Crowdsourcing and Other Free Ways to Supercharge DSM with the Internet

David Costenaro and Carlos Carrera, Applied Energy Group

ABSTRACT

This study is a thought-piece and a state-of-the-market describing how the use of free and low-cost tools on the Internet can dramatically increase the reach, scale, effectiveness, and speed of DSM program activities. Drawing on research, interviews, and analysis, this paper investigates activities like the following to give you a primer and a starting point for your own application of the tools:

- Use of online collaboration tools to create a data source, such as perhaps a national TRM. By leveraging wiki or file-sharing structures like www.wikipedia.org or https://github.com/ as collaborative, open-source resources, the work is done for free in a massive, parallel distributed network of people working in their own interest.
- Use of gameification to motivate participants to earn points, medals, or other "swag" from user communities giving "thumbs up" or "up-votes."
- Creation of forums and social media groups on sites such as Facebook, Twitter, or Pinterest, where DSM program participants can trade stories and encourage energy saving behaviors.
- Crowd funding to raise capital for energy efficiency initiatives, loans, etc. through sites such as kickstarter.org, petridish.org, and prosper.com.

Introduction

The Internet offers us a multitude of no-cost or low-cost, instantly scalable tools that can enhance or compliment just about anything we do, given a little creativity and thought. You probably already use many of these tools in your everyday home-life and work-life; and the opportunities are continuing to expand and evolve at a rapid pace. If businesses ignore this trend in today's competitive marketplace, they do so at their own peril. This paper explores how the demand side management (DSM) industry can supercharge its mission of decreasing the economic and environmental impacts of consumers' energy usage by using these tools.

To seek out the best tools, we scoured the internet and the blogosphere to assemble a long and comprehensive list of applications. We then consolidated them into focused tool categories, and subjectively scored each category on a scale of one to five for *potential impact on the DSM ecosystem* as well as *novelty to the DSM ecosystem*. We then ranked them based on a formula that weighted impact scores at two parts and novelty scores at three parts. This allowed us to quickly organize the set of available tools according to our specific purposes for this paper. We selected the eight highest-scoring categories in the table below to specifically highlight and explore here.

Table of Web Tools considered *(Tools Highlighted in Yellow are Featured in this Paper)*

Tool	Examples	A) Potential Impact for DSM ecosystem	B) Novelty in DSM ecosystem	Interest Score (=2*A + 3*B)
		(1=ruffle a few feathers, 5=sea change)	(1=please tell me you already do this, 5=bleeding edge)	(index based on other scores)
1) Crowdsourcing	Wikipedia, Amazon Mechanical Turk, Innocentive, Elance, Freelancer, Bidwilly, Crowdspring, Odesk	5	5	25
2) Gameification	The L-prize, Climate Mission 3D	4	5	23
3) Crowdfunding	Kickstarter, Petridish, Prosper, Mosaic, Lending Club, Greennote, Indiegogo, Crowdfunder, Gofundme	3	5	21
4) Asset sharing	AirBnB, Relay Rides, Uber, Lyft, Sidecar, Sharedesk, Desks Near Me, Liquidspace	3	5	21
5) QR codes	QR Code Generator, QRstuff,	3	5	21
6) Social media	Linked In, Twitter, Facebook, Hootsuite	4	4	20
7) Video conference & webcast	LiveMeeting, Webex, Join Me	4	4	20
8) User reviews	Yelp, Reddit, Google Reviews, Urban Spoon, Angie's List, Task Rabbit	4	4	20
9) Website analytics	Google Analytics, Twitalyzer	4	4	20
10) Mobile tracking or auditing	National Energy Audit Tool (NEAT), Salesforce mobile app, List of tools on Pinterest	3	4	18
11) Networked devices	Nest	4	3	17
12) Online surveying	Survey Monkey, Kwik Survey	3	3	15
13) Tracking database	Vision DSM	3	3	15
14) Video sharing	YouTube, How-to & tutorial videos	3	3	15
15) GPS / maps	Google Maps API, Bing Maps API	3	3	15
16) Language translation	Google Translate app, Duolingo	3	3	15
17) Online advertising	Google, Bing, Yahoo!, Facebook	3	3	15
18) Website	Any typical Utility website	5	1	13
19) Online billing	Any typical Utility website	5	1	13
20) Web search	Google, Bing, Yahoo!	5	1	13
21) Online energy portal	OPower, Aclara	3	2	12
22) Rewards/Discounts	Groupon, Amazon Local, Living Social	3	2	12
23) News aggregation	Reddit, Digg, RSS feeds, Pinterest	3	2	12
24) Online retail	Amazon, Ebay, APT/EFI online EE stores	3	2	12
25) Customer relationship mgmt	Salesforce	3	2	12
26) Online file storage	Dropbox, Box	3	2	12
27) Photo sharing	Flikr, Imgur, Picasa	3	2	12
28) Podcasts	iTunes store	2	2	10
29) Project mgmt & collaboration	Basecamp, Asana, Google calendar	2	2	10

