic conditions for the use of solar energy
5. Introducing of thermal pump in heating
6. Small hydropower plants
7. Introduction of ICT into buildings (measuring and control systems, SCADA, MSC)
8. Introduction of new environmental and EE materials
9. Favorable climatic conditions for the use of wind energy (northern Serbia)
10. Insulation materials from recycled auto-textile materials
11. Building materials from recycled construction waste
12. Potential for individual houses off-grid PV supply
13. Decrease of PV price around the world
14. Reduction of CO₂ emissions towards global responsibility

Political-Legal

15. Definition of an Energy Policy for the municipality
16. Implementation of the Ordinance to promote the use of RE
17. Integration of the Republic of Serbia into the EU

Public involvement and awareness raising

18. Increasing gap between energy supply and demand
19. Increase awareness raising campaigns, workshops and seminars to spread knowledge and raise awareness to a broader public
20. Raising the overall economic competitiveness of energy systems

Activities

21. Improving of energy efficiency policy
22. Construction of gas interconnections with systems in neighbouring countries
23. Promotion of projects with solar, thermal and PV panels
24. Implementation of EE measures in buildings and public lighting

3.3.4 Threats

Organizational

1. Underdevelopment and inadequacy of energy data collection and statistics

Economical

2. Extra costs for the implementation of EE measures on existing buildings
3. Potentially high R&D expenses
4. Temporary financial support may lead to lack of continuity of RE/EE projects
5. Tendency for further reducing of feeding tariffs by state
6. Enlarging of mass abandonment and neglecting of family houses in villages
7. Exacerbation of state policy for renewables
8. Global climate changes
9. National financial crisis
10. Nacional political crisis
11. Earthquakes, floods, droughts

Political-Legal

12. Energy could not be considered as a political priority
13. Lengthy and complex procedures to obtain permits and licenses

Public involvement and awareness raising

14. Lack of public interest
15. Discontinuity of energy policies
16. High waste processing fee
17. Public opposition to bioenergy plants or monocultures of energy crops
18. The lack of transparency in energy policy making
19. Energy crisis in the world and the possibilities of new energy "shocks"
20. Global disagreement about climate change policy and "cleaner" energy strategies
21. Disagreement in energy policy in the region due to unresolved social and political issues
22. Political opportunism and lack of readiness for depolitization and professionalization in energy sector.
23. Lack of harmonization of standards and regulations with the EU, or failure in implementation.

Activities

24. Displacement of population
25. Saturation of local electrical grid

3.4 SWOT Analysis for Serbia

3.4.1 Strengths

1. Global network of contacts
2. Maintenance of particular contact abroad (for example Russia, Portugal) to support follow-up collaborations
3. Experience in participating (and leading) in EU projects
4. Partner in the European Strategic Cluster Partnership for Internationalization, Investment in Smart Specialization and Excellence (ESCP4i, ESCP3S, ESCP4X)
5. Wide knowledge in numbers of areas, combination of different topics in new ones:
6. Knowledge and experience in energy efficiency, energy audits of buildings, sustainable buildings, circular economy
7. Knowledge and experience in clusters (including being trained about cluster management, strategy, etc)
8. Fast, effective implementation of tasks / specific tasks and hard working under pressure
9. Ability to do in-dept study and learning in particular topic, for example communication and dissemination, Canvas, Social Media, Circular economy
10. Critical attitude for policy actors,
11. Without fear but with precautions when communicating with public actors, and other partners
12. Strategy thinking, seeing potential threads, but also opportunities in this field
13. Seeing, mapping ok business opportunities in actions we are taken or doing and Innovativeness in ideas for novel contents – in different situations
14. Knowledge and experience in training programmes preparation and execution, workshop facilitation
15. Good presentation skills, systemic approach to present content
16. Knowledge and experience in social media use (Linkedin, Twitter, Facebook) and website management
17. Knowledge and experience in communication and dissemination
18. In-dept knowledge in business model design / personal brand in this area
19. Persistence in communication and presentation
20. Work planning, implementation
21. Person to person contact / communication – interpersonal skills
22. Leadership at personal level – team building, trust building
23. Systemic approach to different topic, from organisational to implementation
24. Knowledge and experience about certification of quality labeling related to construction products and services
25. Fluent communication in English, including writing skills.

