

***ECCE Social Network***  
**" BUILDLIFE "**

With central themes:

- nZEB-*NearlyZero Energy Buildings 2020*
- Lifetime based sustainable Civil Engineering

**ECCE SC Knowledge and Technology**

**ECCE Scientific Committee Knowledge and Technology**

Chairman, Prof. Dr. Tech. Asko Sarja

20. 09. 2011

## Project Title

### ***ECCE Social Network BuildLife***

#### 1. Executive Summary

**Social media means communication and interactive building of understanding with the help of information technology, while the partners are able to act both as consumer and as producer.**

**In the Social Network BuildLife ECCE members** can exchange and publish public and internal information as well as share messages, join interest groups and link to other ECCE members or to other users of the ECCE BuildLife Network and Global BuildLife Network. This Network will include both technical and administrative issues.

"ECCE Social Network BuildLife" is a modern tool for **drastic advance of the work of ECCE, transforming ECCE** together its member organisations, beside traditional activities, **into an active and useful platform and actor in actual themes** for the very rapid change of the paradigm of civil engineering in this decade.

The "ECCE Social Network BuildLife" is a networking web-tool that enables the on time information exchange for collaboration between ECCE and its partner organizations, as well as between individual members of European National Organisations of Civil Engineers. The commercial sector enables effective information exchange between companies and clients.

ECCE Society Network is also a part of the generic Global BuildLife Network, which will serve a part of this platform for ECCE application.

In addition to the common internet interaction, the ECCE Society BuildLife provides for its users in the first phase the **four key services** of the BuildLife that are described in the figure 1. During the operation new actual themes can be joined into BuildLife.

The BuildLife Network is working with the open development principle. This means that the ECCE members and groups (Standing Committees and Working Groups) can, under the guidance and control of the ECCE Executive Board, build voluntary circles and themes into the network.

The **paying members of ECCE** will get their **money`s worth** through this social network in their professional everyday work and business.

**Practice will get help for accelerating the change** into sustainable and energy efficient building and civil engineering through direct official and unofficial on time exchange of formal and informal information between the individuals and organisations in projects, national levels, European level and globally.

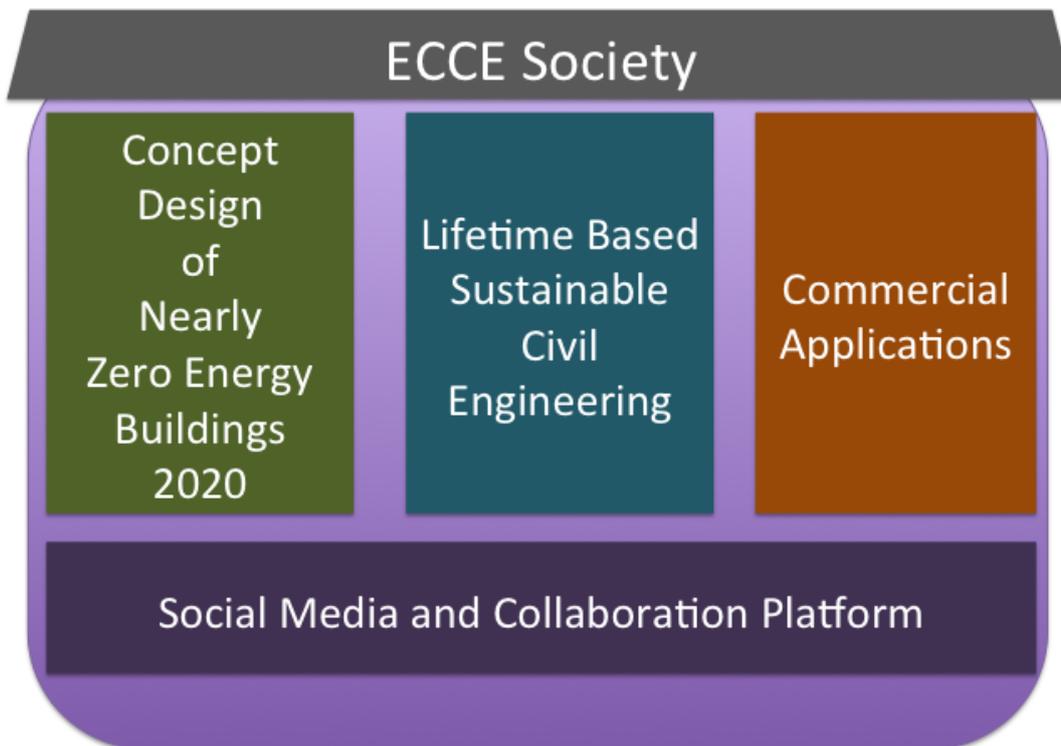


Figure 1. The **four key services** of the BuildLife that ECCE Society BuildLife provides for its users during the first project phase.