For the top eight selected application categories, we will provide a general description of the tool, how it is currently being used, and some examples or ideas of how it could be used in the DSM ecosystem.

Barriers to entry with these tools have never been fewer. Driven by an "open source" ethos, the amount of free content available on the web is immense. Even businesses with a subscription business model often offer a version of their tool or service with limited features that suffices for many users, or at least enough to perform a low risk trial. Additionally, learning how to use today's web tools does not entail the mind-numbing training burden that was commonplace years ago. In order to survive in the fast-changing environment of the web, most providers have sanded their approach to a smooth, user-friendly finish, offering "how it works" webpages and simple, video tutorials. Because of the scale of the internet and the instant access to thousands if not millions of users, any company that has worthwhile user-testing can work out the kinks in a system with beta versions and bug fixes; using customer feedback, data analytics, web traffic optimization, and massive, parallel experimental trials. All these forces are converging on your behalf to create powerful, accessible toolsets.

Crowdsourcing

If two heads are better than one, what about a million heads? Tapping minds all over the world is now enabled by many online Crowdsourcing tools. Other umbrella terms for this phenomenon are Mass Collaboration, Open Innovation, or Community Production. Crowdsourcing.org provides the following definition: "Crowdsourcing is the act of outsourcing tasks, traditionally performed by an employee or contractor, to a large group of people or community (a crowd), through an open invite (call). Crowdsourcing is typically enabled through online communities consisting of members with common skills or interests and is applied as a model that enables individuals and groups to innovate, create, produce, report, predict, collaborate, fund and to engage customers" (Crowdsourcing.org 2014).

Perhaps the most familiar example of Crowdsourcing is Wikipedia. This vast compendium of human knowledge was stunningly created by hundreds of thousands of people *volunteering* in their spare time! To get a sense for the powerful snowball effect that crowdsourcing can have, this relatively minimal fraction of the human population, working in their spare time for free created over 4 million articles in 287 different languages, serving 500 million unique visitors a month (Wikipedia 2014). Wikipedia is built on a collaboration structure called "Wiki", which is Hawaiian for "quick." Wikis can be used to collaboratively develop all kinds of content collaboratively. A potential DSM application would be to create a living and volunteer-driven technical reference manual (TRM) or a repository of evaluation reports; or more usefully, a living table or database where disparate data formats can be assembled in a standardized form and usable framework. This would improve the effectiveness of DSM programs by providing reliable and defendable savings. One such example is Minnesota's Digital TRM which currently classifies 49 Smart Measures and will be increasing to 88 in the next iteration.

One may have reservations about the accuracy and quality of work completed by a crowdsourcing process. There was substantial skepticism of Wikipedia articles relative to other encyclopedias at first. However, encyclopedias have become obsolete while Wikipedia has become exponentially more prominent and accepted. Rigorous, self-regulating quality control processes are implemented here, and can be done so in any crowdsourcing context. Members

can be required to sign in and provide various levels of authentication and identity verification; social norming and peer pressure can utilize upvoting, downvoting, and user reviews to rate the quality of contributions; new additions can be held in a "draft" status until verified by a certain number of users; system administrators can be assigned to review content; etc. Many hands make light work as the review process is distributed across the user base rather than bottlenecked at any single individual. This powerful concept of a mass "reviewing" ecosystem is a tool category unto itself that we will cover in more detail later in this paper.

