the Dandelion Project

may 2010

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Creating the Foundation for a Sustainable Future

Project Team

Storrm CS
Harry te Riele
Noud te Riele

Lange Beestenmarkt 76
2512 EH the Hague
http://www. storrmcs.nl

Except Integrated Sustainability
Tom Bosschaert
Eva Gladek

Stadhuisplein 15
3012 AR Rotterdam
http:// www.except.nl

and Vincent Kneefel

for

Ministerie van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer

Dutch Ministry of Housing, Spatial Planning, and the Environment (VROM)
Frans Vollenbroek, Onno van Sandick, & Arnoud Passenier

Postbus 20951
2500 EZ the Hague
http://www.vrom.nl

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The Dandelion Project

We can see a future where societies and economies flourish, drawing strength from their locally abundant resources.

In the deserts, energy flows freely from the sun. On seashores and mountain ridges, wind towers harvest power for neighboring communities. In river deltas, gradients between salt and fresh water serve as local batteries. Lithium is mined from the oceans. Precious metals are recovered from wastewater streams by bacteria. Carefully designed ecosystems produce abundant and diverse supplies of food year-round.

This multitude of resources already surrounds us. The question remains: how can we transition from our current extractive economies to locally refueling economies of abundance?

The concept outlined in this booklet presents a step on the path to answering that question.

Welcome to the Dandelion Project.

Welcome to the Dandelion Project

Dandelion is a new concept for an interactive online tool that could catalyze the movement towards a more sustainable society and an economy of abundance. The tool combines elements of a search engine, an online encyclopedia, a user-driven content generator, as well as a social networking device.

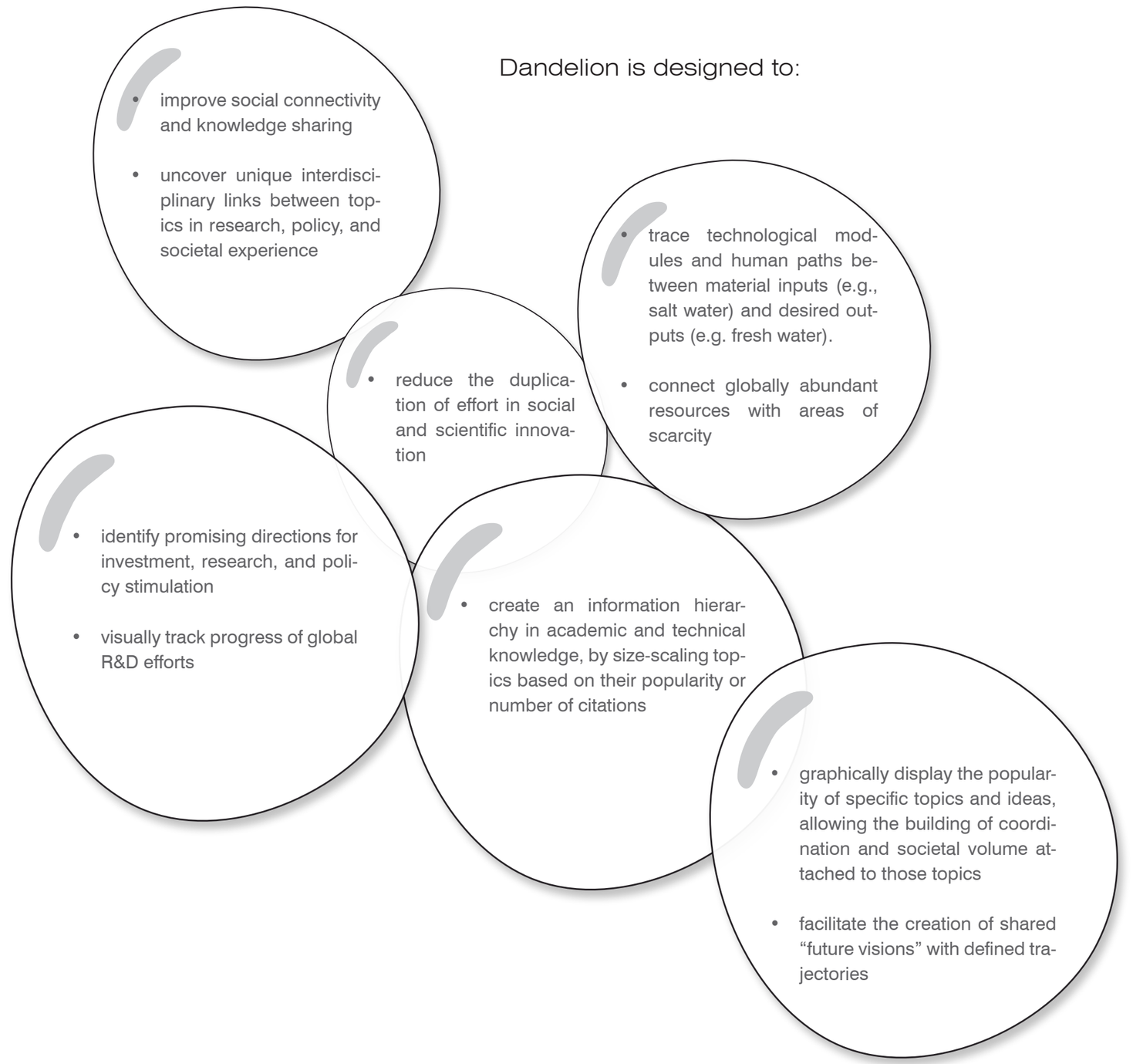
As a visual Wikipedia, Dandelion allows users to navigate through a spatially-displayed network of information that makes intelligent connections based on keywords, usage patterns, and social networks. It also provides opportunities for interaction between different communities and social volumes through its spatially-embedded discussion groups and blogs. Perhaps most interestingly, it is also designed to connect specific problems or needs with potential solutions in response to direct queries.

The ultimate goal of this mode of informational display is to rapidly uncover new connections between concepts and people, and to highlight the common paths we are traveling in our efforts to innovate towards a sustainable future.

It is now commonly acknowledged that it is not a lack of technological capacity that prevents us from moving towards a more sustainable version of our society. Rather, it is the lack of organizational capacity, coordination, and build-up of critical societal mass. The complexity and enormous volume of information our society generates makes it difficult to intelligently filter data for relevance and value without an enormous time investment. Governments, researchers, and companies often end up duplicating one another's efforts, or not benefiting from partnerships and interdisciplinary connections that they could not see. Relatedly, policy makers and investors often have difficulty seeing the larger trends in problem developments or technological innovation because the informational landscape is so vast and scattered.

By visualizing and intelligently organizing information, Dandelion is designed to directly address some of these problems, using a very simple interface.

This document presents a conceptual outline of how TheDandelion Project might look and function. It also details some of the next steps we envision along the path towards further developing the tool. We are now seeking partnerships and support for launching The Dandelion Project pilot.



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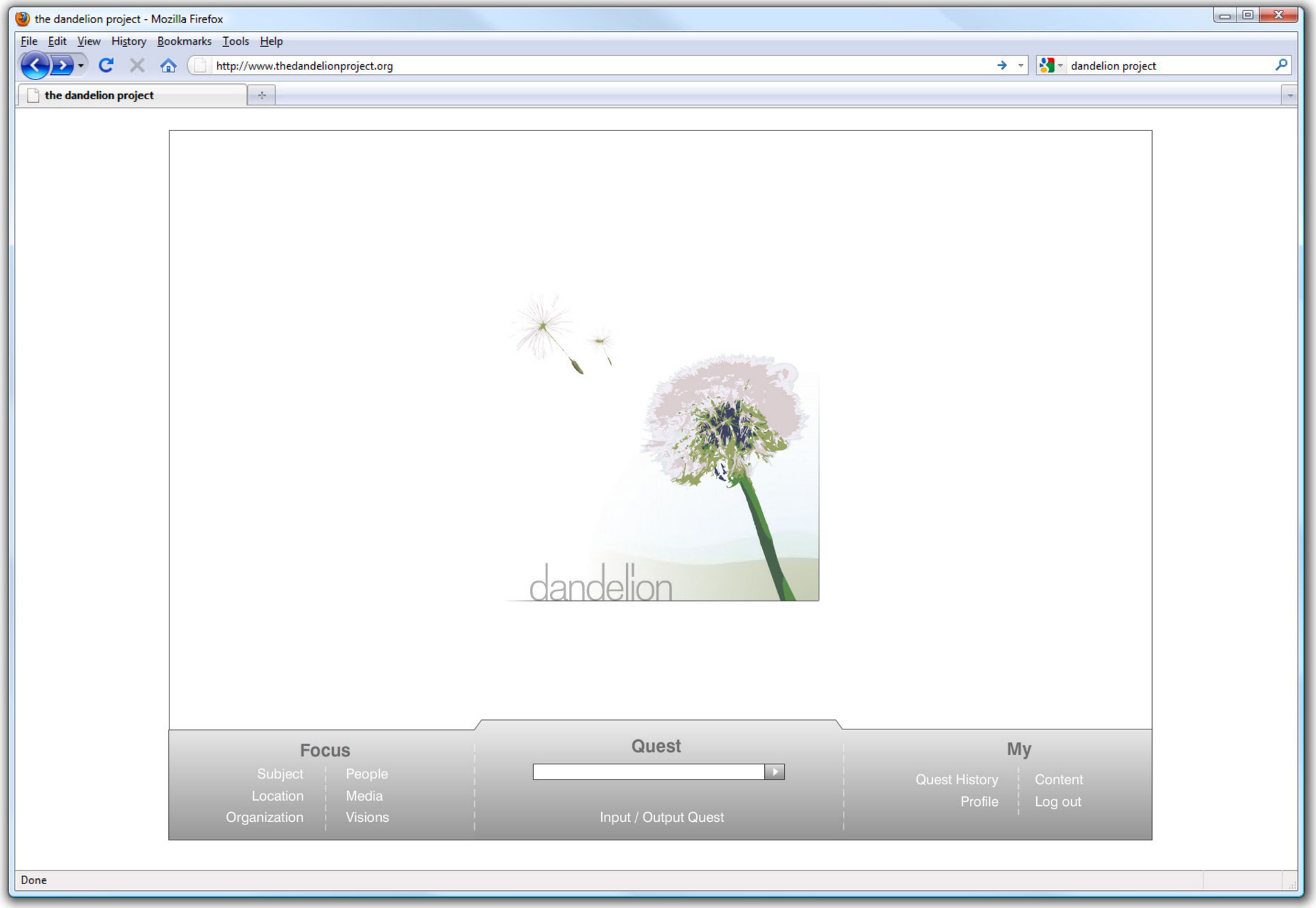
The Dandelion start-up interface:
Users can begin a Quest, or log in to access their saved information and profiles



Interface & Search Features

The Dandelion Project is a web-based portal, which, upon launch, displays a network of information: an infinitely-stretching universe of molecular structures that fade into space. These molecular structures are made up of interactive bubbles of many different types. Some of these bubbles represent people, others represent concepts, technologies, products, institutions, media, or events. These are all linked together in an automatically-generated structure. The display configuration can be changed by the user at the click of a button, altering the focus from "subject-based" to "location-based," or a number of other options.

