Energy Counselling and Modern IT
Drawing on Web 2.0 for a Greener World

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Abstract: The aim of this article is to explore how modern IT solutions for collaborative knowledge evolution could lead to more effective energy counselling and increased energy knowledge among the public. Comparative studies have been performed where the focus has been on the prerequisites for effective use of web 2.0 type collaboration and wikis. The research is primarily aimed at actors within the energy sector, although similar developments also take place in other sectors. Targeted investments employing collaborative IT to involve the public in energy counselling could lead to lower energy consumption and an increased consciousness of environmental issues in the society. A conclusion is that web 2.0-like initiatives could play a valuable role in the knowledge development and exchange between energy counsellors, and further the knowledge exchange between the counsellors, the regional energy agencies and the public. They could also help channel an energy interest among the public into a collaborative knowledge production, and contribute to a good quality factual basis for the conceptions that develop in society. This would strengthen both the energy counselling and the energy counsellor corps.

Key words: communities, sustainability, sector transcendence, energy counselling, web 2.0.

I n Sweden, the municipal energy counselling and the Swedish Energy Agency are two governmental actors providing independent advice on energy-related topics to the general public and to Swedish organisations. In addition to these two, there are local and foreign commercial and idealistic actors, more or less obviously representing interested parties. Yet a type of counselling is provided by private individuals and networks of individuals who share their views and knowledge by direct contact, individual websites, blogs, and through participation in wikis. Organised attempts at using the www to consolidate many small contributions and/or the individually limited demand of a multitude to an interesting, critical mass, is called web 2.0.

Judging by the development in other areas, web 2.0-like initiatives will probably account for a considerable portion of the information dissemination also within the energy area in a near future. It is then important that actors like the Energy Agency and the municipal energy counsellors build knowledge on how to use these emerging arenas and not leave the field entirely to others. Web 2.0-like initiatives could be of value to counsellors' knowledge development and knowledge exchange. They could also, and perhaps more importantly, be tools for channelling an interest among the general public into concerted knowledge production and contribute to a sound basis for the energy-related views that develop among the public.

This type of tool thus enables the development of a consolidated body of knowledge by means of a decentralised development responsibility. Knowledge in using such tools could help strengthen the knowledge exchange between the professional actors and the interested public.

The practical contribution of the article lies in the assessment of the possibilities of employing web-based collaboration and self-service technology to strengthen energy counselling and knowledge development among the general public and other actors, such as energy-related enterprises. Improved counselling can lead to lower energy consumption and improved environmental awareness. The theoretical contribution lies in furthering the knowledge on how web 2.0-like initiatives can be used to build and maintain communities of knowing, using the energy sector as an example.

■ Principles for counselling and training

Traditionally, counselling and training has built on the idea that an expert should teach others. But for at least a century, an alternative organisational form has operated based on the idea that a group of individuals with a shared knowledge goal learn together. In Sweden, for over a century adult education associations built on such shared learning study circles have been one of the cornerstones in building our democratic society. The knowledge lift needed at the turn of the previous century, if the political power was to be transferred to the citizens without serious disruptions, was impossible within the then existing educational system. Where to find the competent teachers who could educate an entire population and where to find the money needed for paying them? The study circle came to be the solution (SOU, 2004:8). By

gathering people with a shared knowledge interest, and giving the group leader a facilitating role, instead of an expert role, study groups could form and learn through the active contributions of all participants rather than through the transfer from teacher to student.

The latest decades have seen a growing interest in communities of knowing and communities of practice. These are often spontaneous groupings around a knowledge area or a (professional) practice. The community is characterised by its members holding shared views on who are knowledgeable, on criteria for what counts as "better" knowledge in the area, but also by the members viewing their participation in the community as an important part of their own identities. Knowledge exchange builds on mutuality of some sort, rather than on a trade of knowledge for money (BROWN & DUGUID, 1991; BOLAND & TENKASI, 1995; McLURE WASKO & FARAJ, 2000). Both spontaneous communities and organised attempts at developing communities have been researched (WESTELIUS, 2000; McLURE WASKO & FARAJ, 2000; NEWELL, PAN, GALLIERS & HUANG, 2001).