Another popular crowdsourcing tool is GitHub, which was created to develop software code collaboratively. Some pioneers in the legal field, however, are using the convenient version-tracking features to draft legal documents, contracts, and legislation. The tool will control a live copy of the document, but show suggested re-writes and revisions that can in turn receive comments and be voted on before acceptance or deletion. For DSM practitioners, this tool could facilitate stakeholder comment processes or the development of planning documents, drafts of legislation, and formal, written testimony.

Taking crowdsourcing one step further in the DSM space could result in crowdsourced energy audits. Individuals could publish photos and information about their home or business, and a user community of experts could provide advice and input on ways to save energy and improve efficiency. Specific suggestions could be affirmed or questioned by the user community of reviewers, all providing the individual with an efficient audit procedure.

Crowdsourcing is also making strides to evolve the traditional pay-for-services model, enabling more modular and rapid outsourcing of contract work. Websites like Elance and Freelancer enable many types of contract workers all over the world to be scouted and engaged quickly and efficiently for tasks such as web design, marketing support, technical analysis, computer coding, and the like. Fiverr is a novel marketplace where thousands of individuals offer a wide array of personal services like proofreading, logo design, voice-over recording, or video editing; all in discrete, easy transactions for $5 dollars. One utility professional tells me that, for important presentations to management, he has paid $5 several times to have someone review his powerpoint files for typos and clarity and to spruce up the formatting and graphics.

Direct contracting is not the only pay-for-services model available. The company InnoCentive has a collaboration platform that was originally designed for chemical design in the chemical & pharmaceutical industry. Many major commercial, government, and nonprofit organizations now utilize the platform to submit problems or challenges of a technical or business nature. They specify a bounty payment for the individual who comes up with the best solution, and a network of millions of problem "Solvers" browses through the marketplace of "Challenges" and offers solutions in an attempt to earn the respective bounty payments.

Another powerful idea in the crowdsourcing space is that of offering micro-payments for small or repetitive tasks. Many small tasks would be impossible or too costly to automate or mechanize, but need to get done nonetheless. Amazon's Mechanical Turk (MTurk) is a marketplace for crowdsourcing what they refer to as "human intelligence tasks" (HIT's), and there are currently hundreds of thousands of such tasks available on their online platform (see Figure 1 below). Hundreds of thousands of workers from all over the world regularly perform tasks on the platform and receive payments of a few cents per task that accumulate into cash balances or Amazon gift cards (Wikipedia 2014). A screenshot of the MTurk "about" page is shown below to describe the tool. Possible applications for DSM practitioners might be converting among file formats; categorizing and prioritizing reams of customer comments as positive, neutral, or negative for market research/intelligence purposes; visually searching a

million rows of data for outliers or errors; or transcribing a valuable, old manual from scanned images into text (if optical character recognition cannot automatically transcribe it). Any task that involves substantial repetition and volume may be a candidate to be creatively parsed and crowdsourced cheaply to a forum like MTurk, rather than occupying and side-tracking higher-value human resources within the organization.

Figure 1. Description of Amazon's Mechanical Turk.

Another popular crowdsourcing method to engage the online creative community is to sponsor an Application (App) coding contest, a 24-hour code-a-thon, or a weekend hack-a-thon. The city of Washington D.C. promoted a contest for mobile apps in 2014 with the goal articulated as: "How best to use energy data? Describe what type of energy data is needed, build an app, and picture an America with a new, better energy infrastructure that meets our needs for the next 100 years." The contest received 40 entries. For all this coding and development work, the city only had to front the costs to administer the contest, plus the grand prize of $1500 to serve as an incentive (DOE 2014). Successful apps like Black Sheep and WattZ were designed in this way. This approach to crowdsourcing and engagement through contests is directly related to the next tool category we will discuss: Gameification.