The ECCE members can publish public and internal information in the ECCE Society Network as well as share messages; join interest groups and link to other ECCE members or to other users of the ECCE BuildLife Network and Global BuildLife Network.

The users of the BuildLife are divided into four actor categories:

- **Co-operation and R&D Organization.** For example ECCE, ECF, WCCE, EU-FRP, research institutes, universities etc.
- **Consumer (Customer).** For example a building owner and developer.
- **Producer (Supplier).** Building industry, for example a building or design service provider, product provider or building management organisation.
- **Authority.** For example a building inspector and policy-makers, EU Commission and Parliament.

The content of the SN BuildLife is structured in the form of matrix structure, as shown in Table 1.

Table 1. Matrix structure of the BuildLife Social Network. The focus areas are marked with a cross x.

LEVEL	ECCE-Organisation			Research and Development		Commercial Sector (Products and Services)	
	ExBo	SC:s	Reports	nZEB <sup>1</sup>	SLCE <sup>2</sup>	nZEB	SLCE
Global Level		X	X	X	X	X	X
European Level	X	X	X	X	X	X	X
National Level	X	X	X	X	X	X	X
Asset Level				X	X	X	X
Project Level				X	X	X	X

<sup>1</sup> nearly Zero Energy Buildings

<sup>2</sup> Sustainable Lifetime Engineering

## 2. Actions needed for change of the construction sector

### 2.1 Integrated actions

Transformation of the building market into a client oriented and sustainable business will require integrated actions from across the building industry, from developers and building owners to governments and policy-makers.

#### 1. Strengthen codes and labelling for increased transparency

- **Policy-makers and governments** must extend current building codes to include strict energy-efficiency requirements (adapted to regional climate conditions) and commit to enforcing and tightening these over time.
- **The building industry and governments** must also develop energy measurement and labelling mechanisms requiring non-residential building owners to display energy performance levels.
- Building energy inspections and audits must be introduced to measure performance, identify improvement opportunities, and establish priorities for implementing efficiency measures. In multi-family residential buildings, tenants must be given access to energy controls for each unit and charged for energy use individually.
- Such energy inspections in commercial buildings should be incorporated into existing fire and health and safety inspections.
- Incentivize energy-efficiency investments

- Governments will need to provide tax incentives and subsidies to enable energy efficiency investments with longer payback periods.
- Charging structures should be introduced to encourage lower energy consumption and on-site renewable generation.
- The balance, and investments exceeding the 10-year discounted payback threshold at today's energy prices, will require additional incentives to become reality.
- Businesses and individuals must work together to develop creative business models to address and overcome the first cost barrier to energy efficiency.

## 2. Encourage integrated design approaches and innovations

- Property developers need to be encouraged to **restructure business** and contractual **terms to involve designers, contractors, utilities and end users early** and as part of an **integrated team**.
  - Measures are needed to incentivize **property developers** in particular. The bidding process hampers **integrated approaches**.
  - **Governments** should introduce incentives for developers to submit applications for energy-efficient buildings.
  - **Subsidies** and other incentives for domestic energy-efficient improvements should be related to an integrated approach aiming **to improve the overall energy performance** of the building.
3. **Develop and use advanced technology** to enable energy-saving behaviours.
  4. Government authorities need to **provide support and investment for research and development** of effective energy-efficient building technologies so that greater rates of advancement are technically and readily achievable.
  5. New and refurbished buildings should be **designed to use information and communication technology that minimizes energy use** and is easily updated with technological advances for buildings to operate at an optimal energy level.
  6. **Technologies exist today** but can be improved and extended to countless existing structures accordingly. Utilities can participate by confirming deviations from best practice in regular usage statements.
  7. **Develop workforce capacity for energy saving**. The building industry must create and prioritize energy-efficiency training broadly for all involved in the sector and create vocational programs specifically for those who build, renovate and maintain buildings. It is also important to develop a "**system integrator**" profession **to support retrofitting** in residential properties.
  8. **Mobilize for an energy-aware culture**. Businesses, government authorities and others must establish sustained campaigns to promote behaviour change and to increase awareness of the impact of energy use in buildings. It is essential to demonstrate their commitment to addressing this urgent challenge by cutting the energy consumption of their own buildings.

### 2.2 Modernisation of the building sector

This change is a **big opportunity for drastic modernization of the building sector and for changing the entire paradigm of building**. Potential building energy savings could be as much as total transport energy use today.

**Transformation of business models** to quickly change **in existing buildings as well as new ones** and in residential as well as commercial property.

- All building sector stakeholders need to adopt a sense of urgency and a **new mindset** in which building energy is a top priority. Businesses will only succeed if they align with a sector transformation, adopting **disruptive technologies and business models**.
- Policy-makers need to introduce **strong regulatory frameworks** that support the market transformation.