Now, with the continued rapid growth of the web, the idea continues as wikis and web 2.0. Wikis are collectively developed knowledge repositories where anyone can contribute according to ability and all who want can access and use them. Web 2.0 signifies web solutions that cost-efficiently handle large amounts of people with low individual demand and small individual knowledge contributions, partly by turning customers into prosumers, activating themselves in producing the service (or goods) that they seek. In general, this type of development grows quickly. Provided the increased interest in the energy sector, fuelled by the climate debate, a rapid growth of web 2.0 solutions and wikis can be expected also within the energy area.

To a large extent, energy counselling, as practiced by, for example, the Swedish Energy Agency and municipal energy counsellors, is based on the counsellor as the key person – a classical counsellor role. But to what extent is self service part of the concept? To what extent is it integrated with the work of counsellors and other "professionals", and to what extent is it an isolated track? To what extent does governmentally funded counselling attempt to draw on the general public's thoughts, ideas and solutions? What potential lies hidden here? And are there other actors who try to offer this type of solution if governmental agencies do not? This study is directed at the energy sector, but draws on examples also from other areas.

■ On idealistic collaboration

Since web 2.0 to a large extent builds on the voluntary cooperation of multitudes, it appears reasonable to study the non-profit sector, which to a large extent builds on voluntary, unpaid collaboration around shared interests or ideals. Some initiatives in the non-profit sector aim at spreading the workload among a larger number of people, increasing the contact possibilities across geographical and organisational boundaries, making information available and increasing transparency, often using modern ICT (WESTELIUS, 2007). Such initiatives are in line with what is done in other areas of society, but in the non-profit sector, divergence between the intentions behind the ICT ventures and different individuals' perceptions of the ventures is an even more pressing issue than in organisations where such differences can be at least partly compensated by economic incentives. The same goes for workload imbalances. That the ICT solution actually fills a need and is capable of engaging voluntary contributions, becomes key, and cannot be concealed by economic compensation to those who do not view the service itself as sufficiently interesting to contribute to it or use it.

In attempts to use ICT for support and enterprise extension, there are strong expectations for virtual volunteering – that ICT-supported contact and work models can entice those who in principle would like to contribute, to move from idea to action (WILSON, KERSLAKE HENDRICKS & SMITHIES, 2001; CRAVENS, 2006). It could be to lower the threshold for meaningful participation so that the contribution can remain small but still be experienced as meaningful. It could also be to more clearly show how the contributions lead to meaningful results and to strengthen the community feeling, and thereby increase the will to participate – and the endurance. But in these attempts at benefiting from the use of ICT, the focus is on extending or traversing boundaries, rather than exploring which boundaries that could be needed to build or maintain trust and community feeling needed for meaningful cooperation and communication.

However, there are examples of web 2.0-like initiatives in counselling and support where the boundary-spanning has been successfully combined with the delimited and personal. One is the employers' confederation that, in addition to expert counselling to its members, provides members easy ways of contacting members in their vicinity. "Closest neighbour" is a service where the fellowship in being close neighbours can lend the trust in each other that facilitates the initiation of a meaningful exchange of knowledge and experience. Another example is the health organisation that, in addition

to information and counsel, provides people with an opportunity to get in contact with others who need collegial support in coming to terms with their ailment, or dealing with afflicted family or friends. In these cases, the organisations provide a point of contact, to help people find each other, to mutual benefit. It is then up to the users to maintain contact on their own, or using for example forum or blog facilities also provided by the organisations (WESTELIUS, 2007). In contrast to the practice in an expert-based model, a web 2.0-inspired energy counselling model ought to create such opportunities for individuals to find and contact other individuals sharing an energy interest.

Web 2.0-oriented energy counselling, viewed from a public sector perspective, combines the hope for broad, voluntary collaboration with public sector ability to provide facilitating resources. Thus, there is a larger potential, as compared with strictly idealistic initiatives, to support a venture in crossing the initial threshold until it gathers self-sustaining momentum, or to provide continued support to prevent central actors from beginning to feel exploited and dropping out (GAVED, HEATH & EISENSTADT, 2006). Neither does a public sector venture start from scratch. It starts with the general public's trust – or distrust – in the public sector. What then would the bases be for an Energy Agency-supported wiki as a valuable part of energy counselling and in the development of the general public's energy knowledge?

