



ORANGE BUTTON  
INITIATIVE

# Digital Ecosystem for Infrastructure Reliability

## Attracting Capital and Financial Markets to Energy Infrastructure

### March 10, 2021

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Chairman, Surety Resource Connection  
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## Digital Ecosystem for Construction Attracting Capital and Financial Markets to Energy Infrastructure

Overview

Problem Statement

The Federal Button

Ecosystem Stakeholders

The Data Element

The Data Stack

Use Cases

Where We Are Today

Summary

Going Forward - Brainstorming



## Digital Ecosystem for Construction Attracting Capital and Financial Markets to Energy Infrastructure

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## Overview

Improving infrastructure reliability that will attract Capital and Financial Markets generally come in three forms:

1. Government studies and regulation  
Slow and methodical
2. Innovation by private entities  
Often proprietary
3. Capital and financial markets better understanding of risk probabilities that impact reliability.  
Can quickly mandate requirements and implementation of best practices that best address risk



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- 3. Capital and financial markets better understanding of risk probabilities that impact reliability.**

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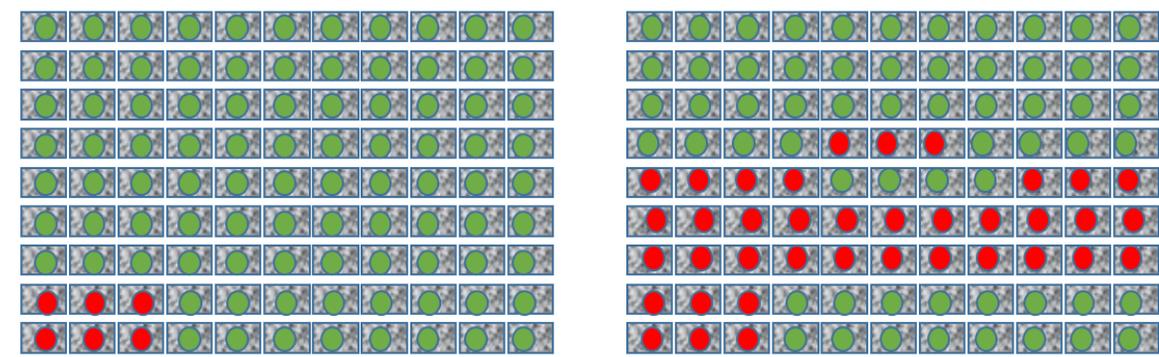
Capital and financial markets better understanding of risk probabilities that impact reliability.

Data for Individual Panel and Panel Array Performance

What we knew Yesterday



What we will know tomorrow



● Not Working  
● Working

Question: Which Panel Array of Tomorrow Will Get Better Financial Terms

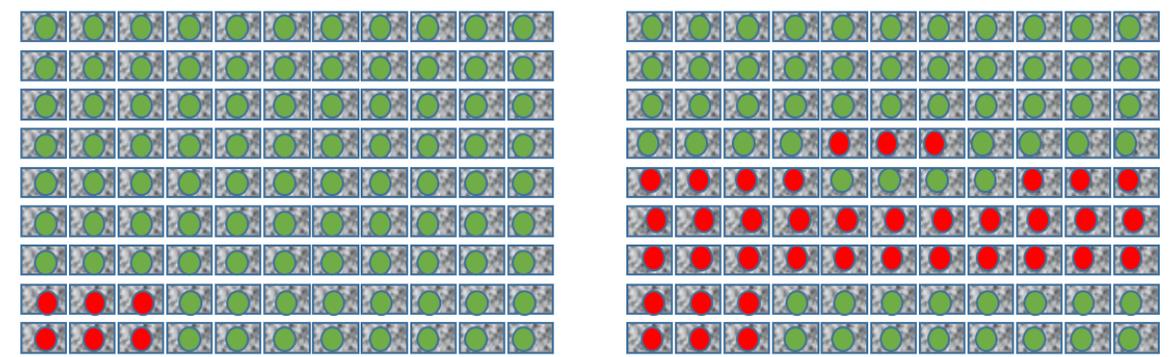
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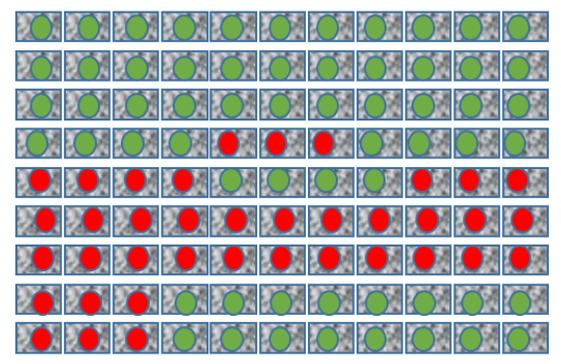
● Not Working  
● Working

Question: Which **Panel Array** of Tomorrow **Will Get Better Financial Terms**  
Answer: The One Whose Data Can **Demonstrate Predictable Performance**

**Capital and financial markets better understanding of risk probabilities that impact reliability.**

Data for Any Infrastructure Project Performance

- Not Working
- Working



Question: Which **Infrastructure Project** of Tomorrow **Will Get Better Financial Terms**  
Answer: The One Whose Data Can **Demonstrate Predictable Performance**



## Capital and financial markets better understanding of risk probabilities that impact reliability.

### Session Abstract:

Banks, Surety and Insurance companies have a unique perspective on risk management due to the very large portfolio of organizations and jurisdictions they service.

This broad window gives them unparalleled insights into the skew between ‘intended’ performance and ‘actual’ performance, where the bank, surety or insurance company has to ‘pay out’ if things don’t actually go as ‘intended.’

Insurance companies manage this risk through data.

Big data provides opportunities to refine and optimize risk management.

Use of ‘big data’ is seen as a means to not only create an actuarial database to set ‘risk premiums,’ but also more near-real time identify potential risk factors that can be used as ‘leading indicators’ for risk management.



## Capital and financial markets better understanding of risk probabilities that impact reliability.

### Session Abstract:

While “Big Data,” “Data Analytics,” “Predictive Analytics,” and “Data is the New Oil” have become commonplace terms in global business parlance, managing “data overload” remains a fundamental and consequential challenge:

*fragmented data from multiple sources in the ecosystem that lacks the data consistency to be of value.*

The ‘Orange Button’ initiative aims to solve the challenge of data consistency across the construction infrastructure ecosystem which will enable and facilitate data interoperability between and among stakeholders — public or private — as well as generate innovations to improve efficiency, reduce risk, and provide the transparency to attract capital (cash funding sources) and financial markets (bank and trade credit, insurance, surety) with greater capacity as well as improved terms and conditions.

This ‘Big Data’ approach will facilitate measuring and monitoring key performance indicators to improve risk management as well as to strengthen policies and capabilities.

Data interoperability will become an increasingly significant factor in determining risk, accessing capital, and/or securing trade credit, and the costs of insurance or surety will likely also be impacted.



**Capital and financial markets better understanding of risk probabilities that impact reliability.**

### Today's Reality

Fragmented data from multiple sources in the ecosystem that lacks data consistency is of no value

### Tomorrow's Objective

Consistent data that allows aggregation of data that can be accurately analyzed to identify failure points and best practices utilized by Capital and Financial Markets for underwriting considerations and requirements.



## Example: Building Code Requires a Single Bolt to Attach Solar Panel to Racking System



Some projects use two bolts for better reliability



Insurance companies review loss history and identify that projects with two bolts have a low probability of loss

Projects with one bolt, even though code compliant, have significantly more loss incidents and higher loss severity.

Outcome – To get financing or insurance the project must demonstrate it is using two bolts



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**Problem:**

Legacy systems that cannot exchange data reliably

**Solution:**

Leverage open data standards so legacy systems can reliably exchange data



[Link to World Economic Forum](#)

[Video](#)



### Problem:

Legacy systems that cannot exchange data reliably

### Solution:

Leverage open data standards so legacy systems can reliably exchange data

### Outcome:

- Significant cost and time savings throughout ecosystem
- Data interoperability promotes innovation enabled by data analytics and AI throughout ecosystem
- Improved risk management for construction of energy and transportation infrastructure.
- Reduce soft costs for clean energy projects so they are more financially viable, bankable and bondable.

### Measure of Success

- Implementation of data standards in the entire ecosystem for the Construction of Energy and Transportation infrastructure Projects to reduce soft costs and enable improved risk management that will make clean energy projects more financially viable, bankable and bondable.
- Electronic transactions, smart contracts, electronic surety bonds and digital communications replace manually prepared inefficient paper documents
- National standards established for common data sets like construction permits and similar regulatory documents to replace thousands of individual and inefficient data requirements.
- Better source data for Environmental, Social, and Governance (ESG) reporting



[Link to World Economic Forum](#)

[Video](#)



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The Blue Button represents a national movement that enables consumers to have easy access to their own health information in a format that they can use.

The Blue Button logo signifies that a consumer can download a single electronic file that contains their available health data.

[Website](#)



The Green Button provides utility customers with easy and secure access to their energy usage information in a consumer-friendly and computer-friendly format.

Customers are able to securely download their own detailed energy usage with a simple click of a literal "Green Button" on electric utilities' websites.

[Website](#)



Orange Button targets a reduction in soft costs by streamlining the collection, security, management, exchange, and monetizing of solar datasets across the value chain of solar.

Creating an industry-driven standardized data landscape will facilitate the growth and expansion of distributed solar.

[Website](#)



### Green Button – Energy Consumption

The Green Button focused on getting the 3,000+ utilities to generate one standardized data set for energy consumption so that new and innovative software applications could provide data analytics to bring awareness to consumers with the goal to reduce energy consumption.

A uniform ecosystem of just utilities.

Utility Company

Energy  
Consumption



One data set for energy consumption

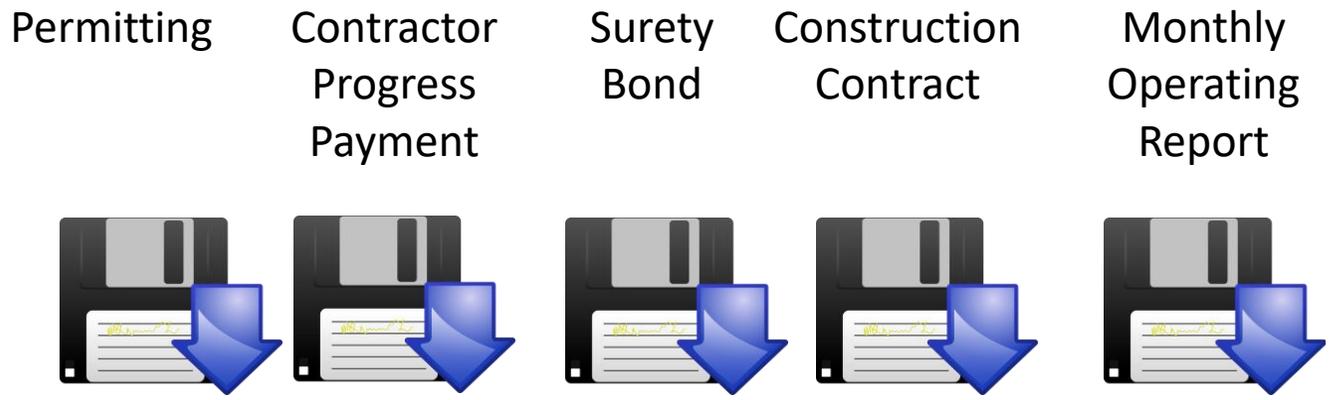
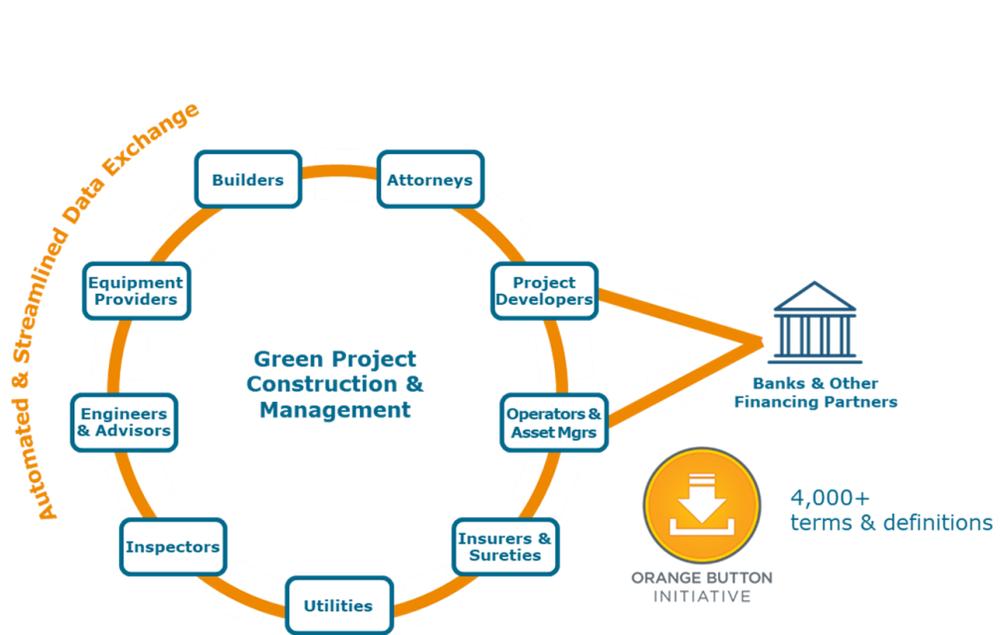




Orange Button – Energy Production

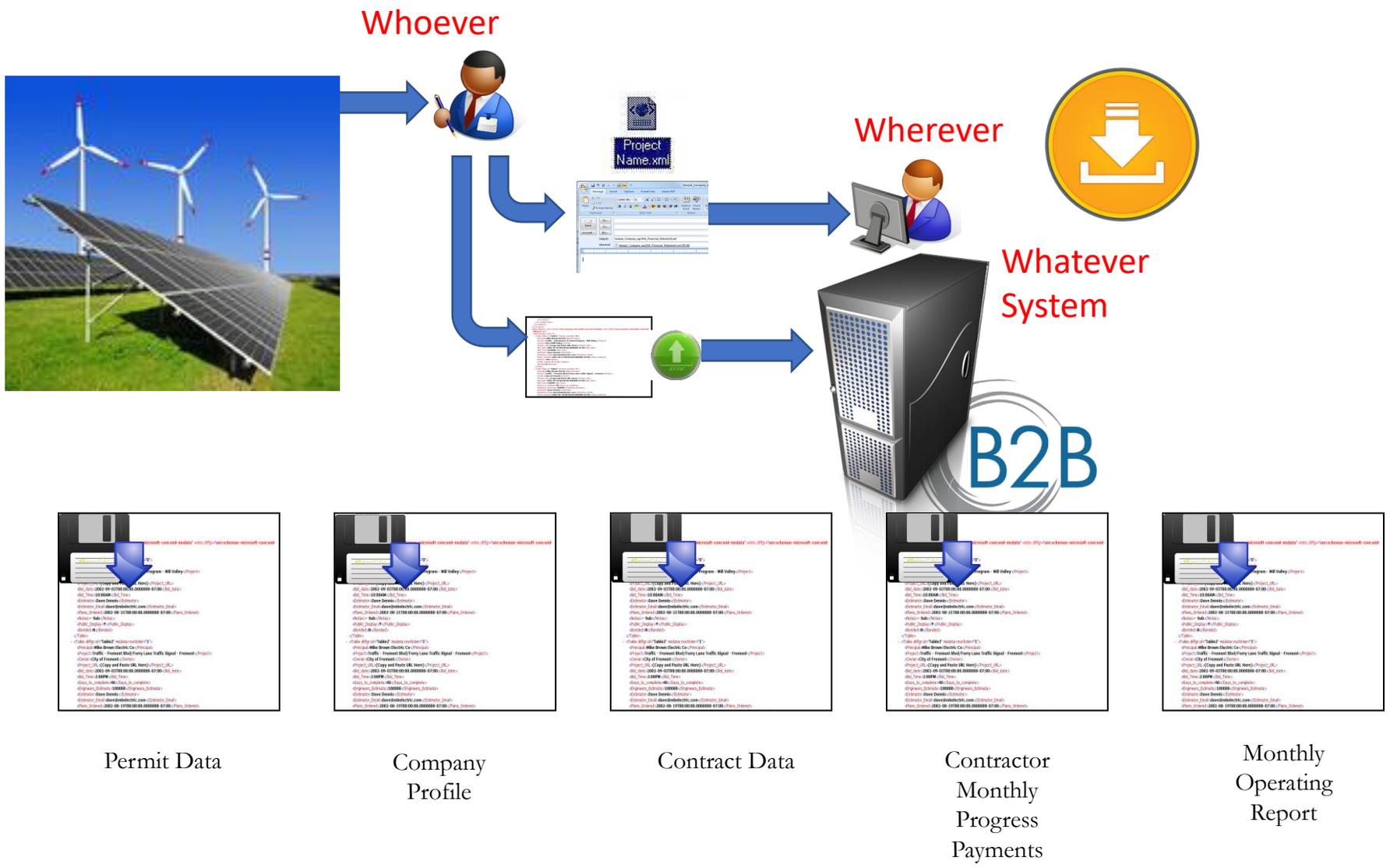
The Orange Button generates data sets for the entire energy ecosystem, from permitting through ongoing operations, to enable data analytics to all stakeholders in the ecosystem with the goal to bring awareness to efficiencies that reduce the cost of energy production.

A fragmented ecosystem of regulatory, finance, construction, insurance, surety and supply chain. Each with old legacy software that needs to be modified and modernized.

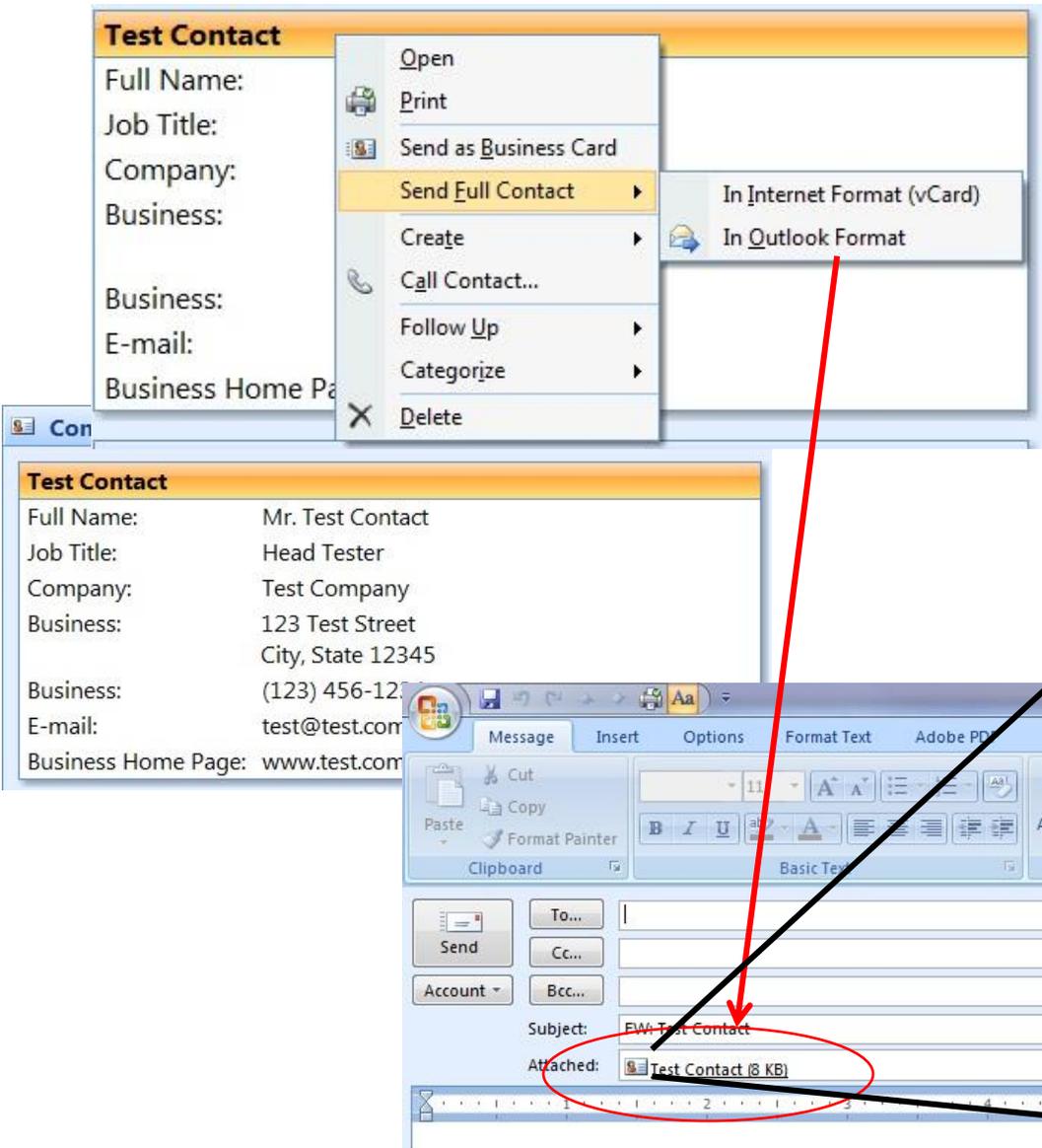


Multiple data sets for energy production





## Sending a file with address data



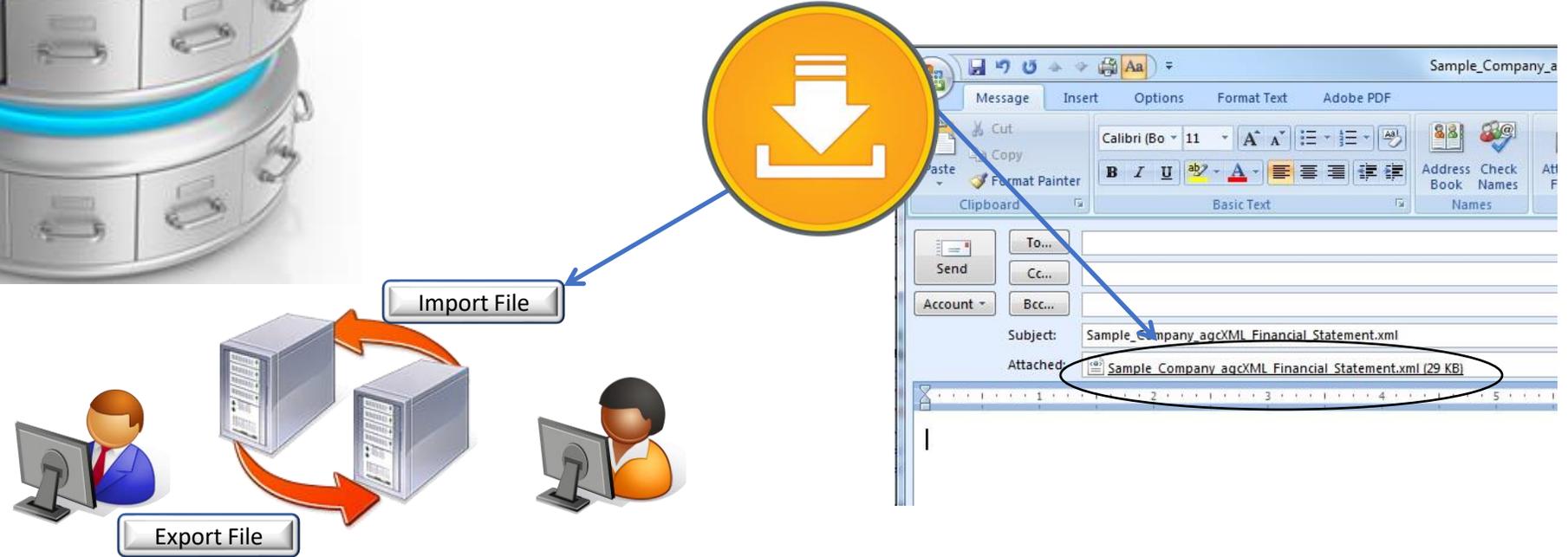
<<Name>>	Mr. Test Contact	<<Name>>
<<Address>>	123 Test Street	<<Address>>
<<Company>>	Test Company	<<Company>>
<<Phone Number>>	123-456-1234	<<Phone Number>>

<<Name>>	Mr. Test Contact	<<Name>>
<<Address>>	123 Test Street	<<Address>>
<<Company>>	Test Company	<<Company>>
<<Phone Number>>	123-456-1234	<<Phone Number>>

# Sending a file with Solar System Performance data



<<Project Name>> Westside Solar Field <<Project Name>>  
 <<Name of Owner>> Westside Group Four LLC <<Name of Owner>>  
 <<PPA Date>> April 1, 2017 <<PPA Date>>  
 <<PPA Minimum Delivery>>1000 WATTS Per Month<<PPA Minimum Delivery>>





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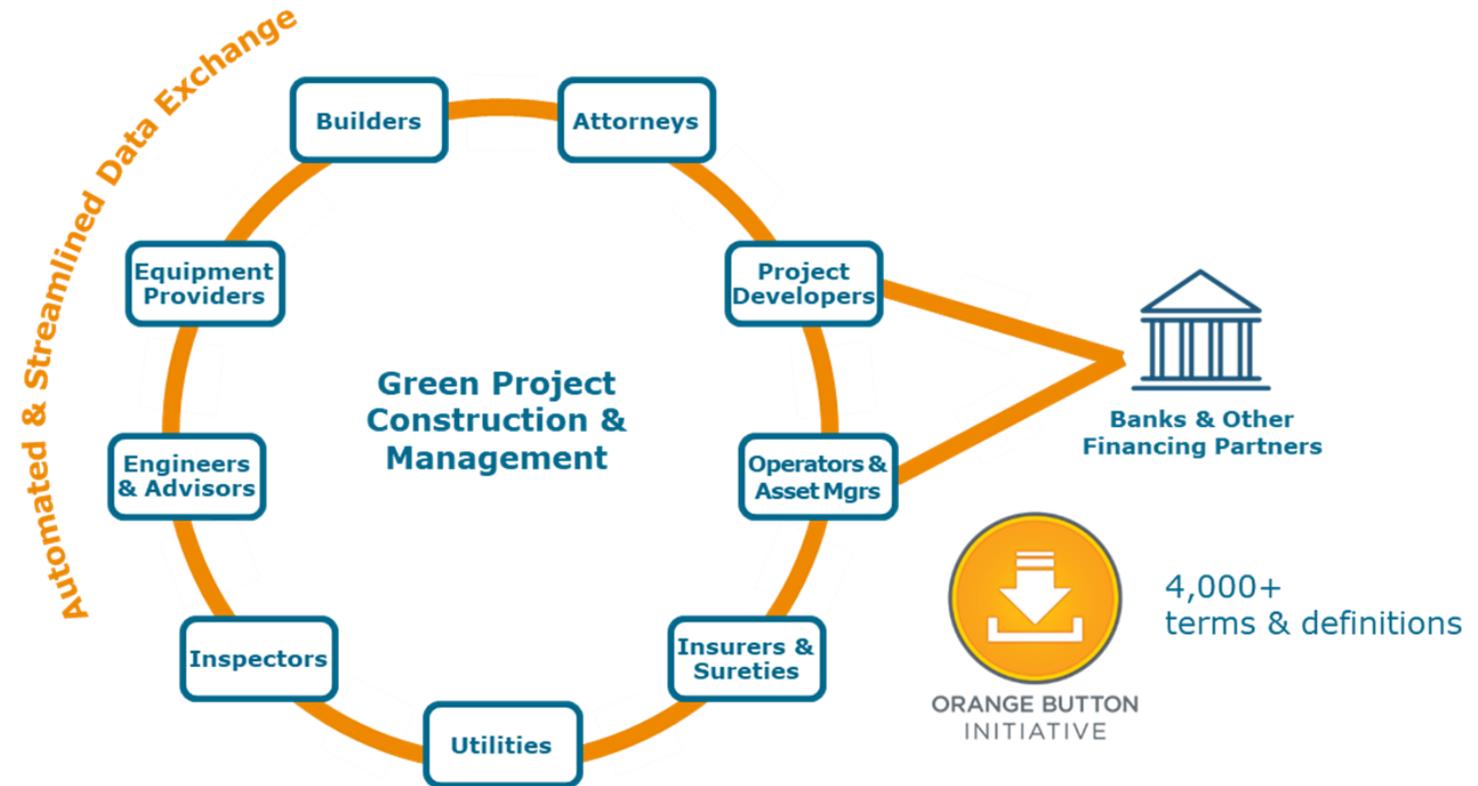
## Ecosystem Stakeholders with Need for Common Data Elements

### Capital Markets

Specific project cash funding sources, like banks, VC's, green bond funds, hedge funds, etc.

### Financial Markets

Credit providers, insurance companies, surety markets and trade credit. Not necessary project specific but utilized on projects as financial producers and services.