Gameification

Gameification is a term that describes the process of intentionally integrating a goal or business objective into an engaging, game-like activity to facilitate achievement or completion. This concept builds on a growing body of psychological and behavioral research; drawing on peoples' innate desire to play, interact, and compete, and be recognized. A new class of Behavioral DSM programs is capitalizing on these concepts by influencing customers to use less energy. The company OPower, for example, offers individualized energy reports for customers that compare their energy usage with neighboring buildings of comparable size. By fostering a spirit of competition, these programs have been shown to reduce annual energy consumption in the range of 1.4% to 3.3% (Allcott 2011). Other efforts are being made to make energy savings a competition among cities, communities, or even university dorms.

One can gameify educational programs and causes as well. For example, the website FreeRice poses fun trivia questions and donates food to the UN World Food Programme for each correct answer. The donations are paid for by advertisers wanting to place their product into the game. Such a concept could be applied to DSM, where a user is asked energy questions to get them learning the right answer. The game could be structured such that efficiency projects, carbon credits, or solar panels are subsidized and funded by advertisers; or without cash flows, simply to educate people in an engaging way on better ways to use energy. Nokia and Microsoft have created a downloadable video game app called *Climate Mission 3D,* where users play ecologically themed games while discovering how to reduce their ecological footprint (see screen shots in Figure 2 below).

Another example is to offer a trivia game or "mixer" as a mobile app to encourage mingling and networking at an industry conference or event. People exhibit amazing levels of motivation and response to earning non-monetary points, medals, or other "swag" from user communities or games; so with a compelling premise, a game or app designer can employ vast amounts of human focus, attention, and effort for virtually zero cost. The way this can work in practice is to have a checklist of questions on the mobile app that need to be answered by visiting various colleagues, booths, or exhibits. Once the questions are all answered correctly, prizes can be awarded. If individuals enable geo-location settings, it would also be possible to collect data on when and where people congregate, in order to optimize spacing at the trade shows and charge variable rates to organizations wanting to locate their exhibits in prime areas. Geo-location settings can also enable people with similar interests to receive a notification when they are in the same area as others.

Finally, a related and compelling way to tap into peoples' inner competitor is to host contests that offer prizes and prestige in exchange for new work. We already mentioned the App coding contest sponsored by the city of Washington D.C. as a successful instance of this. Perhaps the most notable contest in the DSM space is the L-Prize sponsored by the US DOE. In the L-Prize, if a competing vendor achieves specific performance and cost metrics with solid-state LED lighting technology, they are awarded industry recognition and government lighting contracts. This has already helped to spur dramatic improvement in LED lamps and has proven to be a very successful program (DOE 2014).
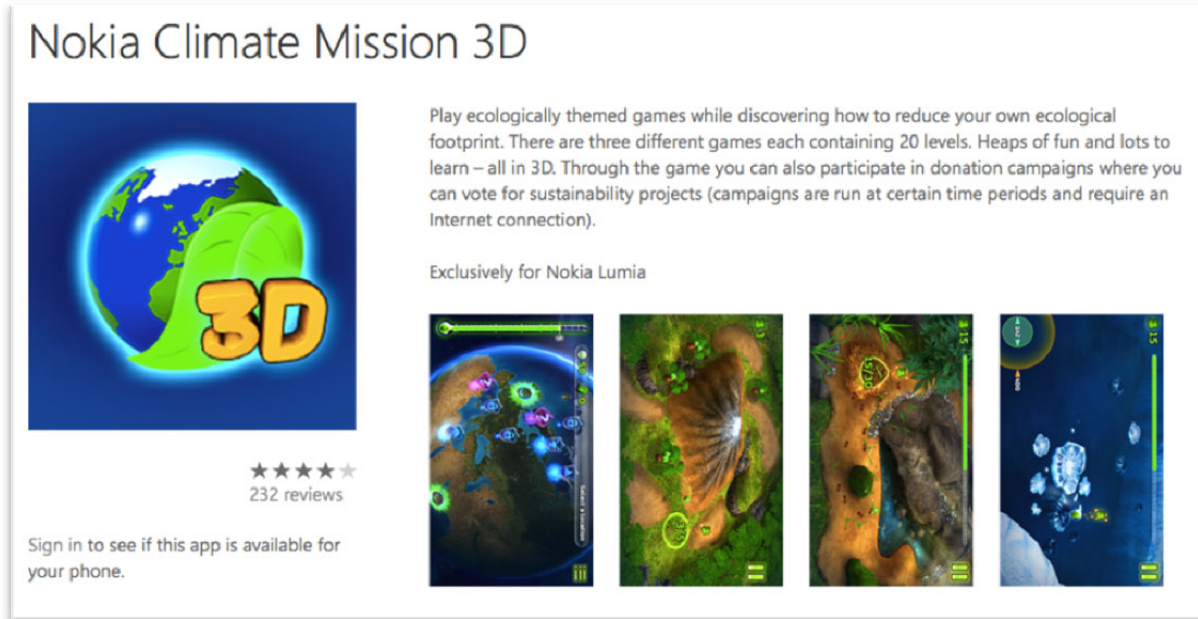
Figure 2. Screen Shot of Nokia Climate Mission 3D.

