TO: The Honorable Mayor and City Council Members

FROM: Michael C. Van Milligen, City Manager

SUBJECT: Smarter Sustainable Dubuque Smarter Discards: Follow-Up

DATE: January 29, 2013

Smarter Sustainable Dubuque is the research component of the Sustainable Dubuque Initiative, in partnership with IBM Research, and designed to provide Dubuque residents and City Departments with the information and tools they need to make smarter choices about resource consumption. The initiative is engaging the Dubuque community through advanced technology and fostering sustainable behavior to reduce costs and better manage resources.

The City Council approved a Joint Development Agreement with IBM Research on January 22, 2013, to test a "Proof of Concept" related to developing an "Intelligent Discard Management" module as part of IBM's Smarter City suite of software services.

In the Proof of Concept, the City, IBM Research and selected vendor partners from the residential discard collection, materials management/ tracking industries would focus on research which will:

- Over a period of twelve months improve and measure trend lines in landfill diversion rates and curbside recycling rates of anonymized residential collection customers.
- Establish the long term cost effectiveness of pilot diversion strategies.
- Inform the City's needs related to current as well as future policy, staffing and equipment issues related to discard management.

In the Proof of Concept, the City would identify two residential collection areas, each with relatively the same number of trash and recycling customers, totaling approximately 400 households, to participate in this project ("Aggregated Customers"). In addition, the City will identify 250 to 400 volunteers among its municipal collection customers ("City Volunteers"). The City Volunteers will specifically authorize their discard (landfill, recycle and compost) data to be provided to IBM by the City in anonymized form for use in the smarter discards portal. The communitywide metric information generated by this project, using only anonymous data from volunteer households, may be used by the City to begin estimating discard baselines and beneficial use choices. The combined City Volunteer anonymized data, with each Volunteer's permission, will also be shared with the City Volunteers so that they may

compare and benchmark their personal usage with that of a comparable subgroup of the City Volunteer community. IBM will develop the tools and will make a portal available to the City Volunteers. The Volunteer Portal is being planned to provide functionalities that include diversion tips for beneficial use, household goal challenges, available incentives, the ability to visualize data over a period of time, analytics that offer insights into discard patterns, analytics that compare consumption with other households with similar profiles, and track performance changes over time. Access to the Portals will be provided for twelve months. City live data collection would start by April 1, 2013. The Proof of Concept portion would start May 1, 2013. The Proof of Concept portion of the project would be completed on April 30, 2014.

In order to undertake this Smarter Discard Management Proof of Concept, the City will need to enter into contracts and make purchases from vendors to provide Radio Frequency Identification (RFID) technology, data collection software, and engagement and project management assistance. Recycling tipper carts will be needed this summer and are included in a Fiscal Year 2014 Improvement Increment Request.

Five major industry leaders responded to our Request for Information and Cost Estimate. Each proposal was evaluated on successful experience with similar systems, expertise of project personnel, response to follow-up questions and cost for the products offered. Resource Management Coordinator Paul Schultz is recommending contracts be approved with:

Sonrai Systems is a discard management technology company. It would provide two Radio Frequency Identification (RFID) technology systems installed in City rear-packer collection trucks, along with collecting and transmitting container and location collection data from two research areas in selected census tracts. The cost of this component is the lowest quoted price and most comprehensive proposal at $23,500. There is an on-going cost for the period of the pilot of $40 per month for two installed communications units (modems) using cellular transmissions, equaling $960 per year.

Location Technologies, Inc. is a wireless data transmission company. It would provide modification of the City's existing Automatic Vehicle Location (AVL) technology to record and transmit data collected citywide from Volunteers in the Proof of Concept. The cost of this component is quoted at $3,500.

Camelot is a holistic local company providing improved software functionalities, RFID materials management, and engagement consulting services. It would provide project management/implementation support to help structure the Proof of Concept outcomes to meet the vision and goals of the City. The cost of this component addresses some of the shortage of City staff availability and is recommended not to exceed $10,000.