## Ecosystem Stakeholders with Need for Common Data Elements

### Capital Markets

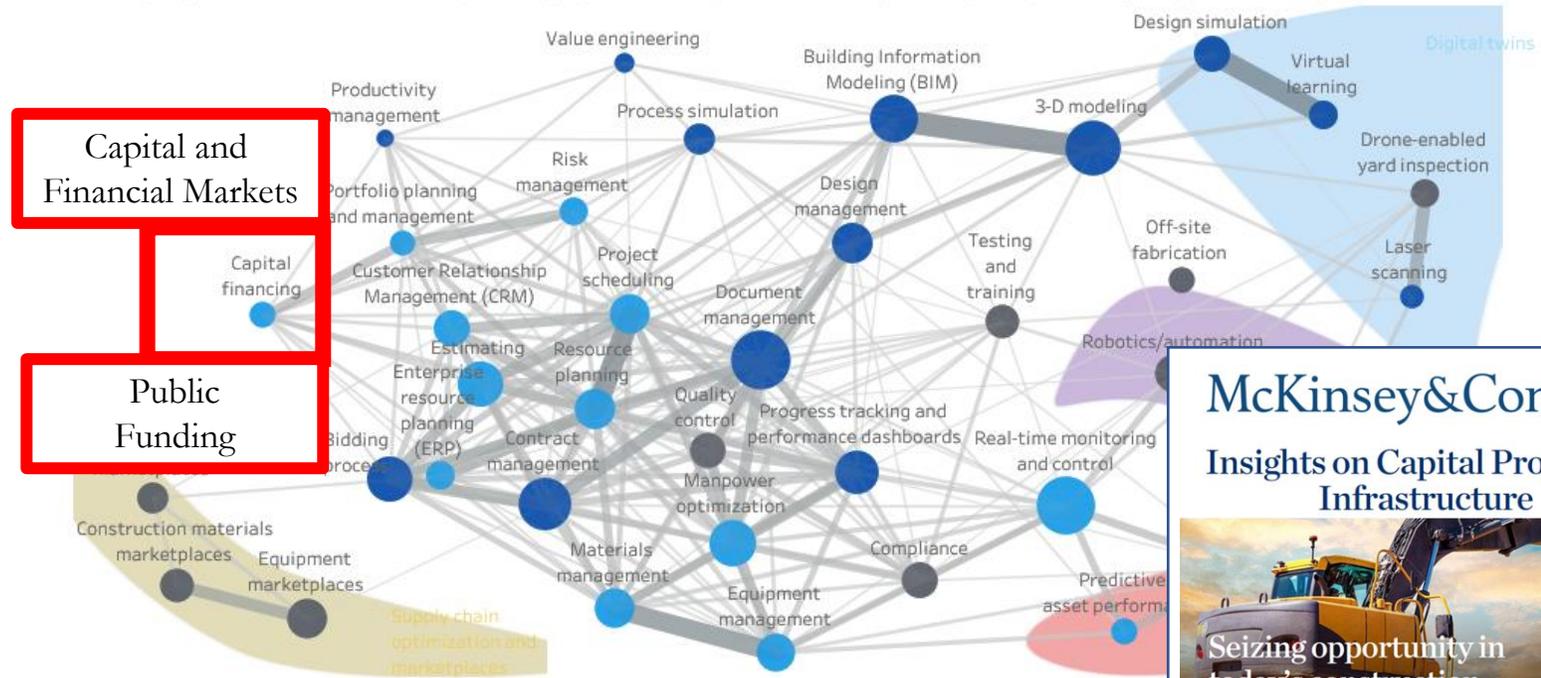
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#### Mapping the construction technology ecosystem

McKinsey analyzed the growing construction technology landscape to look for trends and constellations of activity around established and emerging use cases. Thicker lines connecting two use cases indicate a greater number of technology companies offering both technologies simultaneously. Click on a use case/technology to view its related solutions. Use the zoom options and weight slider to explore the relationships between different technologies. To isolate technologies by functional cluster or constellation, click to highlight or select the option to filter. Zoom / unfilter by clicking the same option again or the white space.



Weight 5.0 to 50.0

Cluster  
 ■ Back-office  
 ■ Digital collaboration  
 ■ On-site execution

Sources: McKinsey Startup and Investment Landscape Analytics, PitchBook, Capital IQ. Data as of Q2 2018. Number of companies per use case includes all companies that provide that technology, even if it is not their primary offering. For more on this research, see our article: ["Seizing opportunity in today's construction technology ecosystem"](#)

McKinsey&Company

**McKinsey&Company**  
**Insights on Capital Projects & Infrastructure**

**Seizing opportunity in today's construction technology ecosystem**

<https://www.mckinsey.com/industries/capital-projects-and-infrastructure/our-insights/seizing-opportunity-in-todays-construction-technology-ecosystem>

Ecosystem Stakeholders with Need for Common Data Elements

# \$500,000,000 Utility Scale Interconnection to the Smart Grid



Some of the stakeholders in the construction ecosystem that can utilize the same project data

Lender Finance  
 Public Program Administrator  
 Project Owner  
 Solar Contractor  
 Project Developer  
 Solar Project Supply Chain  
 Solar Contractor IT systems

Contractor Bank  
 Solar Contractor Surety Broker  
 Solar Contractor Surety Company  
 Solar Contractor Insurance Broker  
 Solar Contractor Insurance Company  
 Project Owner Insurance broker

Authority with Jurisdiction  
 Regulatory  
 Environmental, Social and  
 Governance (ESG) reporting.



# \$50,000 Small DER Interconnection to the Smart Grid



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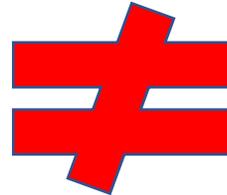
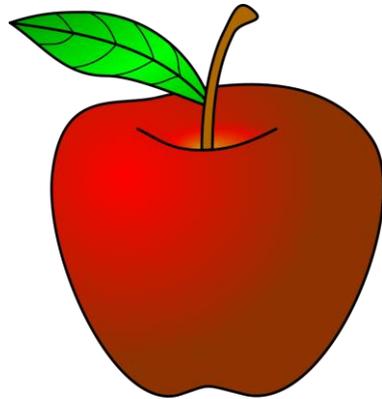
Going Forward - Brainstorming



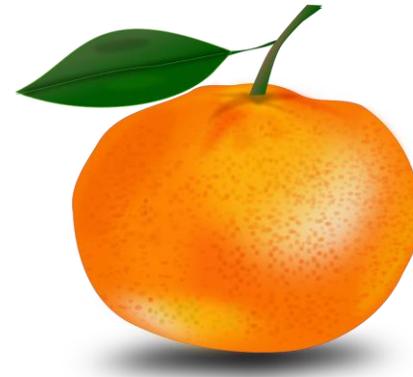
## Major Challenge to Data Interoperability

Two Legacy Systems – Different Definitions for the same data field name

System #1 Profit is before tax



System #2 Profit is after tax

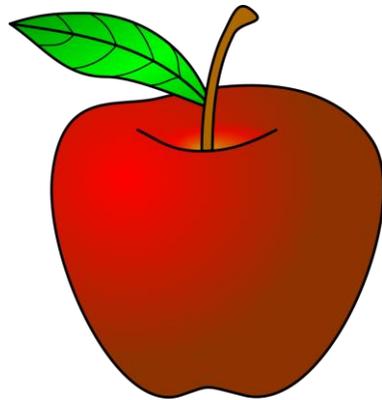




### Major Challenge to Data Interoperability

Two Legacy Systems – Same XBRL Definitions mapped for the same data field name – Pre-Tax Profit

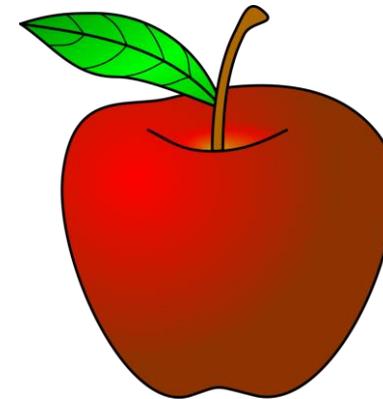
System #1 Pre-Tax Profit



System #1



System #2 Pre-Tax Profit



System #2



XML

System #1 Profit is before tax

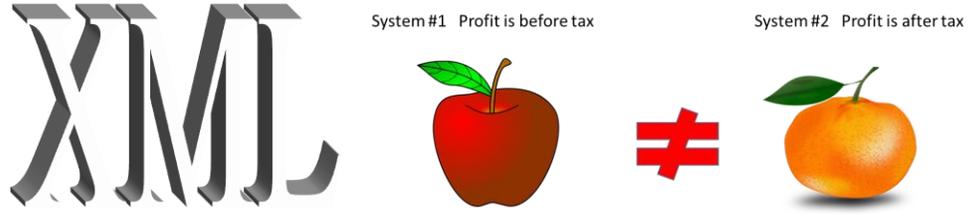


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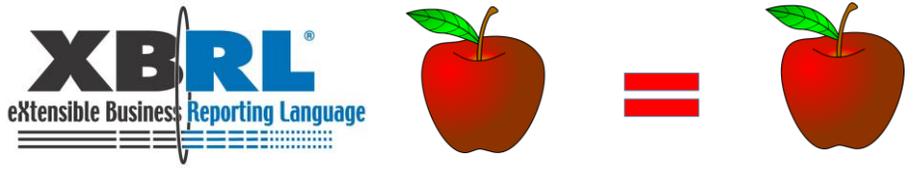
System #2 Profit is after tax



XML is only a field name and XML tag



XML is only a field name and XML tag



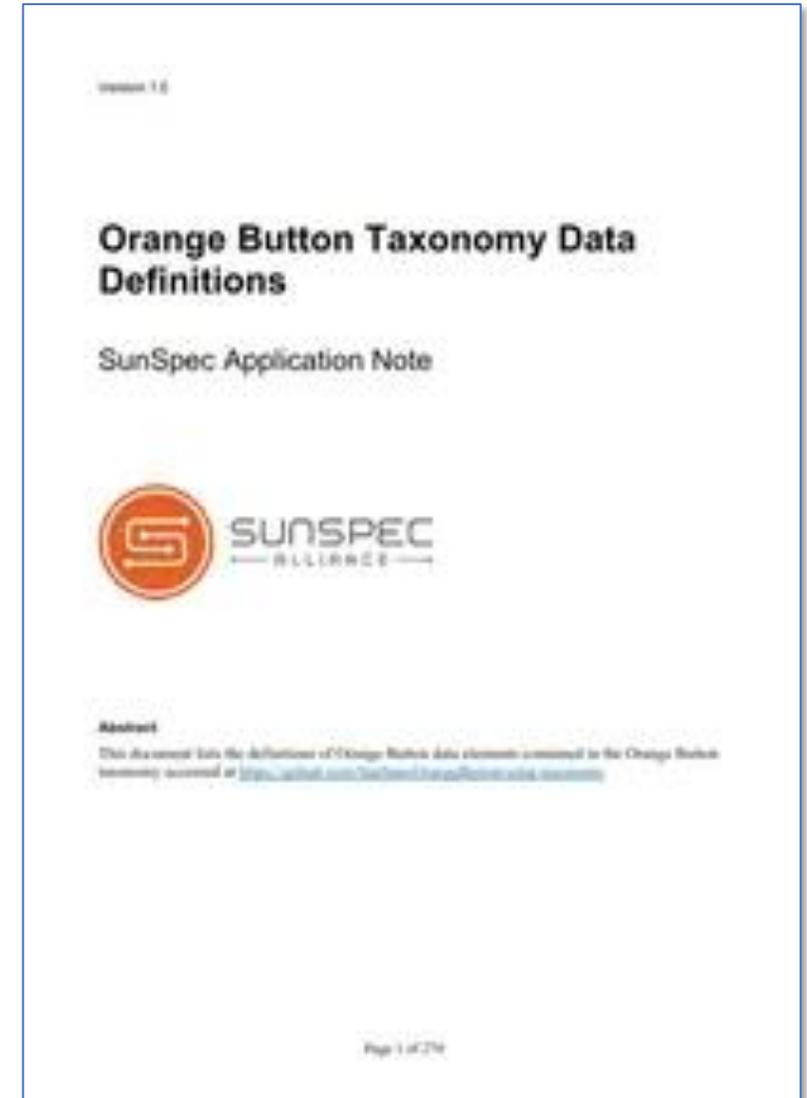
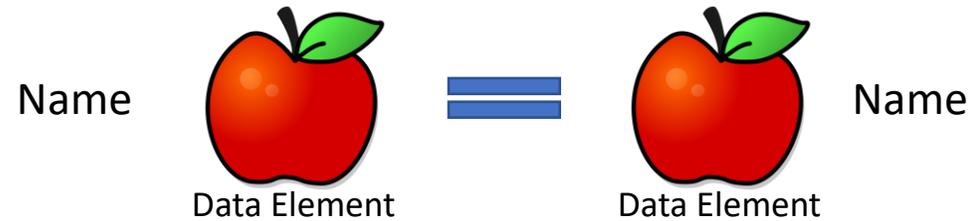
XBRL is XML on steroids – Data field is defined

Details	Relationships	Tree Locations
<b>Cash, Cash Equivalents, and Short-term Investments</b>		
Presentation Reference	Name	Regulation S-X (SX)
	Number	210
	Section	02
	Paragraph	1
	Article	5
<b>Properties</b>		
Property	Value	
Name	CashCashEquivalentsAndShortTermInvestments	
Namespace	http://fasb.org/us-gaap/2014-01-31	
Data Type	xbrli:monetaryItemType	
XBRL Type	monetaryItemType	
Substitution Group	xbrli:item	
Period Type	instant	
Abstract	false	
Nilable	true	
Balance	debit	



Construction projects are made up of a series of data elements that are exchanged between stakeholders

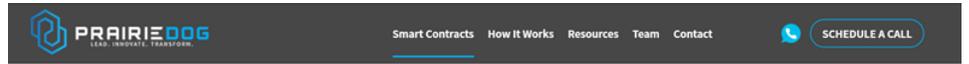
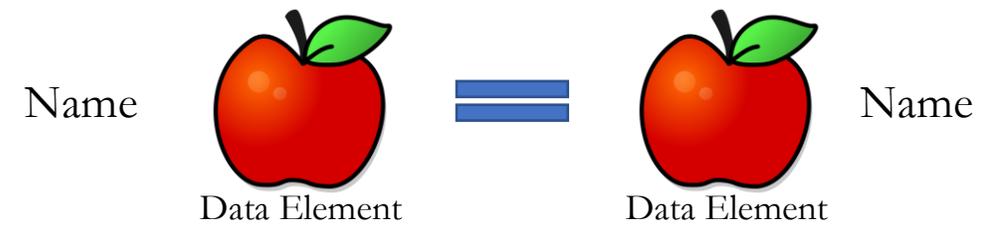
Reliable data exchange requires adoption of common data terms and definitions for each *Data Element*



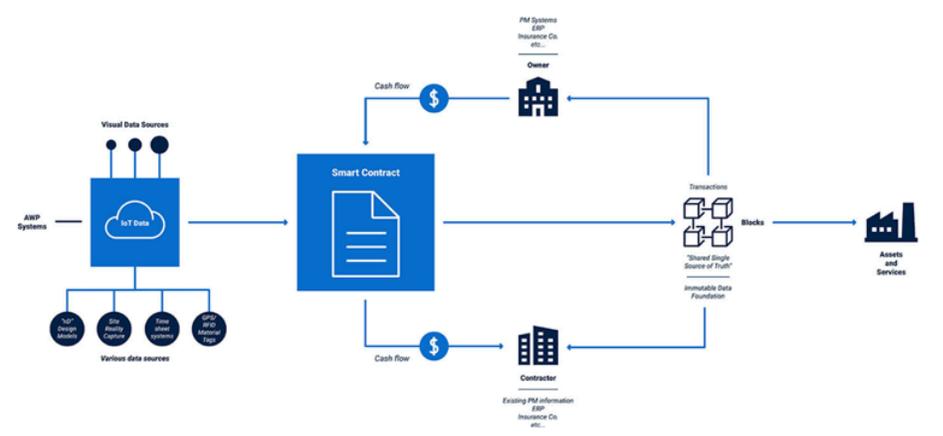


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**SMART CONTRACTS + BLOCKCHAIN**



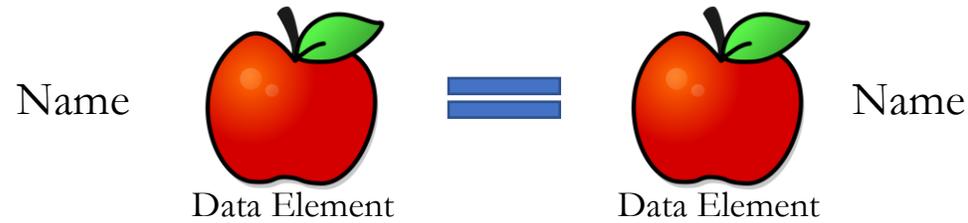
The University of Texas at Austin  
 Cockrell School of Engineering



[PrairieDog Venture Partners](#)  
[Operating System 2.0](#)

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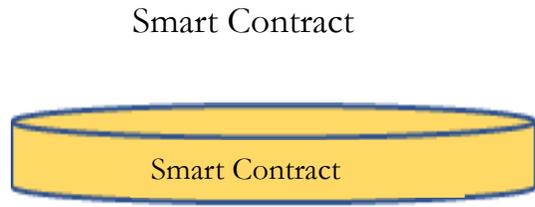
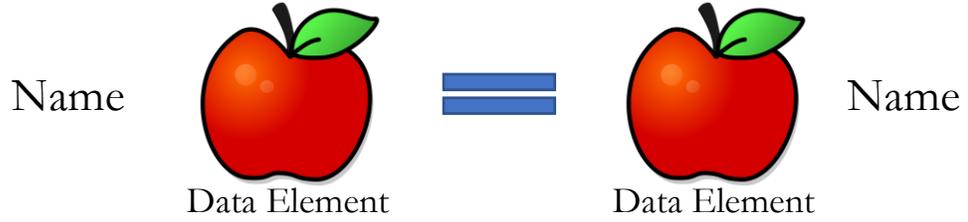
- ConsensusDocs 260: Performance Bond Form (coordinated with agreements between contractor and owner)
- ConsensusDocs 261: Payment Bond Form (coordinated with agreements between contractor and owner)
- ConsensusDocs 262: Bid Bond
- ConsensusDocs 263: Warranty Bond (coordinated for the agreements between contractor and owner)
- ConsensusDocs 470: Design-Build Performance Bond (Surety Liable for Design Costs)
- ConsensusDocs 471: Design-Build Performance Bond (Surety Not Liable for Design Costs)
- ConsensusDocs 472: Design-Build Payment Bond (Surety Liable for Design Costs)
- ConsensusDocs 473: Design-Build Payment Bond (Surety Not Liable for Design Costs)
- ConsensusDocs 706: Subcontract Performance Bond
- ConsensusDocs 707: Subcontract Payment Bond
- ConsensusDocs 760: Subcontract Bid Bond

ConsensusDocs®  
 BUILDING A BETTER WAY

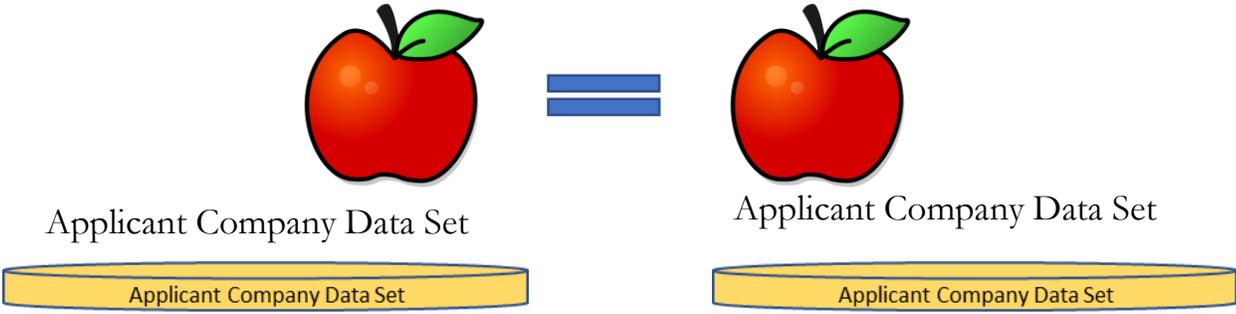
This document is proudly endorsed by:

Construction projects are made up of a series of data elements that are exchanged between stakeholders

Reliable data exchange requires adoption of common data terms and definitions for each *Data Element*

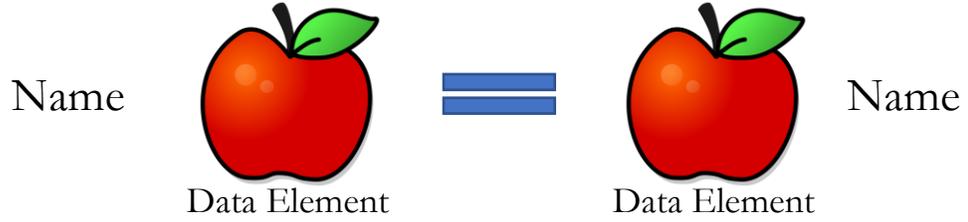


A specific group of data elements is a *Data Set*

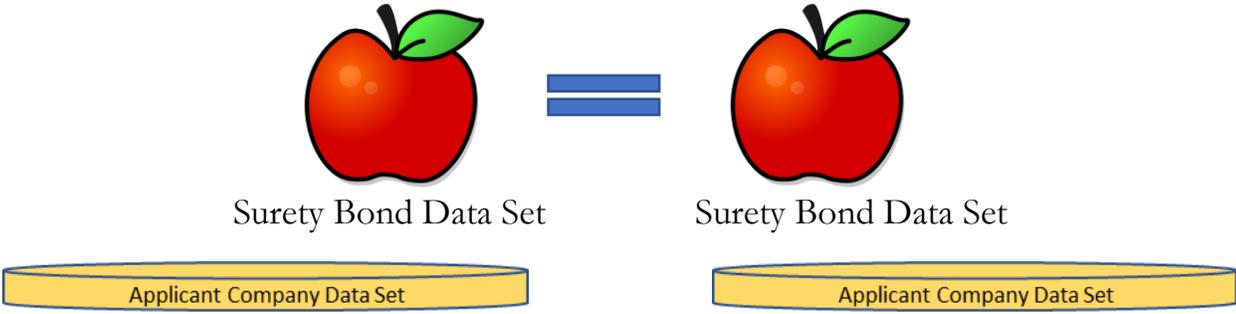


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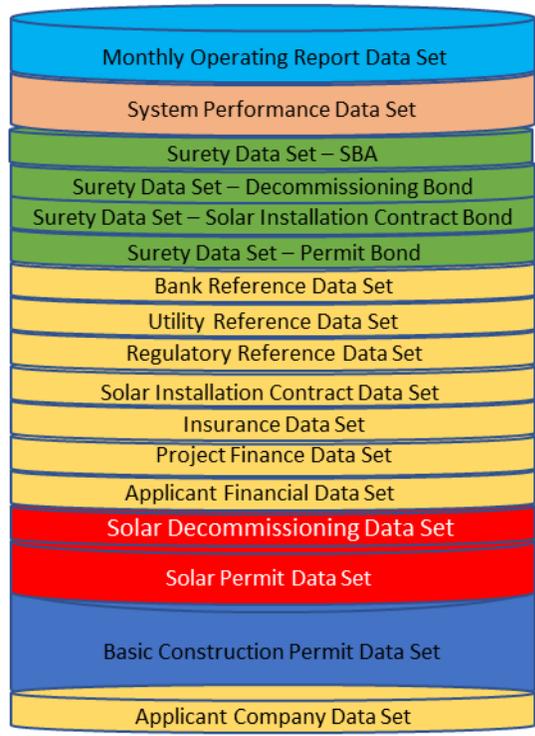
Reliable data exchange requires adoption of common data terms and definitions for each *Data Element*



A specific group of data elements is a *Data Set*



# XBRL Orange Button DATA STACK



A group of data sets is a *Data Stack*



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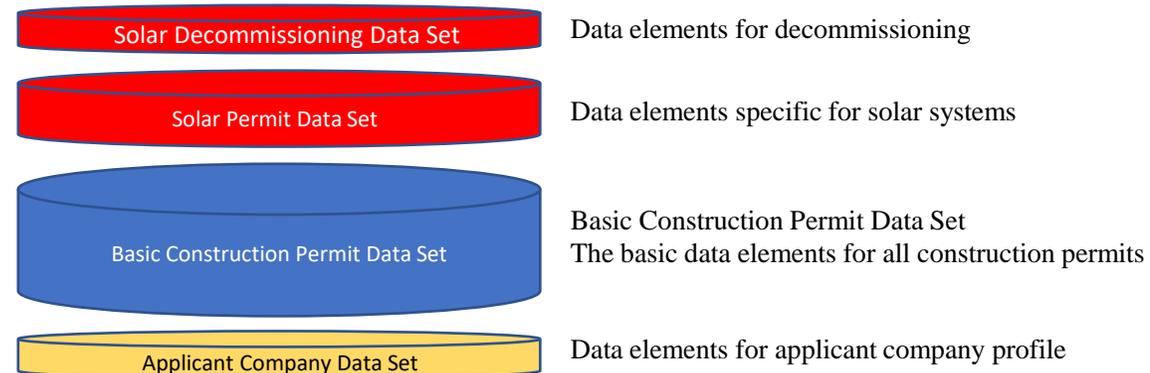
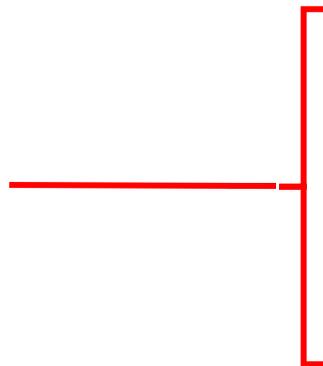


Construction projects are made up of a series of data elements that are exchanged between stakeholders

### Data Stack

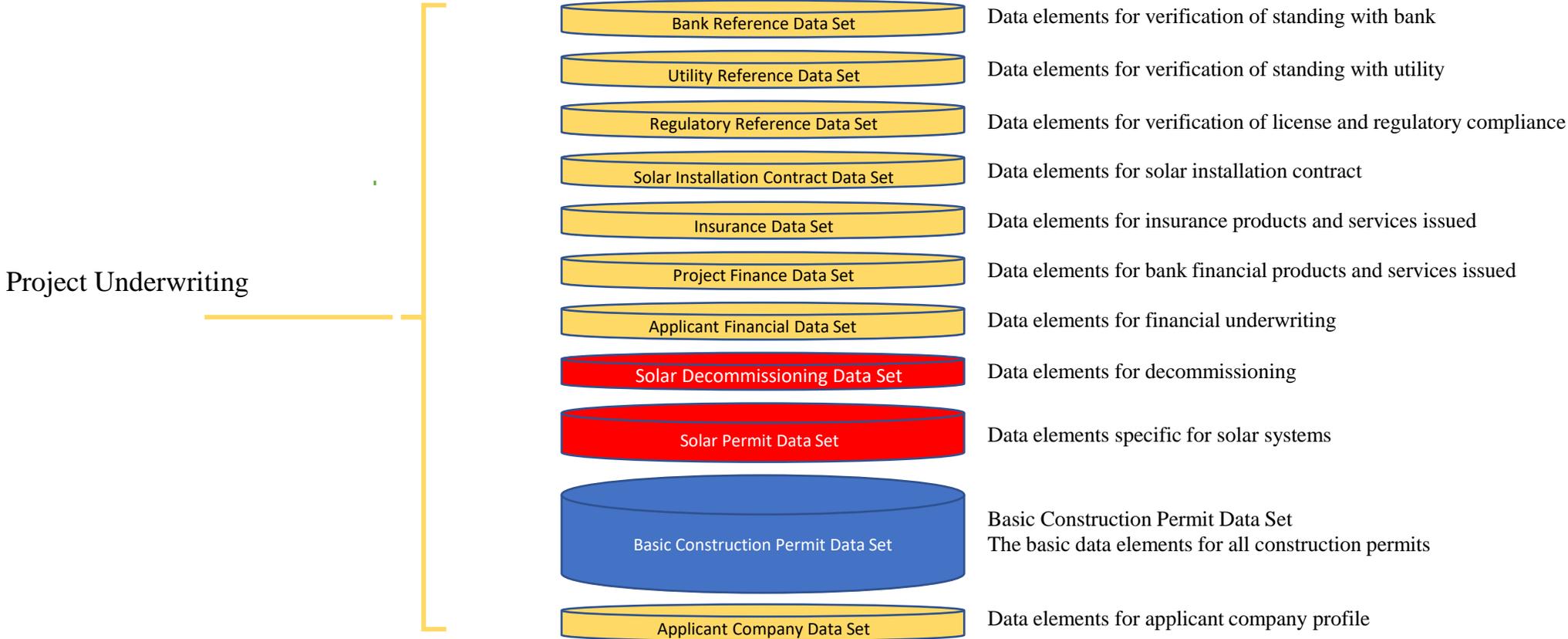
- Machine Readable data standard
- No data elements are repeated
- The combination of data sets is flexible and subject to need
- Each individual system can elect minimum requirements for data sets.