■ The bases for an energy wiki

In 2006, only 4% of those who claimed to know where to turn for counsel in energy-related questions, saw the web as an important source (ENERGIMYNDIGHETEN, 2007). The development of customs in society is largely outside the control of the authorities, and is rather shaped by commercial and social trends. A year later, little had happened. The proportion who believe they would turn to the web for advice had increased somewhat – to 5% (ENERGIMYNDIGHETEN, 2008). This is at odds with the widespread use of the web in other areas, but it agrees with the tendency people have when facing a problem that appears new to them, or difficult to define. In such circumstances, people tend to prefer to talk to people they hold to be knowledgeable, rather than search written sources on their own. Thus, an energy wiki would in the near future rather be a support for energy counsellors serving the public, or those individuals who no longer feel to be

complete novices, rather than serving as the first point of call for people in general.

This said about the demand side, what about the supply? Public sector resources could help build a substantial content base as a start. From this start, directives and incentives could prompt counsellors, other people knowledgeable in energy topics and researchers with public sector financing to continue building and refining the content. Commercially active energy professionals and the general public could probably be stimulated to participate through culture management and key indicator publishing. Culture management would be important to prevent the venture from disintegrating due to differences in goals and values. Key indicators concerning contributions and use could probably help encourage and motivate the more interested and active into contributing and continuing to contribute. Regarding the long tail of contributors, who probably each bring their single, unique piece of the puzzle, it seems unlikely that they could be directed or controlled into contributing. Their contributions will more likely depend on whether the core (the employees and the most active voluntary contributors developing the content) create useful content and the knowledge about the wiki becomes widely disseminated among people in general.

■ Quality and a long tail?

Are experts and professional gatekeepers needed to get quality in 2.0 approach? Is expert-mediated quality development in 2.0 a contradiction in terms? Is quality an ideological question? Or an empirical one? Probably neither long tail evangelists, like Cris Anderson, nor classical elite expert proponents, like Andrew Keen, denigrating the Cult of the Amateur, will carry the day. Firstly, the spread is considerable, and the web contains both what experts would view as high quality, and content making very marginal contributions. Secondly, the web's possibilities for free publishing with good accessibility have changed the rules of the game, facilitating the rise of popularity regardless of the opinions of established experts. In the energy sector, the official, expert-based Energy Agency website is perhaps regarded as authoritative, but the decision to provide unbiased, general information, rather than specific (for example rating and ranking installation companies or products from different brands, or sharing personal experience of specific entrepreneurs or solutions) leaves a gap that is filled by those

who provide subjective views and advice, for example Värmepumsforum, presented later in the article.

But quality assessment as such can also be developed in a web 2.0 manner, for example the community-based quality assessment in Wikipedia. Top quality of an article in Wikipedia is termed FAC, Featured Article Class, a distinction based on an open review process where anyone can participate and argue for or against the distinction (or try to amend objections raised against the article being of FA class).

JONES (2008) found that for nominated articles, on average hundreds of writers contribute around a thousand edits, producing good factual substance. The difference between articles awarded the distinction, and those that are turned down, is mainly the focus on presentation and linguistic finish. In a Wikipedia collaboration, the article is publicly accessible right from the start, and grammatical and other textual editing will thus be a constantly recurring type of action. This polish helps promote a sense of quality. Consistently, the lack of linguistic finish and sense of well-processed text receives critique in the non-FAC article assessments. The Featured Article Class distinction thus promotes the collaborations that have led to something that feels like a finished product. In a technical subject, like energy, the collaboration between providers of content and form could be especially important. People with a technical expertise – or who can contribute with useful technical observations – could be complemented by energy-concerned but technically less knowledgeable individuals who help polish the text.

We can thus see that there are different views on quality and on the possibility to create quality in web 2.0 ventures. The Wikipedia FAC example demonstrates that there can also be web 2.0-based approaches to creating quality and quality assurance – from a broad consensus perspective rather than a system based on the qualifications of a limited number of designated individuals. The term "collective intelligence" is often used to underpin the idea that a large number of people together can achieve a level of quality that none of them could produce on their own.

MACK (2008) asked people around the world who work with organisational learning and knowledge management what they mean by collective intelligence. Mack's respondents tend to view it as a mutual process that requires a trust for the others involved, and a willingness to let the results influence your own views, and perhaps even your self perception. One respondent says: "The outcome is not another smart thought but a

collective sense-making". This could be interpreted as saying that the important part of collective intelligence is perhaps not that the end result is a piece of knowledge that none of those involved held before the start of the process, but rather that those involved actually understand each other and in that way have created a basis for further collaborative development of their understanding – an idea well in line with the web 2.0 ideal of consensus as the basis for quality assessment, and with an ambition to foster energy-awareness among the general public.