3.4.2 Weaknesses

1. Weak communication with members and stakeholders
2. Weak communication with media
3. Lack of communication strategy, especially on social media
4. Public promotion – weak presence, not enough engagement, weak personal brand
5. Too little additional training on topics such as entrepreneurship, sales, marketing,...
6. Perspective of business and earning money is weak.
7. Procrastination with important decisions (not every but many times)
8. Too much studying of details of particular topic, systemic approach which takes time

9. Overtake of leadership role in areas where competences are present, staying as smart observer
10. Not implementing tasks if not according to personal/professional perception, or plan agreed
11. Focused work on particular topic – going too much into details
12. Hoping to get a good EU projects – too much focus on that
13. Ambition to prepare things too much in perfection / completion
14. Weak personal organisation of work (working at home)
15. Financial challenges of non-stable financing, including no steady payment of salaries. Reduced salaries due to liquidity problems
16. Undercapitalisation due to losses in past, related to not approved project proposal, loss of members, non-payment of membership fee, low fee
17. Low numbers of cluster members to assure appropriate scope of possible internal business and development cooperation.
18. Ad-hoc, unstable and not sustainable communication strategy about the cluster value proposition, opportunities, few articles (Gradbenik, Finance), social media presence, attendance on different events could be more intensive
19. Low empowering of clusters members to take more proactive role in cluster growth and development.

3.4.3 Opportunities

1. Mapping and creating business offers for things SGG is working on
2. Creating business offers and leadership in commercialisation in SGG
3. Taking the leadership / co-ordination in the proposal elaboration
4. Exploitation of network, EU ones, including the LinkedIn network
5. Long CVs with different engagements in EU projects, different competencies
6. Integrating different content into one story
7. Knowledge/competences/experiences to be transfer to members, exploited via payable trainings
8. Consulting, mentoring services for cluster members and other in innovation management, circular economy, business model design / CANVAS, international R&D cooperation, internationalization, and digitalisation
9. Supporting C2C and with that also B2B business and R&D collaboration
10. International Circular Construction Cluster – cluster of change development
11. Leadership/coordination of EU project proposals for a fee/ or without
12. Experience in cluster initiation, implementation, and when facing different challenges
13. ECCA – ESCP4i – still active network of partners in circular construction, presence in circular construction activities
14. Involvement in EU projects FP//H20202, COSME, ERASMUS+
15. Coordination of EU project proposal elaboration, knowledge of quality proposal writing, options to find missing partners
16. EU wide network of clusters in construction, energy, sustainability, cluster development
17. EU network of experts in EU project proposal preparation
18. Membership/participation in ECTP, Renovate Europe
19. Contact / network with some EU officials in field of clusters
20. Cluster of Change Development knowledge
21. Information, knowledge on different EU policies, options for taking part in their creation as cluster, or representative of ESCP4i, or withing ECTP

3.4.4 Threats

1. Cluster position in innovation support policies in Slovenia, not having status of innovation subject (like Technology Park, Business Incubator) with no option to apply for yearly public financing of
2. Low level of self-actuation and activation of clusters members
3. Low numbers of members, bad structure of them in terms of potential value chain collaboration
4. Low perception of being part of important story
5. No public support for cluster office activities and services
6. Low number of clusters being actual owners e.g. constituent members of Economic Interest Groups. E.g. of legal entity
7. Visibility in national innovation eco system, and in the industry at large, none in particular fields such as infrastructure investors, contractors, produces

4. Conclusions

The items of the Specific Questionnaires / Individual Development Sheets and SWOT analysis undertaken under WP2 represent the fundamental vectors for driving other project work packages, as indicated in the project proposal (see figure below).