Project Inception  
Permit Process



Construction projects are made up of a series of data elements that are exchanged between stakeholders

As the project data gets administered by stakeholders in the ecosystem the Data Stack expands



Project Construction

As the project data gets administered by stakeholders in the ecosystem the Data Stack expands



Solar Project Operational

As the project data gets administered by stakeholders in the ecosystem the Data Stack expands



# Digital Ecosystem for Infrastructure Reliability

## Attracting Capital and Financial Markets to Infrastructure

Ongoing operations  
 utilizing legacy data  
 elements

As the project data  
 gets administered by  
 stakeholders in the  
 ecosystem the  
 Data Stack expands

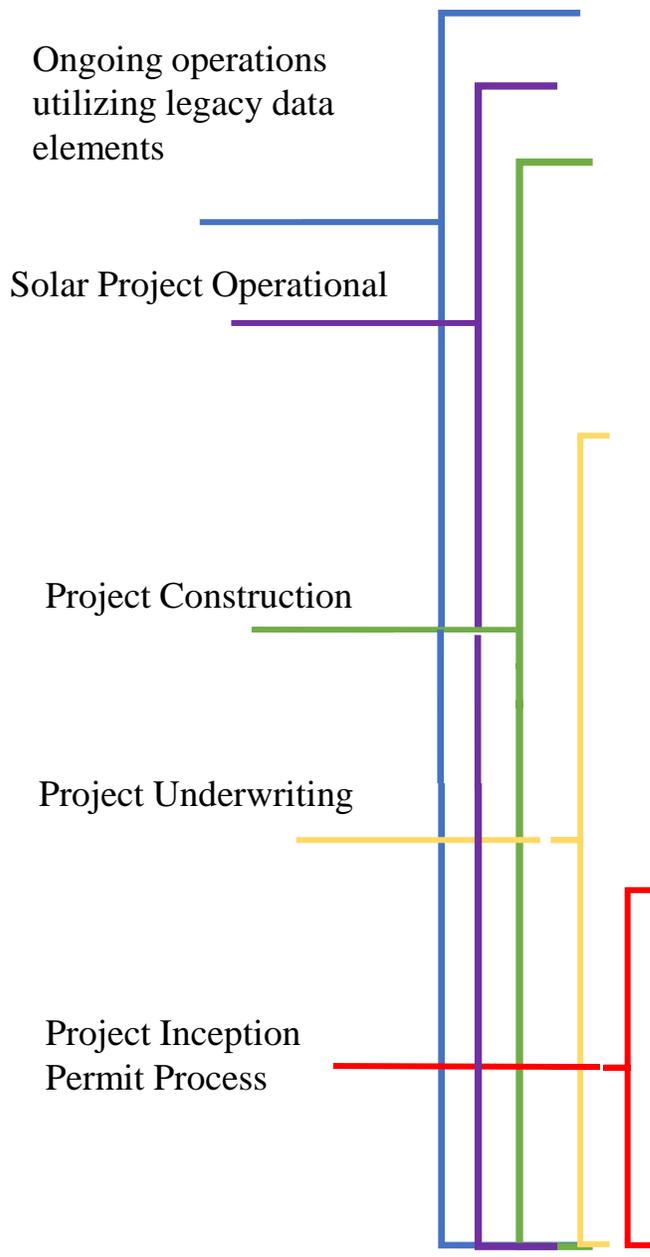


May 10, 2021

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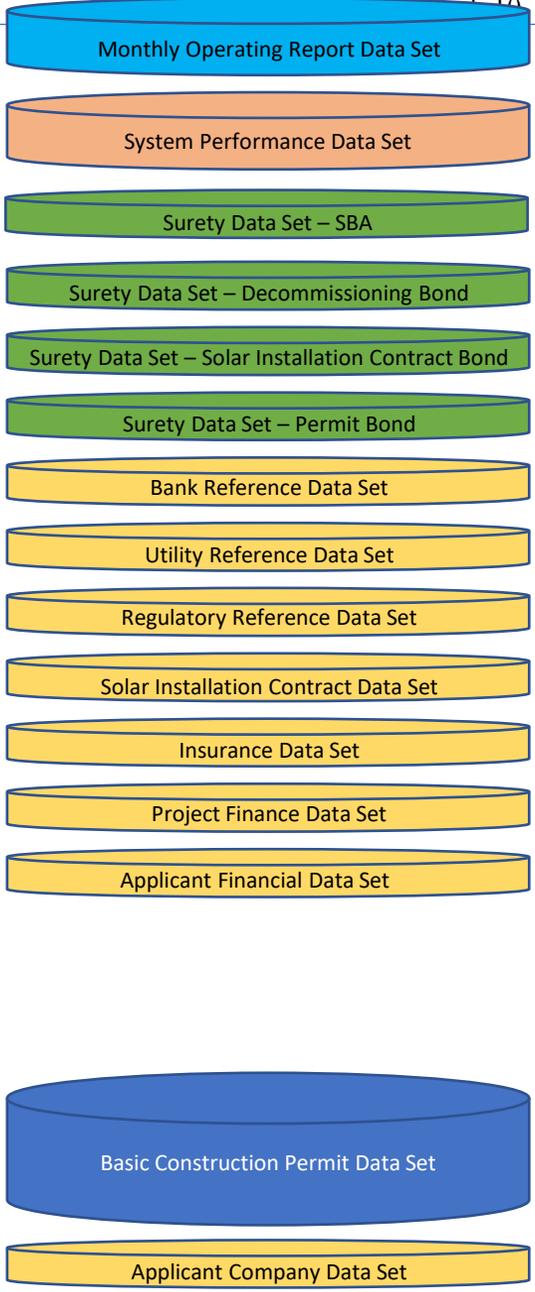
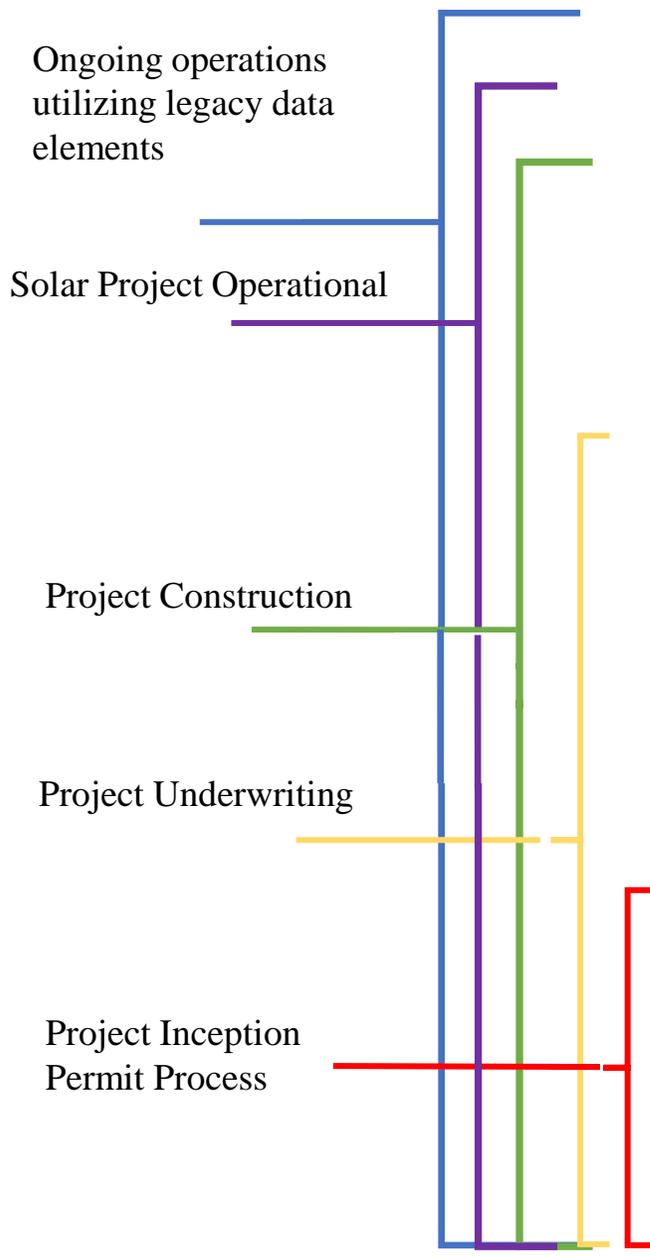


Monthly Operating Report Data Set	Data elements for standard monthly operating report
System Performance Data Set	The data elements for solar system performance for monitoring and measuring to enable risk management and predictive analytics
Surety Data Set – SBA	Data elements for SBA
Surety Data Set – Decommissioning Bond	Data elements for surety performance and payment bond on solar installer
Surety Data Set – Solar Installation Contract Bond	Data elements for surety decommissioning bond
Surety Data Set – Permit Bond	Data elements for surety permit bond
Bank Reference Data Set	Data elements for verification of standing with bank
Utility Reference Data Set	Data elements for verification of standing with utility
Regulatory Reference Data Set	Data elements for verification of license and regulatory compliance
Solar Installation Contract Data Set	Data elements for solar installation contract
Insurance Data Set	Data elements for insurance products and services issued
Project Finance Data Set	Data elements for bank financial products and services issued
Applicant Financial Data Set	Data elements for financial underwriting
Solar Decommissioning Data Set	Data elements for decommissioning
Solar Permit Data Set	Data elements specific for solar systems
Basic Construction Permit Data Set	Basic Construction Permit Data Set The basic data elements for all construction permits
Applicant Company Data Set	Data elements for applicant company profile

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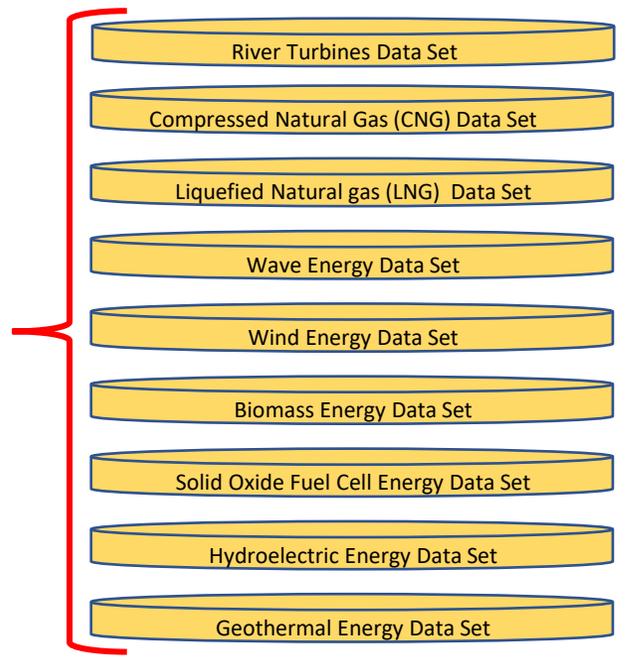
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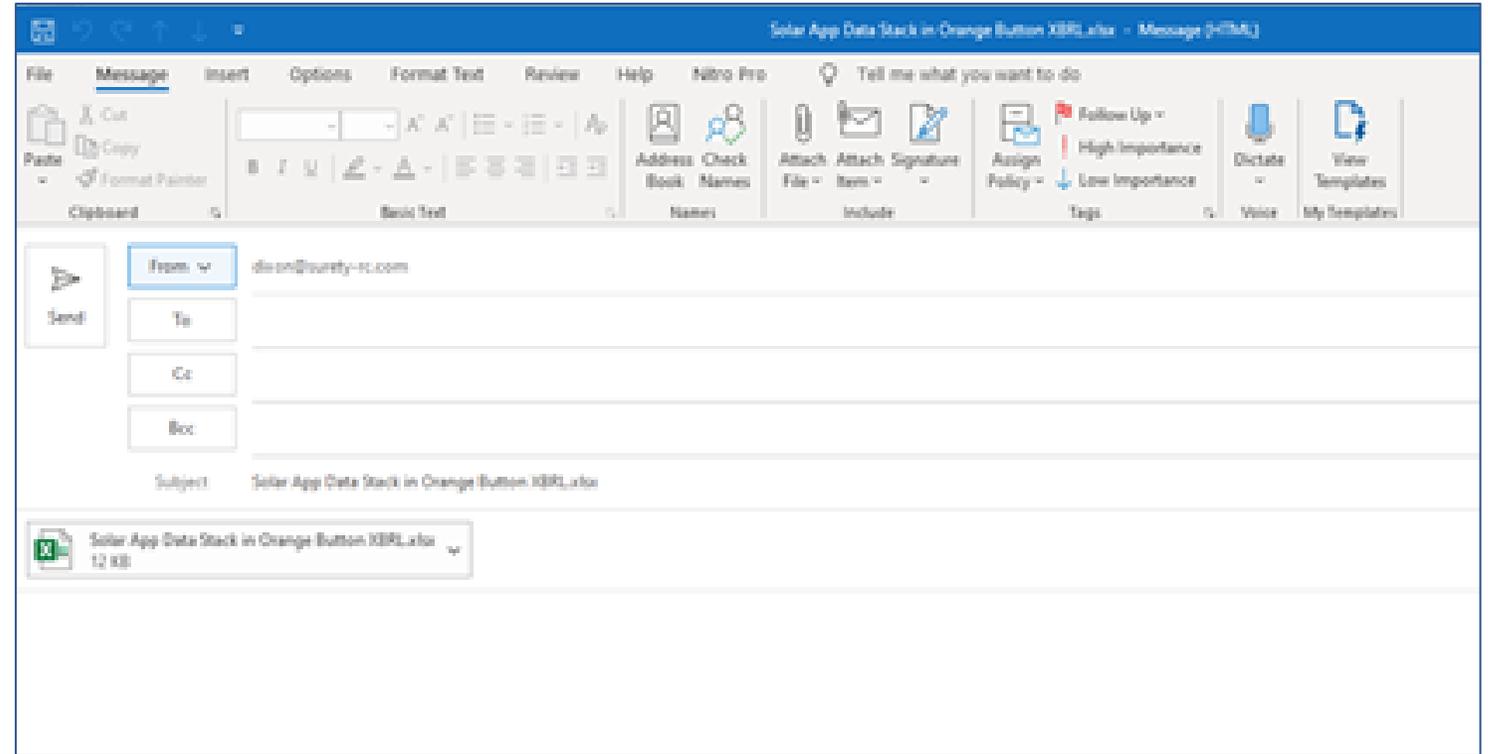
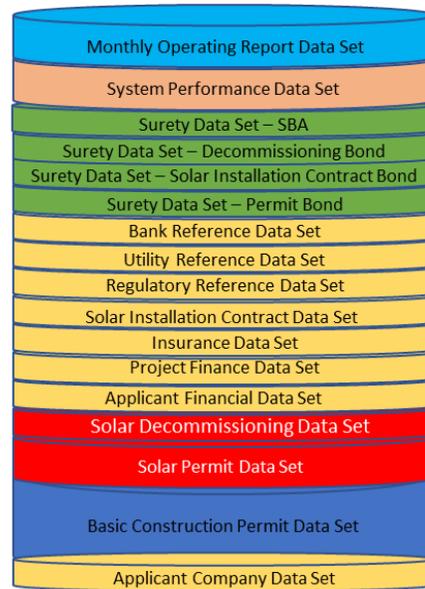


The Orange Button Data Interoperability is focused on Solar Energy to enable Data Driven Decisions

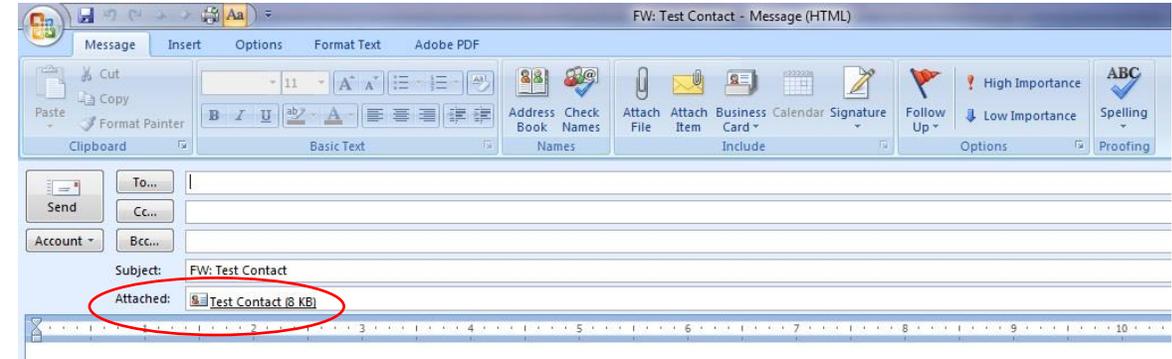
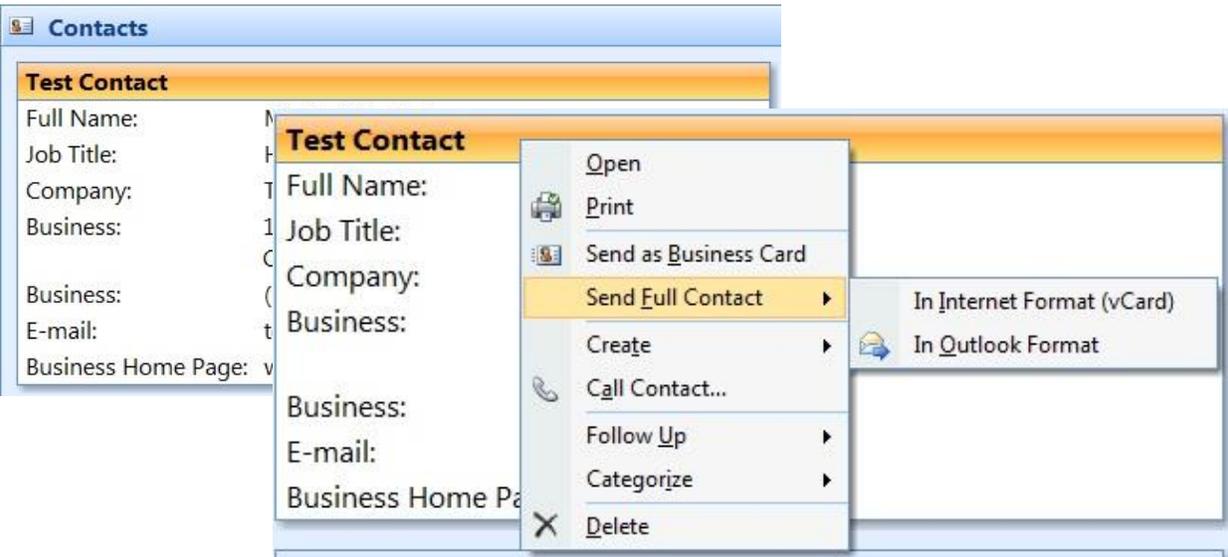
Data Taxonomies are focused on Data Interoperability for all types of energy to enable Data Driven Decisions

The data stack applies to all energy types, regardless of what the type of energy, with appropriate data sets for each



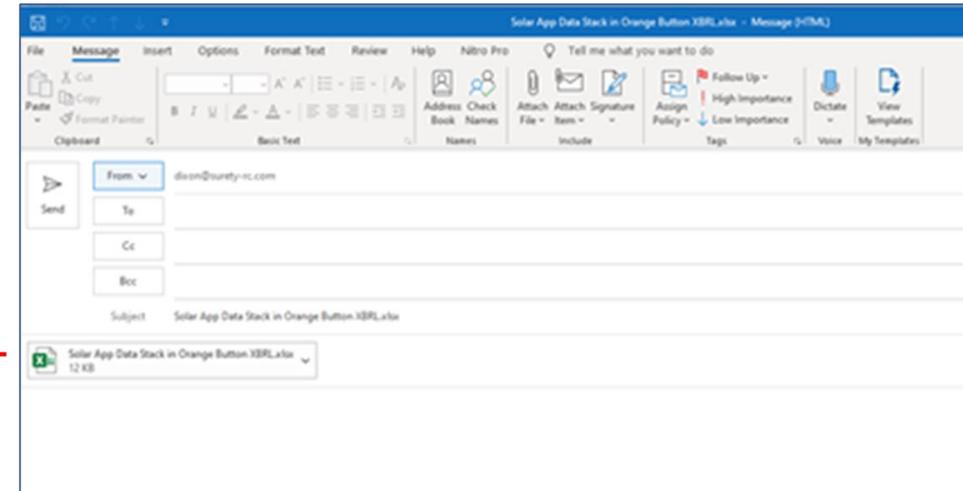
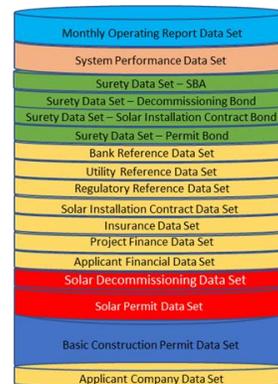


XBRL Taxonomy can provide Data Interoperability enabled by simple email



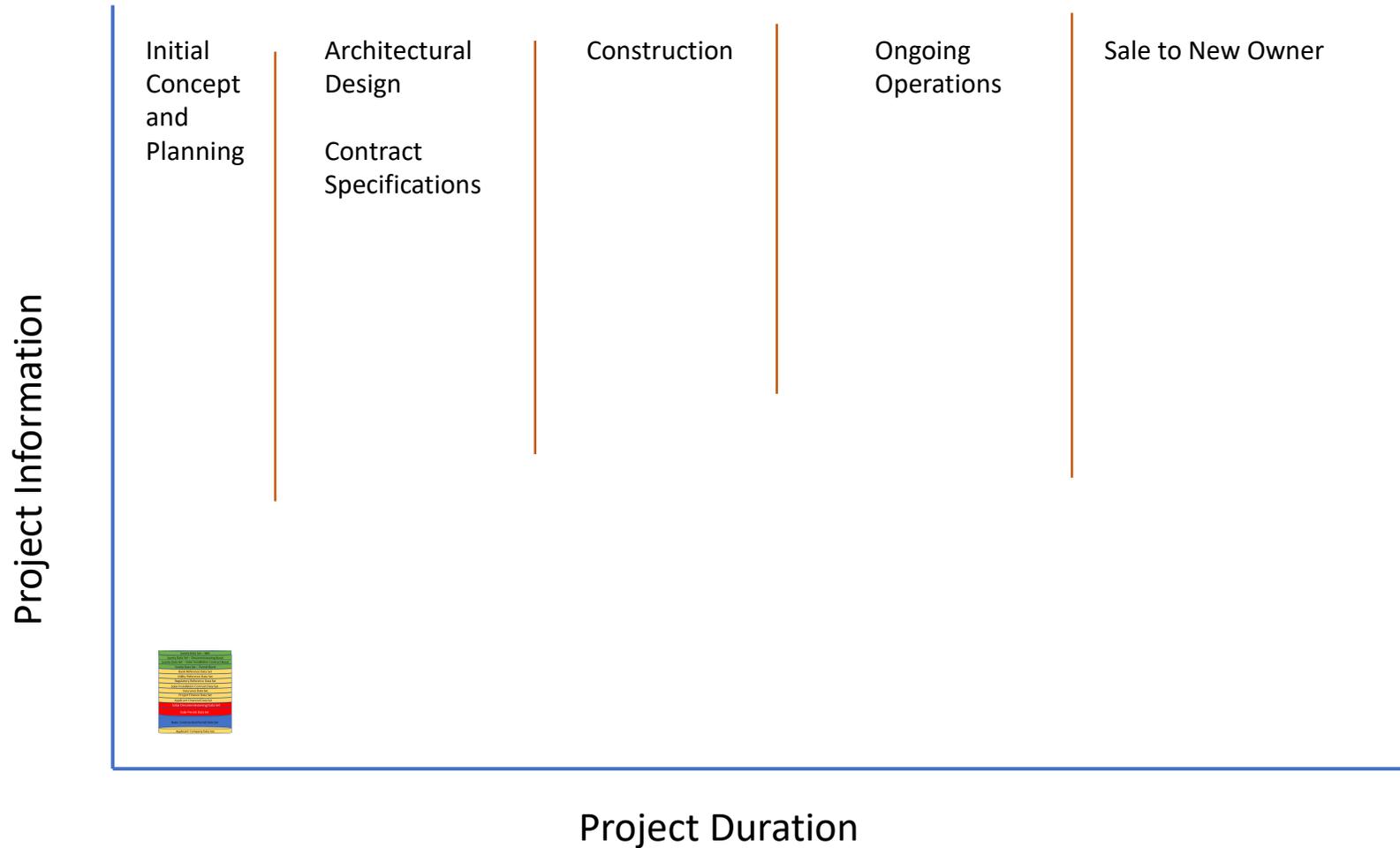
Sending an  
 address *Data Set*  
 from Outlook

Same as sending  
 Any *Data Set*  
 from any system

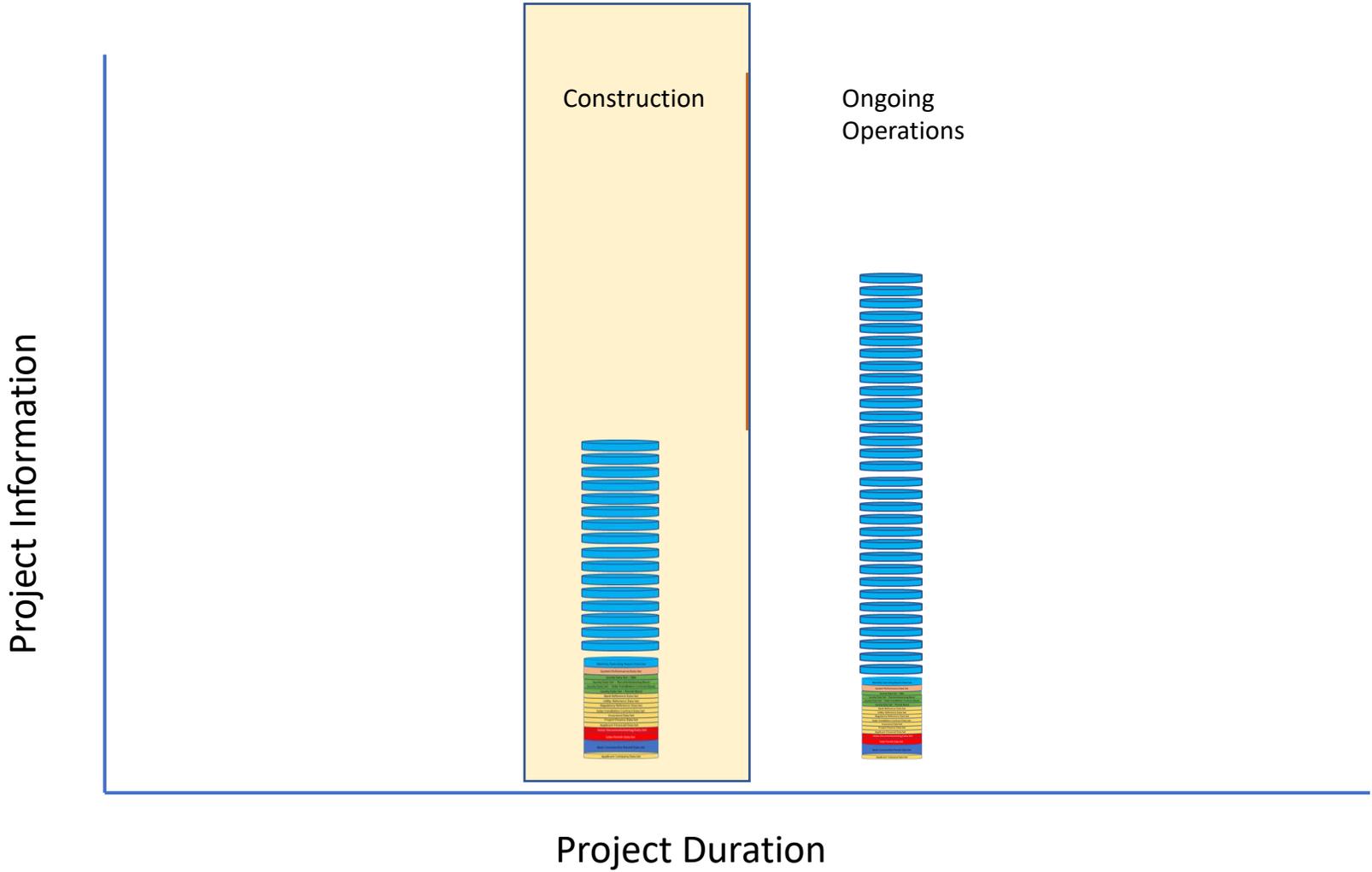




## Project Lifecycle Data Generated



# Project Risk

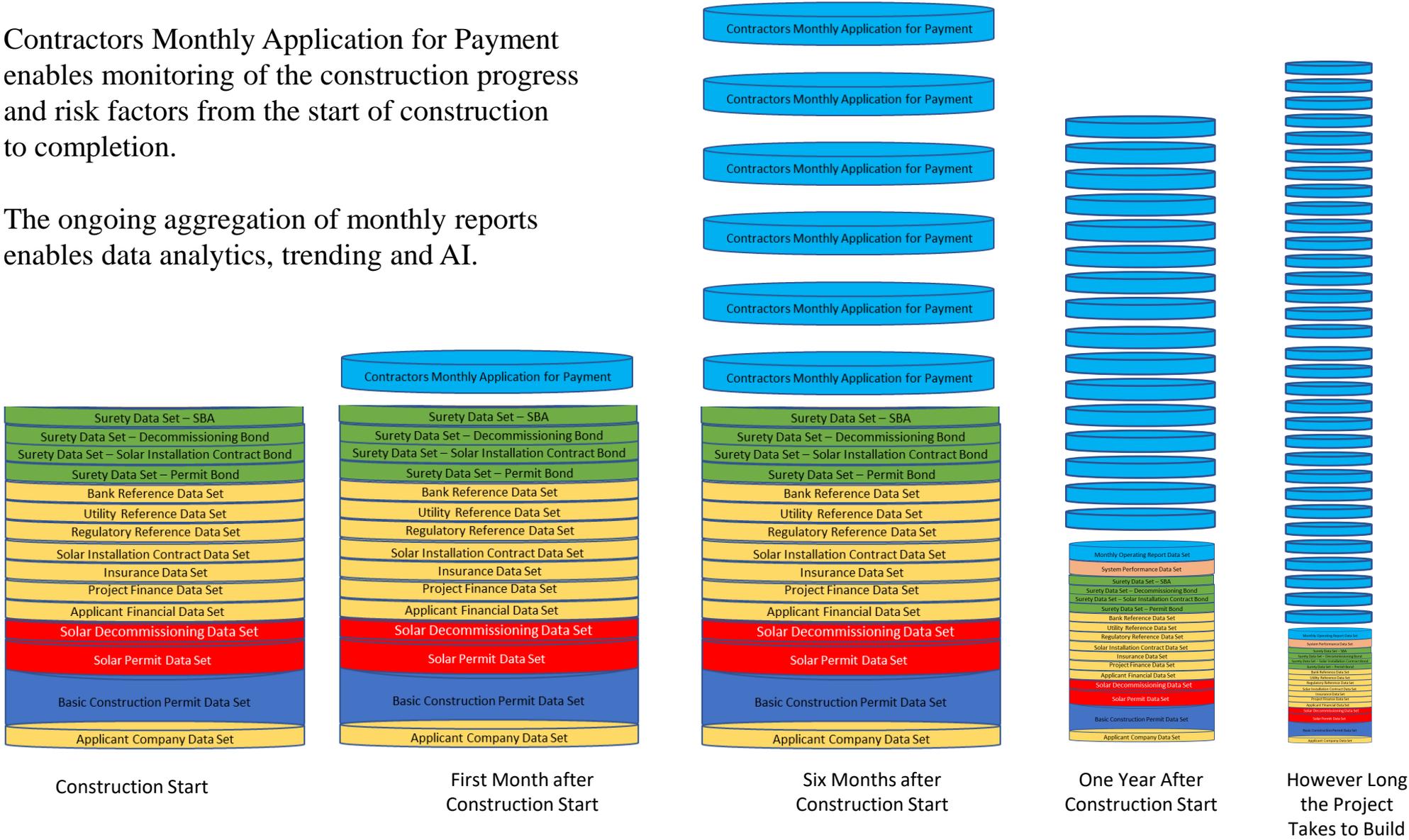


Ongoing  
 construction  
 monitoring utilizing  
 legacy data elements



Contractors Monthly Application for Payment enables monitoring of the construction progress and risk factors from the start of construction to completion.

The ongoing aggregation of monthly reports enables data analytics, trending and AI.