Crowdfunding

Crowdfunding is the act of raising money for a project from multiple investors. With the sprawling reach of the internet, innovators and entrepreneurs now have expedited access to massive sources of capital and a larger probability of finding an individual or community that resonates with their particular project. Depending on the arrangement, in return for their "microinvestments," investors may receive an in-kind product or service produced by the project, a tax deduction, interest income, or even equity in the project (Wired 2014). This makes obtaining capital much easier for small and unique projects. Whimsical and positive projects that capture the public's imagination seem to be some of the most successful. Partnering DSM programs with crowdfunding for publicly favorable institutions like schools, non-profits, or hospitals, and further capitalizing on the positive "green" social nature of DSM, could prove very successful as a co-funding mechanism for efficiency measures in these institutions.

One of the most well known names in crowdfunding is Kickstarter, a website based out of Brooklyn, NY that creates a marketplace for creative fundraisers and interested funders. To provide a notion of scale, in 2013, 3 million people pledged $480 million to Kickstarter projects in the hopes of getting a piece of whatever those projects were making. Funders of an effort to make a book or film, for example, often get a copy of the finished work. A bigger pledge to a film project might result in admission to the premiere. Current investment laws prevent Kickstarter backers from receiving monetary dividends or project equity, but legislation is in the works to create channels for this as well (Wired 2014). Kickstarter's funding policy has another interesting twist that naturally screens and selects the best and most marketable proposals. It is an all-or-nothing funding mechanism where a proposed project must reach its funding goals or it does not receive any money. Kickstarter reports that 44% of projects reach their funding goals and actually receive the pledged payments (Kickstarter 2013). This is an example of a self-regulating quality-control system based on feedback from the user community that naturally screens and selects the best and most marketable proposals.