Cascade Engineering is an environmental services company which also manufactures tipper carts and RFID tags. It would provide RFID tags to be retrofitted by Resource Management staff onto City tipper carts and recycling bins in the two aggregated areas of the Proof of Concept before the start of the Proof of Concept. The cost of this

component for 2,000 RFID tags is $2,000. The recycling tipper carts enabled with RFID tags needed in the second half of the Proof of Concept are recommended to be funded as part of a Fiscal Year 2014 Improvement Increment Request and are estimated to cost $20,000 for 400 carts.

Other implementation costs for staff time and materials are expected to be managed within the Fiscal Year 2013 and Fiscal Year 2014 operating budgets.

The total of the recommended Fiscal Year 2013 Proof of Concept costs that are the responsibility of the City is $39,960.

This Proof of Concept was proposed to the City by IBM in June of 2012, and was therefore not able to be included in the Fiscal Year 2013 budget process. Sources of funds to pay for this POC have been identified from within savings in the Resource Management CIP and operating budgets.

I concur with the recommendation and respectfully request Mayor and City Council approval.

_____
Michael C. Van Milligen

MCVM:jh
Attachment
cc: Barry Lindahl, City Attorney
        Cindy Steinhauser, Assistant City Manager
        Teri Goodmann, Assistant City Manager
        Paul Schultz, Resource Management Coordinator
        Don Vogt, Public Works Director

TO: Michael C. Van Milligen, City Manager
FROM: Paul Schultz, Resource Management Coordinator
SUBJECT: Smarter Sustainable Dubuque: Follow Up on Vendor Selection for the
             Council Approved Smarter Discards JDA with IBM Research
DATE: January 30, 2013

INTRODUCTION

City Council approved a Joint Development Agreement (JDA) with IBM Research on
January 22, 2013 to test a "Proof of Concept" (POC) related to developing an "Intelligent
Discard Management" module as part of IBM's Smarter City suite of software services.

Smarter Sustainable Dubuque is designed to provide Dubuque residents and City
Departments with the information and tools they need to make smarter choices about
resource consumption. The initiative is engaging the Dubuque community through
advanced technology and fostering sustainable behavior to reduce costs and better
manage resources. This POC is a valuable addition to the Smarter Sustainable
Dubuque "Living Lab" research effort and provides access to technology, analytics and
insights unavailable by other means.

BACKGROUND

In the POC, the City, IBM Research and selected vendor partners from the residential
discard collection, materials management/ tracking industries would focus on research
which will:

- Over a period of twelve months improve and measure trend lines in landfill
  diversion rates and curbside recycling rates of anonymized residential collection
  customers.
- Establish the long term cost effectiveness of pilot diversion strategies.
- Inform the City's needs related to current as well as future policy, staffing and
  equipment issues related to discard management.

In the POC, the City would identify two residential collection areas, each with relatively
the same number of trash and recycling customers, totaling approximately 400
households, to participate in this project ("Aggregated Customers"). In addition, the City
will identify 250 to 400 volunteers among its municipal collection customers ("City
Volunteers"). The City Volunteers will specifically authorize their discard (landfill, recycle
and compost) data to be provided to IBM by the City in anonymized form for use in the
smarter discards portal. The communitywide metric information generated by this

project, using only anonymous data from volunteer households, may be used by the City to begin estimating discard baselines and beneficial use choices. The combined City Volunteer anonymized data, with each Volunteer's permission, will also be shared with the City Volunteers so that they may compare and benchmark their personal usage with that of a comparable subgroup of the City Volunteer community. IBM will develop the tools and will make a portal available to the City Volunteers. The Volunteer Portal is being planned to provide functionalities that include diversion tips for beneficial use, household goal challenges, available incentives, the ability to visualize data over a period of time, analytics that offer insights into discard patterns, analytics that compare consumption with other households with similar profiles, and track performance changes over time. Access to the Portals will be provided for twelve months. City live data collection would start by April 1, 2013. The Proof of Concept portion would start May 1, 2013. The Proof of Concept portion of the project would be completed on April 30, 2014.