Construction Start

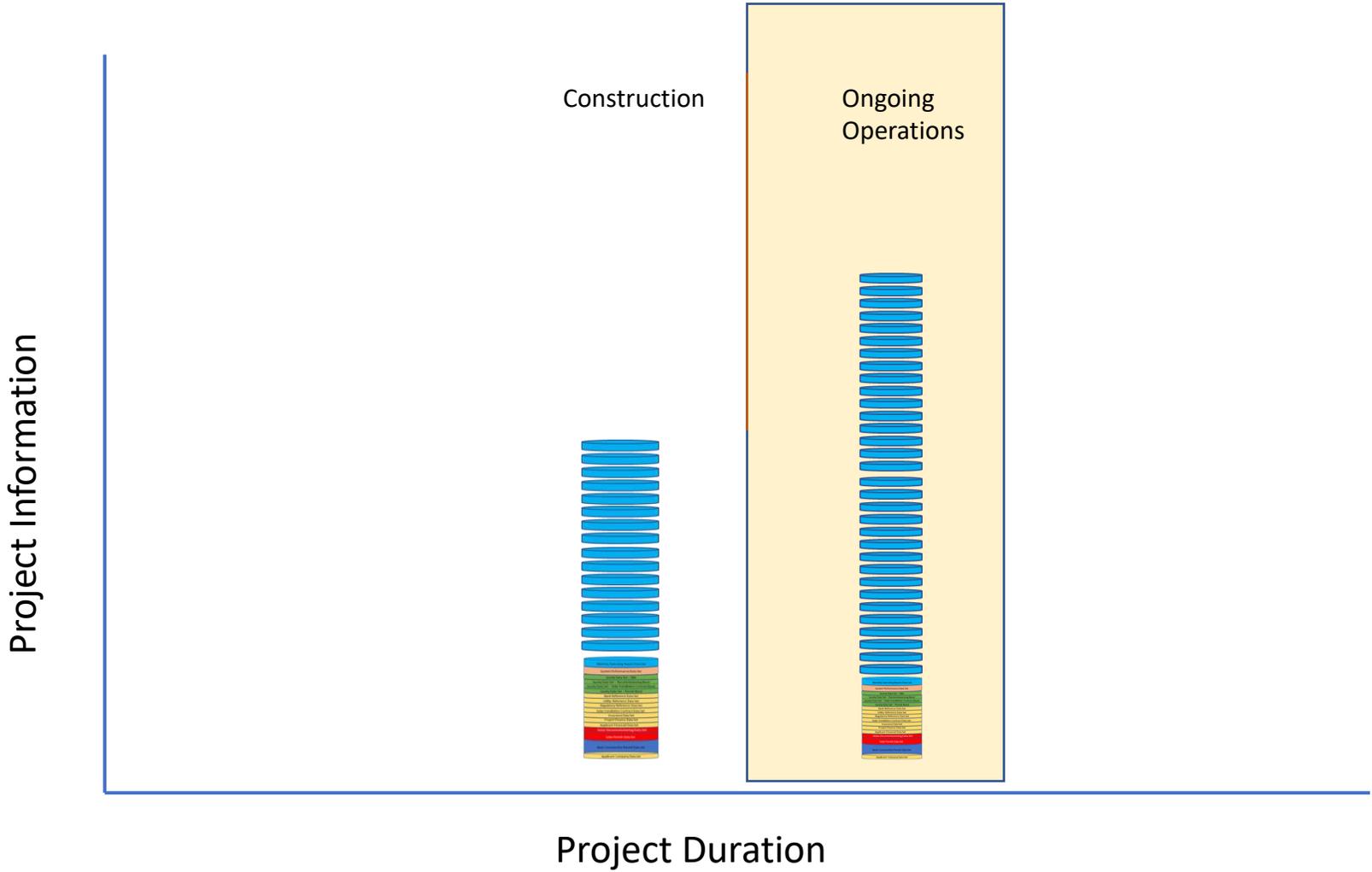
First Month after Construction Start

Six Months after Construction Start

One Year After Construction Start

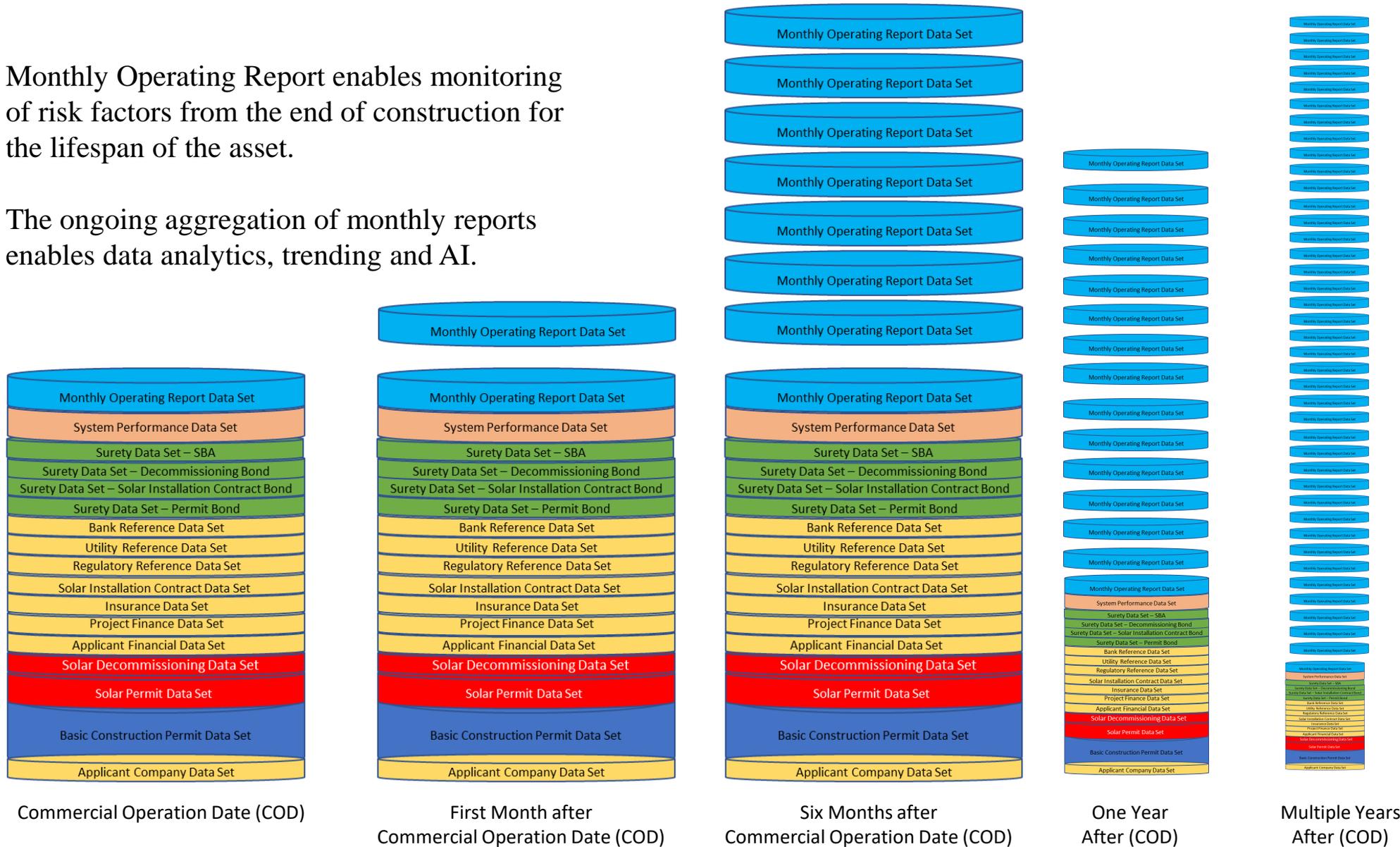
However Long the Project Takes to Build

# Project Risk

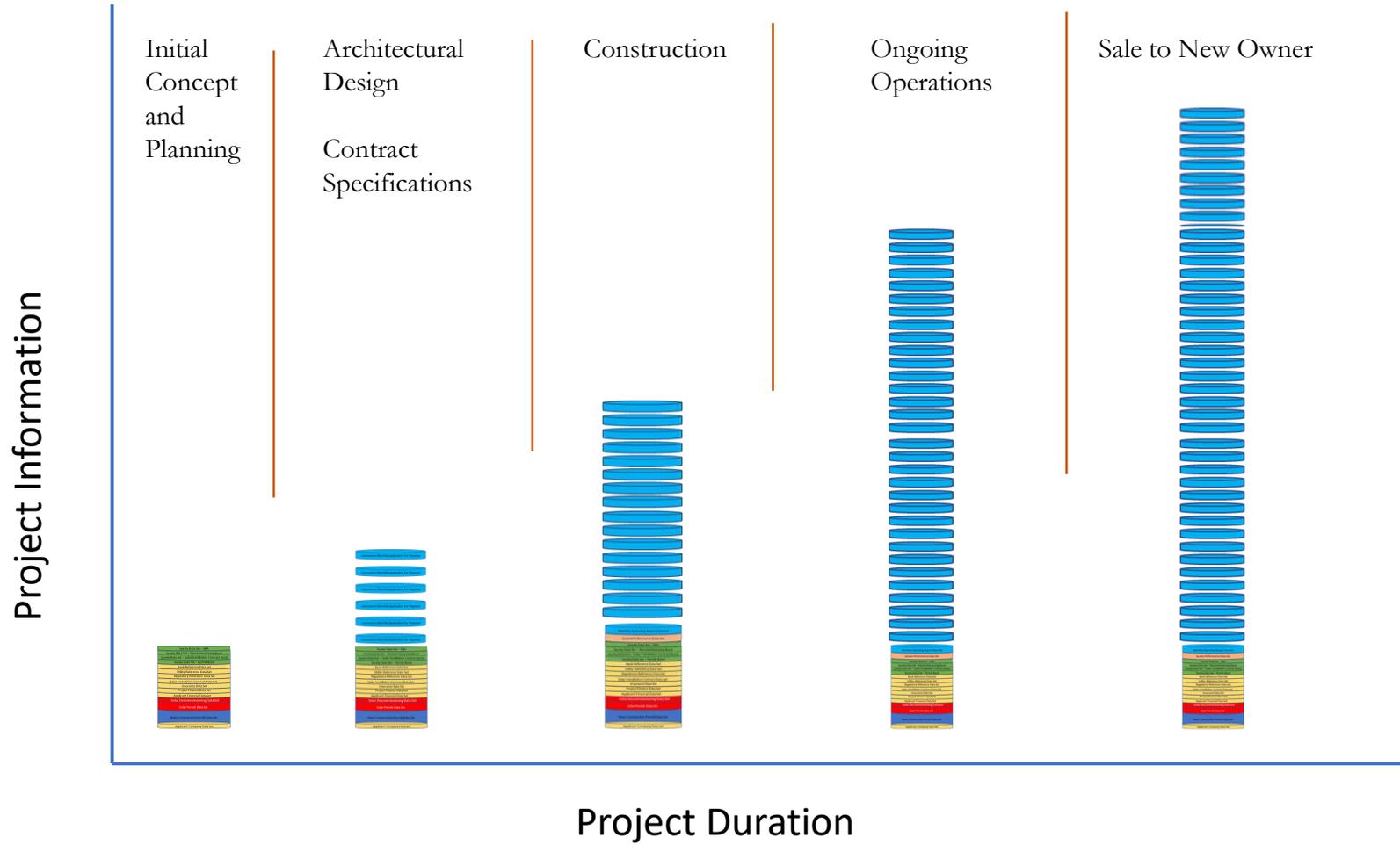


Monthly Operating Report enables monitoring of risk factors from the end of construction for the lifespan of the asset.

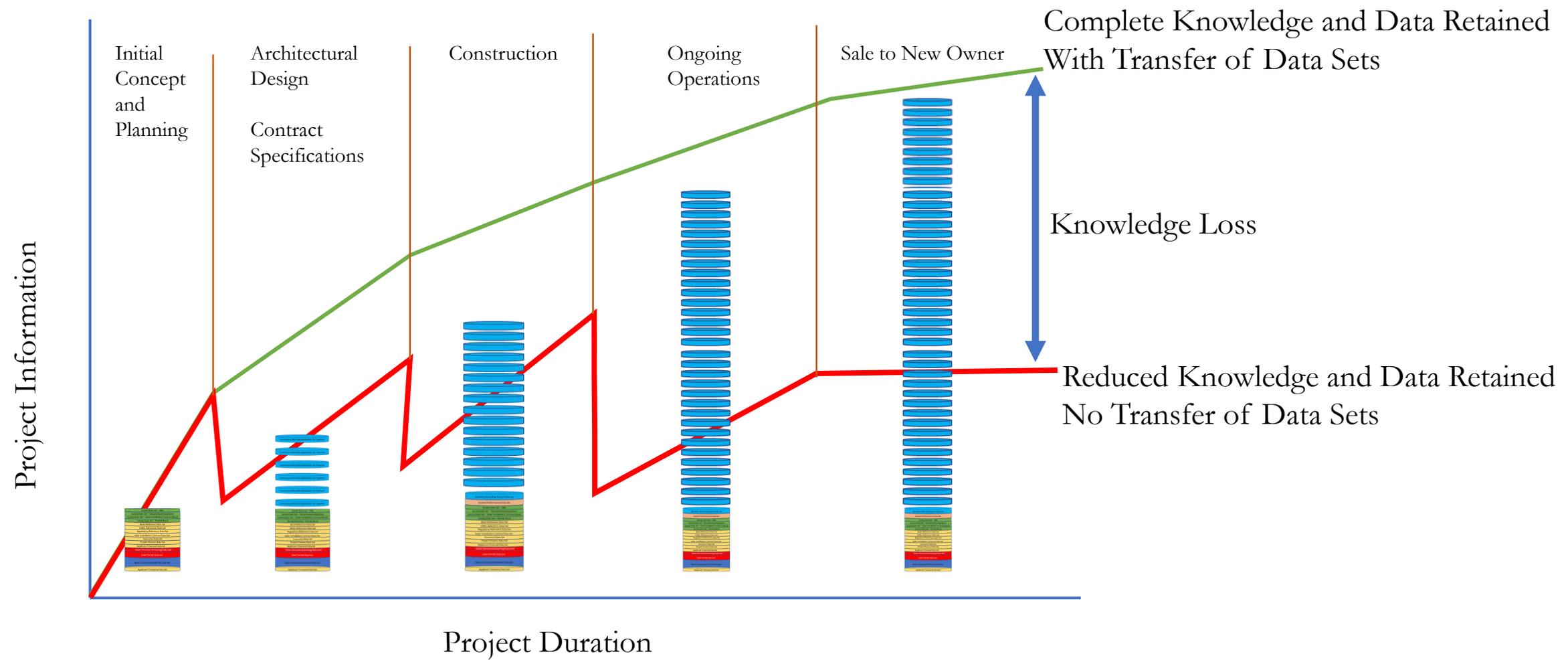
The ongoing aggregation of monthly reports enables data analytics, trending and AI.



# Project Lifecycle Data Generated

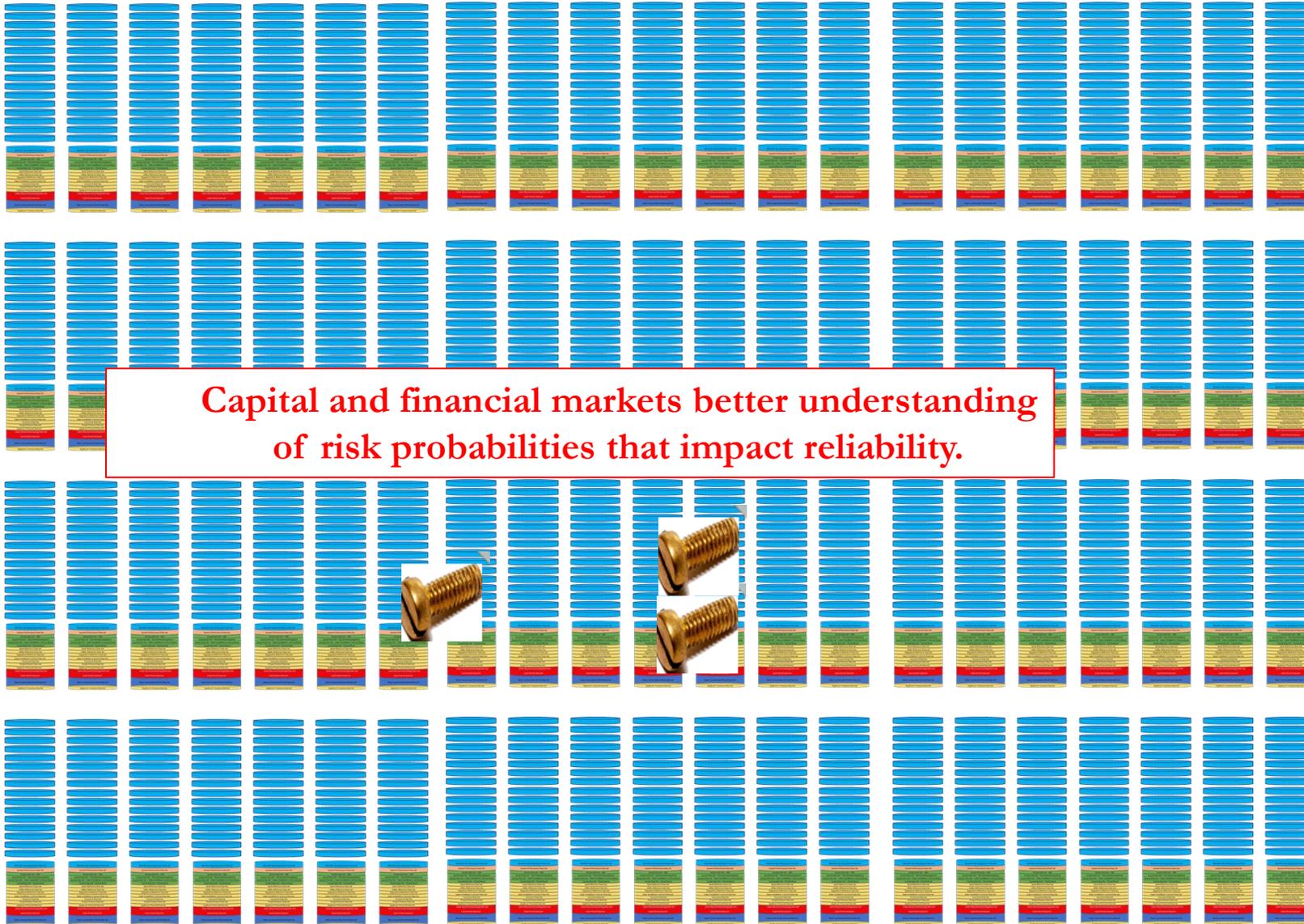


# Knowledge and Data Retained or Lost During Transitions

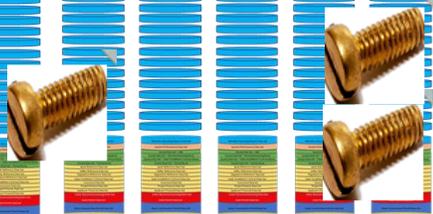




## Portfolio Monitoring



**Capital and financial markets better understanding  
 of risk probabilities that impact reliability.**



**Tomorrows Objective**  
 Consistent data that allows  
 aggregation of data that can be  
 accurately analyzed to identify failure  
 points utilized by Capital and  
 Financial Markets for underwriting  
 considerations and requirements.



## Digital Ecosystem for Construction Attracting Capital and Financial Markets to Energy Infrastructure

Overview

Problem Statement

The Federal Button

Ecosystem Stakeholders

The Data Element

The Data Stack

Use Cases

Where We Are Today

Summary

Going Forward - Brainstorming



## Digital Ecosystem for Construction Attracting Capital and Financial Markets to Energy Infrastructure

### Use Cases

Digital Contractors Monthly Progress Payment Application

Digital Solar System Monthly Operating Report

Digital Surety Bond

On Bill Repayment



## Digital Ecosystem for Construction Attracting Capital and Financial Markets to Energy Infrastructure

### Use Cases

Digital Contractors Monthly Progress Payment Application

Digital Solar System Monthly Operating Report

Digital Surety Bond

On Bill Repayment



Major Construction Payment & Information

Contract Listing by District

State of California  
 DEPARTMENT OF TRANSPORTATION  
 Major Construction Payment & Information System

**Caltrans Contract Listing by District**

**INSTRUCTIONS**

The following contracts are listed in numerical order by district. The first two digits of your contract number is the district number. For example contract number 07999999 would be found in the District 0 section. Please click on the appropriate district below to locate your specific contract from the list.

Go to: 01 02 03 04 05 06 07 08 09 10 11  
 12 Other

**District 01** [Back] [Top of Page]

010A0204	010A0404	010A0604	010A0704	010A0804	010A0904	010A1004
010A1204	010A1404	010A1504	010A2004	010A2104	010A2304	010A3204
010A3404	010A3704	010A3804	010A3904	010A4004	010A4204	010A4304
010A4404	010A4504	010A4604	010A4704	010A4904	010A5204	010A5904
010A6804	010A6904	010A7004	010A7304	010A7404	010A7804	010A8004
010A8104	010A8404	010A8504	010A9904	010AA004	010AA014	010B0504
010B0304	010B0904	010B0904	010B1004	010B1104	010B1304	010B1904
010B2404	010B2604	010B2704	010B2804	010B2904	010B3004	010B3104
010B3204	010B3404	010B3504	010B3604	010B3704	010B4004	010B4104
010B4204	010B4304	010B4404	010B4504	010B4604	010B4704	010B5004
010B5104	010B5204	010B5404	010B5504	010B5604	010B5704	010B6204
010B6304	010B6404	010B6904	010B7704	010B7904	010B8004	010B8104
010B8204	010B8304	010B8404	010B8504	010B8604	010C1004	010C1304
010C1804	010C1904	010C2004	010C2104	010C2304	010C2404	010C2504
010C2604	010C2704	010C2804	010C3004	010C3204	010C3304	010C3404
010C3504	010C3604	010C3704	010C3804	010C3904	010C4104	010C4204
010C4304	010C4404	010C4504	010C4604	010C4704	010C4804	010C5104
010C5404	010C5704	010C5904	010C6104	010C6204	010C6604	010C7104
010C7304	010C7504	010C7604	010C7704	010C7804	010C7904	010C8004
010C8104	010C8204	010C8304	010C8404	010C8604	010C8804	010C9004
010C9304	010C9404	010C9504	010C9704	010E0004	010E0304	010E0804
010E1004	010E1804	010E2004	010E2104	010E2304	010E2404	010E2804
010E2904	010E3104	010E3404	010E3704	010E3804	010E3904	010E4304
010E4404	010E4504	010E4704	010E4804	010E4904	010E5104	010E5204
010E5404	010E5604	010E5704	010E5904	010E5904	010E6104	010E6404
010E6504	010E6904	010E6904	010E7104	010E7204	010E7304	010E7404
010E7704	010E8404	010E8504	010E8604	010E9004	010E9204	010E9504
010E9704	010E9804	010F0004	010F0104	010F0204	010F0504	010F0704
010F0804	010F0904	010F1004	010F1304	010F1404	010F1504	010F1704
010F1804	010F1904	010F2204	010F2604	010F2904	010F3104	010F3204

Major Construction Payment & Information

Contract Details

State of California  
 DEPARTMENT OF TRANSPORTATION  
 Major Construction Payment & Information System

**Contract: 04162514**  
**Mike Brown Electric Co**  
 Date last updated: 03/04/21

- Job Description:  
 MODIFY TRAFFIC SIGNALS IN SAN FRANCISCO COUNTY  
 SAN FRANCISCO AT VARIOUS LOCATIONS FROM  
 JUNIPERO SERRA BOULEVARD TO LINCOLN WAY 2SF  
 0001R0007 0055
- Contract Accepted: 08/13/09
- Stop Notice filing deadline: 11/11/09
- Expiration of Suit-filing period: 02/09/10
- Estimated Completion: 100%
- Current Withhold Obligations: ... \$0.00
- Currently Held: \_\_\_\_\_ \$0.00
- Need to Hold: \_\_\_\_\_ \$0.00
- Surety:  
**Liberty Mutual Insurance Company**  
 One First Street, Suite 300 San Francisco, CA 94111
- Bond Number: 070 002 791.

Payments

Detail estimate information is available for those issued after February 1,1999 while voucher payment data is available for those issued after July 1, 2000. For detail estimate and voucher inquiries prior to the above dates please contact the Resident Engineer or the District Construction office.

The Held and Disbursed columns may include monies withheld or released for stop notices, legal, liens, levies, labor compliance and accounts receivable claims.

Payment History

Est.	Engineering	Contract Data	Type	Pmt Type	Released	Held	Disbursed
1	<a href="#">Detail</a>	<a href="#">Voucher</a>	PIP	Warrant	04/06/08	0.00	11,264.35
2	<a href="#">Detail</a>	<a href="#">Voucher</a>	PIP	Warrant	06/06/08	0.00	84,285.00
3	<a href="#">Detail</a>	<a href="#">Voucher</a>	PIP	Warrant	06/30/08	0.00	205,662.50
4	<a href="#">Detail</a>	<a href="#">Voucher</a>	PIP	Warrant	08/05/08	0.00	258,856.60
5	<a href="#">Detail</a>	<a href="#">Voucher</a>	PIP	Warrant	09/08/08	0.00	88,524.00
6	<a href="#">Detail</a>	<a href="#">Voucher</a>	PIP	Warrant	10/07/08	0.00	191,309.00
7	<a href="#">Detail</a>	<a href="#">Voucher</a>	PIP	Warrant	11/05/08	0.00	290,424.50
8	<a href="#">Detail</a>	<a href="#">Voucher</a>	PIP	Warrant	12/09/08	0.00	432,158.52



Major Construction Payment & Information

Payments

Detail estimate information is available for those issued after February 1, 1999 while voucher payment data is available for those issued after July 1, 2000. For detail estimate and voucher inquiries prior to the above dates please contact the Resident Engineer or the District Construction office.

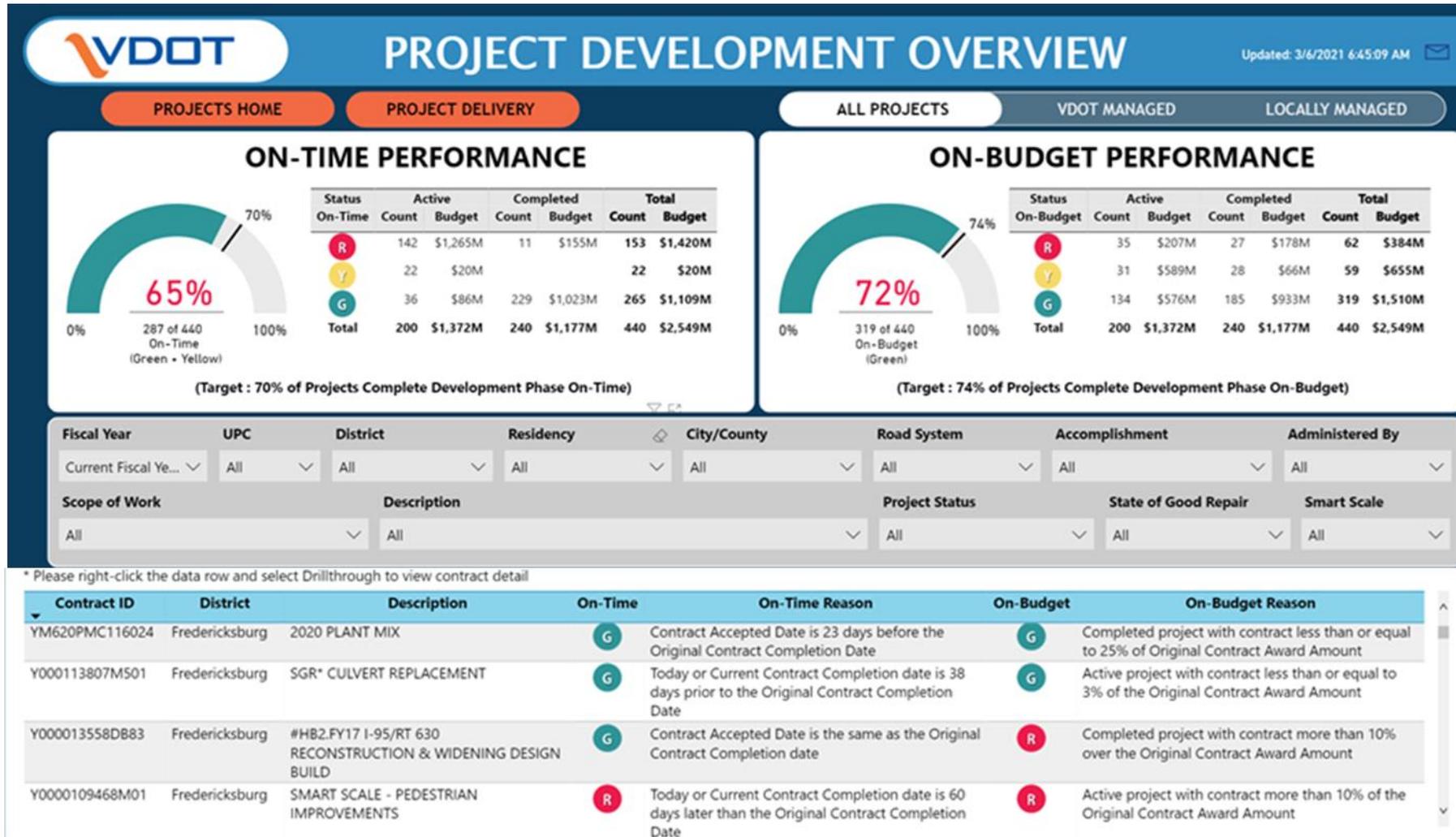
The Held and Disbursed columns may include monies withheld or released for stop notices, legal, liens, levies, labor compliance and accounts receivable claims.