**Government** action is necessary to improve the transparency of energy consumption in buildings and **to stimulate the change**. Businesses in the building sector will make progress, but not the necessary transformation without stronger market signals and regulatory change.

Central **technical tasks** for building engineers and organisations are:

**1. Encourage integrated design approaches and innovations**

- Property developers need to be encouraged to restructure business and contractual terms to involve designers, contractors, utilities and end users early and as part of an integrated team.
  - Measures are needed to incentivize property developers in particular. The bidding process hampers integrated approaches.
  - Governments should introduce incentives for developers to submit applications for energy-efficient buildings.
  - Subsidies and other incentives for domestic energy-efficient improvements should be related to an integrated approach aiming to improve the overall energy performance of the building.
2. **Develop and use advanced technology** to enable energy-saving behaviours. Only a third of the investments required to achieve the IPCC's 77% emissions reduction target have discounted paybacks of 10 years or less, a measure of the opportunity to improve energy-efficiency technologies in building.
3. **Government authorities** need to **provide support and investment for research and development** of effective energy-efficient building technologies so that greater rates of advance are technically and readily achievable.
4. **New and refurbished buildings** should be **designed to use information and communication technology that minimizes energy use** and is easily updated with technological advances for buildings to operate at an optimal energy level.

**Technologies exist today** but can be improved and extended to countless existing structures accordingly. Utilities can participate by confirming deviations from best practice in regular usage statements.

Central issues of new knowledge to the practices are:

- National planning and actions for implementing the Directive EU31/2010: "Energy Efficiency of Buildings in 2020" into praxis in each country
- Campaigns to promote behaviour change and to increase awareness of the impact of energy use in buildings

- Stimulation of the quick change and transformation of business models
- Innovative financial models in existing buildings as well as new ones
- Design and technology innovations
- Optimised Life Cycle Economy
- Renewed Building Process
- Integrated Conceptual Design
- Sustainable Building Technology

Primary actual demands of ECCE Members from ECCE are the information and publishing of results and experiences of zero energy building

- Knowledge transfer between ECCE Members and from sources outside of ECCE
- Model building concepts (new and renovation)
- Measurement results of the technical performance
- Economic analysis
- Experiences in operation and asset management
- Information on existing commercial concepts, systems and products on European Market
- Information on services, like designers, contractors and deliverers on European market

Modern and effective way for answer to these demands is a Social and professional Internet Network.

A platform for the internet Global Network BuildLife has been developed by Android Consulting, Espoo, Finland. There is now a special opportunity to apply this internet platform to an internet ECCE Social Network "BuildLife" .

The operation of the network can be financed with commercial agreements of European company partners. This is why the operation and use of the Network will be free for the members of ECCE member organisations.

The paying members of ECCE will get their money`s worth through this social network in their professional everyday work.

### **3. Project "ECCE SOCIAL NETWORK BUILDLIFE"**

#### **3.1 The objective of the Project**

The objective is to **support the drastic change of building** with an Internet **Social Network for common use of civil engineers, companies and other organisations of ECCE countries.**

This change means the general change of the building paradigm into a sustainable and lifetime oriented technology, but in the first phase focused especially on "nZEB-nearly Zero Energy Buildings 2020" and generic "Lifetime Engineering" issues.

In addition this network can be used for administrative interactive information exchange of ECCE.

### 3.2 Principles of the Social Network

**Social media means communication and interactive building of understanding with the help of information technology, while the partners are able to act both as consumer and as producer.** This means that the users of the network can build themselves the content of the network to correspond their own needs.

A network is a set of relationships. The simplest network contains objects, 1, 2 and 3, and the relationships that link them (fig. 2.) [Stanley Wassermann and Katherine Faust, *Social Network Analysis, Methods and applications*, Cambridge University Press, 1994 and Charles Kadushin, *Introduction to Social Network Theory*, February 2011, www.].

The theory applies to a variety of levels of analysis from small groups to entire global systems. To be sure, there are emergent properties at different system levels, but these are extensions of what can be done at a lower level and not entirely different forms of organization.

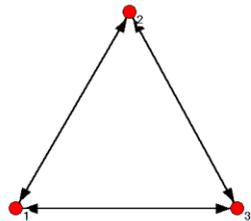


Fig. 2. Basic figure of the relationships of a social network.

Relationships might be more than the sharing of an attribute or being in the same place at the same time. There can be a flow between the objects or the nodes. Flows and exchanges are very important in network theory.