This information network is the user's playground. It can be explored and interacted with in various ways, as well as queried directly for answers to certain questions.

Searching in Dandelion: text-based, spatial, or input/output

There are three unique ways to search for information on Dandelion: text-based, spatial, or input-output.

Text-based searches, called "Quests," use typed keyword inputs as a means of navigating the visual structure of the tool. Though each Quest begins with a single keyword, users can continue adding terms using Boolean logic separators, progressively refining the outcome of their search. Throughout the search process, the visual display updates in real-time as keywords are added and the Quest history stays visible.

Spatial searches allow users to physically navigate through the visual information display by panning, zooming, and clicking on areas of interest. The clicks re-focus the visual display and zoom in on the detailed structure of each area, allowing deeper exploration. This kind of search can be combined with an initial text-based entry.

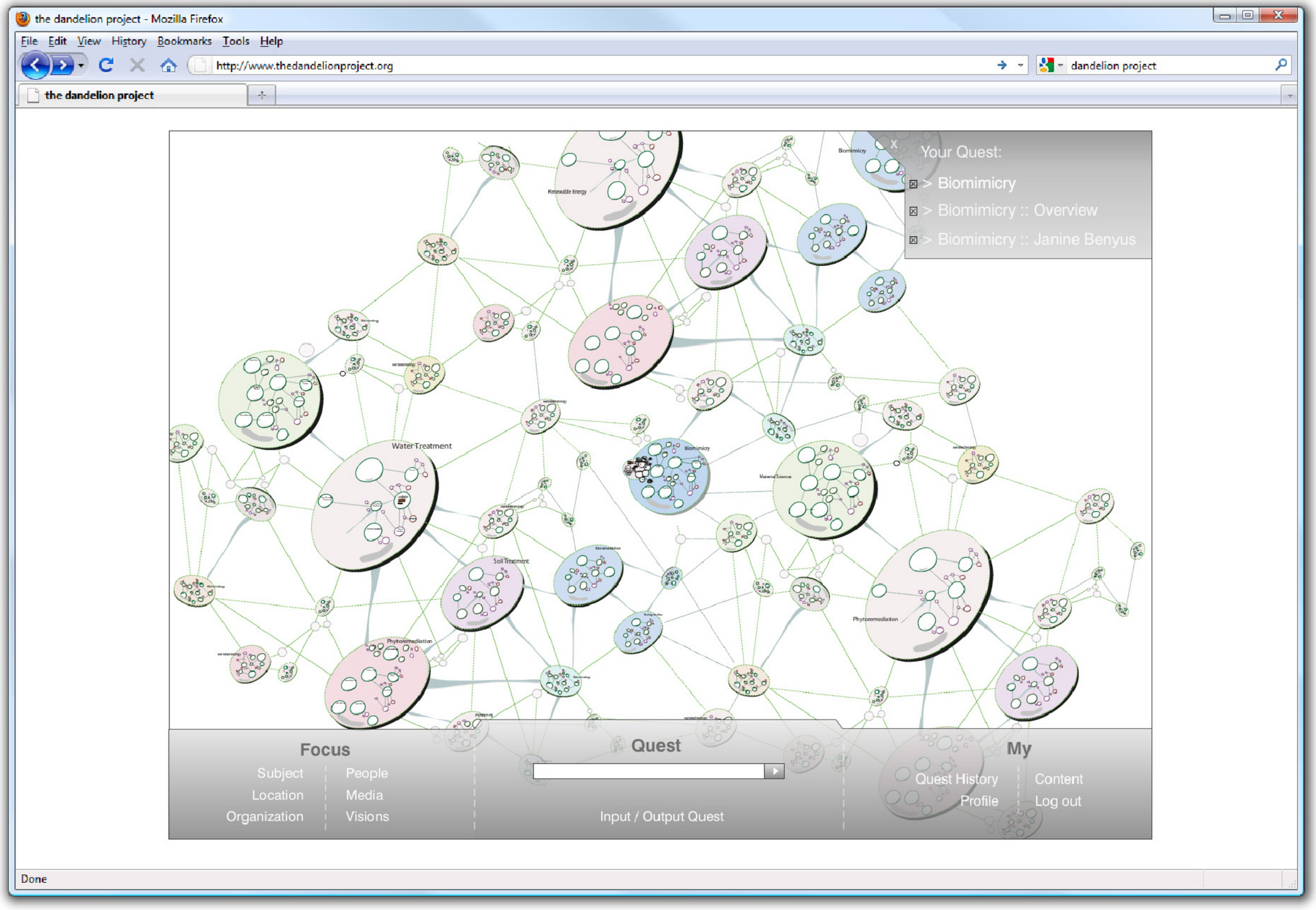
The Input-Output Quest feature is the most exciting and unique aspect of the Dandelion search options. Each technology or product entry within Dandelion has a special set of keywords: the material inputs and outputs associated with that item. For example, "desalination" has salt water, energy, and semi-permeable membranes as some of its inputs, and fresh water and brine as some of its outputs. The input/output keywords are not meant to be 100% accurate, but rather to serve as a rough guideline for connecting up larger scale material and human resource flows. Thus, if a user enters salt water as an input, and fresh water as a desired output, the program will map all of the possible technological paths that can achieve that material transformation. It can also reveal companies, people, and geographic locations associated with that path.

As a result of Dandelion's ability to automatically search for connections between inputs and outputs, it is also possible that new answers will be generated that have never yet been considered. As an additional use of the tool, unlikely paths and connections can be explored. For example, one could enter "chocolate" as an input and "platinum" as an output and see what paths might emerge. It is uncertain what value such explorations could yield, but there is certainly the potential for the discovery of something new, such as novel industrial symbiosis opportunities.

On an immediately practical level, the Input-Output Quest can allow governments, researchers, business owners, investors, or local communities interested in particular areas of research to uncover the full technological landscape associated with a certain material flow. A community interested in local transport options can enter "human transport" as an output, and receive a full menu of possibilities to match to their particular situation.

Finally, because Dandelion is a modular system, other search approaches can always be added on as user needs become articulated. For example, popularity-based searches, time- and activity-based search options (i.e., displaying recently added topics), or detailed human networking searches may be a desirable feature to eventually include.

Random Entry Point:
Once Dandelion is entered, it displays a random section of the informational network, inviting users to explore by panning and clicking through



User Profiles & Feedback Mechanisms

Users of Dandelion have the option of commitment-free and anonymous use, just as in the case of a typical search engine. However, they also have the option of creating a user profile. Through the profile, users will be able to record and save their search paths through the data network, upload data of their own into the system, or participate in relevant discussion groups.

New profiles will automatically be made into "person bubbles," connecting the user to the system by locating them visually within it. Each profile will be placed within a network of geographically or topically related individuals. Items or people of interest will then be suggested during searches based on the memory embedded in the user profile.

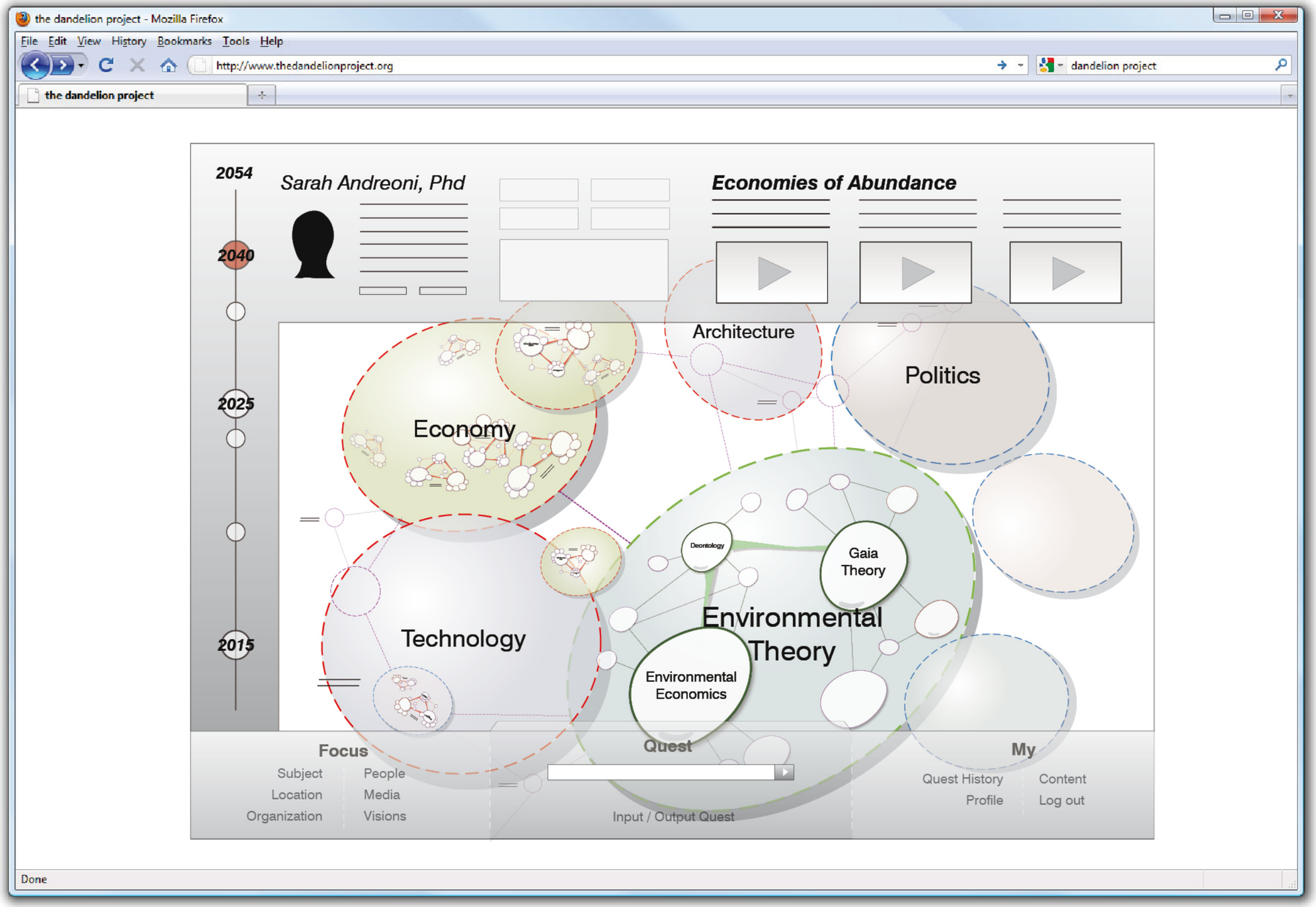
The size of a "person bubble" as visually displayed within the network will vary based on the number of connections that person has with other content in the portal (including connections to people, citations, or even clicks from other users). This kind of simple visual feedback will be a means of encouraging further user participation, and an incentive to become more connected within the network.