If we believe in the value of collective knowledge development, what are then the basic aspects of the processes that make such knowledge development happen?

Knowledge management

It is widely viewed as important to collect and use the knowledge that exists and develops in an organisation in databases, in text and in manuals, or by furthering dialogues, meetings and support for human contact. This calls for micro communities (small groupings) and expert networks, it involves finding ways of turning experience into words and images, for example through mind mapping, other visualisation techniques, and storytelling. Knowledge sharing and development largely builds on that those involved trust each other. And to develop trust, traditionally, personal contact in small, delimited groups is needed. Others, like KOLBITSCH & MAURER (2006), instead start from the new contact possibilities that the web enables; large amounts of people exchange and develop material without having personal contact – a development of collective intelligence on a far larger scale than the intra-organisational, maybe even a global one [1].

Many of the tools available encourage making the private knowledge and experience explicit. Wikipedia, for example, calls on people to contribute to a collective body of knowledge by contributing according to ones ability – adding content, reformulating it or checking its quality. In other cases, the collective, bottom-up classification and the development of the classification (folksonomies) are central to the development of a useful body of knowledge or user-generated resource. Image sites, such as flickr, entice users to

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[1] Below, I will return to the question of whether the web forms the basis for a truly global ICT-based open community, or if in reality there is a multitude of relatively closed micro and macro communities.

contribute meta-data – to use terms and labels to try to describe what a certain image depicts or means to them, so that others have a greater chance of finding that particular image when exploring a label that interests them. And the category, the label, can inspire someone else to add new pictures.

Social services, such as del.icio.us, encourage their users to contribute links they find valuable, and labels, classifications of what they consider that the target document (published by someone else) actually is about. The classifications can then entice others to provide links that they consider important in that specific subject, or agree or disagree with previous assessments. If popularity is a measure of quality, then this becomes both an assessment and an orientation system. Google and other search engines find sites according to an algorithm that is hidden to its users. Social link sites provide guidance by collecting and organising assessments made by individuals, an aproach not yet systematically applied in energy counselling.

The type of collective intelligence offered by these tools has its pros and cons. Although many sites have some kind of assessment process, where visitors can provide their assessments, there is no assurance that these assessments mirror any quality aspect other than popularity [2]. The notion of what the appropriate quality criteria are can also change with the topic and the situation. Wikipedia, with its striving for objectivity and breadth of coverage, has become a favourite example of successful crowd intelligence, or broad collective co-creation. Wikinews, on the other hand, with the same ideals of objectivity, has not at all reached the same prominence. There, blogs and the discussion pages provided by newspapers and tabloids, with their explicit discussion among individuals who each provide their subjective view, appears to better match what people view as interesting and rewarding when it comes to news. Regarding energy counselling and awareness, form and personal touch, not just content, are probably important in catching and keeping people's attention.

But the potential of web-mediated collaboration does not only lie in developing individual interesting sites, such as Wikipedia, flickr or del.icio.us. Ways to find, and automatically connect, material from different sites increases the size of the collective and the potential body of knowledge.

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[2] As noted above, the quality issue is complicated. What is quality? Are the "expert's" quality criteria obviously the best ones? And is the knowledge of "certified" experts better than that of many uncertified individuals? One conclusion is that there is no global quality criterion. The relevant questions are instead: relevant according to whom and according to which criteria?

The web and the content – finding and linking material

A Google search for "home heating" returns 1.4 million hits; "heating system" returns 4.5 million. Could this be consolidated? Below, I present ideas and approaches to finding and utilising material in addition to what can be found on, or explicitly linked with, a particular site.

Combining computer use and social networks could help capture more of the potential in collective knowledge systems. Meta-data in machine-readable form, developed by people who cooperate in social networks, would make it possible for computers to assist by linking pieces emanating from different sources. How this could be accomplished, GRUBER (2008) exemplifies with RealTravel, a site where users can post their stories, images and ratings from their travels. To make the material computer-treatable, users classify their postings using existing or own terms, and provide some data that describe themselves. Based on the material thus collected in the site's database, people who wish to travel, and provide some data regarding themselves, such as destination or area, age, interests and preferences, marital status, length of travel, etc., can receive suggestions, descriptions, stories, assessments and ratings written by previous travellers. But so far, this is just a solitary site.