To be considered networks these connections must not only be lists of people or organizations, but **information must be available about the connections between these people or organizations.**

Large networks might comprise an entire community, city, or even large organization

**Informal relations** exist in reference to or even in opposition to the formal relationships. It is as if the non-prescribed paths or relationships or exchanges are "draped" upon a scaffolding of the formal relationships. The instituted or prescribed relations are always in some way, even negatively, "taken into account." In a large manufacturing organization, there are formal hierarchical relationships that define the positions in the organization – the "organizational chart." When critical decisions are to be made, individuals often "skip levels". True, this is an "informal system" for making decisions.

An important issue is **segmenting networks into regions or groups**. **Customers, suppliers, and owners** are all said to be "stakeholders" whose claims must be satisfied. However, their recurring relations with the core of the process or organization are often ignored in the current building, management and renovation processes and organisations. We make the relations between the stakeholders and their partners relatively arbitrarily for a given purpose; designers of computer algorithms that struggle with how to partition networks are well aware of this.

Another practical difficulty with profound theoretical implications is the matter of multiple flows and crosscutting statuses. **Any set of nodes in real life has multiple flows with one another, so there is never one network connecting the nodes, but many.** This is true **at all levels: people, projects, organizations, nations, etc.** We would like to construct the network connecting the nodes.

### ***Social Circles***

The phenomena of **multiple flows**, cross-cutting statuses, and the softness at the edges of network derived **clusters** combine to produce a reality. The social reality is that many **network clusters are composed of cross cutting smaller units built up into larger ones which in turn overlap with one another.** Social circles are characteristic of modern mass society and serve to integrate apparently disconnected primary groups within larger societies.

The **development of the public mind** shows itself by the fact that a **sufficient number of circles** are present which have form and organization. Their number is sufficient in the sense that they give an individual of many gifts **the opportunity to pursue each of his interests in association with others.** Such **multiplicity of circles implies that the ideals of collectivism and individualism** are approximated to the same extent. An advanced culture broadens more and more the social circles to which we belong with our whole personality; but at the same time the individual is made to rely on his own resources to a greater extent and he is deprived of many supports and advantages associated with the tightly knit, primary group. Thus **the creation of circles and associations in which any number of people can come together on the basis of their interest** in a common purpose, compensates for that isolation of the personality which develops out of breaking away from the narrow confines of earlier circumstances. **A circle has neither clear boundaries nor a formal leadership.** Rather, it is **a denser region of a network.** Because the world is **clustered into overlapping social circles**, it becomes both smaller and larger: if one belongs to the same circle, then distances between nodes are smaller, though density remains lower than for true primary groups. If one does not belong to the same circle, then the distance between nodes may be very large and seem to create a situation in which there is almost an infinite number of "degrees" between nodes.

Further, an important aspect of networks is "brokerage" and **persons who have access to many disparate circles are more likely to be brokers, another form of social capital.** Circles have a dual nature. High density is important for **easy access to the external economy** for the core of the circle, but social circles

also need "brokers" who turn a profit, as any observer of the cultural or economic scene knows intuitively. As **cultural industry circles become more global** and therefore density becomes much lower, there are two parallel and related trends. **Official brokers or agents become even more important**, and economic organizations in the cultural realm attempt to incorporate within their organizations diverse media in an attempt to make the "synergies" which circle based external economies now find difficult to provide.

The **development of the public mind** shows itself by the fact that **a sufficient number of circles are present which have form and organization. Their number is sufficient in the sense that they give an individual of many gifts the opportunity to pursue each of his interests in association with others. Such multiplicity of circles implies that the ideals of collectivism and individualism** are approximated to the same extent.

**Network segmentation** is a critical area for network theory and the one in which hypotheses **most relevant to the practical concerns** of the arts and the economy is most likely to emerge.

### 3.3 Draft descriptions of the Social Network "ECCE Society BuildLife"

Transformation will require integrated actions from across the building industry, from developers and building owners to governments and policy-makers, as presented above. The main segments of the needed actions are described in figure 3.