Visions of the Future

Another core feature supported by The Dandelion Project is the linking of individuals and groups based on their shared visions of the future. Each user can create such a personal "future vision" in a special section of his or her profile. This vision will include a selection of the developmental trajectories that he or she finds most promising or interesting (whether technological or social). The mechanism for this vision-creation will be facilitated by a simple check box questionnaire to start the process. The ability to drag-and-drop items of interest into one's own profile will allow visions to build up organically with use, through a sort of bookmarking mechanism.

These visions can then be given names or categorized into types, and aggregated into common streams that emerge from user participation. The popularity of each vision track will be shown in the "vision-focused" data display option, so that users can get feedback on what the most popular ideas about the future are any given time.

Dandelion User Profiles:
Individuals will be able to construct personalized "future visions"
made up of the social and technological elements that speak to them most



Information Architecture

Data Mining: automated and manual

There are two ways in which data will be gathered for placement in The Dandelion Project system. The primary means will be automatic, through search-engine trawling and searchbots. This data will be filtered into different categories and placed into a pre-determined database structure. From this pre-loaded data structure, the tool will begin to evolve and grow on its own through a stream of user-generated content. Webforms will be available for modifying existing topics or creating new ones, which will refine the quality of available information.

The Dandelion Project will initially be launched with a pre-loaded data structure that will be used to attract a first wave of participants. It is likely that this initial stage will require some manual data corrections and inputs to fix bugs in the automated sorting algorithm.

Once a pilot Dandelion Project is in place, invitations will be sent out to a targeted group of researchers, inventors, business owners, policymakers, and others in order to jump-start the pool of participants. The type of data initially displayed in the pilot version as well as the kinds of people initially solicited will very much set the tone and direction for future development of the tool.

Setting up partnerships with existing organizations / sites (for example, Wikipedia, Google, Flickr, YouTube, LinkedIn, or Facebook) would also be a sensible approach for gathering a large amount of data and tapping into existing networks.

Within a system such as The Dandelion Project, various incentives exist for user-driven data input. For companies, the goal could be exposure, advertising, and uncovering new client bases. For academics, motivations are similar, in that coverage of their research is an important means for securing future research funding. There is also a competitive aspect of accumulating connections (and having this visibly displayed through the bubble size), which should not be underestimated as a motivation for uploading data, both for private individuals as well as commercial entities.

Data Display: nested structures

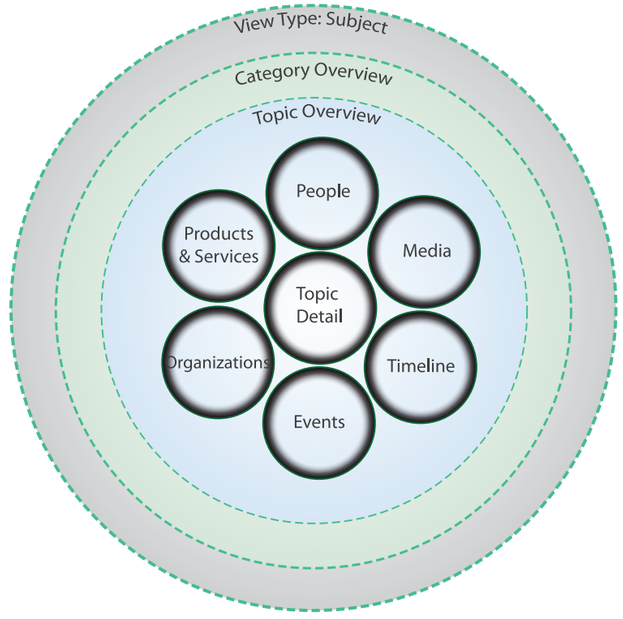
Data in Dandelion is displayed in an auto-generated, nested information structure. The default display is the subject-based category, which connects topic bubbles to one another based on keyword links. However, these basic keyword connections are further strengthened or weakened by additional connections with people, organizations, locations, visions, media, products, or events.

The initial subject-based data display can be reconfigured to focus on one of the other available organizational structures. For example, in the “location-based” view, all of the data within the system is overlaid on a map and pinned to its geographic location of origin (see page 13).

Within the Dandelion platform, information is organized logically from general to increasingly specific as one zooms into the system. The initial structure seen at the start-up phase shows a high-level of categorization, displaying relationships between umbrella categories such as “biodiversity,” “education,” “urban environment,” etc. As one delves into each umbrella category, specific topics within that area become visible. Clicking on a topic reveals a “topic overview,” which is a quick snapshot of all of the major associations of that topic. Inside of each topic bubble, users have the option of delving into specific data portals (i.e., detailed info on the topic, products, timeline, media, etc.).

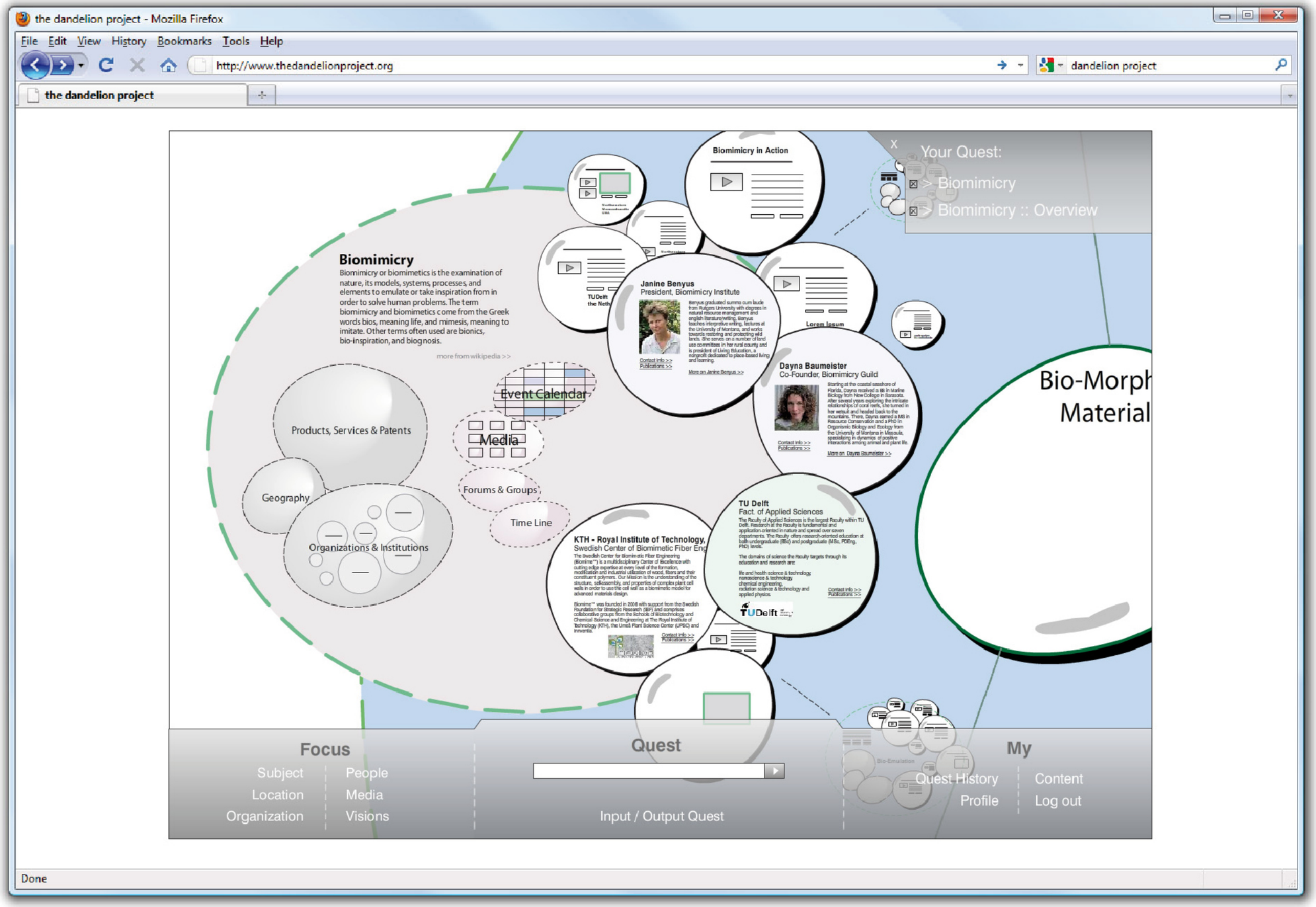
Similarly as with the user profile bubbles, the size of each atom or molecule of information is determined by its level of connectivity it has with other topics. From within a “topic atom,” the largest connecting atoms will be the ones with the greatest number of links to that subject, thus auto-generating a map of major associations. Color coding can also be used to further coordinate data structure. In the examples included in this booklet, we have used blue bubbles to indicate private companies, green to indicate universities and academic institutions, grey for people, and orange for Non-Governmental Organizations and non-profits.

One of the more significant technical challenges for further developing The Dandelion Project will be to devise a consistent algorithm that correctly nests data and properly defines sub-topics.



Schematic of Dandelion data structure in “subject view”