DISCUSSION

In order to undertake this Smarter Discard Management POC, the City will need to enter into contracts and make purchases from vendors to provide Radio Frequency Identification (RFID) technology, data collection software, and engagement and project management assistance. Recycling tipper carts will be needed this summer and are included in a FY14 Improvement Increment Request.

Five major industry leaders responded to our Request for Information and Cost Estimate (attached). Each proposal was evaluated on successful experience with similar systems, expertise of project personnel, response to follow-up questions and cost for the products offered. I am recommending contracts be approved with:

Sonrai Systems is a discard management technology company. It would provide two RFID technology systems installed in City rear-packer collection trucks, along with collecting and transmitting container and location collection data from two research areas in selected census tracts. The cost of this component is the lowest quoted price and most comprehensive proposal at $23,500. There is an on-going cost for the period of the pilot of $40 per month for two installed communications units (modems) using cellular transmissions, equaling $960 per year.

Location Technologies, Inc. is a wireless data transmission company. It would provide modification of the City's existing Automatic Vehicle Location (AVL) technology to record and transmit data collected citywide from Volunteers in the POC. The cost of this component is quoted at $3,500.

Camelot is a holistic local company providing improved software functionalities, RFID materials management, and engagement consulting services. It would provide project management/implementation support to help structure the POC outcomes to meet the vision and goals of the City. The cost of this component addresses some of the shortage of City staff availability and is recommended not to exceed $10,000.

Cascade Engineering is an environmental services company which also manufactures tipper carts and RFID tags. It would provide RFID tags to be retrofitted by Resource Management staff onto City tipper carts and recycling bins in the two aggregated areas of the POC before the start of the POC. The cost of this component for 2,000 RFID tags is $2,000. The recycling tipper carts enabled with RFID tags needed in the 2nd half of the POC are recommended to be funded as part of a FY14 Improvement Increment Request and are estimated to cost $20,000 for 400 carts.

Other implementation costs for staff time and materials are expected to be managed within the FY13 and FY14 operating budgets.

The total of the recommended FY13 POC costs that are the responsibility of the City is $39,960.

This POC was proposed to the City by IBM in June of 2012 and was therefore not able to be included in the FY13 budget process. Sources of funds to pay for this POC have been identified from within savings in the Resource Management CIP and operating budgets: $41,026 in savings in FY13 collection truck purchases and $21,394 savings in reduced FY13 requests for recycling bins and lids. There are other potential sources of support funds if so needed. These two sources total $62,420.

RECOMMENDATION

I respectfully request that you and the City Council authorize staff to finalize solutions and negotiate contract details with the recommended vendors noted above.

CC: David Lyons, Smarter Sustainable Dubuque Project Manager
Chris Kohlmann, Information Services Manager
Jenny Larson, Budget Director
Don Vogt, Public Works Director
Cori Burbach, Sustainable Community Coordinator
Chuck Goddard, DMASWA Administrator

Attachment

City of Dubuque, Iowa
Smarter Discard Management Pilot Project
Request for Information and Cost Estimate

Introduction

The City of Dubuque and IBM Research are considering a partnership to test a "Proof of Concept" (POC) related to developing an "Intelligent Discard Management" module as part of IBM's Smarter City suite of software services.

The Pilot has two primary goals:

- Over a period of 12 months improve and measure trend lines in landfill diversion rates and curbside recycling rates of residential discards to help achieve Dubuque's sustainability commitments.
- Establish the long term cost effectiveness of Pilot diversion strategies due to city and customer access to diversion data, using carts, RFID, customer communications, incentive utilization and campaigns, changes in collection frequencies and potentially new targeted materials.

