CSUC / XBRL-CET / SGIP PAP25 - University Interoperability Research Facility
Buildings University Innovators And Leaders Development DE – FOA – 0001167

Topic Area Number : DE-FOA-0001167
Project Title : **University Interoperability Research Facility**.

- Big Energy and Small Business
- Examining the Potential of Interoperability for building the Nation's Energy Infrastructure and Energy Efficient Buildings by "knitting together' various data standards.

Lead Organization : California State University Chico
Supported by XBRL-CET and SGIP PAP25
Organization Type : Consortium
Principal Investigator : Surety Resource Connection, Inc.
Team Members and Key Participants : XBRL US, SGIP, PwC, Intuit, GALLINA, Solar Nexus (IEP XML) Abbreviation Guide

Anticipated Project Budget

Component	DOE	Consortium	Total
SGIP PAP25 and XBRL-CET alignment with BEDES	$200,000	$50,000	$250,000
IEP XML Alignment with BEDES, XBRL and SGIP	$200,000	$50,000	$250,000
agcXML Alignment with BEDES, XBRL and SGIP	$200,000	$50,000	$250,000
NASBP/SFAA alignment with BEDES, XBRL SGIP	$200,000	$50,000	$250,000
Manufacturing with BAPVC, BEDES, XBRL, SGIP	$200,000	$50,000	$250,000
	$1,000,000	$250,000	$1,250,000

Abstract

DOE funded Smart Grid Interoperability Panel, Energy Star, Green Button, Building Energy Data Exchange Specification, NASEO and IEP XML with the objective of identifying and then "knitting together" data standards for interoperability. Potential is exponentially increased when construction/financial services collaborate, supported by a ***university based sustainable Interoperability R&D Facility*****,** which is the premise of this DOE-FOA response by CSUC and XBRL-CET/SGIP-PAP25.

SGIP-Priority Action Plan 25 , is a collaboration with XBRL US to extend the public FASB USGAAP taxonomy to include energy specific data fields, particularly for building the nation's energy infrastructure, streamlining the interconnection process and enabling DATA Act compliance for energy related projects that have federal funding.

Data standardization enables interoperability across disparate systems and will enable better quality data, data analytics, mandated reporting compliance, investment analysis, significant cost savings and improved access to capital and financial services for all stakeholders, including small business.

This CSUC/XBRL-CET/SGIP-PAP25 will explore how current DOE efforts like BEDES can "knit together" the BEDES Dictionary, IEPXML, NASEO data matrix and the proposed XBRL-CET Data sets to align with the objectives of the DOE to promote more efficiency in energy development, help small business, and create a financially sustainable university based Interoperability R&D Facility.

Technology Description

Introduction

XBRL is a freely available international information standard relevant for expressing business information. Governments around the world have adopted XBRL for business-to-government and government-to-government business information exchange; XBRL is also used by businesses for their own benefit. In the United States, XBRL has been adopted in the banking sector by the Federal Financial Institutions Examination Council (FFIEC) for its Common Data Repository[1] and by the Securities and Exchange Commission for financial statements, mutual fund risk/return summaries and other interactive data regimes[2]. Further, a broad range of business and reporting concepts have been expressed as XBRL Taxonomies including explicit linkages from individual elements to common definitions, labeling options, contextual attributes (e.g. currency, nature, units, etc.) relationships, and in some cases references to authoritative regulations and laws as outlined in Appendix A. These existing taxonomies are used by public and private companies in countries around the world. More relevant to this project, the publicly available FASB US GAAP taxonomy is currently used by all U.S. public companies is being extended to accommodate construction, energy and transportation element definitions specifically relevant to this effort.

BEDES has an extensive dictionary of terms, and a platform designed to "knit together" a wide range of data standards.

Additionally, as with any market effort, some agreement as to the naming of specific legal entities participating in the supply chain is foundational. The U.S. Treasury is collaborating with other governments and commercial organizations around the world in development of the Legal Entity Identifier[3] ("LEI") – providing a unique legal entity naming convention. The LEI may also be a unique information standard relevant to this project effort.

Impact of the Proposed Technology/Approach Relative to State-of-the-Art

The current state of the art for interoperability and/or data exchange is poor and constrained relying heavily on either highly proprietary APIs, commercial software middleware applications and/or manual rekeying and copy-and-paste scenarios. Further, enterprises operating in this segment commonly communicate with a very diverse set of organizations, creditors, stakeholders and government agencies often each with their unique applications, forms and data requirements placing a compliance burden that can be reduced by standardized freely available information artifacts enabling all supply chain constituents to literally 'speak the same language' regardless of their commercial proprietary software application choices.