The value increases when the computer can aid by linking to hotels, travel agencies, airlines, and from them provide information such as currently available supply and offers. It is in the combination between the content of social network sites, such as RealTravel, and such extended linkage of "semantic web" type that the greater potential is to be found, according to Gruber. One could envision similar energy-focused sites, e.g. building on home owners' descriptions of their systems, and their experience, classified using common terminology making them easily searchable and linking to retailers, installation companies, consumer associations, etc.

The vision is appealing, but when it comes to decentralised generation of meta-data, users might place labels that are primarily useful to themselves in orienting in the material, while perhaps being unintelligible to others, or not providing bases for accurate further linking. ANGUS, THELWELL & STUART (2008) studied the user-generated classifications on flickr, the image site mentioned above. They found that users typically entered a number of labels per image, and that the labels showed a considerable variation. The conclusion was that the classifications were mainly meaningful even to others than those who had entered them, and that the variation

corresponded to the richness of natural language, and thus mirrored a nuanced description of the pictures, rather than constituted a weakness. However, not all images were classified. 14% of the images had no labels at all (while one image had 629 labels). If it is important that we find all images of a certain type, this user-generated classification is thus not reliable, but if our goal is to find interesting images that to us have a bearing on a certain concept, the search results could be more than sufficient.

Statistics that greet you on flickr's site indicate that this is the case. "3,842 uploads in the last minute • 160,129 things tagged with 'morning' • 2.8 million things geotagged this month." [3] Is it really important to me that a seventh of the images on this site are not labelled, and that there are consequently probably 25 thousand images that could have been labelled "morning", but are not? The problem with incompletely classified material is thus small if the quantity of available material is sufficiently large. Flickr's present popularity both leads to, and shows, that the image collection and the search possibilities in it are valued by a large number of individuals. Possibly, it could also serve as a basis for further linking. The challenge, in an energy-counselling setting, is then to reach a sufficient volume and popularity.

If we cannot fully rely on user-generated meta-data, can we instead use computers to interpret content? Computer-aided text interpretation has been an active area for decades, both in research and commercially. As an alternative to individuals cooperating in social networks by providing web pages with meta-data, there are consequently those who try to develop computer capabilities for judging the relevance of a text. For example, EARLEY (2006) identifies commercial ventures searching blogs, etc., on the web to get an impression of how different organisations are mentioned – if the ways they appear build positive or negative images of the organisations. Here, machine-based interpretation appears as a more appropriate alternative than user participation.

This type of application deals with all material on the web, not just that which is created within a specific social network. In addition, it is not obvious which incentives would make all those who write about a certain organisation label their postings so that automatic identification and assessment of the mention of the organisation would be possible.

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[3] Visited 2008-10-26.

BOJĀRS, BRESLIN, FINN & DECKER (2008) instead suggest using traces of human contact patterns – Friend Of A Friend (FOAF). By developing search engines that can follow the chains of who has written on a blog, who has participated in a forum discussion, etc., and then see what else they have done, it would be possible to link material that would otherwise probably not have been found. Bojārs et al. claim that this could provide hits with more data of higher quality than today's searches. (They intend that you start from a posting that you have found interesting, asking the search engine to find more material by tracing the posting's author and net of contacts.)

There are thus different approaches to extending the material a user can use at a specific instant. Different technology-based or user-based ways, and combinations of them, exist or are being developed. Imagination and experimentation could help determine how they could be utilised in energy counselling. But collective intelligence, or the strength in collaboration, is not only a matter of collecting and linking pieces of the puzzle more or less automatically. It is also, as indicated in the Wikipedia quality assessment example, a question of achieving explicit collaboration, in direct (possibly ICT-mediated) communication with others.

Working, computer-aided collaboration

An intended collaboration can collapse because the coordination between the parties failed. In collaboration between parties in direct contact with each other and physically present in the same place, there are good possibilities of identifying and repairing coordination problems (cf. DESCOLA in GROUSSIN, 2008; or WESTELIUS, 2001, 2003). In electronically mediated collaboration, and especially if the parties act at different points in time (asynchronously) the risks increase that problems remain undetected and are not dealt with. ALTERMAN (2007) highlights how conversation structures and coordinated representations have important roles to fill. Coordinating representations (such as the watch or the traffic light) help smooth our collaboration provided that we know how to interpret the representations. Menu systems, icons, indicators of work-in-production or stage of completion, etc., can aid us in electronic settings, but are not always sufficient to ensure that the collaboration works. Conversation structures, that we either build when needed, or that are already established in a certain collaboration setting, then make it possible for us to identify and remedy discrepancies. The editing comment in Wikipedia informs other contributors

of the scope of an edit, and, let us hope, the thought underlying the edit. The editing comment, and the log of previous, saved versions of the article, are coordinating representations, meant to coordinate the collective development of the article. When they do not suffice, a discussion should be held by postings on the discussion pages. But an inspection of them (the examples below come from the discussion page to the article "Heat_pump") show that the dialogue can sometimes become heated and less constructive, and that procedural issues regarding the dialogue surface.