Following the Pilot, the City of Dubuque will consider implementation of citywide landfill diversion and collection efficiency strategies beginning in fiscal year 2015. The Pilot will be critical in determining the City of Dubuque's needs related to current as well as future policy, staffing and equipment issues related to discard management and curbside collection.

The City of Dubuque is interested in identifying interested vendors for data collection, transfer and tracking who can provide quality services and support. The focus of the vendor should be customer satisfaction through consistent quality of all services provided and a commitment to continuous improvement of their products and services.

In this document the term "City" will be used interchangeably with "City of Dubuque." Both reference the same entity.

This is a request for information and cost estimates (RFI) not a formal bid, offer or request for proposal. The City is evaluating solutions and how those solutions best fit with referenced integrations. Therefore the City may deploy more than one vendor solution for all or part of this pilot. Information submitted for this proposal will assist staff and the Dubuque City Council in determining next steps for the smarter discards initiative.

Community Profile

Dubuque, Iowa is a progressive community in the upper Midwest. Located along the Mississippi River at the intersection of Iowa, Illinois, and Wisconsin, Dubuque has a population of 58,000 and serves as a metropolitan service area for seven surrounding counties. Recent recognitions include being named one of the seven Most-Connected Locales in the U.S. by Connected World magazine, one of 2010's Ten Smartest Cities on the Planet by Fast Company, the Best Small City to Raise a Family for 2010 by Forbes, the Most Livable Small City in the U.S. for 2008 by the U.S. Conference of Mayors, and one of the 100 Best Communities for Young People, the Most Livable Small City, and a 2007 and 2012 All-America City by the National Civic League. Dubuque, Iowa is truly a "Masterpiece on the Mississippi."

In 2006 and every year since, the Mayor and City Council identified becoming a more Sustainable City as one of their top priorities for Dubuque. Implementation of a community-defined sustainability plan (*Sustainable Dubuque*) is an on-going focus. The *Sustainable Dubuque* model is a holistic approach to making Dubuque sustainable, and involves a three-part approach that addresses Environmental and Ecological Integrity, Economic Prosperity and Social and Cultural Vibrancy . There are eleven principles included, with several specifically impacting this Smarter Discard Management pilot, including Smart Resource Use, Healthy Air and Regional Economy.

Connected with the *Sustainable Dubuque* model is a unique public/private partnership between the City of Dubuque and IBM Research, the division of IBM responsible for its "Smarter Planet" campaign. The project, known as *Smarter Sustainable Dubuque* was initiated in September 2009 when the City of Dubuque and IBM announced their intentions to make Dubuque one of the first "smarter" sustainable cities in the U.S.

Plans include the development of new "smarter" technologies and implementation strategies to create a replicable, international model of sustainability for communities of 200,000 and under, where over 40 percent of the U.S. population resides. The model will integrate community engagement and education, more energy-efficient ways of operating municipal services and buildings, decreased carbon emissions, new job creation, increased financial savings, and a higher quality of life for the entire community.

Smarter Sustainable Dubuque is designed to provide Dubuque residents with the information and tools they need to make smarter choices about resource consumption. The initiative is engaging Dubuque residents and businesses who, through advanced technology, will be able to voluntarily better manage their use of resources like water, electricity, oil, natural gas, wellness and hopefully, with the help of this Smarter Discard Management Pilot, materials management.

The City's municipal collection system serves 20,500 customers collected five days a week on six refuse and five recycling routes. The current base collection fee combined for refuse and recycling is $11.69 per month. The average household's discards to landfill (including furniture and move outs) weighs 21 pounds per week. The average household's discards to curbside recycling weighs 9 pounds per week. Dubuque has a robust Pay As You Throw program, strong curbside recycling, year-round bulky item and organics collections, including a six year old subscription option for food scrap collection, event recycling and zero waste programming. It has a very favorable revenue sharing contract for collected recyclables that incentivizes greater diversion to recycling. The Dubuque Metropolitan Area Solid Waste Agency has a policy supporting a progressive 2% per year reduction in landfilling being diverted to identifiable beneficial uses.