The innovation enabled by supply chain standardization includes significantly enhanced interoperability of data exchanges by sector constituents that will greatly advance the development of new systems, tools and resources for manufacturing, construction and financial services while reducing burdens currently associated with highly manual information exchange, reporting, validation, analysis and other processes.

[1] https://cdr.ffiec.gov/public/
[2] http://xbrl.sec.gov
[3] http://www.leiroc.org/

Overall Scientific and Technical Merit

The proposed use of freely available international information standards enabling interoperability among disparate commercial software applications has significant technical and scientific merit as evidenced by the market implementations in the U.S. and other countries around the world. Appendix B: "Examples of Standards Implementations with Scientific and Technical Merit" includes a litany of case study examples where both the technical and scientific merit of the proposed standardization approach has provided process enhancement and transparency benefits to a broad range of supply chain stakeholders including very small creditors borrowing from the Micro-Finance Exchange to the largest public companies and financial services regulators. Clearly, the ability to establish foundational informational standards, to structure information in a common language or syntax provides and freely available resources to all supply chain participants enabling innovation critical to success.

Follow-on funding secured (grants, investment, etc.)

The FASB is an accounting standards body critical to the capital markets and is largely funded by public company fees and subscriptions and publication income. The XBRL International consortium provides freely available information standards to countries and organizations around the world and is a membership organization that is funded by membership dues and conference fees.

Spin-off companies started

We anticipate a great number of innovations will generated, some as startup companies. There are examples of where XBRL enabled standardization has increased the number of vendor choices as well as enabled new processes and capabilities including:

SEC Interactive Data Program - start-up companies enhancing analytical processes and capabilities of SEC registrants structured data is an increasing number of both commercial and open source vendors including: Calcbench, XBRLAnalyst, Arelle, 9WSearch, Sector3, FIOS, XBRLFinAPP, Rivet, XBRLCloud, Thinknum, RankandFiled "SEC Filings for Humans", and others.

Products commercialized, including cost and performance information

Financial Performance Measurement has a number of potential applications enabled by interoperability. As noted in the answer to the question above, the SEC's Interactive Data Program using XBRL and LEI standards has resulted in a broad range of new companies, new products and new capabilities.

Technical potential primary energy savings for commercialized technologies

The energy savings will be measured in the number of new and retrofitted buildings that were able to take advantage of the capability enabled by interoperability, either directly or indirectly, including access to capital and financial services. Further, this project demonstrates how different commercial vendors speaking the same language can collaborate on freely available open market standards to create mutual benefits as well as benefits for all stakeholders. While this is a business information supply chain standardization project, it provides a useful example for how and why technical energy information exchanges among commercial energy equipment vendors can likewise produce mutual and market benefits.

Improved manufacturing processes implemented by a company
Financial Performance Measurement will result in a number of adaptations during the design process, through construction and ultimately to long term maintenance of buildings and energy related facilities.

The proposed technology is unique and innovative
Supply chain standardization (e.g. UPC/bar code, shipping containers, etc.) has demonstrated repeatable economic outcomes including: high volumes; enhanced quality; accelerated frequencies; greater throughputs; lower costs; and others. Applying the same idea via freely available open market information standards is the unique and innovative proposal with the potential to enhance efficiency and improved access to capital as demonstrated in other market applications.

As to innovation, the potential is unlimited and not constrained to the grant recipient, but to all stakeholders in many different industries. As outlined in Appendix B there are a range of innovative examples and incremental capabilities realized.

The proposed approach is without major technical flaws.
As evidenced in a broad range of market implementations around the world[4], any technical issues are nominal. The project is likely to highlight critical implementation considerations related to the process and cultural changes associated with enhancing existing legacy investments. The market implementations outlined in Appendix B provide useful examples as to the diversity of the applications and related process enhancements.

The degree to which the proposed project, including proposed cost shares, optimizes the use of available EERE funding to achieve programmatic objectives;
The cost benefit, when applies to a national construction in the trillions, and energy related in the hundreds of millions, is as optimal as any can be, without a doubt. A useful example is the Micro Finance Exchange project outlined in Appendix B wherein information standardization enhanced credit processes and thereby lending capabilities and market reach.

The level of industry involvement and demonstrated ability to commercialize technologies;
The list of collaborators answers this component. Further, the XBRL US Consortia membership[5] provides a useful example of how market competitors collaborated to create a shared market benefit. The collaboration on standards while competing on implementation may be a useful method of thinking about how freely available open market information standards enable a broad range of economic benefits.

Increased enrollment and student participation in professional development classes
CSU Chico already has an extensive Construction Management Degree program that engages students in emerging technology related to construction, and has an MIS degree option as well.

[4] https://www.xbrl.org/the-standard/why/who-else-uses-xbrl/
[5] http://xbrl.us/membership/Pages/memberlist.aspx