One example is OrbitOne [Talk|Babel]'s posting 20 January 2007 on the discussion page http://en.wikipedia.org/wiki/Talk:Heat_pump:

"1) Do not remove posts from the talk page, even if they are your own",

and cbrettin's answer:

"First up yes I admit deleting my discussion was a little rough",

and so on, where cbrettin acknowledges the breach of the intended conversation structure, and that the conversation structure is now agreed on in this respect. Furthermore, it attempts to explain in what way earlier postings, and deleting them, were attempts to deal with problems in the heat pump article.

When the conversation structure works, it can lead to feedback to the contributors about how well their contributions work for the intended target group, for example illustrated by Slrubenstein's comments in August 2008:

"Okay, the previous two comments just confuse me (nothing can be 100% efficient by one definition, but that isn't the definition here) -- as I said I am not a pysicist or engineer, but I assume the article is being written to help educate people just like me. The point is not to deocument an argument over how efficiency "should" be measured, the point is that the article has to explain clearly what is going on. I wish it did, but so far it does not." (sic)

And, after the next posting in the discussion:

"Is it possible for someone to explain all this -- and the physical laws behind it -- in the article in a way that is still accessible to people like me?"

In this example, the coordinating representations, supported by the established, and here, re-established, coordinating conversation structure worked. The discussion – and the development of the article – continue, but

based on a mutual check that the goal to write informative articles aimed at the general public is adhered to.

So far, I have focused on the potential for wide-participation ICT-mediated collaboration in building and using knowledge (and attitudes). I now continue with the difference between potential and execution.

Potential and execution

Do people share? And do you really collect what different individuals know? In an organisation, there can be distinct advantages of attempting to collect what the different individuals know into a shared image. "If we only knew what we know…" expresses the often large discrepancy between the sum of the pieces of the puzzle that the different individuals in an organisation have access to, and the image any single person can access.

In principle, that gap could be bridged, partly with the help of databases and communication tools. But prioritisations and the balance between short-term tasks and more long-term ones tend to be some of the reasons why practice diverges from ideal images of knowledge collaboration. In a study of some 70 small and medium-sized enterprises in Hong Kong, CHAN & CHAO (2008) find that 90% do not consider that they have time to spend on knowledge management activities. Quotidian work is so full of tasks, that endeavours of an investment character, such as sharing or registering data that someone else might need in the future, is not prioritised. Furthermore, less than 30% of the companies have some type of IT support for knowledge management, despite the fact that most of them have more than 50 employees, and thus not everyone could expect to be in direct contact with all the others.

The lack of – or deficiencies in – ICT support could be another limiting factor. Experts assembled in 2001 to discuss intranets as tools for organisational learning (JACKO, SALVENDY & SAINFORT, 2001) noted development needs regarding organisational attitudes and routines, but also technically oriented development needs. Since then, rapid technological development has given rise to a number of usable tools, not only for use within organisations, but also for collaboration between individuals outside organisational borders – both private individuals and people acting in their professional role. This does not mean that the technical environment today is complete and free from problems, but now, widely disseminated technical solutions exist for many of the challenges faced at the start of the century. At

the same time, KOLBITSCH & MAURER (2006) claim that the general attitude to collaboration has developed in a way that makes it natural for large groups to engage in things like Wikipedia, RealTravel, MySpace, and YouTube.

Demonstrably, there are now both cultural and technical prerequisites for collaboration between individuals where collections of user-generated content on a large scale render results that large groups view as worth spending time on using – and contributing to. But there are also examples of large ventures that have faltered or failed – because the idea was not sufficiently strong to reach a valuable scale, because those who contributed tired and dropped out, or because the venture was sabotaged (see, for example, the GAVED, HEATH & EISENSTADT (2006) study of geographical wikis). There is thus no guarantee that a specific venture will succeed, but provided that it is an area that interests many people, in a way that many find important, and that those who support the venture initially have the resources and the tenacity to see to it that the venture reaches such a scale that it becomes viewed as valuable by a sufficient number of people, chances are that it will succeed. It does not require that everyone who could, actually contributes fully. Like in the flickr example, chances are that a site that many experience as interesting and useful will not suffer from inadequate contributions.