Searching in Dandelion:
Entering a search term begins a Quest



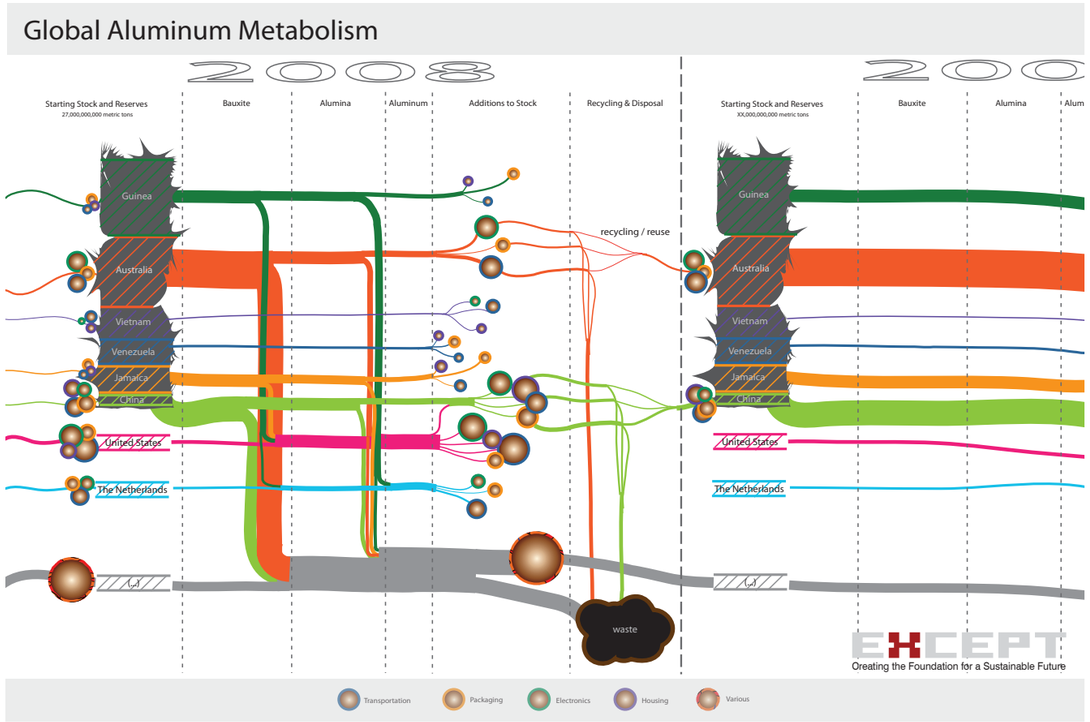
A Global Perspective

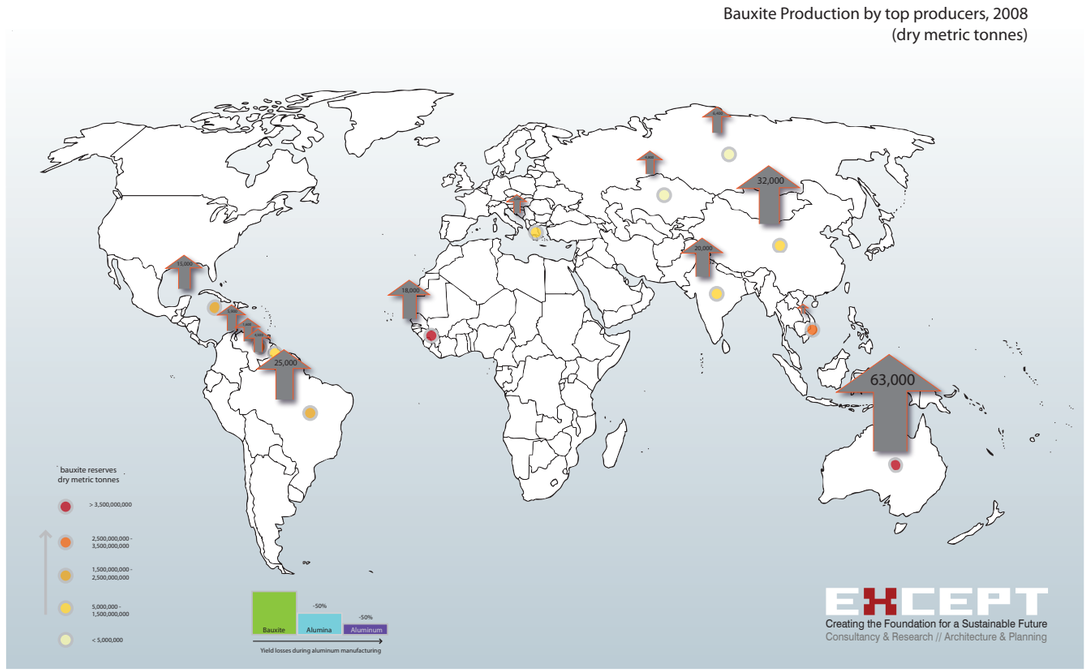
One of the main objectives of The Dandelion Project is to increase informational connectivity across international borders. For that reason, Dandelion will ideally be able to handle and link data entries in any language, or, at the very least, many languages. This is an area for further investigation in terms of its technical feasibility.

Though the content described in our current mock-up is very much focused on the needs of scientists, researchers, investors, and policymakers, we believe that the user base for Dandelion should not be artificially limited. The Dandelion Project should be available to users worldwide as a search engine. There also should not be any structural restrictions placed on the kinds of information that can be entered and stored within the Dandelion platform. In theory, there is no problem if cooking recipes and sports statistics eventually make their way into the system. There is no way to dogmatically assert ahead of time which kinds of information will prove valuable for facilitating societal transitions to an economy of abundance.

However, despite a lack of outright restrictions, it is possible and desirable to guide the focus and development of the tool. The initial selection of topics for the Dandelion pilot phase will naturally attract certain core user groups. Later on, special accounts can be perhaps be created for specific kinds of users – policymakers, scientists, businesspeople, etc. Each kind of account can have slightly different privileges associated with it, or perhaps a different interface. This difference in "account type" could simply give certain users more control over inputting or modifying data. This could be seen as similar to the Wikipedia approach where editors are given extra privileges to review articles for accuracy.

Images at right: Input-Output Quests in Dandelion will clarify our understanding of global material flows. Combining these Quests with the location-view can be made to display areas of relative resource abundance and scarcity.





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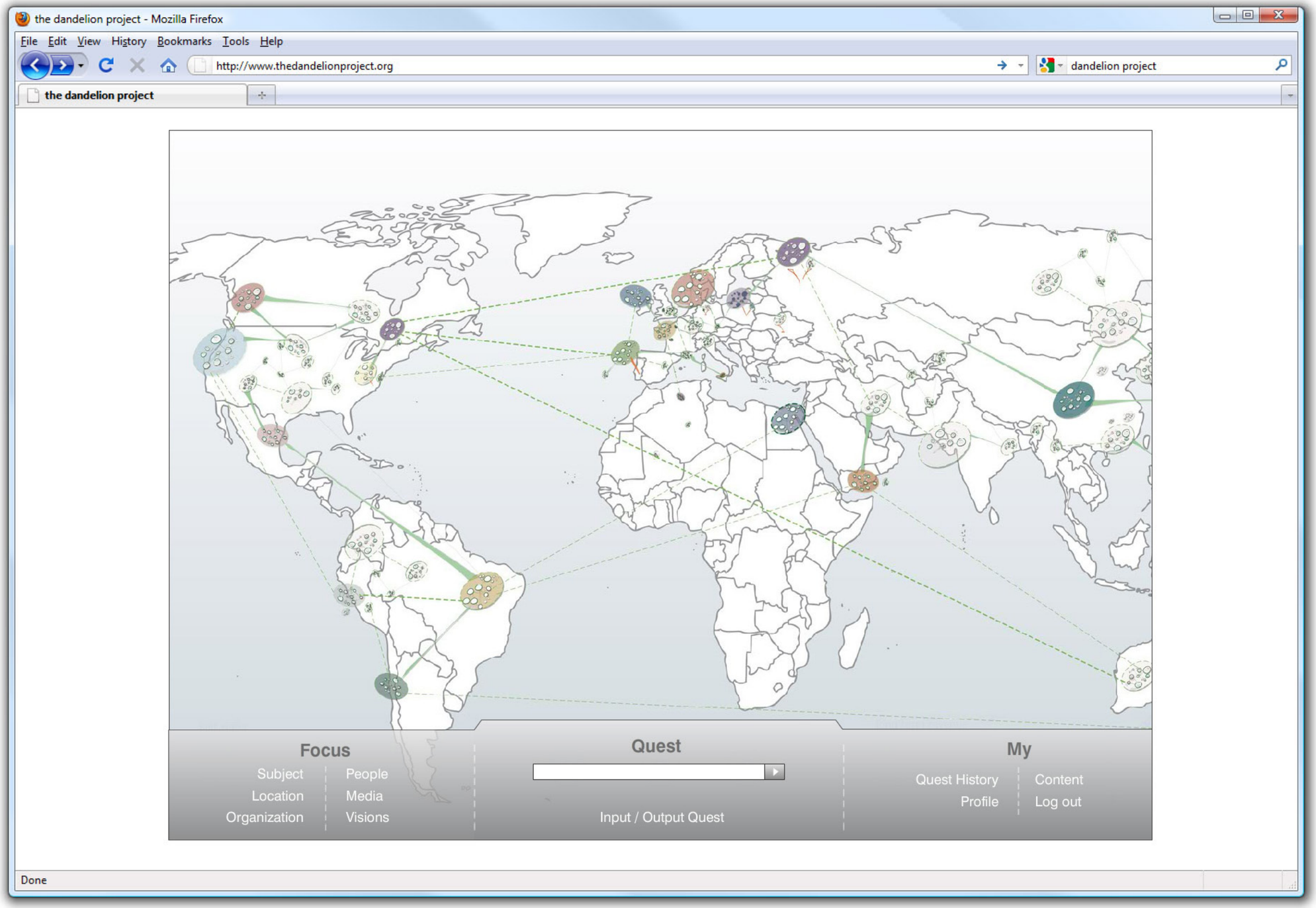
Dandelion: Location-View:
If location-view is selected, information nodes are displayed on a map rather than by subject- or human-based connections



Future Development

We believe that Dandelion could be of great interest as a tool for governments, private entities, individuals, and communities worldwide. It represents, in many ways, the next logical step in information management: a synthesis of social networks, automatic data structures, web 2.0, and visual data displays. It also has the capacity to accelerate societal transitions through its ability to connect key niches worldwide and uncover links between large-scale material flows.

We are now seeking partners and investors to assist in moving towards the implementation of the Dandelion concept. Our immediate objectives are to:

1. Better define the technical functionality of the Dandelion tool (including specifically defining the underlying database structure and data filtering mechanisms)
2. Develop a business case
3. Define the budget required for piloting, upscaling, and maintaining the tool.

To that end, some of the future steps we envision along this trajectory include:

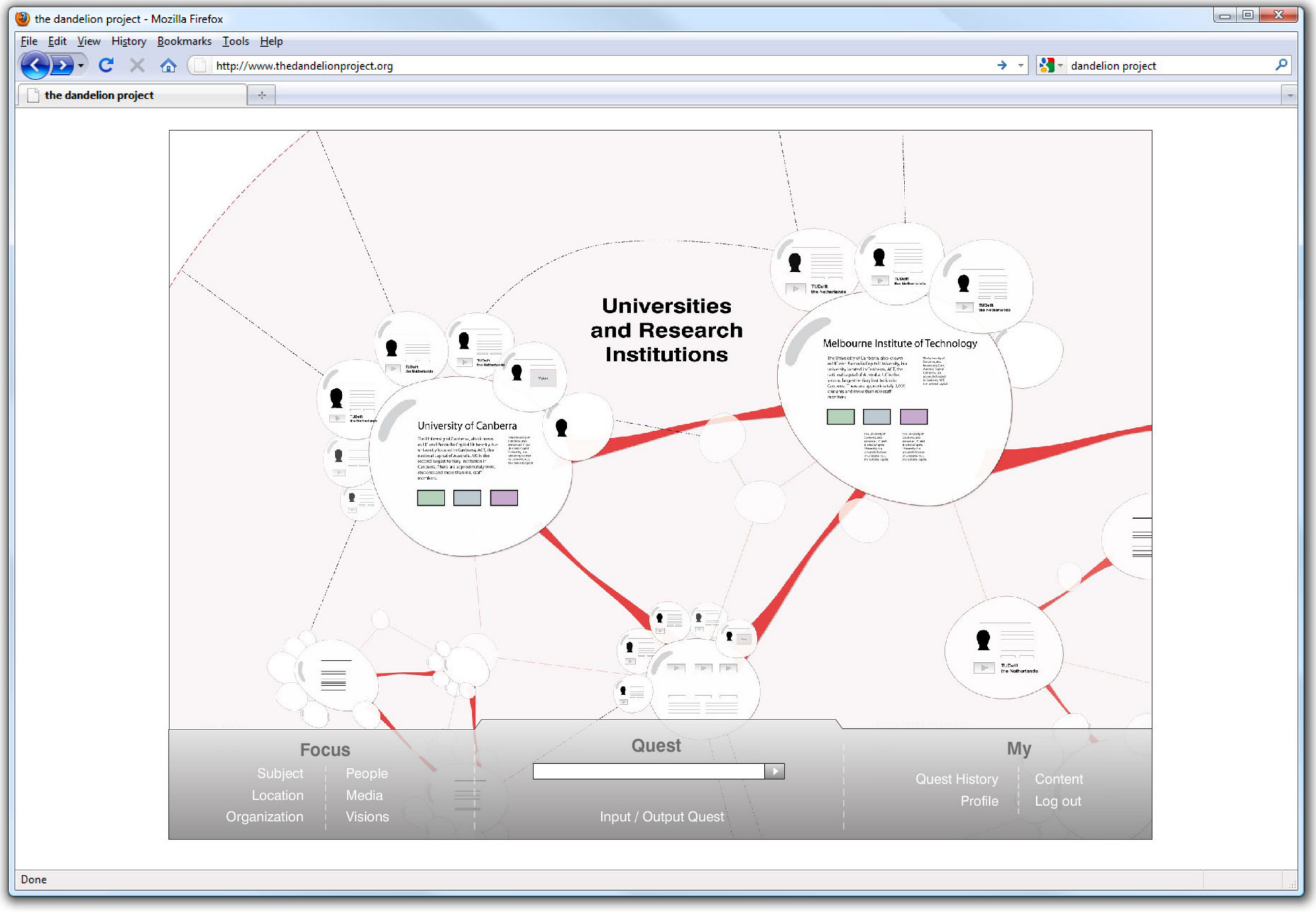
- Setting up a “Dandelion Foundation” to manage future development of the project.
- Securing an intermediate amount of funding to develop a full technical description of the Dandelion tool, draft a business case, and conduct a feasibility analysis of the detailed project proposal. We imagine that this would require a team of 6 - 7 people working for a period of 3 - 4 months, and could perhaps be overseen by the original team at the Ministry of VROM that commissioned this first report.
- Finding interested partners to support the project, including governmental and non-governmental organizations, investors, and technically-skilled visionaries.
- Finding a group of volunteers to participate in data entry for the pilot phase of the project, most likely through an online campaign.

Throughout this process, we hope to maintain fixed and realistic deadlines. Ideally, the first phase required for developing a technical description and business case will be completed by December 2010.

Finally, we believe that if this project is further developed and supported by Dutch governmental institutions, it can be submitted as a Dutch or Dutch-Flemish national contribution to various international sustainability efforts, such as the upcoming Rio+20 Summit in 2012.

Dandelion: Organization-View:

If organization-view is selected, the connections between institutions are displayed.
This view feature can also be applied to see organizations related to a specific topic.



The Dandelion Project: Test Drive

In the following pages, we have provided some examples of how the data structure within The Dandelion Project might look. We have selected a few topics that we believe are representative in terms of the kind of subject matter that might be found in The Dandelion Project pilot. We have explored how the overall data nesting could function, how media might be displayed, how the timeline feature might look, and how calendar events might be recorded.

It is important to remember that though these explorations give a tangible sense of how the tool might work, they cannot show what a functioning prototype will actually deliver. For example, it isn't possible to simulate the inherent intelligence that the functioning system will have (i.e., automatic size scaling as a function of popularity or link frequency). Furthermore, because these images are static snapshots, it is impossible for them to contain the actual amount of information that the tool will store; in a functioning prototype, additional information will be accessible at any point through zooming, panning, and linking.

Index of Test Drive Topics

Starting the Test Drive:

We begin in a random section of The Dandelion Project information network. Clicking on a pink cell structure in the bottom right of our view zooms us in for a closer look.

Political Theory
Education
Environmental Ethics
Microfinance
Secondary Currencies
Air Quality
Urban Environment
Climate Change
Energy Storage
Transportation
Genomics
Energy Generation
Biomimicry
Biotechnology
Agriculture
Bioremediation
Soil Treatment
Phytoremediation
Biodiversity
Aquaculture
Forestry & Ecomanagement
Biodegradation
Phytomining
Water Treatment
Oceans
Green Architecture
Fisheries
Nanotechnology
Floating structures

Category View

We have entered the category view for “water treatment.” We see several interconnected atom structures that contain brief descriptions of topics ranging from “filtration” to “semi-permeable membranes.” We click on the atom-structure with the heading “forward osmosis.”

Water Treatment

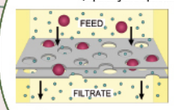
Water Purification

Water purification is the process of removing undesirable chemicals, materials, and biological contaminants from raw water. The goal is to produce water fit for a specific purpose. Most water is purified for human consumption (drinking water) but water purification may also be designed for a variety of other purposes, including meeting the requirements of medical, pharmacology, chemical and industrial applications. In general the methods used include physical process such as filtration and sedimentation, biological processes such as slow sand filters or activated sludge, chemical process such as flocculation and chlorination and the use of electromagnetic radiation such as ultraviolet light.

more from wikipedia >>

Filtration

Filtration is a mechanical or physical operation which is used for the separation of solids from fluids (liquids or gases) by interposing a medium through which only the fluid can pass. Oversize solids in the fluid are retained, but the separation is not complete; solids will be contaminated with some fluid and filtrate will contain fine particles (depending on the pore size and filter thickness).



more from wikipedia >>

Desalination

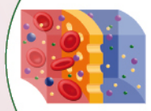
Desalination, desalinization, or desalination refers to any of several processes that remove excess salt and other minerals from water. More generally, desalination may also refer to the removal of salts and minerals, as in soil desalination.
Water is desalinated in order to convert salt water to fresh water so it is suitable for human consumption or irrigation. Sometimes the process produces table salt as a by-product.

more from wikipedia >>

Membrane Distillation

more from wikipedia >>

Semi-Permeable Membranes



A semipermeable membrane, also termed a selectively-permeable membrane, a partially-permeable membrane or a differentially-permeable membrane, is a membrane that will allow certain molecules or ions to pass through it by diffusion and occasionally specialized "facilitated diffusion." The rate of passage depends on the pressure, concentration, and temperature of the molecules or solutes on either side, as well as the permeability of the membrane to each solute.

more from wikipedia >>

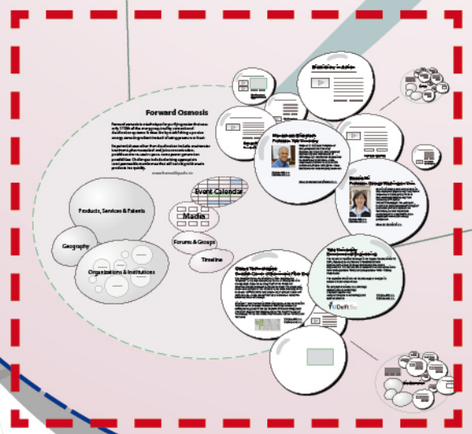
Reverse Osmosis

Reverse osmosis (RO) is a filtration method that removes many types of large molecules and ions from solutions by applying pressure to the solution when it is on one side of a selective membrane. The result is that the solute is retained on the pressurized side of the membrane and the pure solvent is allowed to pass to the other side. To be "selective," this membrane should not allow large molecules or ions through the pores (holes), but should allow smaller components of the solution (such as the solvent) to pass freely. Reverse osmosis is most commonly known for its use in drinking water purification from seawater, removing the salt and other substances from the water molecules.

more from wikipedia >>

Thermal Distillation

more from wikipedia >>



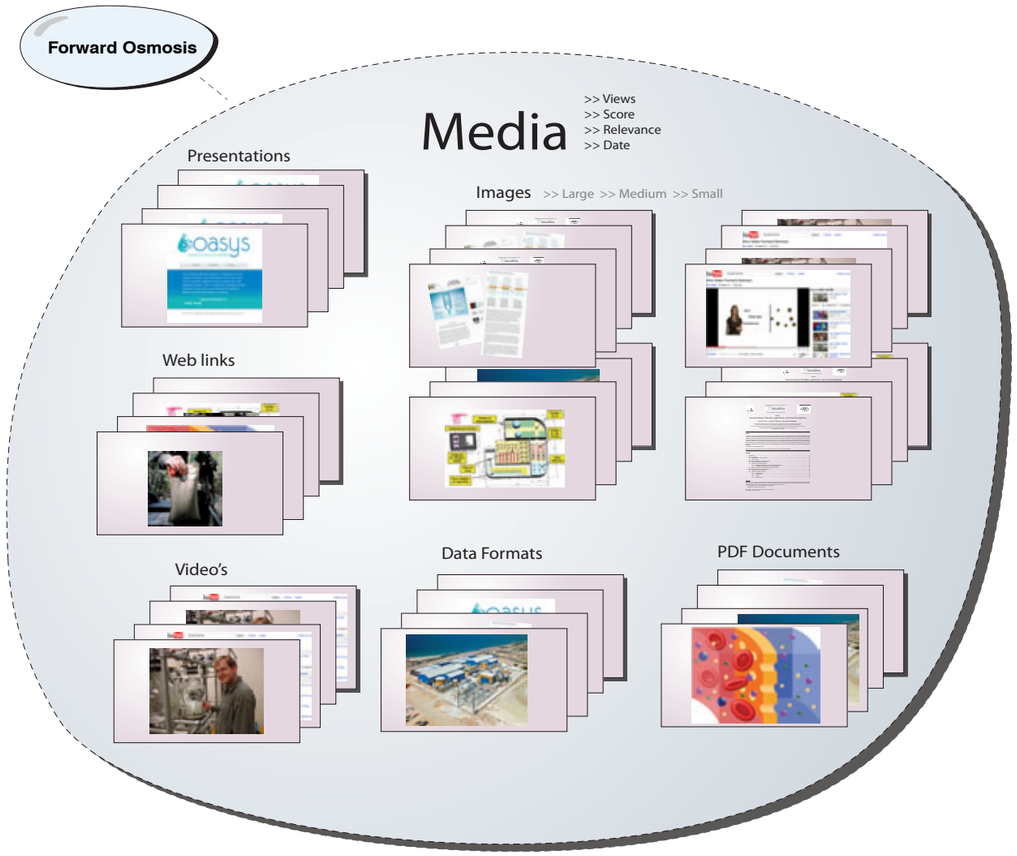
Topic View & Media View

The “forward osmosis” topic bubble immediately unfolds into a complex molecular structure that is attached to a variety of associated bubbles. These satellite bubbles feature information on everything from people to movies. Within the topic bubble, we also see a number of portals for entering special areas (such as discussion groups) or alternative view-types. These include:

- Event calendar
- Geography
- Media
- Products, services, & patents
- Organizations and institutions
- Forums and groups

Clicking on the “media” portal brings up a floating display of images and news articles organized into different categories. These can be scanned through to select and download interesting data, or follow a link to the source page.