Payment History

Est.	Engineering Contract Data	Type	Pmt Type	Released	Held	Disbursed
1	<a href="#">Detail</a> <a href="#">Voucher</a>	P/P	Warrant	04/08/08	0.00	11,284.35
2	<a href="#">Detail</a> <a href="#">Voucher</a>	P/P	Warrant	06/06/08	0.00	84,285.00
3	<a href="#">Detail</a> <a href="#">Voucher</a>	P/P	Warrant	06/30/08	0.00	205,662.50
4	<a href="#">Detail</a> <a href="#">Voucher</a>	P/P	Warrant	08/05/08	0.00	258,856.60
5	<a href="#">Detail</a> <a href="#">Voucher</a>	P/P	Warrant	09/08/08	0.00	88,524.00
6	<a href="#">Detail</a> <a href="#">Voucher</a>	P/P	Warrant	10/07/08	0.00	191,309.00
7	<a href="#">Detail</a> <a href="#">Voucher</a>	P/P	Warrant	11/05/08	0.00	290,424.50
8	<a href="#">Detail</a> <a href="#">Voucher</a>	P/P	Warrant	12/09/08	0.00	432,158.52
9	<a href="#">Detail</a> <a href="#">Voucher</a>	P/P	Warrant	01/06/09	0.00	228,804.01
10	<a href="#">Detail</a> <a href="#">Voucher</a>	P/P	Warrant	02/05/09	0.00	410,165.78
11	<a href="#">Detail</a> <a href="#">Voucher</a>	P/P	Warrant	03/10/09	0.00	179,635.50
12	<a href="#">Detail</a> <a href="#">Voucher</a>	P/P	Warrant	04/08/09	0.00	227,972.45
13	<a href="#">Detail</a> <a href="#">Voucher</a>	P/P	Warrant	05/06/09	0.00	137,701.80
14	<a href="#">Detail</a> <a href="#">Voucher</a>	P/P	Warrant	06/08/09	0.00	109,625.89
15	<a href="#">Detail</a> <a href="#">Voucher</a>	P/P	Warrant	06/30/09	0.00	95,303.93
16	<a href="#">Detail</a> <a href="#">Voucher</a>	P/P	Warrant	08/07/09	0.00	145,381.54
17	<a href="#">Detail</a> <a href="#">Voucher</a>	A/A	Warrant	09/10/09	0.00	195,020.02
18	<a href="#">Detail</a> <a href="#">Voucher</a>	FIN	Warrant	01/27/10	0.00	54,713.17
				<b>Total:</b>	<b>\$0.00</b>	<b>\$3,317,628.56</b>

16	LEAD COMPLIANCE PLAN	LS	3,075.0000	3,075.00	1.000	3,075.00			
17	ASPHALT CONCRETE (TYPE A, 1/2" MAXIMUM GRADING)	TON	500.0000	7,000.00	26.000	13,000.00			
18	FURNISH SINGLE SHEET ALUMINUM SIGN (0.063"-UNFRAMED)	SQFT	17.1500	11,662.00	80.000	1,372.00	680.000	11,662.00	
19	INSTALL SIGN (STRAP AND SADDLE BRACKET METHOD)	EA	95.0000	4,085.00	13.000	1,235.00	51.000	4,845.00	
20	MINOR CONCRETE (CURB, SIDEWALK AND CURB RAMP)	CY	1,200.0000	216,000.00			178.500	214,200.00	
21	CURB RAMP DETECTABLE WARNING SURFACE	SQFT	45.0000	9,000.00			84.000	3,780.00	
22	THERMOPLASTIC PAVEMENT MARKING	SQFT	5.0000	31,750.00			7,470.000	37,350.00	
PROGRAM CAS145									
DATE 01/06/10			STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION			04-162514			
TIME 01:30 PM			PROJECT RECORD - ESTIMATE			ESTIMATE NO. 18			
BID OPENING 10/31/07			WORK PERFORMED THROUGH 08/11/09			DATE OF THIS ESTIMATE 01/06/10			
R.E. NAME: DUAN, FRANK									
-----									
ITEM NO.	ITEM DESCRIPTION	UNIT	CONTRACT PRICES	ORIGINAL AUTH. AMT	THIS ESTIMATE QUANTITY	\$ AMOUNT	TOTAL ESTIMATE QUANTITY	\$ AMOUNT	
-----									
23	MAINTAINING EXISTING TRAFFIC MANAGEMENT SYSTEM ELEMENTS DURING CONSTRUCTION	LS	54,000.0000	54,000.00			1.000	54,000.00	
24	MODIFY SIGNAL AND LIGHTING (LOCATION 1)	LS	297,000.0000	297,000.00			1.000	297,000.00	
25	MODIFY SIGNAL AND LIGHTING (LOCATION 2)	LS	225,000.0000	225,000.00			1.000	225,000.00	
26	MODIFY SIGNAL AND LIGHTING (LOCATION 3)	LS	144,000.0000	144,000.00			1.000	144,000.00	
27	MODIFY SIGNAL AND LIGHTING (LOCATION 4)	LS	147,000.0000	147,000.00			1.000	147,000.00	
28	MODIFY SIGNAL AND LIGHTING (LOCATION 5)	LS	150,000.0000	150,000.00			1.000	150,000.00	
29	MODIFY SIGNAL AND LIGHTING (LOCATION 6)	LS	148,000.0000	148,000.00			1.000	148,000.00	
30	MODIFY SIGNAL AND LIGHTING (LOCATION 7)	LS	149,000.0000	149,000.00			1.000	149,000.00	
31	MODIFY SIGNAL AND LIGHTING (LOCATION 8)	LS	145,000.0000	145,000.00			1.000	145,000.00	
32	MODIFY SIGNAL AND LIGHTING (LOCATION 9)	LS	160,000.0000	160,000.00			1.000	160,000.00	
33	MODIFY SIGNAL AND LIGHTING (LOCATION 10)	LS	225,000.0000	225,000.00			1.000	225,000.00	
PROGRAM CAS145									
DATE 01/06/10			STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION			04-162514			
TIME 01:30 PM			PROJECT RECORD - ESTIMATE			ESTIMATE NO. 18			
BID OPENING 10/31/07			WORK PERFORMED THROUGH 08/11/09			DATE OF THIS ESTIMATE 01/06/10			
R.E. NAME: DUAN, FRANK									
-----									
ITEM NO.	ITEM DESCRIPTION	UNIT	CONTRACT PRICES	ORIGINAL AUTH. AMT	THIS ESTIMATE QUANTITY	\$ AMOUNT	TOTAL ESTIMATE QUANTITY	\$ AMOUNT	
-----									
SUBTOTAL CONTRACT ITEMS WITHOUT MOBILIZATION						11,887.00		2,765,486.00	
ADJUSTMENT OF COMPENSATION						0.00		67,217.85	
EXTRA WORK						37,826.17		207,924.71	
SUBTOTAL AMOUNT EARNED WITHOUT MOBILIZATION						49,713.17		3,040,628.56	
34	MOBILIZATION	LS	277,000.0000	277,000.00			1.000	277,000.00	
ORIGINAL CONTRACT AMOUNT								3,317,628.56	
TOTAL WORK COMPLETED						49,713.17		3,317,628.56	
MATERIALS ON HAND ON SITE								0.00	
MATERIALS ON HAND ELSEWHERE								0.00	
DEDUCTIONS						5,000.00		0.00	
TOTAL						54,713.17		3,317,628.56	
ITEMS FOR WHICH CONTRACT PRICE EXCEEDS MAXIMUM VALUE									
			MAXIMUM VALUE	CONTRACT PRICE	OVERBID AMOUNT				
016 LEAD COMPLIANCE PLAN			3,000.00	3,075.00	75.00				
DATE CONTR	CONTRACT	DATE WORK	BEGIN	JOB COM-	WEATHER MON-	C.C.O.	OTHER	PERCENT	PERCENT
APPROVED	DAYS	STARTED	CONSTR	PLETED	WORKING	DAYS	DAYS	COMPLETED	ELAPSED
01/23/08	250	02/07/08	02/07/08	08/11/09	311	65	0	100%	100%
					DUAN, FRANK				
					RESIDENT ENGINEER				
PROGRAM CAS145									
DATE 01/06/10									

Project Data For Analytics



Project Data For Analytics



March 10, 2021



### SRC Project Status Connection

**Not on Time:** 3 (Projects greater than or equal to 10 percent behind schedule, and all uncompleted projects past the completion date.)

**Warning:** 3 (Projects between 1 and 10 percent behind schedule.)

**On Time:** 10 (Projects less than 1 percent behind schedule.)

**Recently Completed:** 21 (Projects 100% completed, updated within the last 90 days.)

View: The Travelers Insurance Co. Filter To Surety: **\*\*\*All Surety Companies\*\*\***

Owner	Contractor	Description	Location	Contract #	Status Date	Comp Date	Cont. Amt.	Surety	Bond #	% Time	% Comp.	% Ahead/Behind Sch.	Info
Caltrans	GREFFIN COMPANY	MODIFY INTERCHANGE AND ON RAMP	IN LOS ANGELES COUNTY IN BURBANK AND LOS ANGELES FROM 0.5 MI WEST OF PASS AVENUE OVERPASSING TO 0.3 MI EAST OF OLIVE AVENUE OVERPASSING	0118354	6/19/2020	11/19/2020	\$23,941,175.45	Travelers Casualty & Surety Company of	10042287	19	91	-27	
Caltrans	VISSING CONSTRUCTION COMPANY	WIDEN BRIDGES AND UPGRADE PAV.	IN WASHINGTON COUNTY ON ROUTE 162 AT OUTLET CREEK BRIDGE AND ON ROUTE 202 AT ANDERSON CREEK BRIDGE AND SOGA CREEK BRIDGE	0101814	6/11/2020	7/9/2020	\$3,952,137.82	Travelers Casualty and Surety Company	10044532	94	82	-11	
Caltrans	VISSING CONSTRUCTION COMPANY	CONSTRUCT AUXILIARY LANE	IN SAN DIEGO COUNTY IN SAN DIEGO FROM 0.1 MILE EAST OF ROUTE 52'S SEPARATION TO WEST BLVD UNDERPASSING	1138734	9/27/2020	7/9/2020	\$18,380,285.74	Travelers Casualty and Surety Co of	10024332	97	88	-11	



#### Major Construction Payment & Information

5) 22 THERMOPLASTIC PAVEMENT MARKING SQFT 5,000 31,750.00 7,470,000 37,350.00  
 PROGRAM CAS145 PAGE 2  
 DATE 03/06/10 STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION ESTIMATE NO. 18  
 TIME 01:10 PM PROJECT RECORD - ESTIMATE WORK PERFORMED THROUGH 08/11/09  
 BID OPENING 10/31/07 DATE OF THIS ESTIMATE 01/06/10  
 R.E. NAME: DUAN, FRANK

ITEM NO.	ITEM DESCRIPTION	UNIT	CONTRACT PRICES	ORIGINAL AUTH. AMT	THIS ESTIMATE QUANTITY	\$ AMOUNT	TOTAL ESTIMATE QUANTITY	\$ AMOUNT
23	MAINTAINING EXISTING TRAFFIC MANAGEMENT SYSTEM ELEMENTS DURING CONSTRUCTION	LS	54,000.0000	54,000.00	1.000	54,000.00	1.000	54,000.00
24	MODIFY SIGNAL AND LIGHTING (LOCATION 1)	LS	297,000.0000	297,000.00	1.000	297,000.00	1.000	297,000.00
25	MODIFY SIGNAL AND LIGHTING (LOCATION 2)	LS	225,000.0000	225,000.00	1.000	225,000.00	1.000	225,000.00
26	MODIFY SIGNAL AND LIGHTING (LOCATION 3)	LS	164,000.0000	164,000.00	1.000	164,000.00	1.000	164,000.00
27	MODIFY SIGNAL AND LIGHTING (LOCATION 4)	LS	167,000.0000	167,000.00	1.000	167,000.00	1.000	167,000.00
28	MODIFY SIGNAL AND LIGHTING (LOCATION 5)	LS	150,000.0000	150,000.00	1.000	150,000.00	1.000	150,000.00
29	MODIFY SIGNAL AND LIGHTING (LOCATION 6)	LS	148,000.0000	148,000.00	1.000	148,000.00	1.000	148,000.00
30	MODIFY SIGNAL AND LIGHTING (LOCATION 7)	LS	169,000.0000	169,000.00	1.000	169,000.00	1.000	169,000.00
31	MODIFY SIGNAL AND LIGHTING (LOCATION 8)	LS	145,000.0000	145,000.00	1.000	145,000.00	1.000	145,000.00
32	MODIFY SIGNAL AND LIGHTING (LOCATION 9)	LS	160,000.0000	160,000.00	1.000	160,000.00	1.000	160,000.00
33	MODIFY SIGNAL AND LIGHTING (LOCATION 10)	LS	225,000.0000	225,000.00	1.000	225,000.00	1.000	225,000.00
PROGRAM CAS145 PAGE 3 DATE 03/06/10 STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION ESTIMATE NO. 18 TIME 01:10 PM PROJECT RECORD - ESTIMATE WORK PERFORMED THROUGH 08/11/09 R.E. NAME: DUAN, FRANK								
ITEM NO.	ITEM DESCRIPTION	UNIT	CONTRACT PRICES	ORIGINAL AUTH. AMT	THIS ESTIMATE QUANTITY	\$ AMOUNT	TOTAL ESTIMATE QUANTITY	\$ AMOUNT
SUBTOTAL CONTRACT ITEMS WITHOUT MOBILIZATION						11,887.00	2,765,486.00	
ADJUSTMENT OF COMPOSITION EXTRA WORK						37,826.17	207,924.71	
SUBTOTAL AMOUNT EARNED WITHOUT MOBILIZATION						49,713.17	3,000,628.56	
34 MOBILIZATION ORIGINAL CONTRACT AMOUNT						277,000.0000	3,034,812.00	1.000 277,000.00
TOTAL WORK COMPLETED						49,713.17	3,317,628.56	
MATERIALS ON HAND ON SITE							0.00	
MATERIALS ON HAND ELSEWHERE							0.00	
DEDUCTIONS						5,000.00		
TOTAL						54,713.17	3,317,628.56	
ITEMS FOR WHICH CONTRACT PRICE EXCEEDS MAXIMUM VALUE								
			PACKER VALUE	CONTRACT PRICE	OVERBID AMOUNT			
			3,000.00	3,075.00	75.00			
016 LEAD COMPLIANCE PLAN			DATE CONTR	CONTRACT DATE	WORK BEGN	300 COM- PLETED ON	WEATHER WORKING DAYS	OTHER DAYS
APPROVED			01/23/08	02/07/08	02/07/08	08/11/09	311	65
			C.C.O.	OTHER	PERCENT COMPLETED	PERCENT TIME ELAPSED		
			DUAN, FRANK	RESIDENT ENGINEER	100%	100%		
PROGRAM CAS145 DATE 03/06/10								

### VDOT PROJECT DEVELOPMENT OVERVIEW

Updated: 3/6/2021 6:45:09 AM

PROJECTS HOME PROJECT DELIVERY ALL PROJECTS VDOT MANAGED LOCALLY MANAGED

#### ON-TIME PERFORMANCE

70% Target: 70% of Projects Complete Development Phase On-Time

65% (Green - Yellow)

287 of 440 On-Time

Status	Active Count	Active Budget	Completed Count	Completed Budget	Total Count	Total Budget
On-Time (R)	142	\$1,265M	11	\$155M	153	\$1,420M
Warning (Y)	22	\$20M			22	\$20M
On-Time (G)	36	\$86M	229	\$1,023M	265	\$1,109M
<b>Total</b>	<b>200</b>	<b>\$1,372M</b>	<b>240</b>	<b>\$1,177M</b>	<b>440</b>	<b>\$2,549M</b>

#### ON-BUDGET PERFORMANCE

74% Target: 74% of Projects Complete Development Phase On-Budget

72% (Green)

319 of 440 On-Budget

Status	Active Count	Active Budget	Completed Count	Completed Budget	Total Count	Total Budget
On-Budget (R)	35	\$207M	27	\$178M	62	\$384M
Warning (Y)	31	\$589M	28	\$66M	59	\$655M
On-Budget (G)	134	\$576M	185	\$933M	319	\$1,510M
<b>Total</b>	<b>200</b>	<b>\$1,372M</b>	<b>240</b>	<b>\$1,177M</b>	<b>440</b>	<b>\$2,549M</b>

Fiscal Year	UPC	District	Residency	City/County	Road System	Accomplishment	Administered By
Current Fiscal Year	All	All	All	All	All	All	All

Scope of Work	Description	Project Status	State of Good Repair	Smart Scale
All	All	All	All	All

\* Please right-click the data row and select Drillthrough to view contract detail

Contract ID	District	Description	On-Time	On-Time Reason	On-Budget	On-Budget Reason
YM620PMC116024	Fredericksburg	2020 PLANT MIX	G	Contract Accepted Date is 23 days before the Original Contract Completion Date	G	Completed project with contract less than or equal to 25% of Original Contract Award Amount
Y000113807M501	Fredericksburg	SGR CULVERT REPLACEMENT	G	Today or Current Contract Completion date is 38 days prior to the Original Contract Completion Date	G	Active project with contract less than or equal to 3% of the Original Contract Award Amount
Y000013558DB83	Fredericksburg	#HB2.FY17 I-95/RT 630 RECONSTRUCTION & WIDENING DESIGN BUILD	G	Contract Accepted Date is the same as the Original Contract Completion date	R	Completed project with contract more than 10% over the Original Contract Award Amount
Y0000109468M01	Fredericksburg	SMART SCALE - PEDESTRIAN IMPROVEMENTS	R	Today or Current Contract Completion date is 60 days later than the Original Contract Completion Date	R	Active project with contract more than 10% of the Original Contract Award Amount



## Digital Ecosystem for Construction Attracting Capital and Financial Markets to Energy Infrastructure

### Use Cases

Digital Contractors Monthly Progress Payment Application

Digital Solar System Monthly Operating Report

Digital Surety Bond

On Bill Repayment



## Financial Underwriting of Single Purpose Entity – Solar Project

Single Purpose Entity

Balance Sheet

GAAP Accounting

Financial Guarantee by LOC

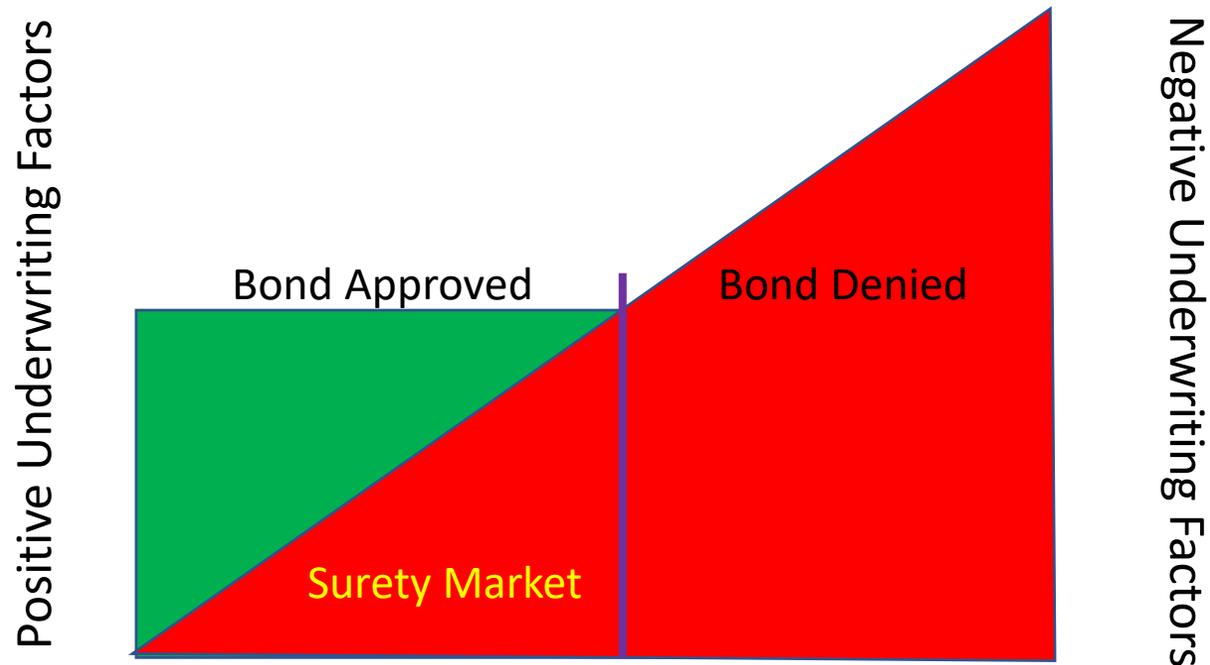
Book Value	100
Debt on Solar Assets	(300)
LOC's Outstanding	(100)
Restricted Cash	<u>(100)</u>
Equity	(400)

Profit and Loss

Income from Solar Assets	100
Depreciation	(200)
Tax Planning	<u>(200)</u>
Loss	(300)



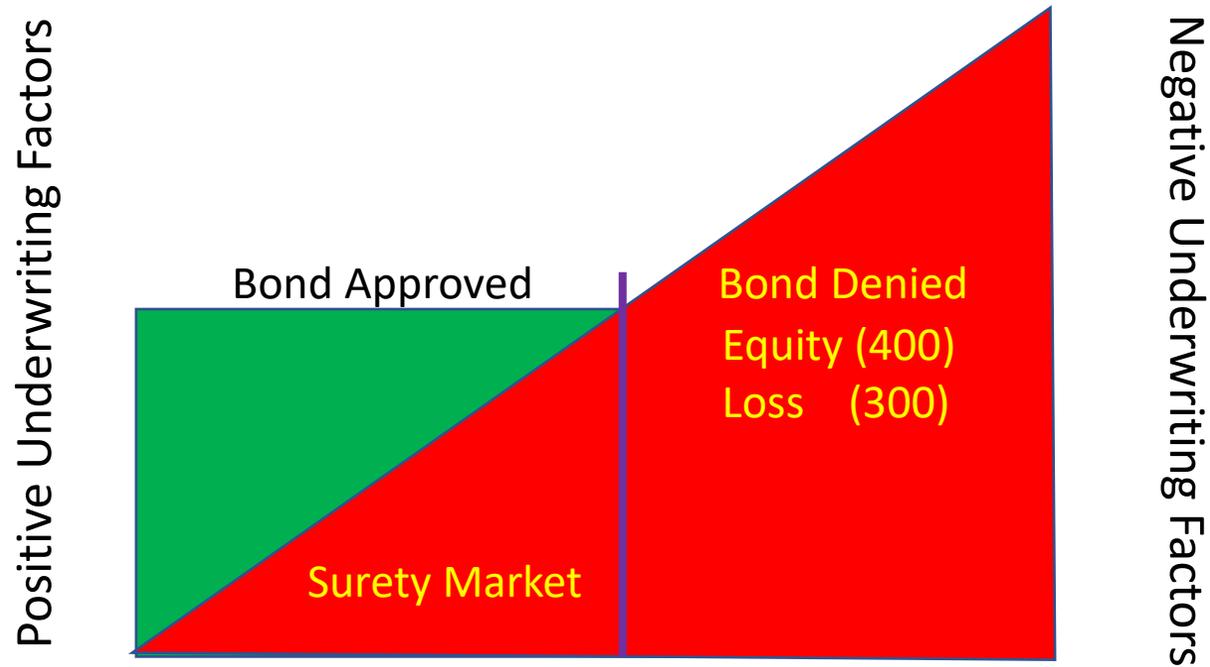
# Surety Market



The Surety Market has a range of Risk Tolerance,  
but past a certain point no surety support is available



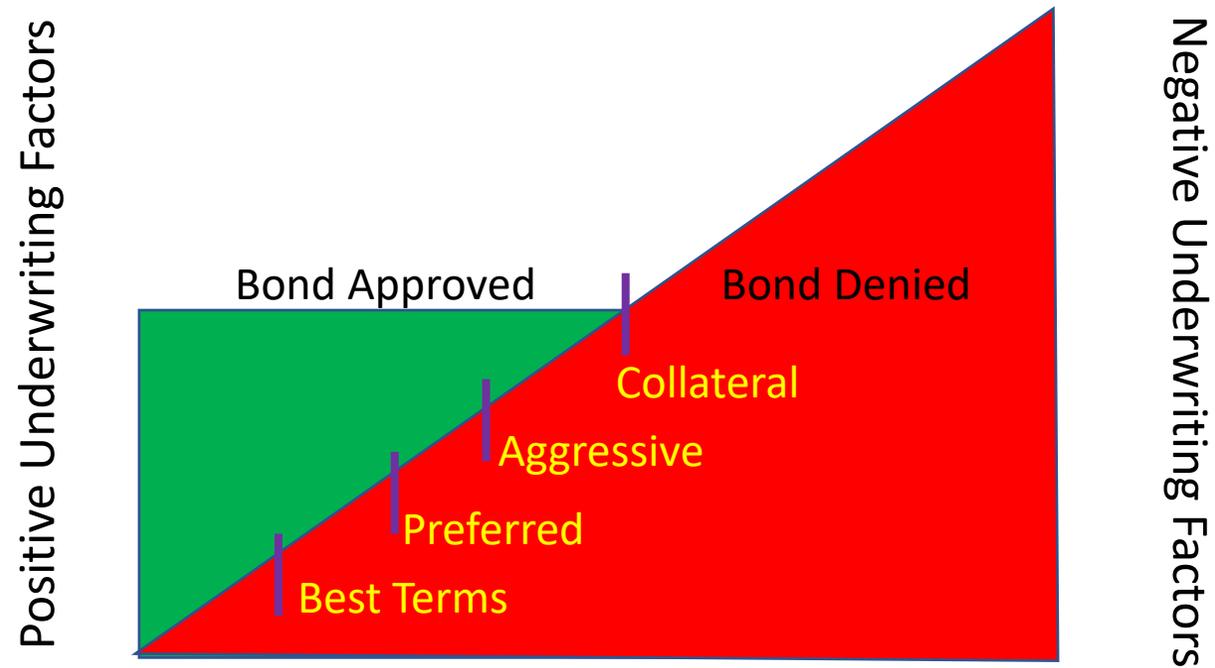
# Surety Market



The Surety Market has a range of Risk Tolerance, but past a certain point no surety support is available



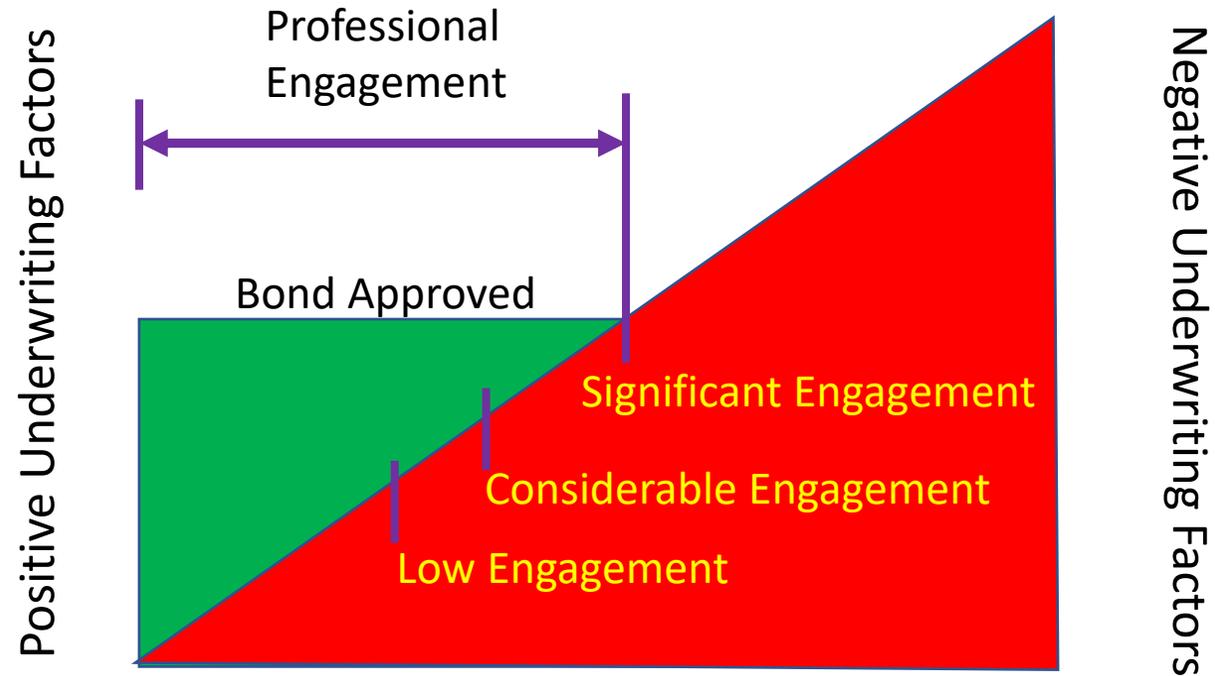
## Surety Market By Underwriting Approach



The Surety Market has a range of Risk Tolerance  
Surety Markets Have Different Underwriting Approaches and Targeted Clients



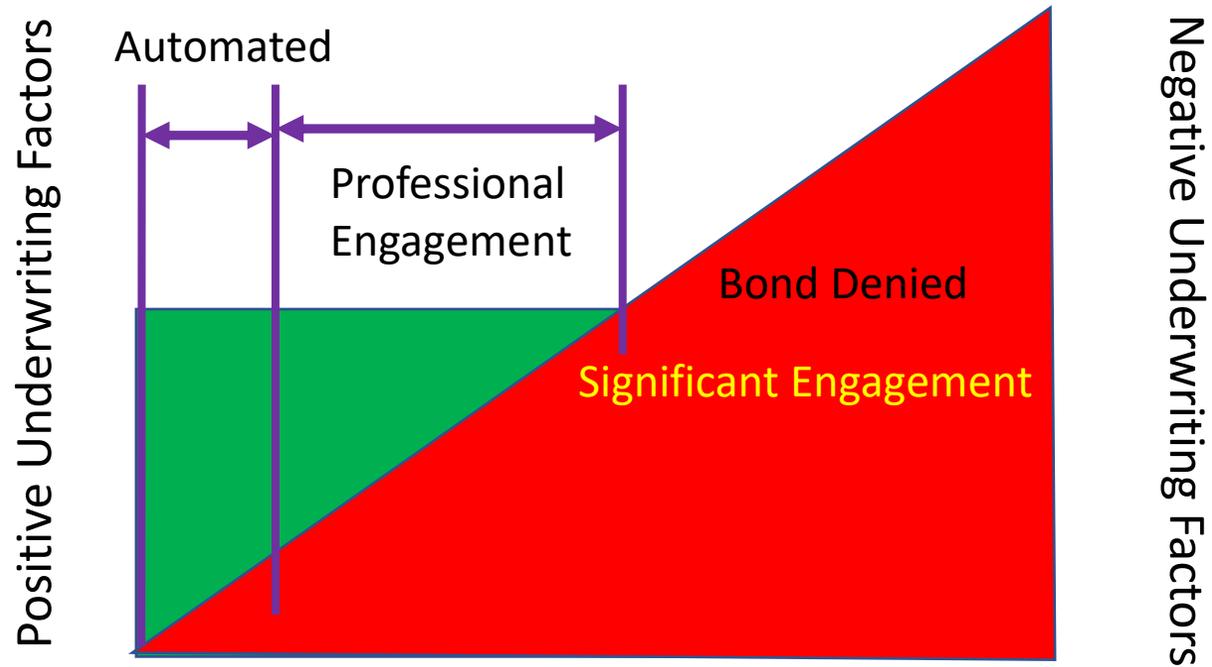
## Surety Market – Professional Engagement



Surety Underwriting is Evolving as Automation Matures  
From All Underwriting and Bonds Manually Processed  
Professional Engagement on Every Bond