The City and been assessing local government and community Green House Gas (GHG) emissions, has set a target of a 50% reduction in GHG by 2030, and is near completion with a draft Climate Action and Resiliency Roadmap to facilitate meeting that target. The 2007 GHG assessment identified the solid waste management as 69% of our local government carbon footprint.

Response Submission

Interested vendors should be careful to completely read the requirements and description of this RFI. All inquiries concerning this RFI should be submitted in writing via e-mail to Paul Schultz Resource Management Coordinator pschultz@cityofdubuque.org

The proposed timeline for this project is as follows:

Proposed Timeline

Event	Date(s)
RFI Issue to Vendors	January 3, 2013
RFI Webinar for Vendors	January 7, 2013 10:00am CST
RFI Due	January 11, 2013
City Council consideration and decision on IBM Joint Development Agreement and decision to proceed with vendor contract negotiations	January 22, 2013
City council consideration and approval of Final Vendor Selection and Scope of Deliverables and budget	February 4, 2013
Implementation and Training	February – March 2013
Go Live	March – April 2013
Data Transfer begins to IBM	April 2013

Responses to this RFI are to be received by 4:00 PM on January 11, 2013. Firms whose qualifications and information are determined to be best suited to leadership of such a Pilot may be invited to an interview/presentation meeting for further evaluation after a council assessment and decision on the IBM Joint Development Agreement .

Responses should be sent to:

Paul Schultz
Resource Management Coordinator
Municipal Services Center
925 Kerper Court
Dubuque, IA 52001
563.589.4249

Responses (a printed original) must be received by 4:00 pm on January 11, 2013. Vendors should insure that their responses arrive at the correct location on or before the stated deadline. Late responses or responses delivered to the incorrect location may not be considered.

Responses must be submitted in sealed packages marked "Smarter Discard Management Pilot Project." Proposed costs for the pilot should be included in a separate envelope titled "Costs for Smarter Discard Management Pilot Project."

As an alternative, vendors are invited and encouraged to submit their responses electronically via the City's ftp site. If your organization would be interested in doing such, please contact Chris Kohlmann via e-mail at ckohlman@cityofdubuque.org no later than 5:00pm January 10, 2013 to receive submittal instructions and access information for the ftp site.

RFI Pre-Proposal Webinar

An RFI Webinar – Pre-proposal Meeting will be held on **January 7, 2013 at 10:00am CST.** Online and conference phone connection is:

https://www2.gotomeeting.com/join/843346914

Use your microphone and speakers (VoIP) - a headset is recommended. Or, call in using your telephone.

Dial +1 (213) 493-0601
Access Code: 843-346-914
Audio PIN: Shown after joining the meeting

Meeting ID: 843-346-914

The purpose of this meeting is to review the project, to provide clarification and respond to questions

Smarter Discard Management Pilot Project Description and Expectations

There is an expectation of contributed/donated and discounted products, such as tipper carts, and services as part of the relationship in this research. Within the parameters identified below, please describe the end-to-end capacity you would deliver for this Pilot.

1. The City of Dubuque and IBM Research are looking to target and measure the components of the two goals within two pre-determined aggregated discrete route areas each totaling approximately 400-600 households. Collection would occur on two separate collection days and each day would have the same overlapping refuse and recycling customers. These areas are expected to include both single and multi-family (2-6) housing units. Minimally it is expected that one refuse truck and one recycling truck would need to have equipment installed to record and transmit the data from all containers collected with RFID tags or similar. There will also be a need for a procedure and equipment to manually report "exceptions" – collected containers without RFID tags. There will also be RFID tags needed for installation on city containers: recycling bins and tipper carts. There should be a backup strategy for if and when the RFID data collection system is disabled or if the City opts to not use RFID tags and instead wishes to pursue use of AVL data integration to obtain location.