A floating tag bubble allows us to click back to the “forward osmosis” topic view.



Forward Osmosis

Forward osmosis is a technique for purifying water that uses only 1/10th of the energy required by conventional desalination systems. It does this by establishing a passive energy osmotic gradient instead of using pressure or heat.

Its potential uses other than desalination include: wastewater treatment, pharmaceutical and juice concentration, potable-water re-use in space, some power generation possibilities. Challenges include devising appropriate semi-permeable membranes that will not clog with waste products too quickly.

more >>

Yale University
Location: USA

Yale University is a private research university in New Haven, Connecticut, and a member of the Ivy League. Founded in 1701 in the Colony of Connecticut, the university is the third-oldest institution of higher education in the United States. Yale has produced many notable alumni, including five U.S. presidents, seventeen U.S. Supreme Court Justices, and several foreign heads of state.

Contact Info >>
Publications >>

More on Yale University >>

Menachem Elimelech
Professor, Yale University

Menachem Elimelech is Roberto C. Goizueta Professor of Environmental and Chemical Engineering. His research interests include: environmental applications and implications of nanomaterials; membrane separations for desalination and water reuse; engineered osmosis for sustainable production of water and power; water and sanitation in developing countries. His laboratory at Yale conducted the pioneering research behind the forward osmosis technology now in pilot phase at Oasys Water.

Contact Info >>
Publications >>

More on Menachem Elimelech >>

Baoxia Mi
Professor, George Washington Univ.

Baoxia Mi holds a B.S. and an M.S. in Environmental Engineering from Tianjin University in China and a Ph.D. in Environmental Engineering from University of Illinois at Urbana-Champaign. Her research focuses on physicochemical/biological processes with an emphasis on nanomaterials and membrane technologies for sustainable water supply and renewable energy production.

Contact Info >>
Publications >>

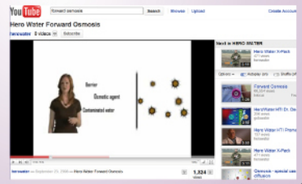
More on Baoxia Mi >>

George Washington University
Location: USA

The George Washington University (GW, GWU, or George Washington) is a private, coeducational comprehensive research university located in Washington, D.C. The university was chartered by an Act of Congress on February 9, 1821 as The Columbian College in the District of Columbia. It is the largest university in the nation's capital. It is renowned for its programs in international affairs, political science, and journalism.

More on George Washington University >>

Forward Osmosis Film



Media

Geography

HTI Water
Location: USA

Event Calendar

Forums & Groups

Timeline

Products, Services & Patents

Organizations & Institutions

Oasys Water
Location: USA

"Oasys (Osmotic Application Systems) is a Cambridge, MA based company developing a suite of proprietary energy and resource recovery products to address the growing, global water crisis.

Engineered Osmosis™ (EO™) is a platform for reducing cost in the production of clean water, power and energy through more efficient and sustainable utilization of resources." Oasys recently raised 10 million USD for a pilot forward osmosis plant. The company's foundational technologies were developed primarily at Yale University.

More on Oasys >>

Contact Info >>
Publications >>

Exploring Topics

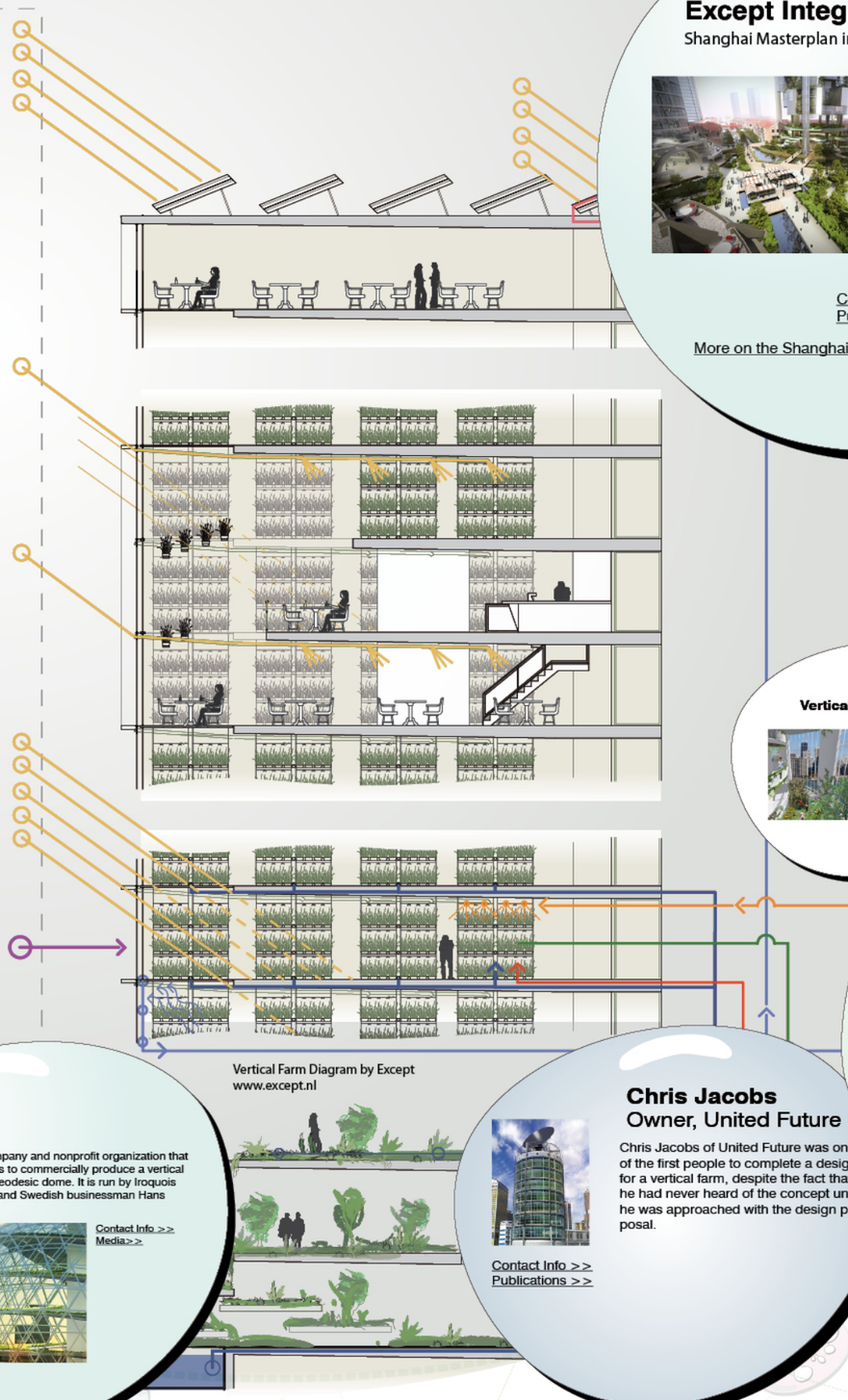
Using the text-based Quest feature, we are able to move directly to subjects that we are interested in. Typing in “vertical agriculture” immediately brings us to the topic view for that field. The program automatically reroutes our search to the more common term “vertical farming.”

Vertical Farming

Vertical farming is a proposed agricultural technique involving large-scale agriculture in urban high-rises or "farmscrapers". Using recycled resources and greenhouse methods such as hydroponics, these buildings would produce fruit, vegetables, edible mushrooms and algae year-round.

It is argued that, by allowing traditional outdoor farms to revert to a natural state and reducing the energy costs needed to transport foods to consumers, vertical farms could significantly alleviate climate change produced by excess atmospheric carbon, and provide healthy local food in urban areas.

more >>



Vertical Farm Diagram by Except
www.except.nl

Except Integrated Sustainability

Shanghai Masterplan incorporating Vertical Agriculture

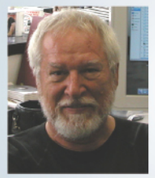
A sustainable city masterplan for Shanghai developed by Dutch company Except proposed vertical farms as a key feature. The farm sturctures would purify water and air while generating energy and food. Each is designed to provide for the basic food requirements of 50.000 people in a range of 1km in diameter from the facility.

Contact Info >>
Publications >>

More on the Shanghai Masterplan>>

Dickson Despommier

Professor, Columbia University

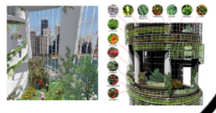


Dickson Despommier, a professor of environmental health sciences and microbiology at Columbia University in New York City, developed the idea of vertical farming in 1999 with graduate students in a medical ecology class.

Contact Info >>
Publications >>

More on Dickson Despommier >>

Vertical Farm Designs



Columbia University

Location: USA

Columbia University in the City of New York (commonly known as Columbia University, or simply Columbia) is a private university in the United States and a member of the Ivy League. Columbia is the oldest institution of higher learning in the state of New York, and is the 5th oldest in the United States[4] making it one of the country's nine Colonial Colleges founded before the American Revolution. Columbia's main campus lies in the Morningside Heights neighborhood in the borough of Manhattan in New York City.

Contact Info >>
Publications >>

More on Columbia University >>

Plantagon

Location: Sweden

Plantagon is both a company and nonprofit organization that has designed and hopes to commercially produce a vertical farm in the shape of a geodesic dome. It is run by Iroquois national Oren R. Lyons and Swedish businessman Hans Hassle.

Contact Info >>
Media>>

Chris Jacobs

Owner, United Future

Chris Jacobs of United Future was one of the first people to complete a design for a vertical farm, despite the fact that he had never heard of the concept until he was approached with the design proposal.