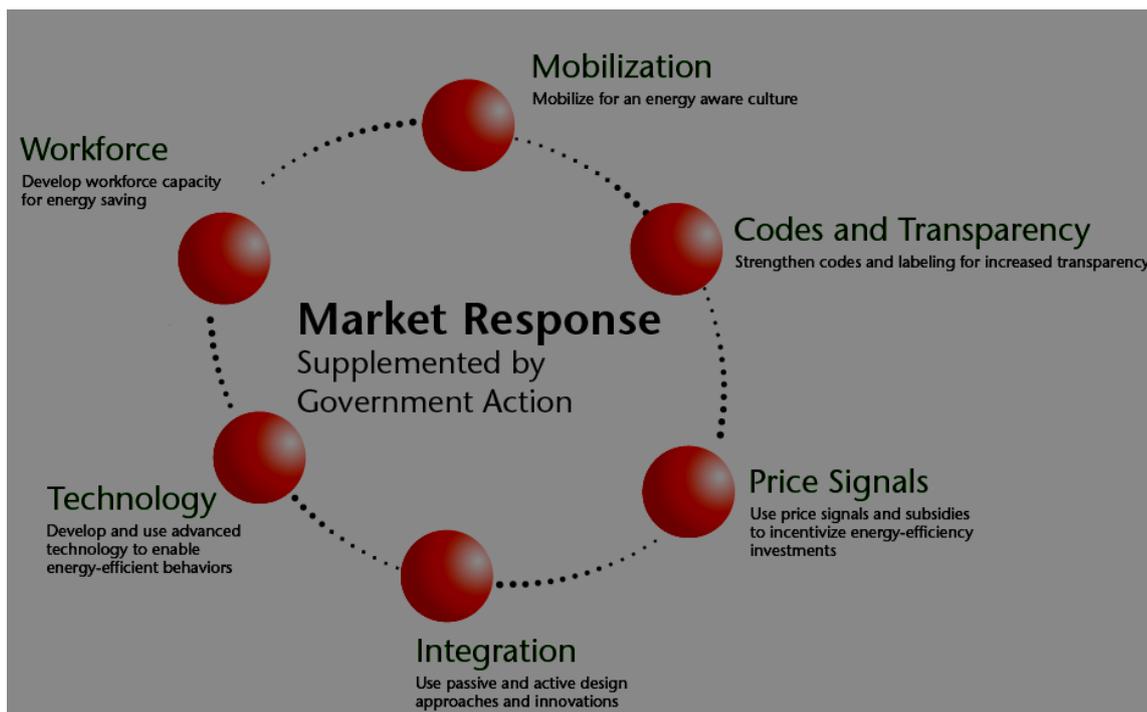


Figure 3. Mutually supportive recommendations of actions for the change.

The Social Network "ECCE BUILDLIFE" will act on several partly overlapping segments and circles as described in figure 4. The focus lies in the ECCE organisation and in the national and project activities of all stakeholders.

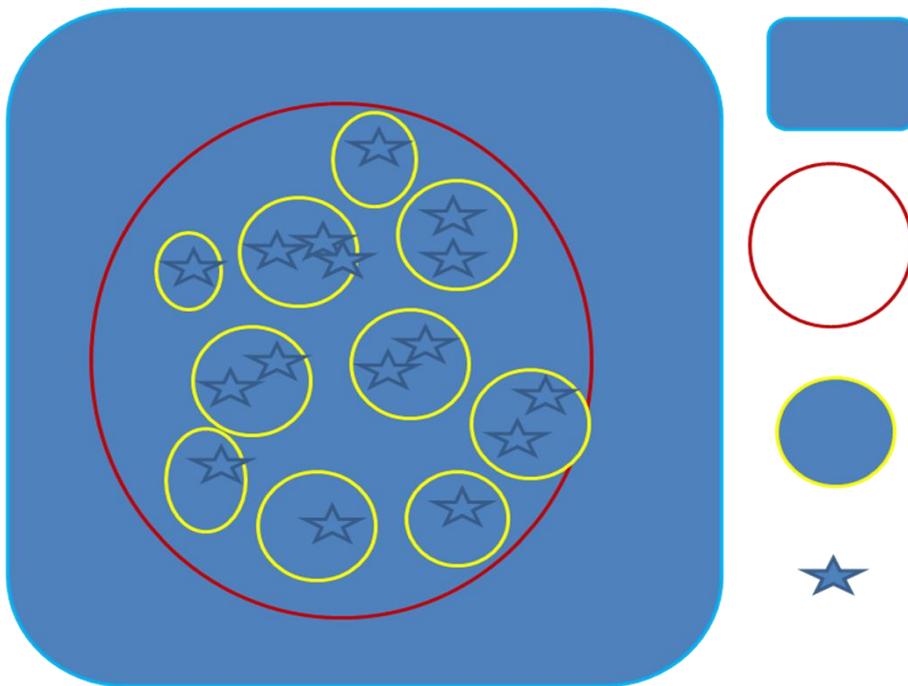


Figure 4. Social circles of different levels of ECCE BuildiLife: Globe, Europe, Nations, Projects.

The **segments** of the **BuildLife Network** on European, national and project levels) are:

1. **Technology** development, based on lifetime engineering principles (integrated lifetime planning and design, industrial building process, building concepts, innovative building products). The BuildLife Network will include both open information and commercial trade activities of building products.
2. **Workforce** improvements: Research, education (globally, but focused on European and national level).
3. **Mobilisation** of the sustainability and energy aware culture in civil and building engineering.
4. **Codes and standards** (focused on European level, and on national applications)
5. **Price signals** (on global, European and national levels)
6. **Integration** of design and innovation lifetime approaches **in building and renovation projects and in asset management.**
7. **Administration** of ECCE, and information exchange between ExBo, National Associations and the members of these Associations.