- One of the two aggregated areas, as finally determined by the city, is targeted to be in a lower income census demographic (lower income person or family is defined as having a total income which falls between the fifty (50) percent and eighty (80) percent median for the area, adjusted for size) that already has a significant deployment of city refuse carts.
- The second area, as finally determined by the City, is targeted for an area with a higher recycling diversion rate. This area could likely both increase diversion to recycling and reduce collection costs with deployment of optional recycling tipper carts of varying sizes. After base line data is collected on weekly recycling, this area would collect all recyclables, both yellow 18-gallon bins and newly deployed recycling tipper carts, every other week.

2. The selected vendor would enable Dubuque to automatically read collection data via a push/pull web service or provide collection data via a CSV file. Please be sure to note alternative approaches and design considerations needed with the use of RFID tags or the use of on board AVL giving the location of the pickup of the container.

The vendor will also provide API, WSDL, schema or data format information for the data being provided.

The following data will be collected, assembled and transmitted to the City of Dubuque for the Pilot:

- o Daily customer curbside collection participation data for landfill (trash) & recycling collection
- o Daily container types (tipper carts, recycling bins, etc) collected by address
- o Daily total content weights from Landfill and MRF scaling for each aggregated area
- o Monthly participation rate and setout frequencies for both landfill & recycling collection per customer
- o Monthly participation rate and setout frequencies for both landfill & recycling collection for the Pilot route as a whole
- o Addresses & Geocoding for each customer referenced within the City's GIS
- o Address mapping for RFID tags and non-RFID containers
- o Whether the collected setout is from a multiplex
- o Whether multiple households are using a common container.

3. Dubuque live data collection would start by April 1, 2013 or sooner. The Proof of Concept portion would start May 1, 2013. The Proof of Concept would be completed on April 30, 2014.

PILOT COMPONENTS, DESIRED OUTCOMES AND LONGER TERM POTENTIAL EXPANSION IMPLICATIONS:

- Identify and document needed technology, equipment, carts, RFID tags and services
- Identify any cost and resource requirements
- Identify appropriate/needed staffing levels and City of Dubuque support
- Identify, test out and measure potential incentives/disincentives, crew supportive actions, social media approaches, customer communications, tips, self reporting buy-in, gamification, carbon footprint calculations, environmental impacts, personal goal diversion progress/achievement, and any other components suggested to foster sustainable behavior changes to reduce the Pilot customer's landfilling materials and increase the curbside recyclable and compostable materials
- Describe collaboration with other companies/partners/sub contractors
- Provide an initial review and evaluation of the likely process that will be designed
- Identify potential strengths/weaknesses for the plan
- Identify potential sustainability/resiliency impacts
- Identify measure and project I changes in landfill and recycling tonnages
- Identify measure and project change in costs, cost savings, revenues

NEXT STEPS and Response: City may choose to request additional information and design input from parties describing a complete set of services, sufficient for it to be able to complete such Pilot. Important to that consideration will be:

1. Level of expertise for the project
2. Previously involvement in similar research, studies or projects.
3. Past record of performances on similar projects
4. Project organization and management
5. Qualifications of any personnel that would be made available to such a Pilot.

Potential vendor/partners are requested to respond with an answer to the following:

1. Is this project one that your company would wish to participate?

2. What would your organization think is reasonable/available to be contributed to this project by your company?

3. What issues/concerns does your company have with the described approach in the RFI/RFQ and from your knowledge of this project? What do you see as missing components or needs to be considered?

4. Please provide a narrative of your firm's approach to partnering on this project.

5. Please provide projected budgetary costs for the pilot and long term project. Please provide proposed costs for the pilot in a separate envelope titled "Costs for Smarter Discard Management Pilot Project" or folder titled "Costs for Smarter Discard Management Pilot project" if submitting information electronically.