Crowdfunding is also emerging as a popular tool for raising capital for solar photovoltaic projects in so called "solar farms" or "solar gardens." As illustrated in Figure 3, individuals can purchase small portions of a solar project in return for an ownership share or some of the revenue that it may generate (PV Tech 2013). A similar arrangement could be used to finance capital-intensive DSM measures like HVAC system replacements or process equipment retrofits. Prosper is a peer-to-peer lending website that, with over 2 million members and almost $1 billion in personal loans funded, could help finance such projects while attracting a pool of investors that wish to earn interest by investing in a portfolio of micro-loans (Prosper 2014). Other similar websites to explore are: PetriDish, Mosaic, and LendingClub.
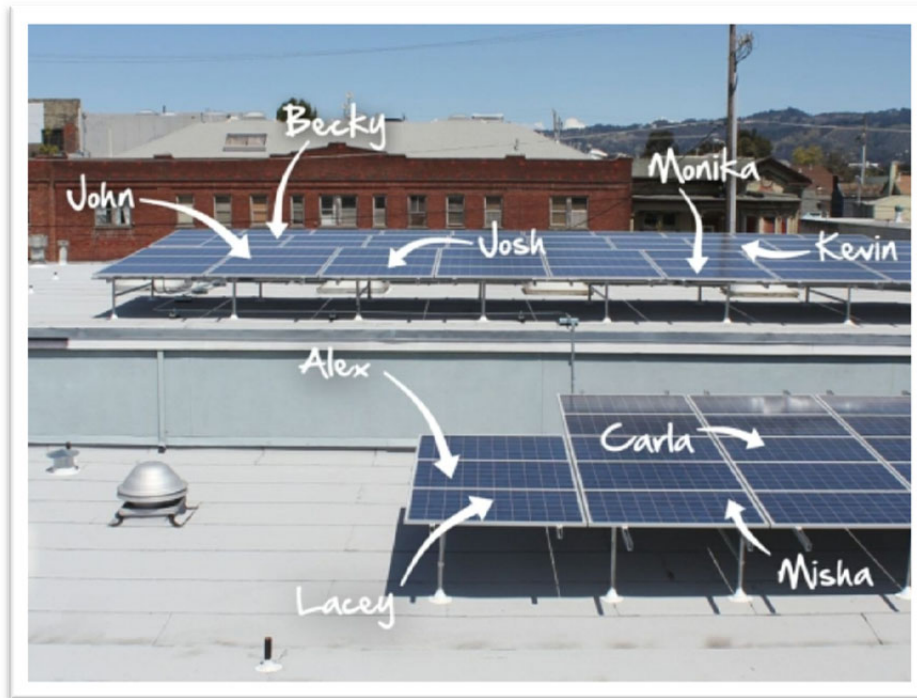

Figure 3. Crowdfunded Solar Panels in PV Solar Farm.

Asset Sharing

Asset sharing is the sharing, loaning, or renting of assets that typically have a high capital cost and a low frequency of utilization. It is much more efficient to share these items if there is excess capacity, rather than to purchase or produce the item separately for each individual that wishes to use it. The most accessible example is a car in an urban location, which is usually parked more often than it is in use. Web services like RelayRides enable a car owner to rent out their car to others at a price lower than a typical rental car agency so they can recoup the cost of their automobile while providing a cheaper service to the renter (Relay Rides 2014). Similarly, people with extra rooms or a vacation home can use forums like AirBnB and HomeAway to earn some money by renting out or sharing these extra assets.

These phenomena are only possible because of the larger and more accessible user base of owners and renters, as well as the administrative scale of the web service that can offer insurance, dispute resolution, arbitration, and payment security (The Economist 2013). Additionally, one cannot overstate the importance of user reviews in a community like this that

relies so much on trust. We will cover in more detail later how the upvotes and downvotes can galvanize or ostracize certain users based on reviews and interactions among community members.

Applications for the DSM ecosystem may be asset sharing of plug-in electric vehicles, cleaning or maintenance equipment used to service energy equipment, or diagnostic or audit devices such as thermal cameras, blower doors, lighting sensors, wattage meters and the like. Such equipment could be made available by a program administrator for customers or trade allies to rent or check out on an as-needed basis. Some efficiency programs have used local libraries to offer energy efficiency tools like this using their "check out" method. Through this, we reinforce the idea of "Reduce, Reuse, Recycle" by sharing equipment to help save energy.

QR Codes

QR stands for "Quick Response" and refers to those black & white squares with checkerboard patterns that look like a UPC bar code in two dimensions. QR codes are scannable patterns that image processing software can translate into a web address or url that is directly linked to location-based or time-based information. Scanning capability, available as a native function or in a downloadable app on most smart phones today, is illustrated in Figure 5 below. This is powerful because you can distribute information or promote initiatives to mobile device users with both location- and time-specificity.