**BuildLife Network** can be used for especially for **accelerating the change** through **direct** official and unofficial **on time exchange of formal and informal information** between the individuals and organisations in projects, national levels, European levels and globally (figure 5.). This will be concretised in a modern technology of Social Networks in internet.

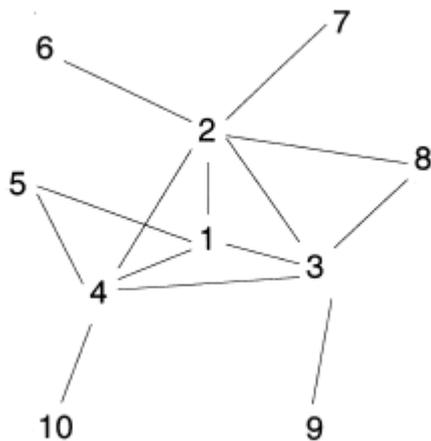


Figure 5. Direct on time information Networks between individuals and organisations.

### 3.4 Examples of the Social Network

As an example, a social circle is created for a building project. The goal of this demonstrative project is to build a new energy efficient building (nZEB2020) for the building owner. All actors that participate in the building project on some level are connected to the circle.

- **Building Owner** creates a new **Building Project** to the BuildLife.
- **Building Owner** selects the **Building Product Producer** and the **Building Service Producer** from the BuildLife's producer catalog to work on the project.
- **Building Owner** invites the **Building Inspector** to review the conceptual design plan of the building.
- **Certificator** validates the design and the implementation of the building.

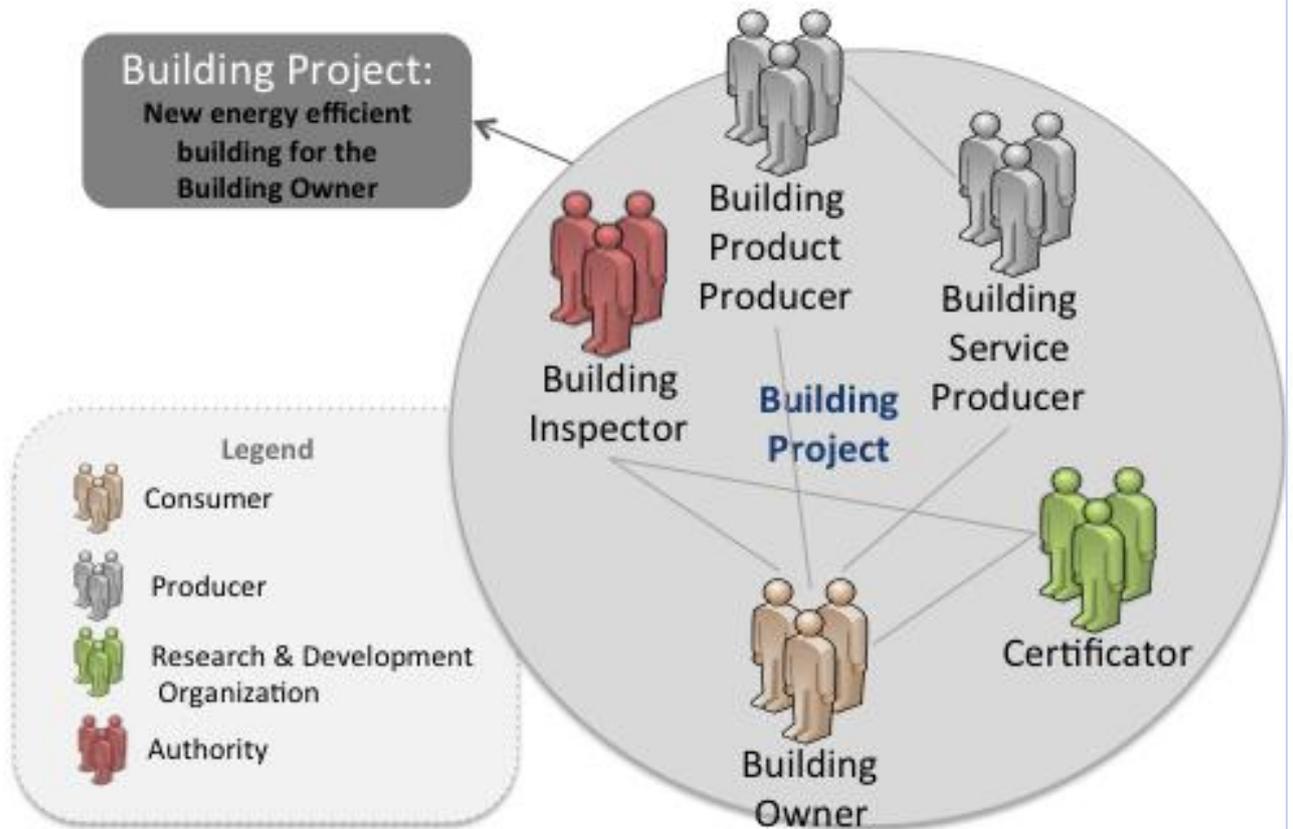


Fig. 6. An example of the development of ECCE Society with Demonstration project.