Contact Info >>
Publications >>

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urrencies

Forestry & Ecomanagement

Fisheries

Nanotechnology

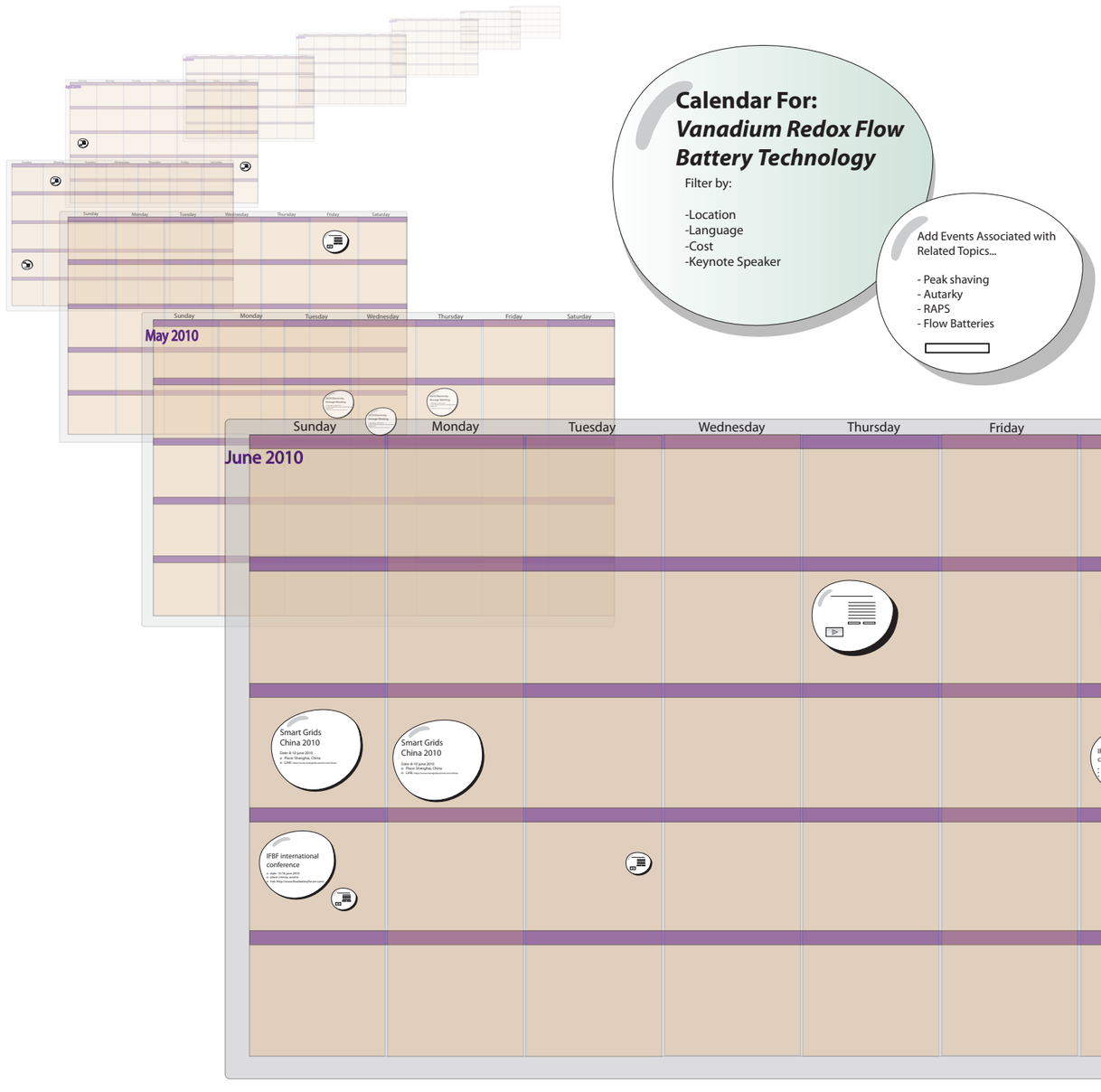
Urban Agriculture

Floating structures

Calendar View

While looking at the topic view for “vanadium redox flow batteries” we click on the “event calendar” portal to see if there are any interesting conferences coming up on that subject.

A calendar display appears, showing “event bubbles” mapped to the appropriate calendar square. Additional features of the calendar mode include filtering the events by location, language, cost, or associated people (such as keynote speakers). Events associated with related topics can also be added to the same calendar, and, as usual, any element can be dragged to one’s personal profile for bookmarking.

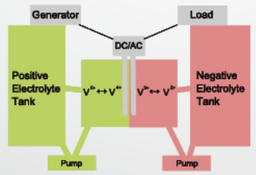


Vanadium Redox Flow Battery

Flow batteries are a class of electrochemical energy storage device that separates power from energy.

In most arrangements, electrolytes are stored outside the electrochemical cell, and flow through the cell during the charging and discharging process. Cells may be joined together in various configurations. Flow batteries have technical and commercial advantages including economies of scale, simplicity of operation and low cost of manufacture. Flow batteries are also known as redox flow batteries.

more >>



Applications

The extremely large capacities possible from vanadium redox batteries make them well suited to use in large power storage applications such as helping to average out the production of highly variable generation sources such as wind or solar power, or to help generators cope with large surges in demand.

Their extremely rapid response times also make them superbly well suited to UPS type applications, where they can be used to replace lead-acid batteries and even diesel generators.

Typical applications:
- Independent household electricity supply (autarky), mini-grids,
- Solar filling stations for electric vehicles,
- Autonomous energy supply for communications stations e.g. telecom transmitters,
- Telemetric stations, and radar station,
- Local stabilisation of weak grids,
- Load shifting of the grid – peak shaving,
- Remote Area Power Supplies (RAPS).

Products, Services & Patents

Geography

Organizations & Institutions

International Flow Battery Forum
Location: Austria

This meeting is the first event in an annual series of meetings brings together developers, researchers and all those with an interest in flow batteries with the intention to:
a) raise the profile of flow batteries as a modern and effective means of electrical energy storage
b) promote the latest developments in the science, technology and deployment of flow batteries
c) encourage publication of peer reviewed papers on all aspects of flow battery technology and deployment.

more >>

Cellstrom GmbH
Location: Austria

Cellstrom GmbH is an Austrian supplier of energy storage systems and complete solutions for uninterrupted electrical energy supply.

The energy store is based on the vanadium redox flow battery. Development began in 2002 and lead to the first series-produced FB10/100 in 2008. Cellstrom products aim at sustainable usage of our global resources and are characterised by high quality and reliability.

Contact Info >>
More about Cellstrom >>

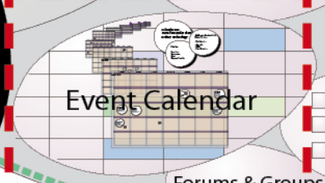
University of Southampton
Location: United Kingdom

The University of Southampton is a British public university located in the city of Southampton, England. The origins of the university can be dated back to the founding of the Hartley Institution in 1862 by Henry Robertson Hartley.
The university is a member of the Russell Group of research universities and the Worldwide Universities Network. It currently has over 17,000 undergraduate and 7,000 postgraduate students[, making it the largest university by higher education students in the South East region.
The university has a strong emphasis on research, having one of the highest proportions of income derived from research activities in Britain. Southampton is highly regarded as a centre for educational excellence, ranking nationally as a top 20 university in various tables,

Contact Info >>
Publications >>

Timeline

Event Calendar



Media

Forums & Groups

Maria Skyllas-Kazacos
Professor, Univ. of New South Wales

Maria Skyllas-Kazakos has been Professor, School of Chemical Engineering and Industrial Chemistry, University of New South Wales since 1993. She has considerable expertise in battery research and has invented a revolutionary battery called the vanadium redox battery, which can be used to provide power in remote areas as a renewable energy storage system, and in electric vehicles.

Contact Info >>
Publications >>

More on Maria Skyllas-Kazacos >>

Frank Walsh
Professor, University of Southampton

Frank Walsh holds the degrees of BSC (Applied Chemistry), MSc (Materials Protection and PhD (Electrochemical Engineering) following periods of study at from the Universities of Portsmouth, UMIST and Loughborough. Frank has over 20 years industrial experience of electrochemical reactor design gained via consultancy assignments and direct industrial projects. He has published and presented over 200 papers and three text books in aspects of electrochemical engineering and surface finishing of metals.

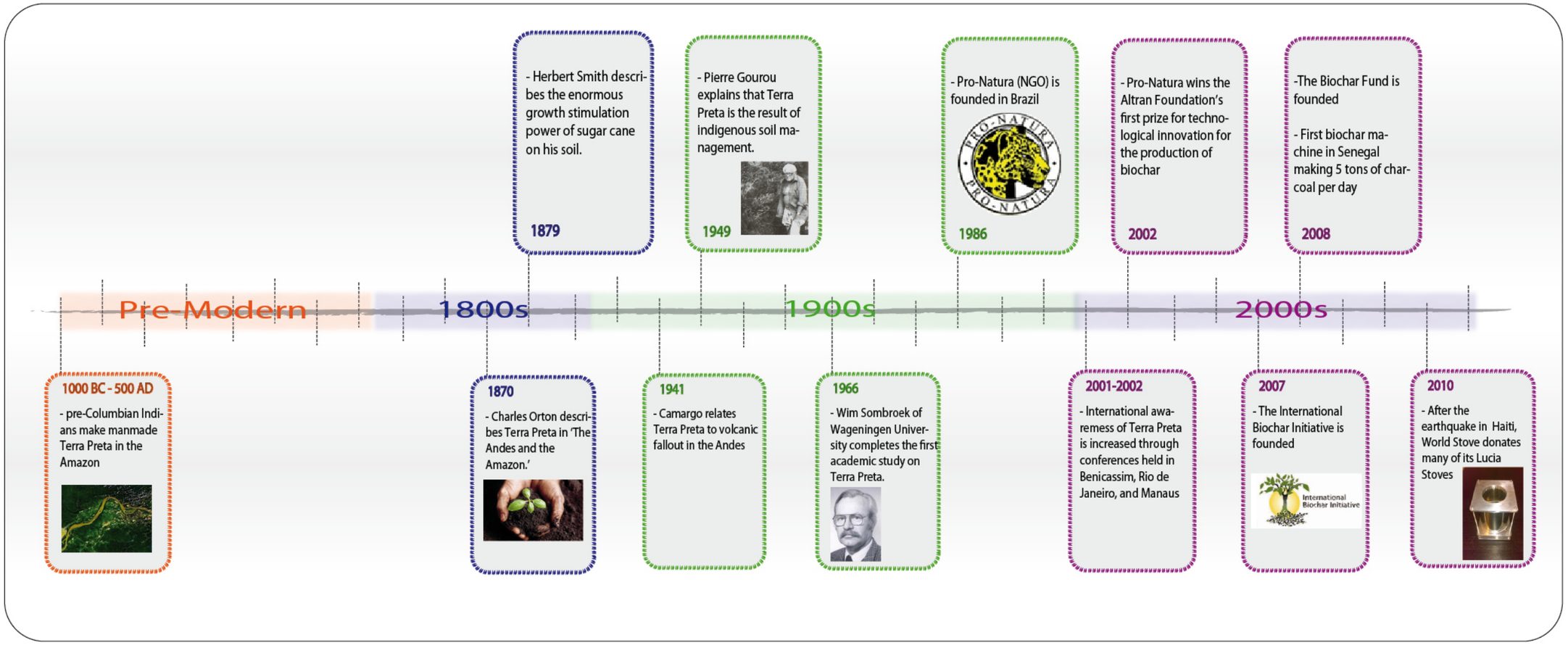
Contact Info >>
Publications >>

More on Frank Walsh >>

Timeline View

While exploring the topic bubble for “biochar / terra preta,” we select the timeline view.

Any piece of information tagged with a date in The Dandelion Project automatically gets displayed in timeline form when this feature is called up.

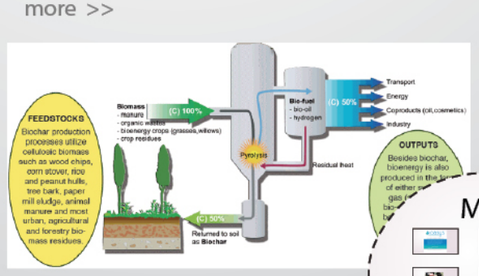


Biochar / Terra Preta

Biochar is a 2,000 year-old practice that converts agricultural waste into a soil enhancer that can hold carbon, boost food security and discourage deforestation.