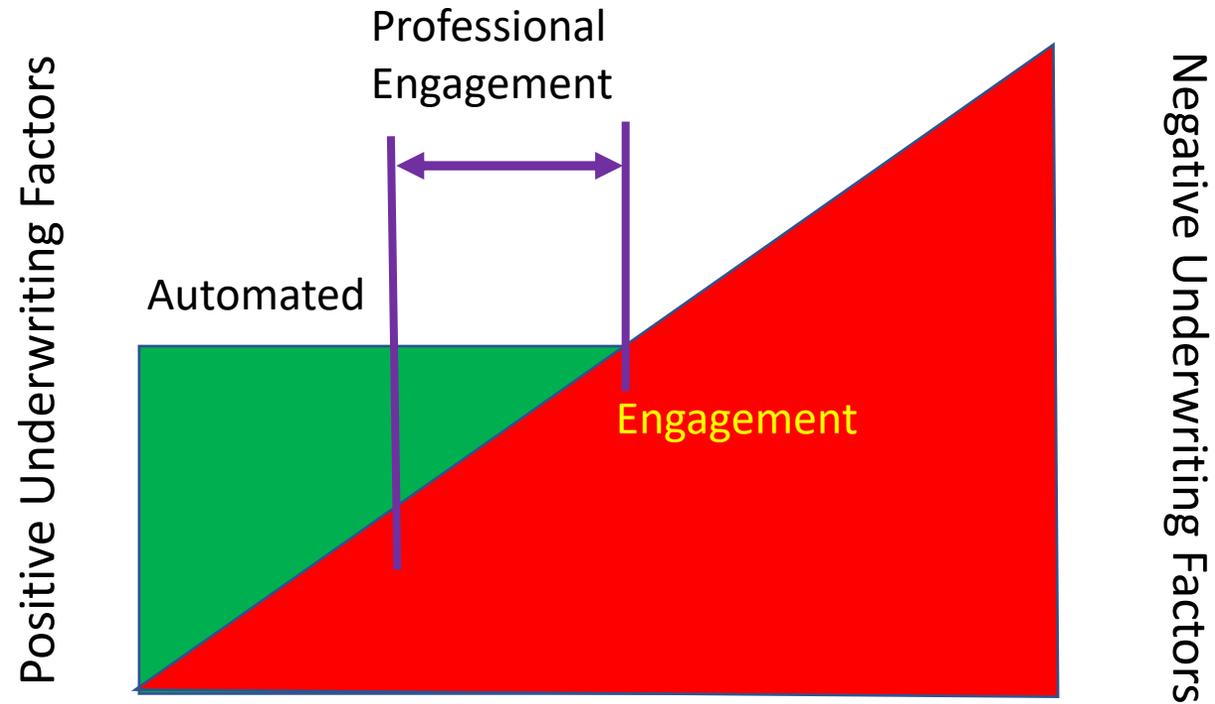
## Surety Market – Professional Engagement



Surety Underwriting is Evolving as Automation Matures  
To Some Bonds Automated Online  
Professional Engagement on Most Bonds



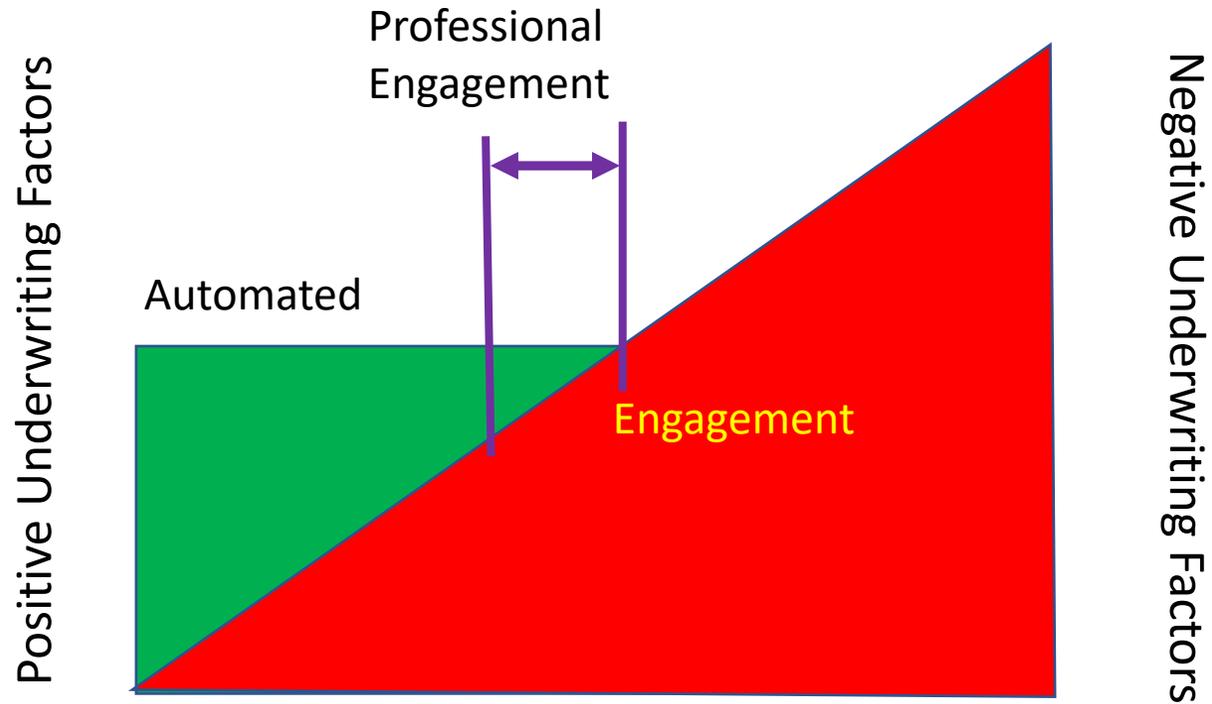
## Surety Market – Professional Engagement



Surety Underwriting is Evolving as Automation Matures  
To More Bonds Automated Online  
Professional Engagement Where There is Value Added



## Surety Market – Professional Engagement



Surety Underwriting is Evolving as Automation Matures  
To More Bonds Automated Online

Professional Engagement **Only Where There is Value Added**



## Financial Underwriting of Single Purpose Entity – Solar Project

Single Purpose Entity

Balance Sheet

GAAP Accounting

Financial Guarantee by LOC

Book Value	100
Debt on Solar Assets	(300)
LOC's Outstanding	(100)
Restricted Cash	<u>(100)</u>
Equity	(400)

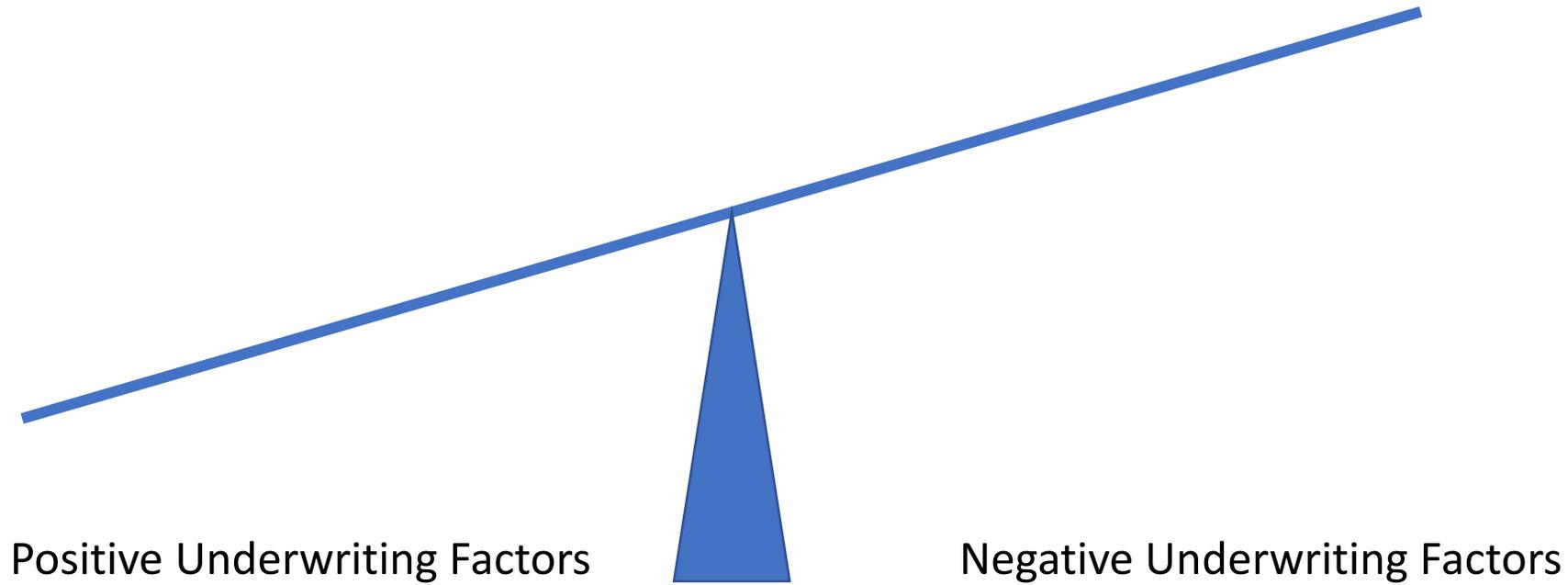
Profit and Loss

Income from Solar Assets	100
Depreciation	(200)
Tax Planning	<u>(200)</u>
Loss	(300)



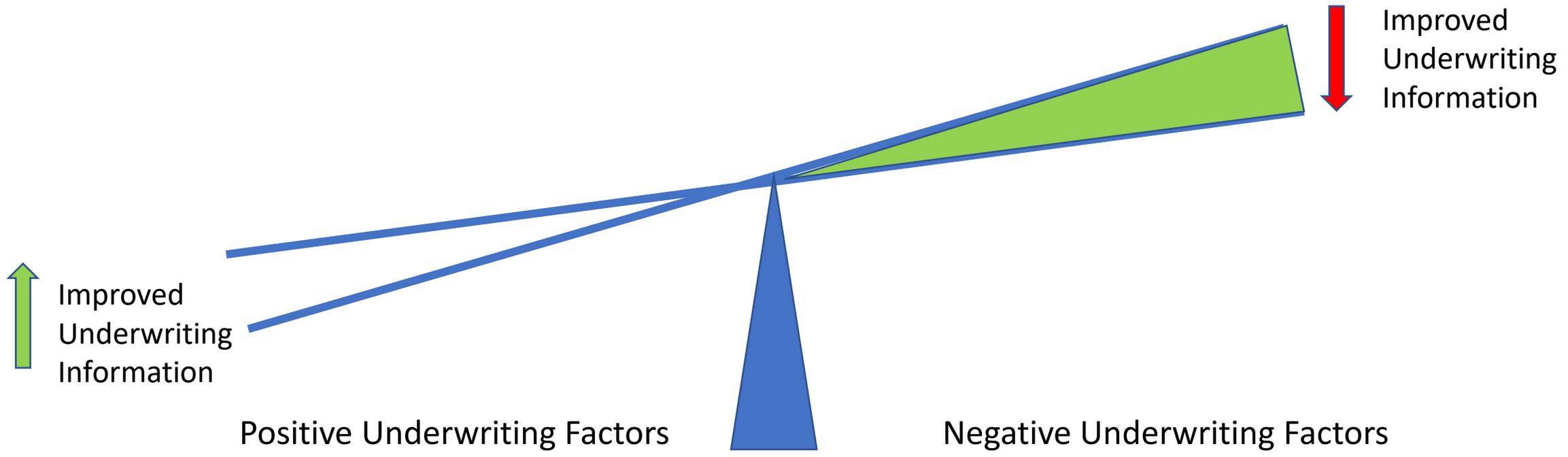


## Surety Market – Professional Engagement



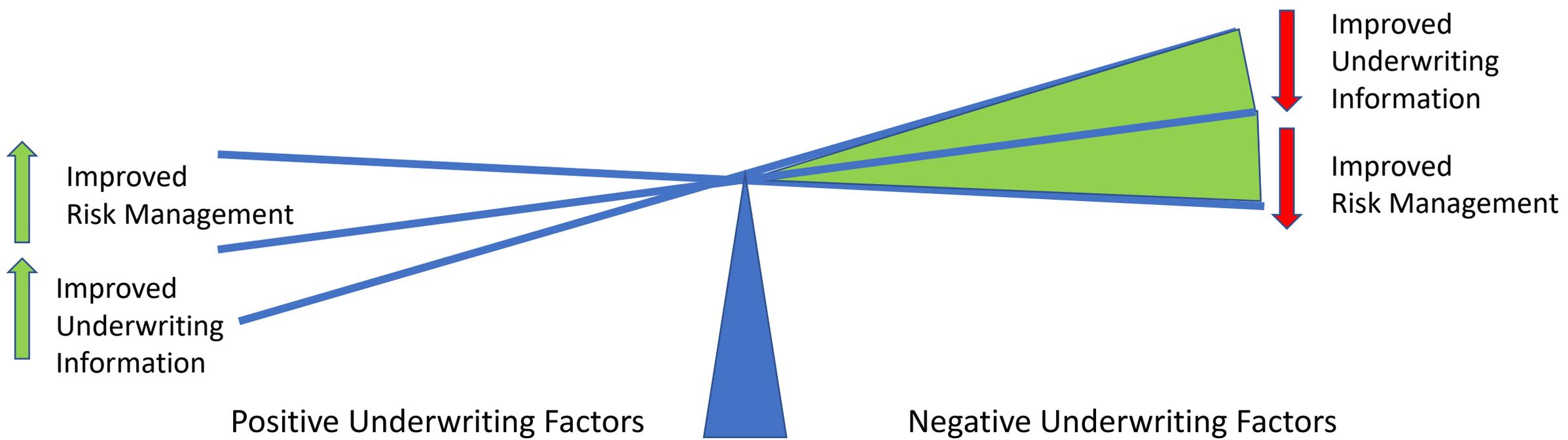
Professional Engagement Value Add  
Leveraging Data Analytics for Improved Underwriting Information

# Surety Market – Professional Engagement



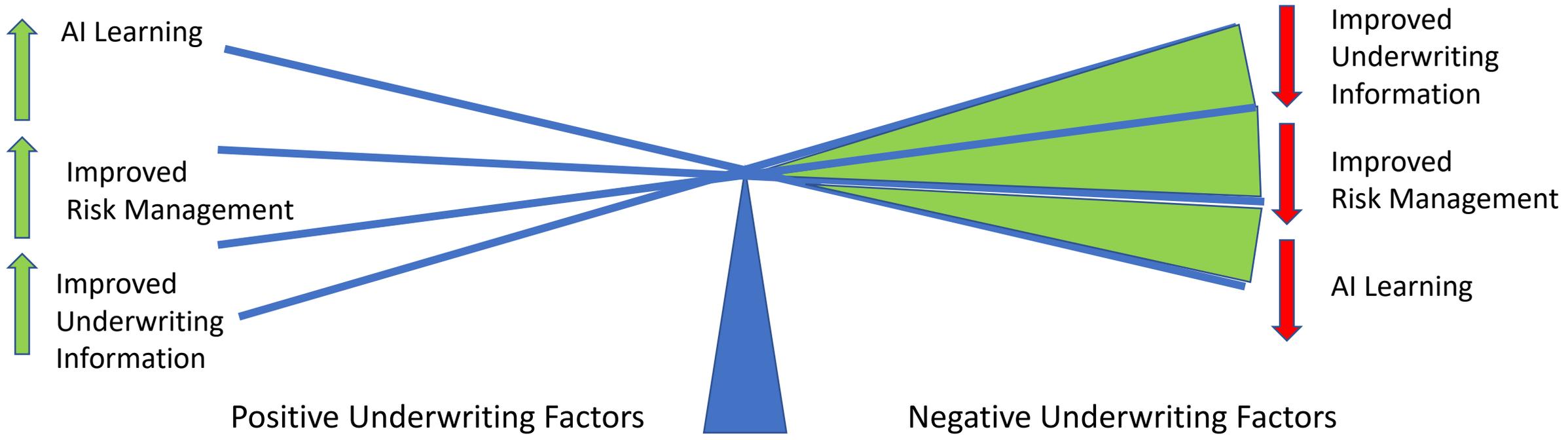
Professional Engagement Value Add  
Leveraging Data Analytics for Improved Underwriting Information

# Surety Market – Professional Engagement



Professional Engagement Value Add  
Leveraging Data Analytics for Improved Risk Management

# Surety Market – Professional Engagement



Professional Engagement Value Add  
Leveraging Data Analytics for AI



### Financial Underwriting of Single Purpose Entity – Solar Project

#### Single Purpose Entity

#### Balance Sheet

#### GAAP Accounting

#### Financial Guarantee by LOC

Book Value	100
Debt on Solar Assets	(300)
LOC's Outstanding	(100)
Restricted Cash	<u>(100)</u>
Equity	(400)

#### Profit and Loss

Income from Solar Assets	100
Depreciation	(200)
Tax Planning	<u>(200)</u>
Loss	(300)

#### Single Purpose Entity

#### Balance Sheet

#### Monthly Operating Report

#### Financial Guarantee by Surety

Estimated Value	1,000
Debt on Solar Assets	<u>(300)</u>
Equity	700

#### Profit and Loss

Cash Flow Solar Assets	100
Debt Service	(20)
O&M	<u>(20)</u>
Cash Flow	80

As Evaluated by Surety



## Financial Underwriting of Single Purpose Entity – Solar Project

Single Purpose Entity

Balance Sheet

GAAP Accounting

Financial Guarantee by LOC

Book Value	100
Debt on Solar Assets	(300)
LOC's Outstanding	(100)
Restricted Cash	<u>(100)</u>
Equity	(400)

Profit and Loss

Income from Solar Assets	100
Depreciation	(200)
Tax Planning	<u>(200)</u>
Loss	(300)



## Financial Underwriting of Single Purpose Entity – Solar Project



Single Purpose Entity  
Balance Sheet  
Monthly Operating Report  
Financial Guarantee by Surety

Estimated Value	1,000
Debt on Solar Assets	<u>(300)</u>
Equity	700

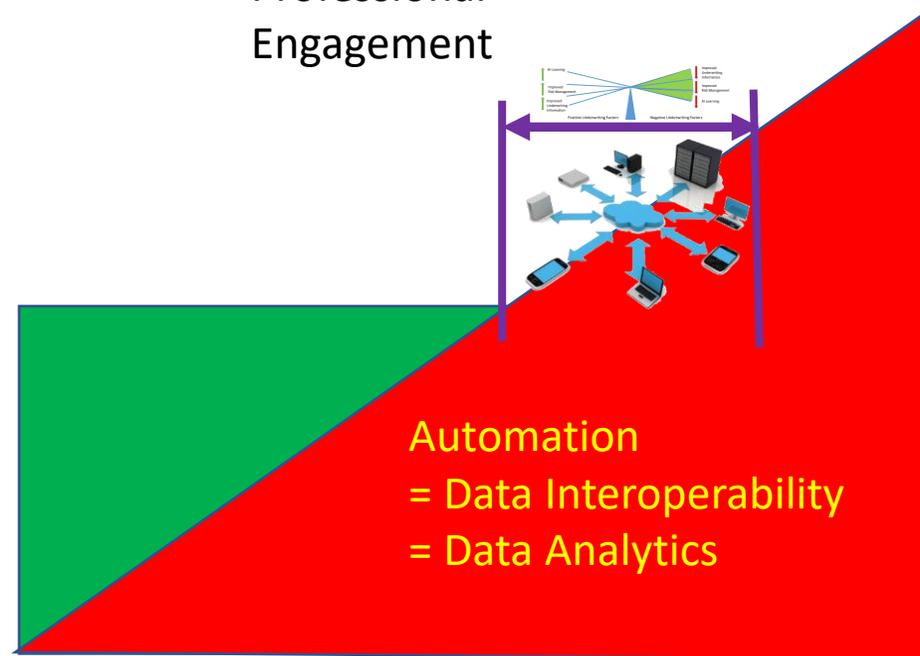
Profit and Loss	
Cash Flow Solar Assets	100
Debt Service	<u>(20)</u>
O&M	<u>(20)</u>
Cash Flow	80

As Evaluated by Surety



# Surety Market – Professional Engagement

Professional  
Engagement



Professional Engagement **Value Added**  
**More Surety Opportunity with Data Interoperability**



## Digital Ecosystem for Construction Attracting Capital and Financial Markets to Energy Infrastructure

### Use Cases

Digital Contractors Monthly Progress Payment Application

Digital Solar System Monthly Operating Report

Digital Surety Bond

On Bill Repayment

# Digital Surety Bond



## Traditional Paper Surety Bond

Issued manually with wet signatures for each person signing the bond.

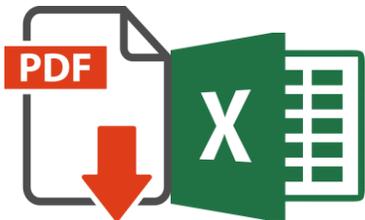
- Distributed via mail, FedEx or hand delivery.
- Limited data elements extracted manually or by OCR with potential errors.



## Electronic Surety Bond

Issued manually with digital signatures for each person signing the bond.

- Digital signatures provided by companies like DocuSign, JotForm, HelloSign, PandaDoc, Adobe Sign, Qwilr, HoneyBook, AND.CO, Proposify, GleanQuote, SignNow and eSign Genie.
- Distributed via email.
- Limited data elements extracted manually or by OCR with potential errors.



Bond Validation Number

## Digital Surety Bond

Issued online, with Bond Validation Number (BVN)

- BVN distributed by email
- Surety bond retrieved by secure download with both PDF and importable surety bond data set.
- Expanded data elements are importable error free.

# Digital Surety Bond



**On Bill Finance  
Solar Projects  
Utility Payment Bond**  
Page 1 of 11

Bond Type	On Bill Financing – Solar Projects- Utility Payment Bond
Surety Bond Form and Version Number	2018_03-04_XBRL-CET_On Bill Financing – Solar Projects - Utility Payment Bond
Principal	_____
Principal Email	_____
Obligee	_____
Obligee Email	_____
Name of surety company	_____
Surety NAIC Code	_____
Bond Number	_____
Bond Amount	_____
Surety Email	_____
Name of Electronic Surety Provider	_____
Electronic Surety Provider Website for validating bonds	_____
Electronic Surety Provider Bond Verification Number	_____
Annual Surety Premium	_____
Bond Effective Date	_____
Contract Date	_____
Contract Description	_____
Legal Jurisdiction	_____
Utility Account Number	_____
Attachment - Schedule of Detachable Assets	_____



**On Bill Finance  
Solar Projects  
Utility Payment Bond**  
Page 2 of 11

KNOW ALL MEN BY THESE PRESENTS, that **Principal and Surety** are held and firmly bound unto **Obligee** in the **Bond Amount** as the penal amount, lawful money of the United States of America for the payment of which amount Principal and Surety bind themselves, their successors, executors, administrators and assigns, jointly and severally firmly by these presents

**WHEREAS**, the said Principal has entered into an On Bill finance Contract as of the **Contract Date** for **Contract Description** under **Utility Account Number** to finance the purchase and installation of assets including those identified in the **Schedule of Detachable Assets** which is provided as security for the surety under this bond in the event of default.

**WHEREAS**, as a condition of said **Contract**, the Principal is required to file security to guarantee the payment of the monthly utility bill, inclusive of both the cost of utility services and repayment of the **On Bill financing**.

**NOW, THEREFORE THE CONDITION OF THIS OBLIGATION IS SUCH**, that if the said Principal shall comply with the conditions of the Contract as referenced, then this obligation shall be void, otherwise to remain in full force and effect.

**PROVIDED, HOWEVER, THAT THIS BOND IS EXECUTED BY THE PRINCIPAL AND SURETY AND ACCEPTED BY THE OBLIGEE SUBJECT TO THE FOLLOWING EXPRESS CONDITIONS:**

- 1) This bond is effective as of the **Bond Effective Date** and shall be continuous without amendment until canceled or exonerated.
- 2) This bond is automatically cancelled, and Surety exonerated, when the obligations of the Principal under the Contract have been fulfilled, or the Contract terminated by mutual consent of Obligee and Principal.
- 3) That this bond may be cancelled by Surety by 60 days' prior notice in writing from Surety to Principal and to Obligee that the Surety elects not to renew this bond for any such additional period.
- 4) Any notice of cancellation must be delivered to **Obligee email** with receipt acknowledged by Obligee.

or cancellation shall not affect any liability incurred or accrued under this bond prior to the effective date of such termination or understood and agreed that the Obligee may recover the full amount of the bond (less any previous amounts paid to Obligee) if Surety cancels or non-renews the bond and, within thirty (30) days prior to the effective date of cancellation or nonrenewal, received replacement financial security acceptable to it to replace the bond.

**Data elements, including identifying the bond form to incorporate the text**

**The surety bond has two basic parts**

1. The fixed text of the bond depending on the bond form
2. The data elements in the bond which need to be exchanged

# Digital Surety Bond

**XBRL-CET**  
Construction  
Energy  
Transportation

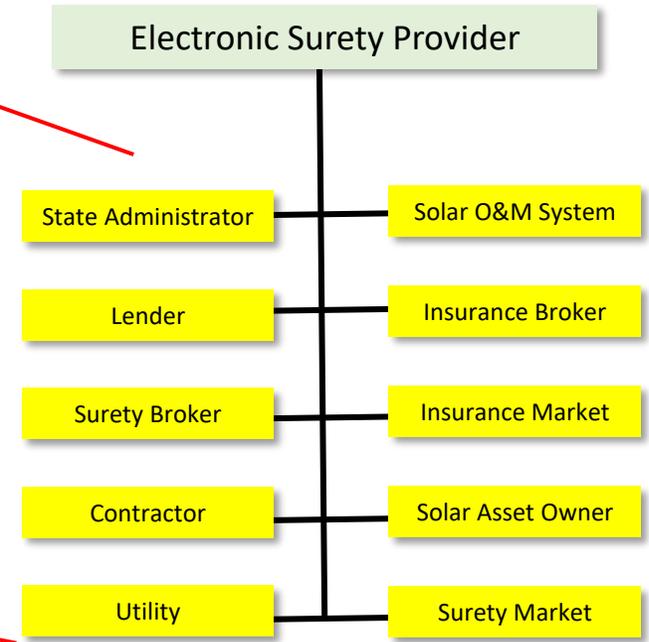
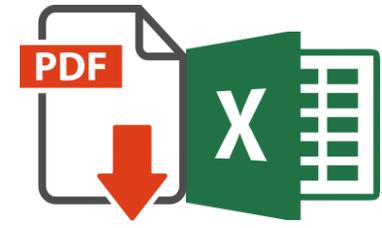
**On Bill Finance  
Solar Projects  
Utility Payment Bond**  
Page 1 of 11

On Bill Financing – Solar Projects- Utility Payment Bond

2018 03-04 XBRL-CET On Bill Financing – Solar Projects - Utility Payment Bond

Bond Type	_____
Surety Bond Form and Version Number	_____
Principal	_____
Principal Email	_____
Obligee	_____
Obligee Email	_____
Name of surety company	_____
Surety NAIC Code	_____
Bond Number	_____
Bond Amount	_____
Surety Email	_____
Name of Electronic Surety Provider	_____
Electronic Surety Provider Website for validating bonds	_____
Electronic Surety Provider Bond Verification Number	_____
Annual Surety Premium	_____
Bond Effective Date	_____
Contract Date	_____
Contract Description	_____
Legal Jurisdiction	_____
Utility Account Number	_____
Attachment - Schedule of Detachable Assets	_____

Digital Surety Bond  
 PDF of Surety Bond  
 Importable Surety Bond data Set



The surety bond has two basic parts

1. The fixed text of the bond depending on the bond form
2. The data elements in the bond which need to be exchanged

Final Data Distribution



## Digital Ecosystem for Construction Attracting Capital and Financial Markets to Energy Infrastructure

### Use Cases

Digital Contractors Monthly Progress Payment Application

Digital Solar System Monthly Operating Report

Digital Surety Bond

On Bill Repayment



# On Bill Repayment

## Traditional

On Bill extensively researched and documented

[Department of Energy - On-Bill Financing and Repayment Programs](#)

[American Council for an Energy-Efficient Economy \(ACEEE\) - On-Bill Energy Efficiency](#)

[Environmental Protection Agency - Clean Energy Finance: On-bill Programs](#)

[National Conference of State Legislatures - On-Bill Financing: Cost-free Energy Efficiency Improvements](#)

[National Association of State Energy Officials - On-Bill Financing/On-Bill Repayment](#)

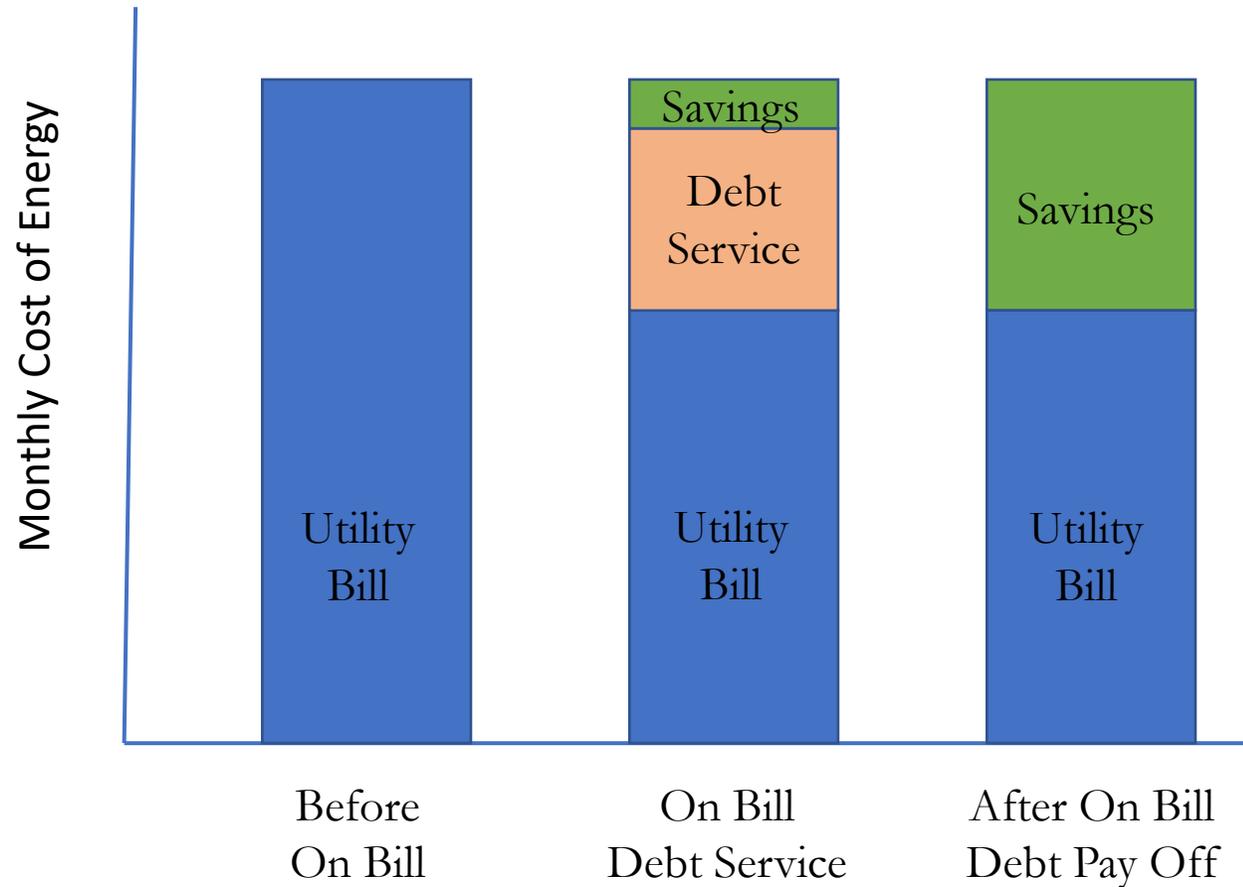
The [DOE Orange Button initiative](#) has already expanded the [XBRL taxonomy](#) with over 4,000 data elements required by various stakeholders throughout the digital ecosystem.