A **social circle** is created as a demonstration for a client controlled building process. ECCE Working Group is playing the owner of the project.

- **ECCE Working Group** creates a new **guideline object** to the BuildLife. All documents and other information are collected to the guideline object.
- **ECCE Working Group** finds an ongoing building project from the BuildLife. The building project covers the same topics that are described in the guideline. **ECCE Working Group** links the **Building Project** to the **Guideline** as an example implementation.
- Both **Guideline Production** and **Building Project** circles are linked together which enables collaboration between the ECCE Working Group and the other actors with common interest.
- **ECCE Working Group** requests for consultancy on the guideline definition from **Building Inspector**.

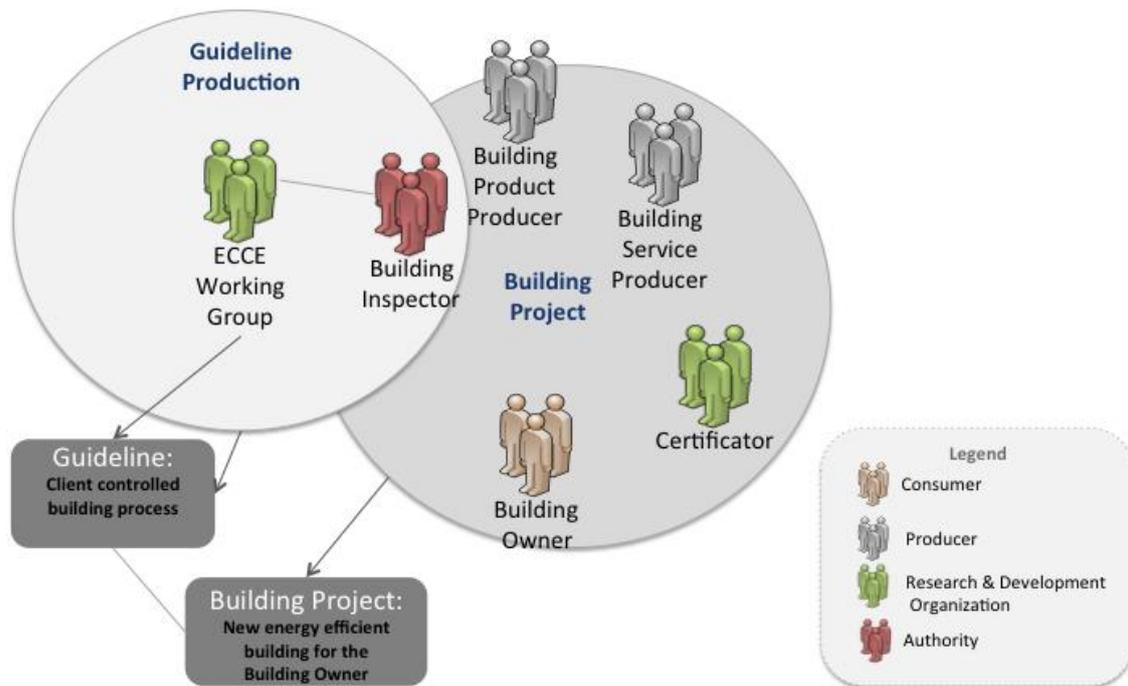


Fig. 7. A schedule of social circles in ECCE BuildLife Network.

#### 4. ECCE Society BuildLife: Project organisation

1. **Leading Group**, to be elected by ECCE ExBo
2. **Project Co-ordinator**: Professor Asko Sarja, Chairman of SC K&T, Vice Co-ordinator: Paul Ruben Borg, vice Chairman of SC K&T
3. **Supporting Group**: ECCE SC "Knowledge and Technology"
4. **Consulting IT company**: Android Consulting, Espoo, Finland (attachment 1) (also developer and owner of the Global Social Network BuildiLife)
5. All **ECCE Members** are invited to follow, comment and otherwise contribute the work in internet.

## 5. Time schedule

### **Software development methodology: iterative and incremental**

Implementation project is managed using an iterative and incremental agile software development method. This approach fits best to the collaborative nature of the project. Results can be reviewed frequently, and it is possible to quickly react to the review feedback and other changes in requirements.