For example, you could place a link on the water heater shelf at the hardware store that leads to DSM rebate forms. If a customer scans the code, they could be led to information about the water heating models with the most energy savings, interactive savings calculators, instant coupons applied at checkout, and related products or services in a wider DSM portfolio, such as a list of nearby, qualified installers. Or perhaps a customer scans the bottom of an advertisement on a city bus or at the baseball stadium that leads to enrollment in a contest or additional energy trivia and information. One could even "gameify" this concept and place QR codes strategically around the city on billboards that provide location-based clues and individualized codes that need to be completed by your unique device in order to be entered into a contest or drawing.

One could even provide coupons or deals to those who scan certain QR codes at certain times of day. To reduce traffic or crowding in a high congestion area of the city, you could publish a coupon via QR code during off-peak hours so that people were encouraged to travel or commute during those times instead of rush hour (CreativeLogical 2011).

Figure 5. Mobile Device Scanning a QR Code.

Social Media

It is no revelation that online communities and blogs are radically transforming the fabric of our culture. Facebook has over one billion users. Twitter has 3935 tweets published per second. LinkedIn is becoming the default professional networking website, with 259 million profiles acting as online resumes and business cards.

Simply put, modern businesses cannot ignore the role that social media plays in their marketplace. Social media is integral to the language of our society. Besides the obvious benefits of communicating with and hearing from customers, DSM programs can use social media to send DR event notifications, broadcast promotions, track customer satisfaction trends, and stay informed about general developments in the industry.

Creating a sense of community with people is a powerful way to promote socially desirable causes. Perhaps one could found the "SEER 16 Club" as a Facebook group or something like it to promote high efficiency air conditioners. People would receive positive reinforcement for energy saving behaviors and DSM program participation in the form of peer recognition and solidarity. At this intersection, you could also apply gameification concepts by awarding badges, swag, or rankings. You could also attempt to control specific behaviors, such as releasing a Netflix show at a certain hour to drive behavior and energy use toward or away from certain times or activities, or asking people to "Tweet during an electric peak" to spread awareness about not using energy, and the Tweet would earn them a small DR credit on their bill. You could also team with local retailers that would offer discounts on purchases during peak hours, or promote outdoor activities during peak hours, so that residents would not be at home using electricity.

Providing customers with 24/7 engagement or help services may drive energy users to be more proactive. Utilities can start offering customer service through Twitter or promoting a local utility hashtag (i.e. #PG&E) to organize discussions.

A more recent development in the world of social media is the notion of social media management or aggregation applications. Campaign management applications, like Hootsuite, allow you to coordinate, delegate, schedule, and automate communication campaigns across multiple social media outlets from a single control center. This would allow an administrative team to plan and deploy related series of DSM communications across multiple channels.

Video Conferences & Webcasts

Video conferences and webcasts allow people from geographically dispersed areas to improve communication and productivity without incurring the large carbon footprint penalty of traveling. The tools available today from services like www.join.me, LiveMeeting, and Webex are much faster, more reliable, and easier to use and access than even a few years ago.

Remote meetings are greatly enhanced with visuals such as static presentations, dynamic screen-sharing, or face-to-face video. This results in better meetings, better collaboration, and better business results. These tools can be used to reduce costs and increase effectiveness of communication among DSM program colleagues, partners, regulators, consultants, and evaluators. It also reduces the carbon and energy footprint associated with traveling to and from meetings. A possible way to apply these tools directly to customers for DSM purposes is to host live Q/A session for people to discuss program implementation details or ask questions about specific topics – like a live chat about steam trap maintenance in industrial settings or refrigeration improvements for grocery and convenience store owners.

User Reviews

The online reviews of a user community provide one of the crucial support paradigms that hold web tools together like glue. As in many of the examples that we have discussed above, user-generated "likes", upvotes and downvotes, quantitative ratings, and qualitative reviews are simple actions that, when aggregated thousands or millions of times, serve to quickly organize, prioritize, and make sense of massive amounts of data. This self-regulating quality control mechanism is implemented by accumulating very low-effort actions from a high volume of users.