"Many", "a sufficient amount", "the long tail", etc., are fuzzy concepts. Some people claim that the Internet in principle enables global contacts and can connect the entire world. But Internet use, even though large and widely disseminated, is still far from including everyone. According to Internet World Stat's numbers from the summer 2008, more than 20% of the world's less than seven billion people were Internet users, with shares reaching from Africa's more than 5% to Northern America's 75%. In Sweden, the proportion of users in the population of 16 years of age is over 80% (FINDAHL, 2008). But to what extent are the users of the global network of the Internet in contact with each other, or could reasonably come to get in contact? A clear and precise answer to that question is not available, but the image of the global, virtual society can at least be nuanced somewhat by a closer look at how social networks work in the Internet setting.

It has been claimed that there are hundreds of millions of blogs, connecting to form the blogosphere. However, Technorati, claiming to keep track of "citizen media" – blogs, photo and video sites, rating sites, etc.,

listed 113 million blogs in 2008 [4]. But related to their figure of 1.6 million updates per day, this would either tell us that the average blog is updated once every 70th day, or, more likely, that only 10% are active. (1.6 million updates per day could provide for one update a week for 11 million blogs.) Probably the distribution is much more skewed than that, with a rather small number of highly active blogs. Still, with millions of blogs around, are they connected to a global whole?

In a Chinese study of blogospheres at the Sina blogging network with two million registered users, the ten most popular blogs had tens of millions of page accesses per day, which would amount to five or more page accesses per user per day on average. However, studying how the blogs linked to each other, it turned out that 30% of the blogs at Sina had no links at all. The others had some kind of link to each other, but the distance between the most distant blogs was 27 clicks, that is, you would have to follow a chain of 27 links to get from one end of the blogosphere to the other. Thus, in practice, no one could be expected to move through the blogosphere from end to end. Typically, the blogs were interlinked in small clusters, linking to central, more popular blogs, and on to other, small clusters. (The blog with the most incoming links had 13,341).

A classical experiment often used to support the idea of a strongly connected world is Milgram's friend-of-a-friend delivery of letters, where people in the American Midwest were told to convey letters to a by them unknown person on the east coast, by handing it to a friend, who would hand it to a friend, etc. (MILGRAM, 1967). On average, it took five handovers for the letters that eventually reached the addressee to get there. However, most chains were broken – only one letter in five reached its destination. Rather than claiming that he had proved that it is indeed a small world, Milgram noted that five handovers is an enormous distance, socially speaking. There is little reason to believe that you would ever get in contact with a friend of a friend five times removed. And it is unlikely that a FOAF-based social network search extending even five clicks would be useful. Chances are that topics dicussed at that social distance would not be relevant in the specific, for example energy-related search context. Thus, Internet users around the globe could not usefully be viewed as one connected body, certainly not from an energy perspective, but rather as a (very) large amount of communities and loosely coupled networks.

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4 http://technorati.com/about/ accessed 2008-08-19.

Are there, then, any noticeable communities of energy-focused people, or of counselling nets that could inspire an energy-focused venture? Let us take a brief look at three.

The Wikipedia energy portal
(en.wikipedia.org/wiki/Energy_portal)

WikiProject Energy seems to have started in 2005 and is now a large collection of articles on types of energy; energy saving; politics and economics, etc. As the name indicates, it is a portal within Wikipedia, trying to collect and organise energy-related articles and bringing together people with an interest in energy issues. Building on Wikipedia, the project has thus already shown that it can generate considerable volume, and of seemingly good quality and up to date. But because of the wiki norms, the articles can offer a lot of material on energy, energy production, buildings, standards, etc., in general, but no counselling. Someone interested in heat pumps, for example, can read about basic principles, construction, applicability in different parts of the world, energy efficiency, etc., but can find no advice on brands or installation services, for example.