Project is divided into two week iterations. A small increment of system's new functionality can be tested after each iteration. The detailed work tasks are planned in the beginning of each iteration.

### **Project themes: ECCE BuildLife's key services**

The following key services of the ECCE BuildLife are defined, designed and implemented in parallel during the whole life-cycle of the project:

- Social Media and Collaboration Platform
- Concept design of Nearly Zero Energy Buildings (nZEB) 2020
- Lifetime Based Sustainable Civil Engineering
- Commercial Applications
- Administrative applications of ECCE.

The requirements definition of the services is an incremental process which requires much iteration in order to fully understand how the different services interact together.

## 6. Decisions and Actions

### **Project decisions**

The background, presented in the draft Position Paper: "Energy Efficient Buildings" and the **project proposal of SC K&T were discussed** in the ECCE meetings in Malta.

The proposal for development of the final proposal of Social Network BuildLife was accepted by ECCE Expo meeting in Malta, May 2011. ECCE Standing Committee Knowledge and Technology was asked to carry out the **final planning for the acceptance of the project budget and working plan by ECCE ExBo.**

## Next actions

1. Invitation of members to Working Group in July-November, 2011: SC K&T.
2. Defining and presenting the first test version of the internet Network with the help of the Android Consulting Company in October-December, 2011.
3. Testing the test version by Working Group and Reference Group of the Project
4. Development of the internet Network application into  $\beta$ - version, December 2011-February 2012.
5. Second round of testing and commenting the internet Network by Working Group and Reference Group, February-April 2012.
6. Presenting the result: *ECCE Society* "BUILDLIFE" in the Annual Meeting of ECCE, 2012
7. Delivery of the ECCE Social Network "BuildLife" platform for the common use of ECCE members, Annual Meetings 2012
8. Discussion of the activity and further development of the Social Network BuildLife in the Annual Meetings 2012 of ECCE.
9. Continuing the general use and development of the content of the ECCE "BuildLife" Network by all bodies and members of ECCE, 2012-continued.

## 7. Costs and funding

### Costs of the IT consultant

(the Offer of Android Consulting Ltd, for building the IT Network application for ECCE, based on the Global Social Network BuildLife, owned by Android Consulting Ltd)

- Building the IT environment application by IT consultant,  
phase 1: period October – December, 2011 9000 €
- Finishing the IT system, phase 2, period January 2012-October 2012 5500 €
- Operation costs (to be paid by commercial partners): no ECCE payment 0 €
- Working costs of ECCE partners: no payment of ECCE 0 €

**Total cost for ECCE**

**14500 €**

Espoo, Finland, 20<sup>th</sup> September, 2011

Asko Sarja, Chairman of the SC Knowledge and Technology

## APPENDIX: Introduction of the IT Consultant: Android Consulting Ltd



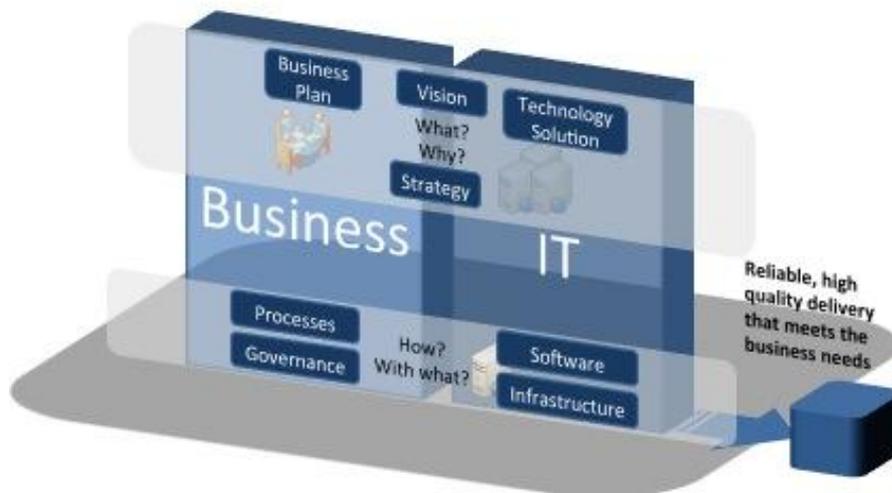
- Innovation factory that creates new kind of service models for different industries.
- Provides consultancy and acts an internet service provider.
- Founded in Espoo, Finland, in 2006.
- Experienced in global projects. Current activities in Europe, United States and Asia.
- Agile company with two co-owners and a wide network of highly skilled subcontractors.
- Experience from many industry domains: civil engineering, TV and media, retail, mining industry, energy sector, finance and insurance, telecom operator business, telecommunications, environmental sector and public sector.
- Strong IT technology and project management methodology knowledge.



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