The process creates a fine-grained, highly porous charcoal that helps soils retain nutrients and water. Biochar can be an important tool to increase food security and cropland diversity in areas with severely depleted soils, scarce organic resources, and inadequate water and chemical fertilizer supplies. Biochar also improves water quality and quantity by increasing soil retention of nutrients and agrochemicals for plant and crop utilization.

more >>



Herbert Smith

Northwestern
Massachusetts
USA

Pierre Gorou

Northwestern

SeaChar

Location: USA

Interreg IVB North Sea Region Programme

BlueLeaf, Inc.

Location: Canada

Lorem Ipsum

Christopher Johannes Lehman

Associate Professor, Cornell University

Johannes Lehman is an agricultural scientist and expert on biochar. Prior to his appointment at Cornell University, he coordinated an interdisciplinary research project on nutrient and carbon management in the central Amazon for the Federal Research Institution of Forestry, and the University of Bayreuth, Germany. Professor Lehmann's publications range from dryland research and nutrient cycling in irrigation systems to the rehabilitation of highly weathered soils.

Contact Info >>
Publications >>

More on Johannes Lehman >>

Wim Sombroek, 1934-2003

Professor, Wageningen University

Wim Sombroek was Secretary General of the International Society of Soil Science from 1978 to 1990.He was born in Heiloo, The Netherlands, on 27 August 1934. He obtained his M.Sc at Wageningen University in 1959, and was awarded a Ph.D. in 1963 on the thesis "Amazon Soils" This well-known book was based on his work in Belem, Brazil, as member of the FAO/Unesco team for forestry research and animal husbandry.

(www.iuss.org/popup/Wim_Sombroek.htm)

Contact Info >>
Publications >>

More on Wim Sombroek>>

Pro-Natura

Location: Brazil

Established in Brazil in 1986, Pro-Natura is a non-governmental organization that specializes in sustainable development. In 1992, following the Rio Conference, Pro-Natura became one of the first NGOs from the Southern Hemisphere to internationalize its operations. Today it is a global organization with two principal hubs: Instituto Pró-Natura (Brazil) - responsible for the Americas, and Pro-Natura International (France) - responsible for Europe, Africa and Asia.

Contact Info >>
More on Pro-Natura >>

Wageningen University

Location: The Netherlands

Wageningen University and Research Centre (also known as Wageningen UR; abbreviation: WUR) is a research and higher education concern which consists of Wageningen University, the Van Hall-Larenstein School of Higher Professional Education, and the former agricultural research institutes (Dienst Landbouwkundig Onderzoek) from the Dutch Ministry of Agriculture. With its combination of knowledge and experience in higher education and research Wageningen UR aims to train specialists (BSc, MSc and PhD) in life sciences and through its research contribute actively to solving scientific, social and commercial problems in the field of life sciences and natural resources.

More on Wageningen University>>

WAGENINGEN UNIVERSITY
WAGENINGEN UR

World Stove

Location: Italy

World Stove is a company that manufactures and distributes pyrolitic stoves that can be used to convert biomass into biochar. They have conducted pilot programs in Uganda, Kenya, Haiti, Malawi, Indonesia, Zaire, and the Phillippines, and have four additional pilot programs running currently. After the 2010 earthquake in Haiti, World Stove contributed a number of their Lucia Stoves for developing nations.

Contact Info >>
World Stove >>

BioChar Engineering

Location: Canada

Biochar Engineering Corporation is a Canadian company that builds biochar production equipment. They design, develop, and set up industrial scale converters that use waste biomass to produce biochar.

Contact Info >>
Publications >>

BIOCHAR ENGINEERING

Dynamotive Energy Systems

Location: Canada

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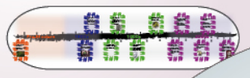
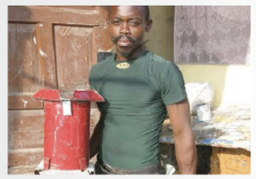


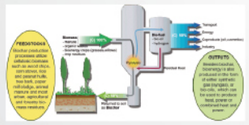
Detailed Topic View

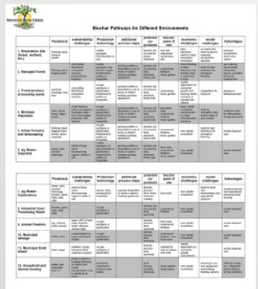
Clicking on the “more >>” link that is found under any text description in the system pulls up a detailed topic view.

The bubble on the facing page shows this detailed view for the “biochar / terra preta” topic, and features a full-length article with embedded images. This is the only detail-level that makes use of traditional scroll bars, since it represents the highest zoom level available within the tool.

Biochar / Terra Preta







Click to enlarge

Biochar is a 2,000 year-old practice that converts agricultural waste into a soil enhancer that can hold carbon, boost food security and discourage deforestation.

The process creates a fine-grained, highly porous charcoal that helps soils retain nutrients and water. Biochar can be an important tool to increase food security and cropland diversity in areas with severely depleted soils, scarce organic resources, and inadequate water and chemical fertilizer supplies. Biochar also improves water quality and quantity by increasing soil retention of nutrients and agrochemicals for plant and crop utilization.

Sustainable biochar is a powerfully simple tool to fight global warming. This 2,000 year-old practice converts agricultural waste into a soil enhancer that can hold carbon, boost food security, and discourage deforestation. It's one of the few technologies that is relatively inexpensive, widely applicable and quickly scalable.

Biochar is a high-carbon, fine-grained residue which used to be produced using centuries-old techniques by smoldering biomass (i.e., covering burning biomass with soil and letting it smolder). Biochar is another word for charcoal. The ancient method for producing charcoal for native use as fuel (and accidentally as a soil additive) was the "pit" or "trench" method, which created terra preta, or dark soil after abandonment

Biochar enhances soils. By converting agricultural waste into a powerful soil enhancer that holds carbon and makes soils more fertile, we can boost food security, discourage deforestation and preserve cropland diversity. Research is now confirming benefits that include:

-- Reduced leaching of nitrogen into ground water
-- Possible reduced emissions of nitrous oxide
-- Increased cation-exchange capacity resulting in improved soil fertility
-- Moderating of soil acidity
-- Increased water retention
-- Increased number of beneficial soil microbes
-- Biochar can improve almost any soil. Areas with low rainfall or nutrient-poor soils will benefit the most.

There are many different ways to make biochar, but all of them involve baking biomass in the absence of air to drive off volatile gasses, leaving carbon behind. This simple process is called thermal decomposition, and it comes in three main varieties: pyrolysis, gasification and hydrothermal carbonization. These methods can produce clean energy in the form of gas or oil along with the biochar. This energy may be recoverable for another use, or it may simply be burned and released as heat. It's one of the few technologies that is relatively inexpensive, widely applicable and quickly scalable.

But biochar technology is more than just the equipment needed to produce biochar. Biochar technology necessarily includes entire integrated systems that can contain various components that may or may not be part of any particular system.

The use of Biochar is one of the most exciting new strategies for restoring carbon to depleted soils, and sequestering significant amounts of CO_2 for 1,000 years and more." "The principle barrier to the use of this strategy is the lack of a price on carbon that would drive the economy toward the most effective ways to sequester it. There is presently no formalized network of biochar distribution channels or commercial scale production facilities. But a stable price on carbon would cause them to quickly emerge – because biochar holds such promise as an inexpensive and highly effective way to sequester carbon in soil."

On a large scale Biochar is produced in developing countries (as Senegal, Pro-Natura together with JTS Seeds). But on a small scale the method is very interesting as an alternative for poor rural area's with large scale deforestation and a low crop-efficiency. By using a cheap LuciaStove from WorldStove. people can produce Biochar and syngas for cooking from tiny bits of wood or biowaste. It is used recently in Haiti for instance after the earth quake.

Inputs: cellulosic biomass (like woodchips), agricultural biomass residues, organic wastes, animal manure, etc.

Outputs: biochar (a very strong fertiliser) and bioenergy like syngas or bio-oils, heat, power, 20% less CO_2 output as input

Solution for: deforestation, hunger, poor soil, expensive energy, CO_2 release

See you online!

Now that you've gotten a glimpse of The Dandelion Project static mockup, you may also wish to explore a more interactive preview. The online version has some of the zooming functionality that will be a key feature of The Dandelion Project.

Check out the interactive online presentation at:
www.except.nl/dandelion

Marine Lithium Extraction

Lithium is regarded a strategic resource for mobility systems of the future. It's commonly used in modern batteries. Seawater contains vast amounts of lithium, though in low concentrations. The South-Korean government and metals company Posco are jointly building a research project in order to commercialize a new marine lithium mining technology.

Concentrations in sea water are low (0,1 to 0,2 ppm), so mining is expensive. Japan since long has mined marine lithium but closed it down since it their technology was too expensive. The Posco method claims to be 30% more efficient than the Japanese.

more from wikipedia >>

Korean Ministry of Land, Transport and Maritime Affairs

Location: South Korea

The Ministry of Land, Transport and Maritime Affairs (MLTM) of the Republic of Korea is one of the essential ministries in the water sector. We, the MLTM, aim at developing and conserving the land systemically, including the sea, creating pleasant urban spaces, improving people's lives, and pursuing the balanced development of the country. The Ministry is implementing integrated Water Resources Management (floods and droughts) and developing policies and technologies for effective water use.

Contact Info >>
Publications >>

More >>

Chun Joon-yang
CEO, POSCO

Wim Sombroek was Secretary General of the International Society of Soil Science from 1978 to 1990.He was born in Heiloo, The Netherlands, on 27 August 1934. He obtained his M.Sc at Wageningen University in 1959, and was awarded a Ph.D. in 1963 on the thesis "Amazon Soils" This well-known book was based on his work in Belem, Brazil, as member of the FAO/Unesco team for forestry research and animal husbandry.

(www.iuss.org/popup/Wim_Sombroek.htm)

Contact Info >>
Publications >>

More on Chun Joon-Yang>>

POSCO

Location: South Korea

The Pohang Iron and Steel Company, or POSCO , based in Pohang, South Korea, is the world's second largest steel maker by market value and Asia's most profitable steelmaker. Currently, POSCO operates two steel mills in the country, one in Pohang and the other in Gwangyang. In addition, POSCO operates a joint venture with U.S. Steel, USS-POSCO, which is located in Pittsburg, California.With the strong Korean shipbuilding and automobile industry dependent on POSCO for steel, it has been seen as the bedrock of Korea's industrial development over the past 40 years. POSCO recently announced that it would commence a marine lithium mining program in conjunction with the South Korean government.

Contact Info >>
More on POSCO >>

Korean Institute of Geoscience and Mineral Resources (KIGAM)

Location: South Korea

KIGAM's mission statement: "The mission of KIGAM is to contribute the advancement of science and technology nationwide, the development of industries and the improvement of our quality of life in Korea by conducting geological survey of the territory and overseas, and performing research and development on mineral resources, and providing with reliable scientific information to the government, industry and public."

More on KIGAM>>

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