Värmepumpsforum – heat pump forum

A niche player trying to close that gap is the Swedish site Värmepumpsforum [5], a forum specifically dealing with heat pumps, not energy in general. Started five years ago by a private individual, it shows considerable activity, having collected a couple of hundred thousand postings from tens of thousands of contributors in some ten sub-fora. When I visited the site, hundreds of users were active. Questions asked tend to be specific and receive answers – on average about ten answers to a question. The profiles users enter typically describe the users' house heating system(s), and thus provide an idea of that contributor's experience base.

The forum is open to both private individuals and professionals, but to some extent under different headings. Anyone can participate in the discussions with sincere advice and questions, but not marketing, save for in the specific forum "suppliers". Discussions on specific brands and products

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[5] www.varmepumpsforum.com

are common, and it is also possible to submit requests for proposals, that will then be checked for completeness by the site managers and sent to suppliers in the vicinity of the requester.

aAQUA, almost all questions answered

RAMAMRITHAM *et al*. (2008) present an interesting project, aAQUA, for Internet-based counselling in agriculture. It is tri-lingual (English, Hindi and Marathi) and has a self-service interface. Unlike other systems, aAQUA provides access to all three languages in parallel, while a specific topic might not exist in all languages and it would not be uncommon for users to have some knowledge in two or all three languages. In addition to the self-service database with questions and answers, organised by topic and searchable by keywords or through diagnosis dialogues, the system provides possibility to ask experts. The experts consist of a large network of people who choose how much or little they want to work with answering questions. However, aAQUA promises that a question will get at least one answer in 36 hours. The competence of the experts is signalled by organisational affiliation, etc.

■ Conclusions

Wikipedia's energy portal shows that it is possible to direct voluntary efforts in a web 2.0 fashion to build a large and rich collection of information on energy-related issues. The Swedish Värmepumpsforum (Heat pump forum) shows that a focused, energy-related forum can exhibit considerable vitality once it reaches a sufficient volume, while simultaneously, the individual visibility of those who contribute probably plays an important role in sustaining the level of contribution among the prominent contributors.

The forum also shows that it is possible to achieve a working cooperation between business people and private individuals, between idealistic and commercial actors. If Värmepumpsforum is a counselling service that has grown organically from a grass root initiative, then aAQUA is a venture of the same age that has been nurtured by the support of authorities and NGO development funds. aAQUA testifies to the possibility to build a functioning service based on a wide network of experts who contribute to a degree that they each choose themselves, but based on a user-centred service level agreement (answer within two days). Energirådgivningen.se (the Energy

Counselling), finally, displays a fairly broad attempt at collaboration among energy counsellors, but a venture that so far does not actively benefit from web 2.0-like initiatives. Thus, there is room for development.

There is considerable attention on energy-related issues in society at present, but those with an interest in such matters do not constitute a community. Rather, the field consists of a large number of partly overlapping, partly clearly separated knowledge areas. If, for example, the Swedish Energy agency and the energy counsellors want to benefit from, and contribute to, a more user-generated energy counselling, it is a question of supporting an ecology, rather than establishing a site – an ecology where the energy authority's efforts and financing is just one of the contribu¬tions, although rather large and with considerable resources.

One way of supporting the ecology is to strengthen the interlinking. This could be more expert-based, for example by tracing and identifying different spheres, and by actively participating in their discussions and referring to other topically related spheres. It could also be more web 2.0-like, by creating and marketing a central site, where those who have found a good, energy-related site can add links and searchable descriptions of it (akin to del.icio.us). Inspired by the multilingual aAQUA, it would also be reasonable to open up for multilingual contributions and links – to better cater to a multilingual Sweden, and to better benefit from sources abroad.

It could also be important to not just focus the energy counsellors and the "end customers" in the ecology, but also to investigate how, for example, individuals with an intense energy engagement could be supported. In other areas there are technical blogs, for example in software development, where knowledgeable developers share their insights and experience and provide an image of their business by writing a blog, and keep updated on what others are doing by reading their blogs. This probably exists in some parts of the energy sphere, too, and could be expected to increase in line with the general growth of blogging. Such blogs are hardly of interest to the casual consumer, but those with a fervent interest in energy issues could probably benefit from them in maintaining and developing their competence. One way of supporting this would be to develop summarising and integrating blogs, using RSS feeds from interesting blogs to tie together and to provide an overview of current developments, and to encourage both the spread of links to these integrating blogs, and the provision of tips of yet other interesting blogs that could help improve the summaries. Thus, an actor like the Energy Agency, could act to development a web 2.0-like energy-focused ecology.

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