[California Hub for Energy Efficiency Financing \(CHEEF\) Pilot Programs now allows On Bill Repayment for solar photovoltaic or battery storage up to \\$5 million for small businesses and affordable multi-family.](#)

CPUC is currently investigating [Clean Energy Financing Options \(CEFO\)](#) to attract private capital for financing energy projects, and the Orange Button collaboration has submitted the On Bill Repayment model.

[PG&E On Bill Finance pilot](#) for the CPUC CEFO and collaboration with the Orange Button collaboration group will evidence implementation and identify more data elements that need to be incorporated into the XBRL taxonomy.

# On Bill Repayment Traditional



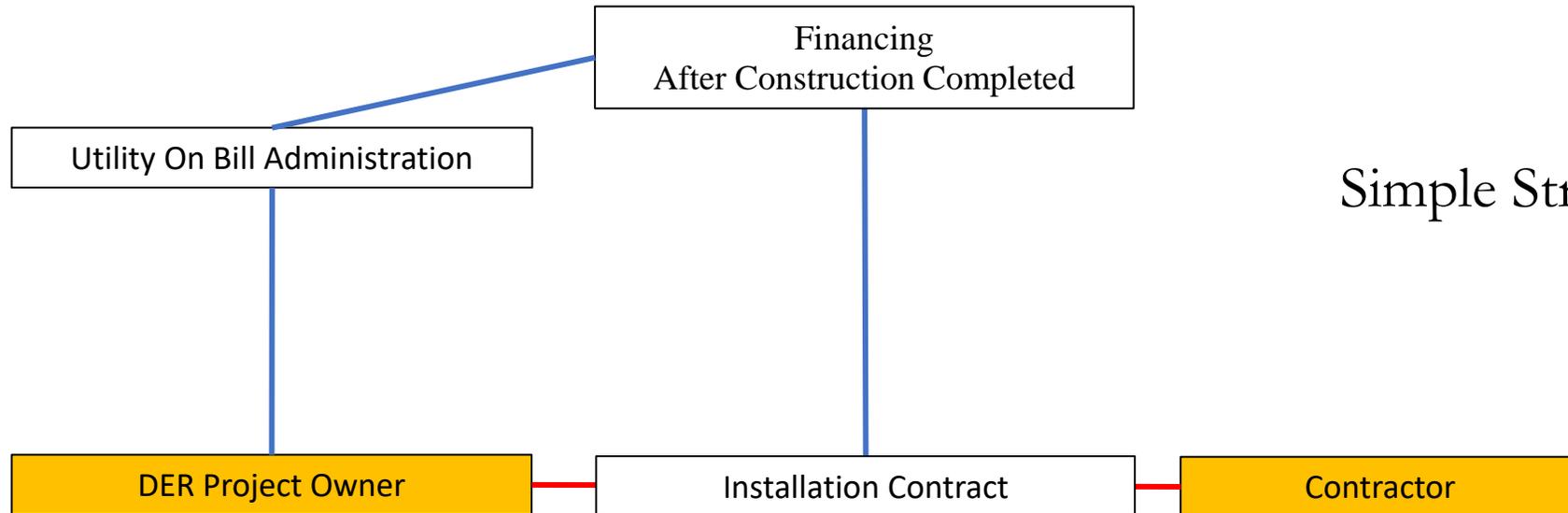
Energy Savings  
Covers the Cost  
of Debt Service

After Debt Paid Off  
Energy Savings  
Are Even More

High Cost of Debt  
Undermines  
Value Proposition



# On Bill Repayment Traditional

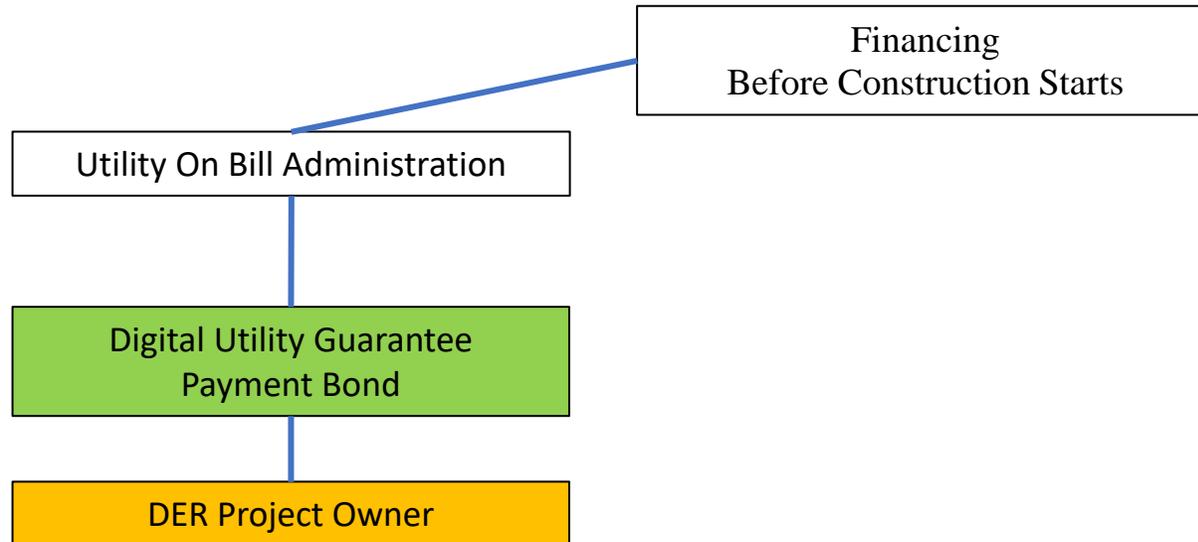


Simple Structure



# On Bill Repayment

## Surety Based Risk Management



Reduce Cost of Debt With  
Utility Guarantee Bond  
Protecting the Lender

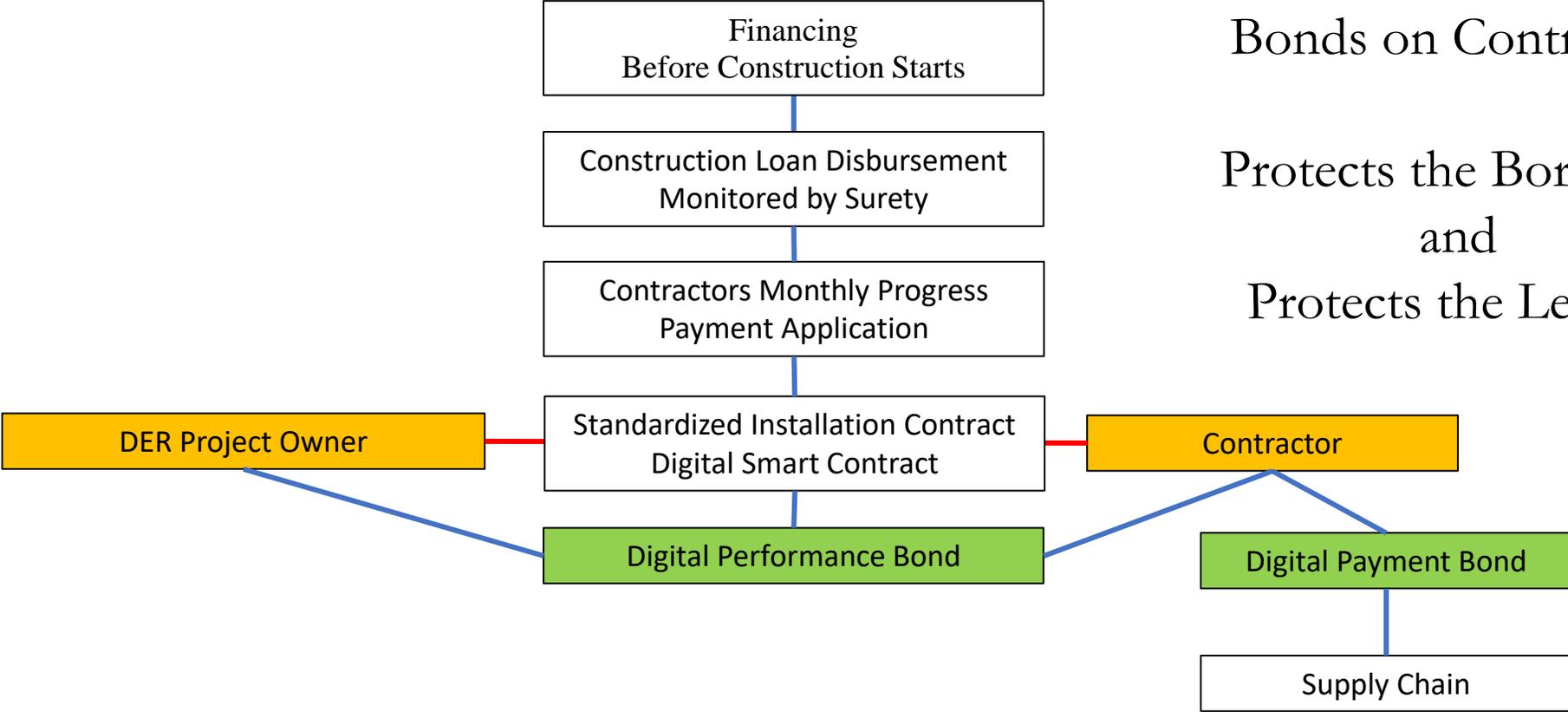
Value Proposition  
Significantly Improves

# On Bill Repayment

## Surety Based Risk Management

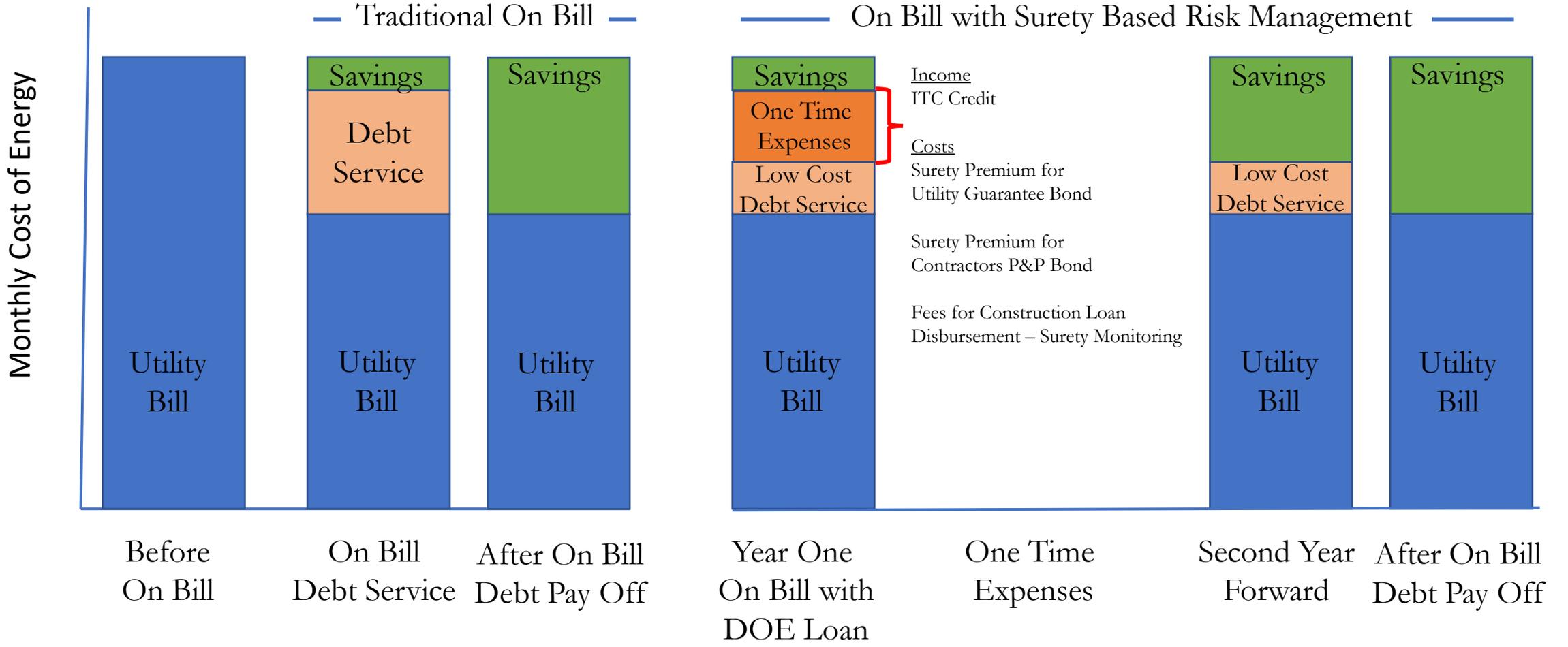
Eliminate The Risk of Contractor Default with Performance and Payment Bonds on Contractor

Protects the Borrower and Protects the Lender



# On Bill Repayment

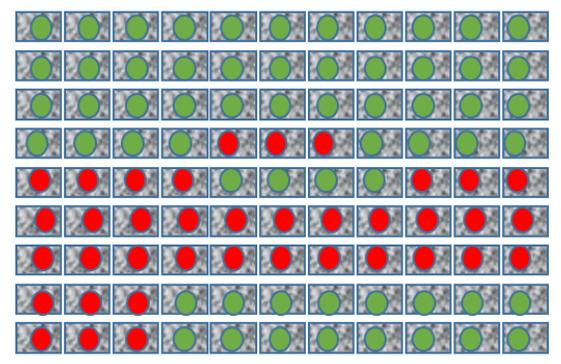
## Surety Based Risk Management



**Capital and financial markets better understanding of risk probabilities that impact reliability.**

Data for Any Infrastructure Project Performance

- Not Working
- Working

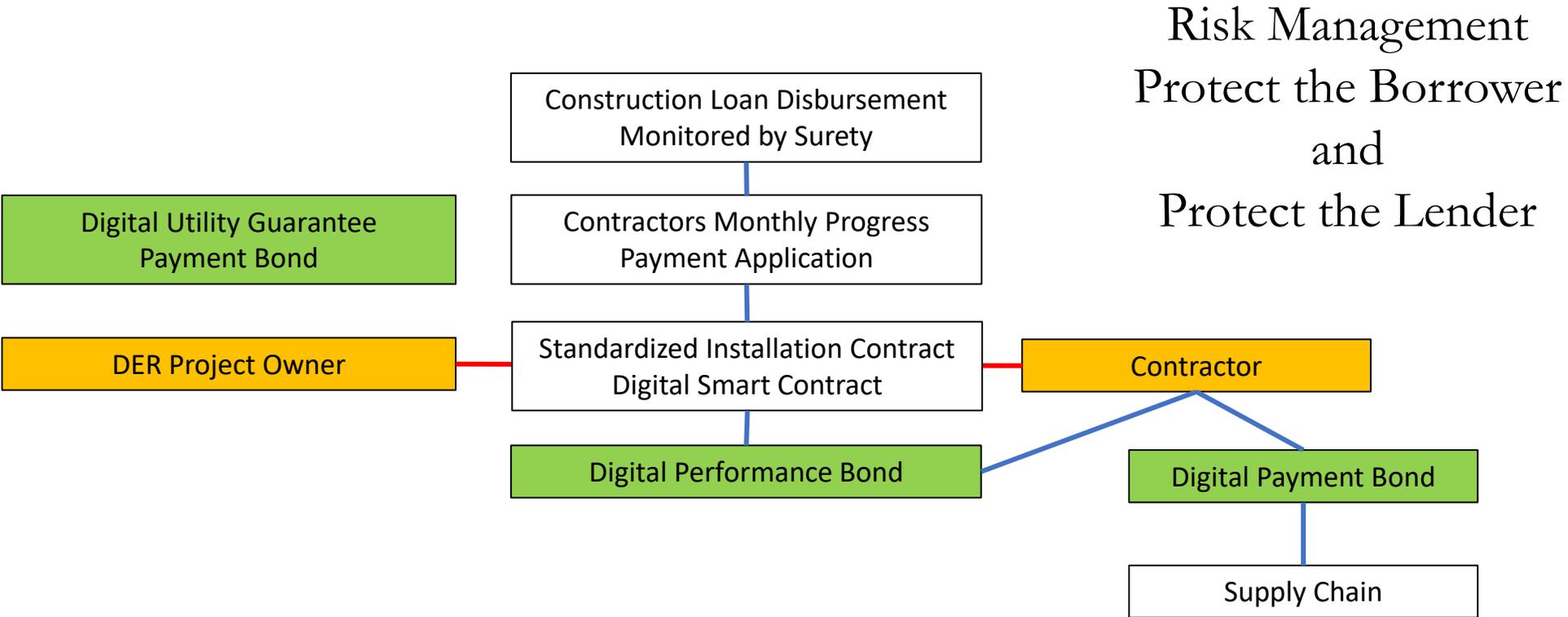


Question: Which **Infrastructure Project** of Tomorrow **Will Get Better Financial Terms**  
Answer: The One Whose Data Can **Demonstrate Predictable Performance**

**Capital and financial markets better understanding of risk probabilities that impact reliability.**

Question: Which *Infrastructure Project* of Tomorrow **Will Get Better Financial Terms**

Answer: The One Whose Data Can **Demonstrate Predictable Performance**





## Digital Ecosystem for Construction Attracting Capital and Financial Markets to Energy Infrastructure

Overview

Problem Statement

The Federal Button

Ecosystem Stakeholders

The Data Element

The Data Stack

Use Cases

Where We Are Today

Summary

Going Forward - Brainstorming



# Where We Are Today



# DATA Act

BETTER DATA. BETTER DECISIONS.  
 BETTER GOVERNMENT.

2014

May 9, 2014  
 [S. 994]

Digital  
 Accountability  
 and  
 Transparency Act  
 of 2014.  
 31 USC 6101  
 note.  
 31 USC 6101  
 note.

Public Law 113–101  
 113th Congress

An Act

To expand the Federal Funding Accountability and Transparency Act of 2006 to increase accountability and transparency in Federal spending, and for other purposes.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,*

**SECTION 1. SHORT TITLE.**

This Act may be cited as the “Digital Accountability and Transparency Act of 2014” or the “DATA Act”.

**SEC. 2. PURPOSES.**

The purposes of this Act are to—

(1) expand the Federal Funding Accountability and Transparency Act of 2006 (31 U.S.C. 6101 note) by disclosing direct Federal agency expenditures and linking Federal contract, loan, and grant spending information to programs of Federal agencies to enable taxpayers and policy makers to track Federal spending more effectively;

(2) establish Government-wide data standards for financial data and provide consistent, reliable, and searchable Govern-



## Where We Are Today



### **Sustainable Development Goal 7**

Ensure access to affordable, reliable, sustainable and modern energy for all

### **Sustainable Development Goal 9**

Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

### **Sustainable Development Goal 11**

Make cities and human settlements inclusive, safe, resilient and sustainable

### **Sustainable Development Goal 13**

Take urgent action to combat climate change and its impacts

# Where We Are Today

**XBRL | US** FILERS INDUSTRIES

Home > US Taxonomies >

## Orange Button Taxonomy

Tweet 1

STATUS: PUBLISHED

This Taxonomy was developed as part of the U.S. Department of Energy Solar Energy Technologies Office-funded **Orange Button™** program, that aims to make it easier to aggregate and share solar data, facilitating more efficient and cost-effective financing of distributed energy projects.

SunSpec Alliance heads the Orange Button project team that is tasked with establishing an open, easy-to-adopt, data standards, XBRL, up to the standard to build

**XBRL | US** FILERS INDUSTRIES

Home > US Taxonomies >

## Contractor Financials Taxonomy

Tweet 0

STATUS: PUBLISHED

The XBRL US Surety Working Group has developed the initial release of the Contractor Financials Taxonomy, which contains data standards to capture income statement and balance sheet information about contractors. The taxonomy was created by starting with an initial set of data standards contributed by Crowe LLP, a public accounting, consulting, and technology firm. The Surety Working Group, which is comprised of surety carriers, bond agents, and software companies, then further refined the data fields and definitions, and expanded on the initial set of standards.

**XBRL | US** FILERS INDUSTRIES

Home > Industries >

## FinTech

Technology can automate financial services, creating efficiencies and reducing cost. Accurate, timely information drives financial markets.

And within the past two decades, technology-driven data standards have dramatically increased the efficiency of financial products. So it's only logical to consider how they can be incorporated into fintech offerings. Without data standards, the automation and speed promised by new financial technologies, like blockchain, crowdfunding and peer-to-peer lending, will not be met. This transformation is years, not decades away. We invite you to join us, exploring how data standards can help fuel the innovation that is happening now.

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Home > Industries >

## Solar

XBRL US, in partnership with the SunSpec Alliance and the solar industry have developed a Candidate release of the Orange Button Taxonomy 1.2, for the financing of solar projects. While the initial release is now available, comments can still be submitted through the taxonomy viewer. Yet, and will be considered for the second release of the taxonomy. Below, visitors can access the taxonomy viewer, download the full Taxonomy, read the Orange Button Taxonomy Guide, and access XBRL APIs that work with the Taxonomy and Orange Button data.

**Background**

The U.S solar industry has grown by an average of 68% per year for the past decade (Source: SEIA). Rapid expansion in the solar energy industry highlights the need to streamline the collection, management and exchange of solar datasets to reduce market inefficiencies and lower costs for consumers.

Orange Button, which is a U.S. Department of Energy Solar Energy Technologies Office-funded program, was launched to set data standards for the solar industry. The initiative seeks to make solar energy cost-competitive with other forms of electricity by funding cooperative research, development, demonstration, and deployment projects by private companies, universities, state and local governments, nonprofit organizations, and national laboratories to drive down the cost of solar electricity to \$0.06 per kilowatt-hour.

The XBRL data standard is uniquely suited to transport financial datasets that are needed to communicate distributed solar financial disclosures.

Interested in getting involved and potentially joining the working group that will be further developing the Orange Button standard? Email [info@xbrl.us](mailto:info@xbrl.us) for more information.

[Learn more about Orange Button.](#)

**XBRL | US** FILERS INDUSTRIES

Home > US Taxonomies >

## 2016 Surety Work in Process Taxonomy

Tweet 0

STATUS: PUBLISHED

The 2016 XBRL Work in Process Taxonomy (WIP) contains concepts for Contractors to prepare Work in Process reports to submit to Surety insurance companies.

**Work in Process (WIP) Taxonomy Resources**

- **Namespace:** <http://taxonomies.xbrl.us/wip/2016/>
- **Recommended Namespace Prefix:** wip
- **Entry Points:**
  - WIP Only <http://taxonomies.xbrl.us/wip/2016/entire/wip-entryPoint-2016-01-31.xsd>
  - WIP and US GAAP Combined <http://taxonomies.xbrl.us/wip/2016/entire/wip-entryPoint-all-2016-01-31.xsd>
  - WIP and Standard US GAAP Combined <http://taxonomies.xbrl.us/wip/2016/entire/wip-entryPoint-std-2016-01-31.xsd>
- [WIP Taxonomy Guide \(pdf\)](#)
- [Work in Process Taxonomy \(zip\)](#)
- [WIP Taxonomy Version 1.1 \(Github\)](#)
- [WIP Taxonomy Review \(pdf\)](#)
- [Authorized Use / Legal Notice](#)
- [General Comments: info@xbrl.us](#)

**Example Instances**

- [Example Instance #1 \(xml\)](#)
- [Example Instance #2 \(xml\)](#)

**XBRL | US** FILERS

Home > Industries >

## Surety

Surety providers review the contractor's financial statements to identify risks and determine eligibility for surety bonds. Financial statements include a Work in Process (WIP) report that describes the financial performance and status of a contractor's construction projects. Today's surety underwriting process is highly manual and therefore, labor-intensive, time-consuming and costly.

**Using Data Standards to Streamline the Process and Reduce Costs**

The XBRL data standard renders paper-based information computer-readable, reducing costs and delays. Bringing XBRL into the surety underwriting process will make the WIP report and supporting financial computer-readable with data that can be extracted automatically into the sureties financial system without rekeying. The XBRL data standard will not change the underwriting process or what data is used, it will simply change how the data needed for underwriting is conveyed.

The first version of the **XBRL Surety Work in Process Taxonomy** was published in September, 2016. Details for the current published version

# Where We Are Today

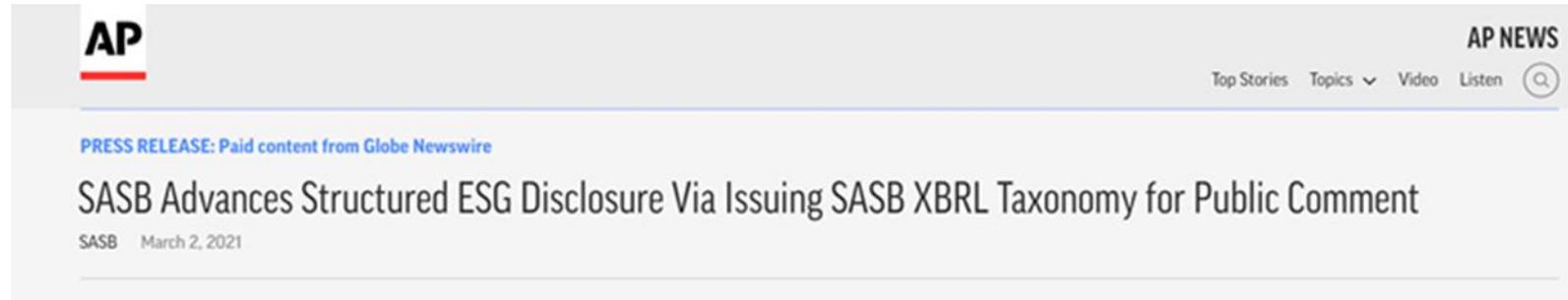


The screenshot shows the XBRL website header with 'NEWS' and 'EVENTS' tabs. Below is a breadcrumb trail: 'Home > News > XBRL Spreads to Small Business Administration'. The main headline is 'XBRL Spreads to Small Business Administration', posted on April 26, 2019, by an editor. A 'Tweet' link is visible. The image shows several hands of different skin tones holding up small American flags. Below the image is a caption: 'Great news from the US as contractors and bond agents can now submit data in XBRL format, automating what was a laborious manual process and freeing up valuable time for small businesses.'

Great news from the US as contractors and bond agents can now submit data in XBRL format, automating what was a laborious manual process and freeing up valuable time for small businesses.



## Where We Are Today



SAN FRANCISCO, March 02, 2021 (GLOBE NEWSWIRE) -- Today the Sustainability Accounting Standards Board (SASB) announced that the SASB eXtensible Business Reporting Language (XBRL) taxonomy is [now open for a 60-day public comment period](#).

SASB engaged PwC to support in the development of an XBRL taxonomy encompassing SASB's 77 industry Standards.

By integrating into the common language for business reporting, the SASB XBRL taxonomy can further enhance the quality and usefulness of SASB disclosures.



## Where We Are Today



### Federal Energy Regulatory Commission

#### FERC Adopt XBRL for Utilities Reporting

Posted on June 21, 2019 by [Editor](#)

[Tweet](#)



Yesterday, the Federal Energy Regulatory Commission (FERC) announced that they are adopting the XBRL standard for utilities reporting on Form Nos. 1, 1-F, 2, 2-A, 3-Q electric, 3-Q natural gas, 6, 6-Q, 60, and 714. The final rule states:

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*“The use of XBRL will make the information in these forms easier for filers to submit and data users to analyse, and assist in automating regulatory filings. The Commission believes that transitioning from the current Visual FoxPro system to XBRL will decrease the costs, over time, of preparing the necessary data for submission and complying with future changes to filing requirements set forth by the Commission.”*

# Where We Are Today

NIST Framework for Smart Grid Interoperability

CPUC Order Instituting Rulemaking to Investigate and Design Clean Energy Financing Options for Electricity and Natural Gas Customers.

PG&E On Bill Finance Pilot

**NIST Framework and Roadmap  
 for Smart Grid Interoperability  
 Standards, Release 4.0**

Avi Gopstein  
 Cuong Nguyen  
 Cheney O'Fallon  
 Nelson Hastings  
 David Wollman

This publication is available free of charge from:  
<https://doi.org/10.6028/NIST.SP.1108e4>


**California Public Utilities Commission**

**PROPOSED DECISION**      Agenda ID #18695  
 Quasi-Legislative

Decision \_\_\_\_\_

**BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA**

Order Instituting Rulemaking to Investigate and Design Clean Energy Financing Options for Electricity and Natural Gas Customers.      R. \_\_\_\_\_

**ORDER INSTITUTING RULEMAKING**



**Erik Jacobson**  
 Director  
 Regulatory Relations

Pacific Gas and Electric Company  
 77 Beale St., Mail Code 8132  
 P.O. Box 70900  
 San Francisco, CA 94177  
 Fax: 415-873-2642

January 12, 2021

**Advice 4360-G/6052-E**  
 (Pacific Gas and Electric Company ID U 39 M)

Public Utilities Commission of the State of California

**Subject:** Pacific Gas and Electric Company's Proposal to Implement an On-Bill Financing Resiliency Pilot for K-12 Schools

# Where We Are Today

## Department of Energy and National Labs – Standardizing Project Information

### SolarApp

Department of Energy, Office of Energy Efficiency and Renewable Energy

[SolarApp - National Renewable Energy Laboratory](#)

[SolarApp – The Solar Foundation](#)

[SolarApp - Solar Energy Industries Association](#)

SolarApp is a standardized national data set for permitting solar projects that can also be utilized for finance, construction, surety and insurance.

### [Solar TRACE: Permitting, Inspection, and Interconnection Data and Analytics](#)

The Solar Time-based Residential Analytics and Cycle time Estimator (Solar TRACE) for rooftop solar permitting, inspection, and interconnection (PII) was developed by the National Renewable Energy laboratory (NREL).

### [AHJ Registry](#)

Search a street address or a set of latitude and longitude coordinates and see the AHJs for that location. The registry has a record for all 43,096 AHJs in the US, including municipal, county and state agencies.

October 20, 2020 - Solar Builder - [Searching AHJs for solar permitting? Check this free, crowd-sourced registry](#)

Aurora Solar - November 12, 2020 - [Is Permitting Killing Your Solar Business? Help May Be An Orange Button Away.](#)

### Department of Energy - Solar Energy Technologies Office

Interstate Renewable Energy Council, Sustainable Energy Action Committee (SEAC), International Association of Electrical Inspectors (IAEI), International Code Council (ICC), UL LLC, International Association of Fire Fighters (IAFF), National Association of State Fire Marshals (NASFM), Solar Energy Industries Association (SEIA), U.S. Energy Storage Association (ESA) and California Solar & Storage Association (CALSSA).