As mentioned earlier, upvotes and downvotes can galvanize or ostracize certain community members based on their actions, serving to attract members to some and protect members from others.

We talked earlier in the Crowdsourcing section about contracting a freelance vendor for a project over the internet. This would be a much more difficult and risky affair without some sort of feedback mechanism to rate and review the potential vendors based on their past performance. Their reviews and rankings serve as a quick and efficient way to gauge their effectiveness. Indeed, without a quick and efficient way to sort and search the available opportunities, the tools would be largely unusable, overwhelming with a sea of information. The world of internet tools spins on the axis of responsible feedback and reviews.

This concept is used ubiquitously throughout the world of Internet tools, as described in the examples above like assembling crowdsourced work or assessing projects that are seeking crowdfunding. Particularly relevant examples of applying the concept of user reviews to the DSM space would be Angie's List or Consumer Reports, where one can find ratings and reviews on HVAC contractors or energy efficient appliances. This helps customers select the most appropriate energy efficient projects and options for them. DSM programs could use a feature like this to provide recommendations among their network of trade allies or program partners.

Conclusions

In conclusion, the Internet affords us a medium where we can increase the reach, scale, effectiveness, and speed of DSM program and business efforts. There are many examples and innovations happening around the country, and DSM industry professionals can and should take heed and join the movement. An abundance of free and cheap functionality can be at your fingertips by using the tools discussed in this paper: Crowdsourcing, Gameification, Crowdfunding, Asset sharing, QR codes, Social media, Video conferencing & webcasts, and User reviews. The enhancements to DSM from these tools; either applied on a standalone basis or combined with each other; are limited only by the imaginations of the user.

References

Allcott, H. 2011. *Social norms and energy conservation*, J. Public Econ. doi:10.1016/j.jpubeco.2011.03.003

CreativeLogical, 2011. Scannable Rewards Urge Travellers to Avoid Rush-Hour. http://creativelogical.blogspot.com/2011/09/avoid-rush-hour-scan-for-rewards.html

Crowdsourcing.org, 2014. *Frequently Asked Questions*. Retrieved April 7, 2014, from http://www.crowdsourcing.org/faq#anchor3.

[DOE] US Department of Energy. 2014. *Apps for Energy Contest.* Washington, D.C. Retrieved April 7, 2014, from http://energychallenge.energy.gov/

[DOE] US Department of Energy. 2014. *L Prize Competition Overview.* Washington, D.C. Retrieved April 7, 2014, from http://www.lightingprize.org/overview.stm

The Economist, 2013. *The rise of the sharing economy*. March 7, 2013. http://www.economist.com/news/leaders/21573104-internet-everything-hire-rise-sharing-economy

Kickstarter, 2013. *Kickstarter 2013 Highlights*. Retrieved April 7, 2014, from https://www.kickstarter.com/year/2013/?ref=footer#1-people-dollars, https://www.kickstarter.com/hello?ref=footer

Prosper, 2014. *How it Works.* Retrieved April 7, 2014, from https://www.prosper.com/welcome/how-it-works/

PV Tech, 2013. *Friday Focus: The revolution will be crowd funded*. http://www.pv-tech.org/friday_focus/friday_focus_the_revolution_will_be_crowd_funded

Relay Rides, 2014. *How it Works.* Retrieved April 7, 2014, from https://relayrides.com/how-it-works

Wikipedia. 2014. *Wikipedia:About*. FL: Wikimedia Foundation, Inc. Retrieved April 7, 2014, from http://en.wikipedia.org/wiki/Wikipedia:About

Wikipedia. 2014. *Wikipedia:Amazon Mechanical Turk*. FL: Wikimedia Foundation, Inc. Retrieved April 7, 2014, from http://en.wikipedia.org/wiki/Amazon_Mechanical_Turk

Wired, 2014. *How You'll Fund — And Wildly Profit From — The Next Oculus Rift*, April 4, 2014. http://www.wired.com/2014/04/how-to-profit-from-crowdfunding/