[Solar & Storage Permitting](#) standardized data set for inspection of permitting solar projects that can also be utilized for finance, construction, surety and insurance.

### Department of Energy - Solar Energy Technology Office

[North American Board of Certified Energy Practitioners \(NABCEP\)](#)

[Institute for Building Technology and Safety \(IBTS\)](#)

[FIT-QM - Standardized Data Set for photovoltaic \(PV\) inspection platform](#) standardized data set for inspection of permitting solar projects that can also be utilized for finance, construction, surety and insurance.



## Digital Ecosystem for Construction Attracting Capital and Financial Markets to Energy Infrastructure

Overview

Problem Statement

The Federal Button

Ecosystem Stakeholders

The Data Element

The Data Stack

Use Cases

Where We Are Today

Summary

Going Forward - Brainstorming



# Summary



To get financing or insurance the project must demonstrate it is using two bolts



# Summary

Digital Ecosystem for Infrastructure Reliability  
Attracting Capital and Financial Markets to Energy Infrastructure

Consistent data that allows aggregation of data that can be accurately analyzed to identify failure points utilized by Capital and Financial Markets for underwriting considerations and requirements.



## Digital Ecosystem for Construction Attracting Capital and Financial Markets to Energy Infrastructure

Overview

Problem Statement

The Federal Button

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The Data Element

The Data Stack

Use Cases

Where We Are Today

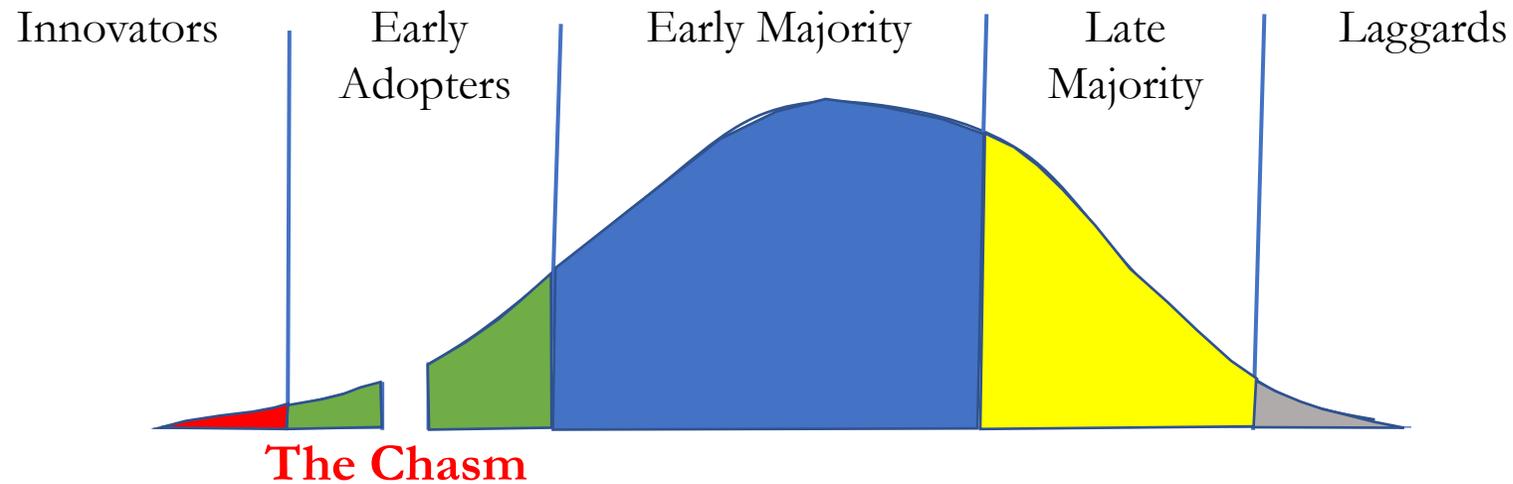
Summary

Going Forward - Brainstorming

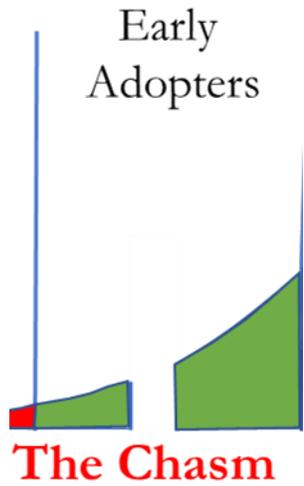
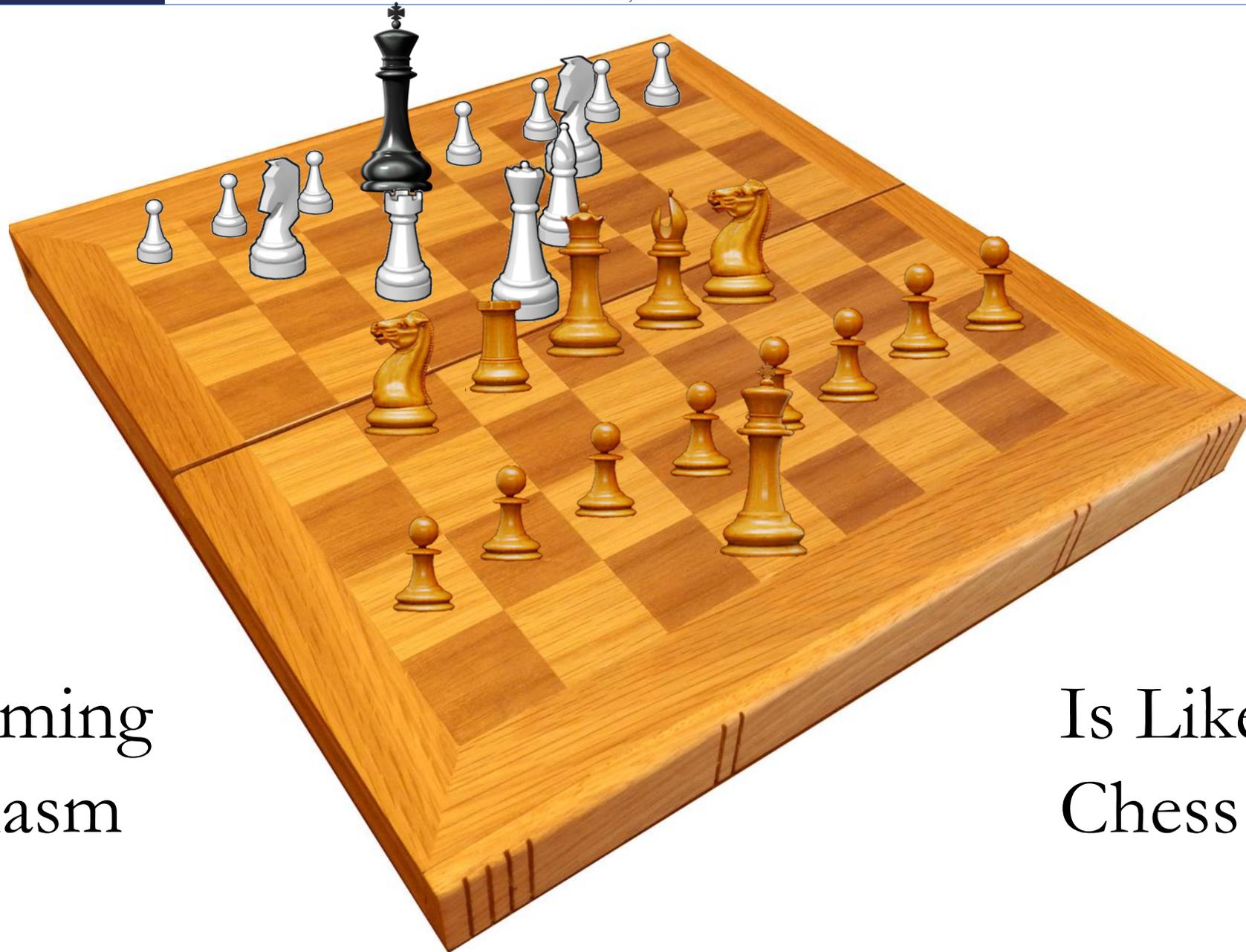


# Going Forward - Brainstorming

## Technology Adoption Lifecycle



We Are At The Chasm

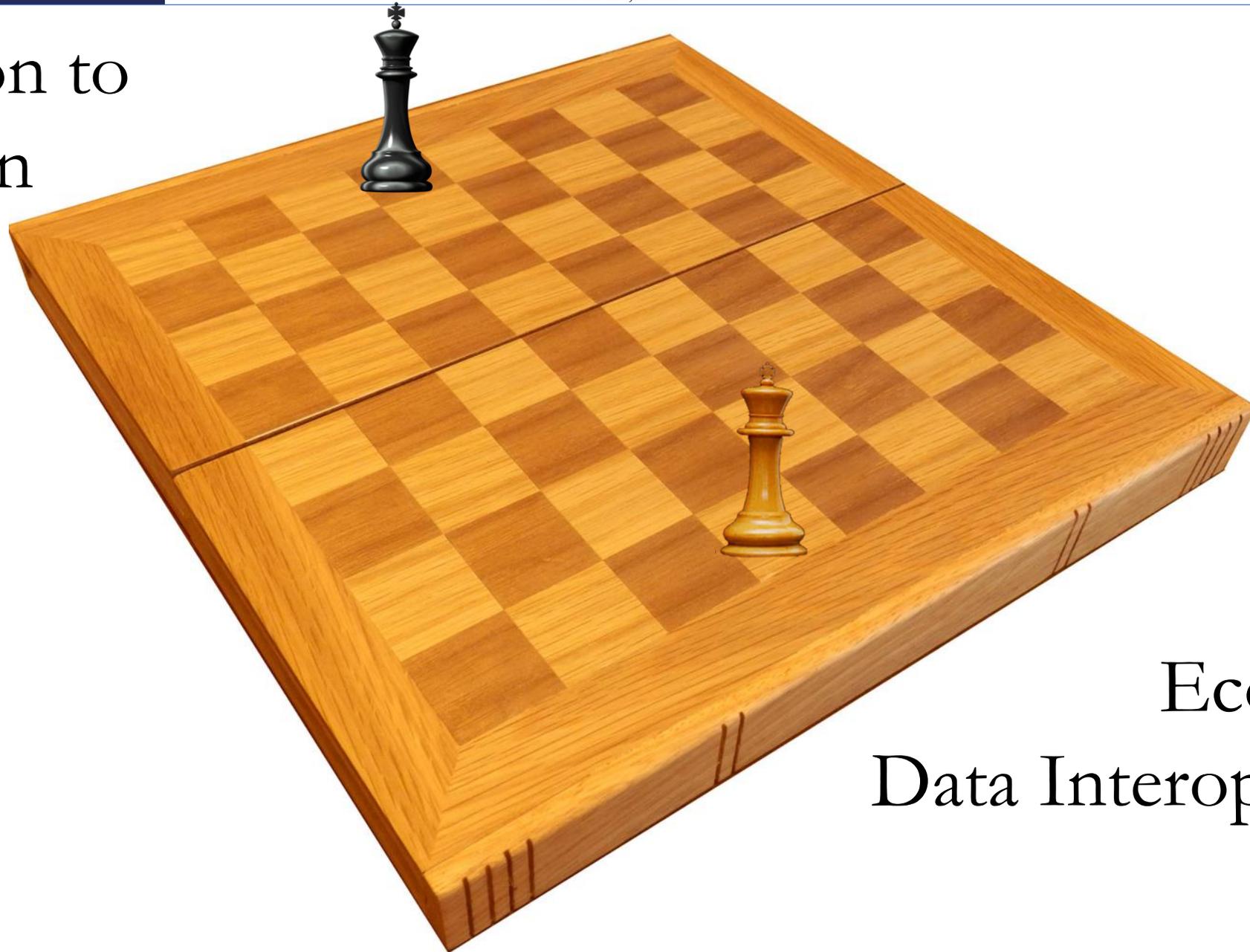


Overcoming  
The Chasm

Is Like A  
Chess Match



Opposition to  
Disruption  
Prevails



Ecosystem  
Data Interoperability  
Prevails



To Win the Chess Match



# Disruption

Resistance to anything that changes the status quo



# Meritocracy

The best products and services will prevail

## Two Opposing Forces



# To Win the Chess Match



Government Support

Digital Surety Bonds

Orange Button Data Standard

XBRL

Internationally Recognized  
 and Adopted Data Standard

Strong Main Offence



Perception of  
Other Solutions

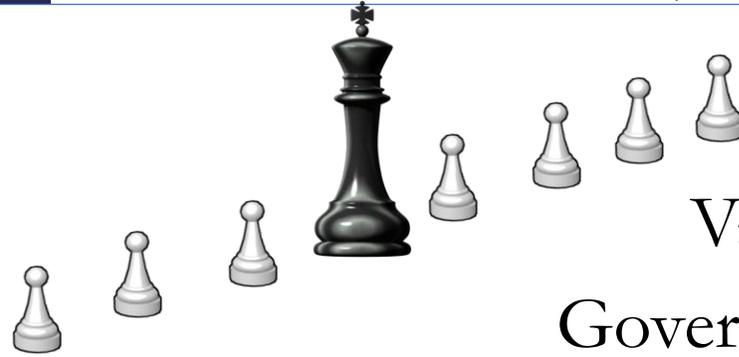


Not My Idea / That's My Department

Highly Fragmented Ecosystem

Economic – *Will I lose my job to automation and AI*

Strong Main Opposition



*Apathy — Why fix it if its not broken.*

Vaporware

Government regulations to hard to change

Difficulty in making procedural changes

Avoidance of Responsibility

Short Term Mindset

History of failed IT projects

Formidable Secondary Opposition



# To Win the Chess Match



## Offensive Secondary Assets



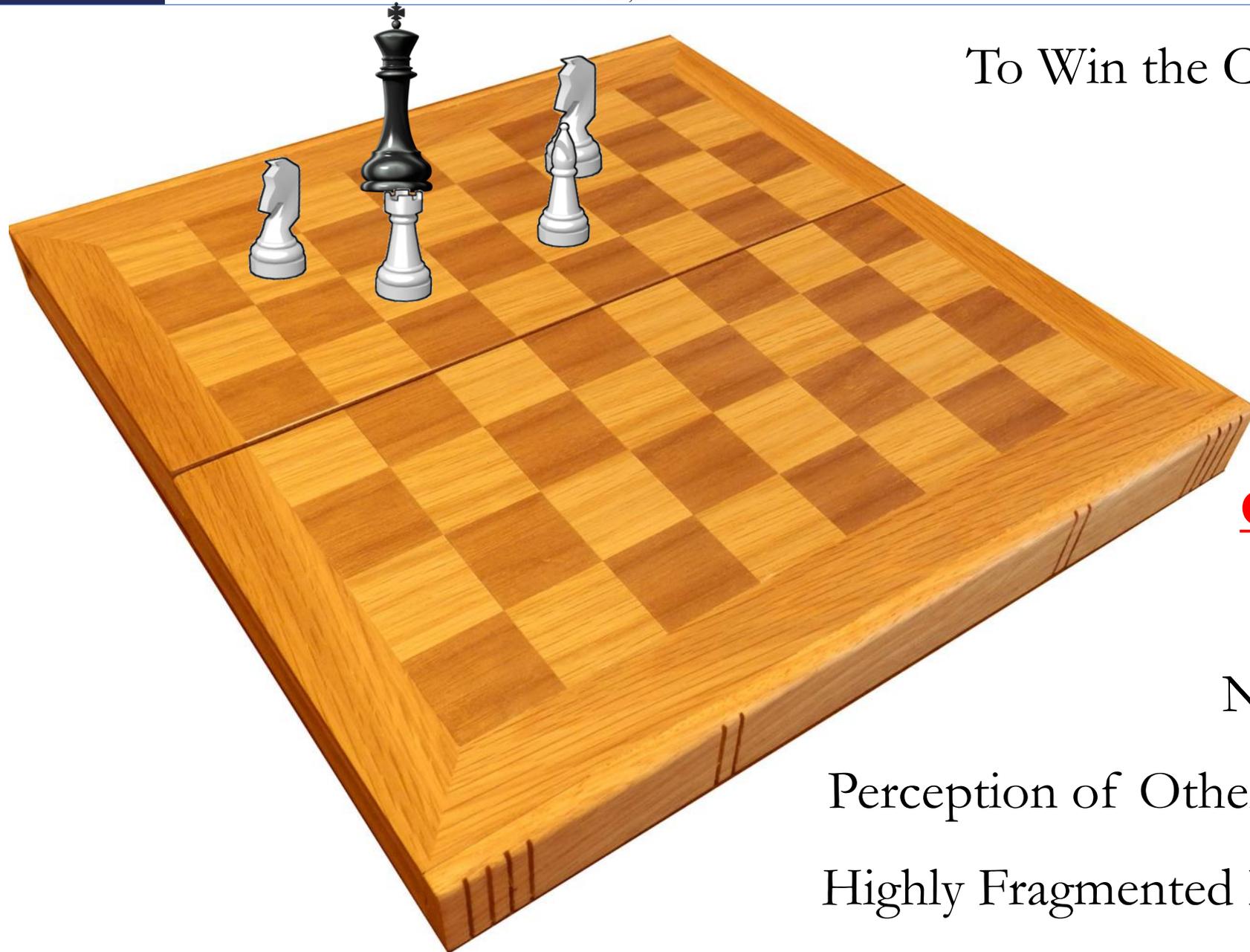
To Win the Chess Match



To Win the Chess Match  
Overcome Disruption



To Win the Chess Match  
Overcome Disruption



To Win the Chess Match

Overcome

Economic

Not My Idea

Perception of Other Solutions

Highly Fragmented Ecosystem



To Win the Chess Match

Add  
Ecosystem Approach



To Win the Chess Match

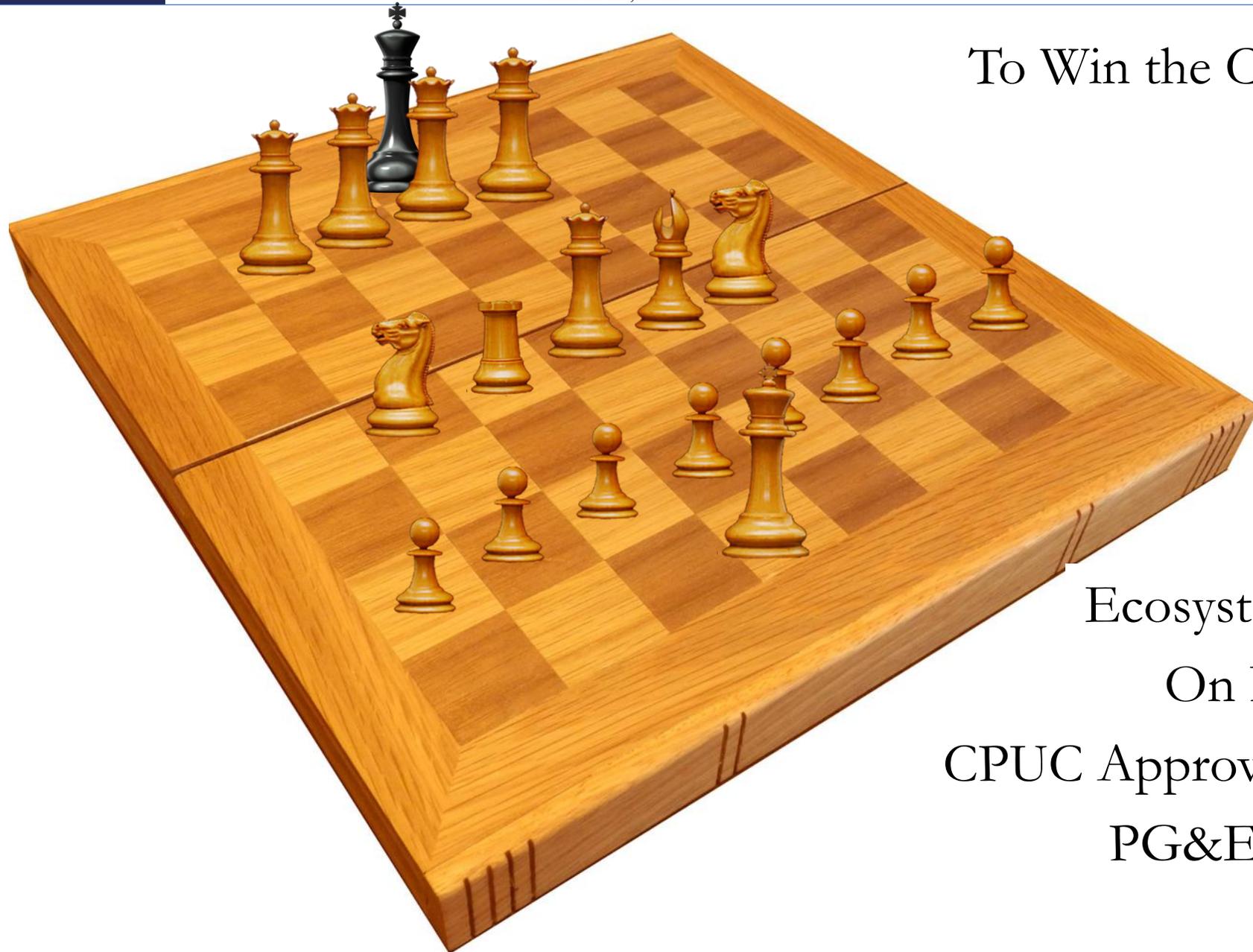
Add  
Ecosystem Approach  
On Bill Financing



To Win the Chess Match

Add

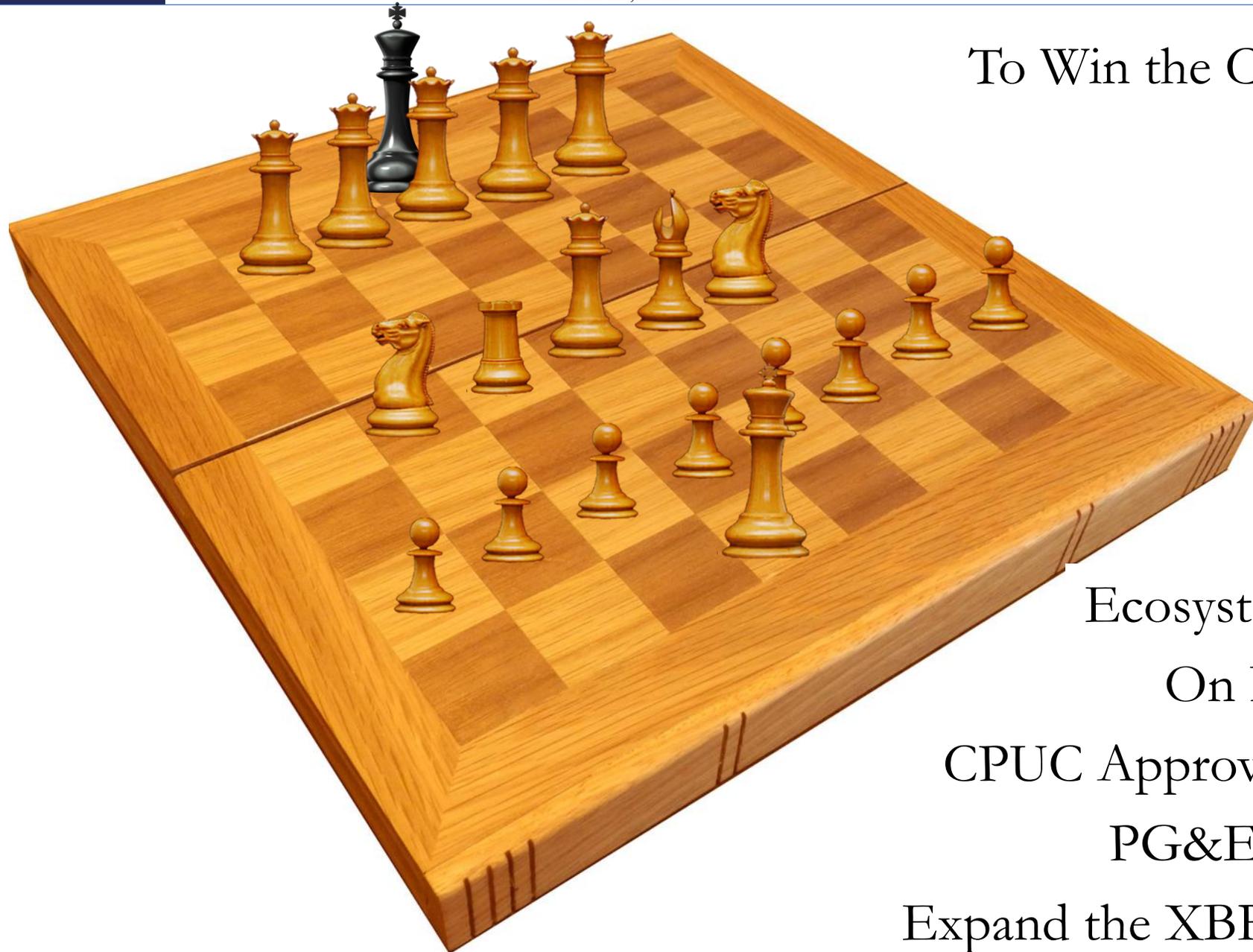
Ecosystem Approach  
On Bill Financing  
CPUC Approval for On Bill



To Win the Chess Match

Add

Ecosystem Approach  
On Bill Financing  
CPUC Approval for On Bill  
PG&E On Bill Pilot



## To Win the Chess Match

Add

Ecosystem Approach

On Bill Financing

CPUC Approval for On Bill

PG&E On Bill Pilot

Expand the XBRL Taxonomy

Government Support

Digital Surety Bonds

Orange Button Data Standard

XBRL

Internationally Recognized  
and Adopted Data Standard

Innovation

Entrepreneurial

International Data Standard

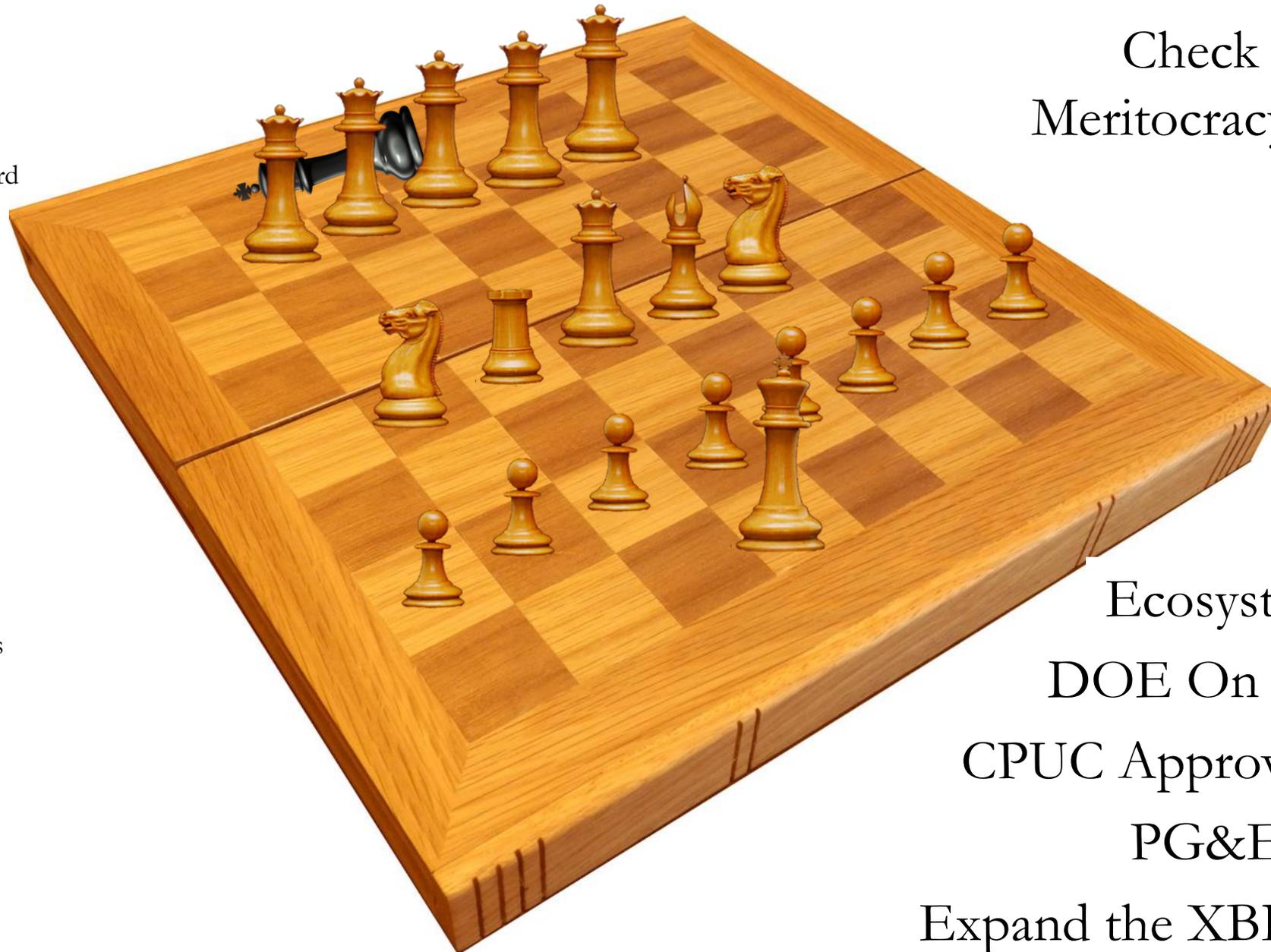
Trade Group Support

Other Successful IT projects

Process Reset Going On

Long Term Mindset

Competitive Advantage



Check Mate  
Meritocracy Prevails

Add

Ecosystem Approach  
DOE On Bill Financing  
CPUC Approval for On Bill  
PG&E On Bill Pilot  
Expand the XBRL Taxonomy



# Brainstorming Topic

## How do we leverage:

Ecosystem Approach

DOE On Bill Financing

CPUC Approval for On Bill

PG&E On Bill Pilot

XBRL - Internationally  
Recognized and Adopted Data  
Standard

Government Support

Digital Surety Bonds

Orange Button Data Standard

Innovation

Entrepreneurial

International Data Standard

Trade Group Support

Other Successful IT projects

Process Reset Going On

Long Term Mindset

Competitive Advantage



# Brainstorming Topic

## How do we overcome:

Highly Fragmented Ecosystem

Economic – *Will I lose my job to automation and AI*

Not My Idea / That's My Department

Perception of Other Solutions

Apathy – *Why fix it if its not broken.*

Vaporware

Government regulations to hard to change

Difficulty in making procedural changes

Avoidance of Responsibility

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History of failed IT projects



# Brainstorming