

Maximizando el **valor** de la **inversión**

20 y 21 de Octubre

5° Congreso
AAE International
de Ingeniería de Costos
PERÚ 2017

(ID) Uso de Tecnología en Procesos de Gerencia de Proyectos

CARLOS ORTEGA DÁVILA (COLOMBIA)

Con el paso del tiempo, los proyectos se han vuelto más complejos y costosos. Asimismo, los procesos de Gerencia de Proyectos adquieren mayor relevancia. El uso de tecnología ha permitido asistir dichos procesos para ser más efectivos y eficientes en nuestros proyectos.

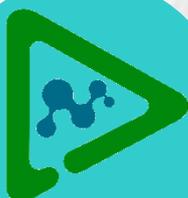


TURNING technologies



**PROUD SPONSOR
INTERACTIVE POLLING SOLUTION**

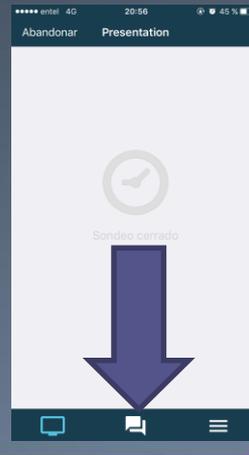
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TECHNOLOGIES

“Creando experiencias interactivas, creando conocimiento”
contacto@dmtechnologies.com.pe

QUESTIONS/COMMENTS? (PLEASE USE INTERACTIVE POLLING TURNING SYSTEM)



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- Ingeniero Civil
- Maestría en Gerencia de Proyectos e Innovación en Ingeniería
- MBA con Énfasis en Gerencia de Proyectos y Mejores Prácticas
- 15 años de experiencia en América Latina y Australia
- *“Algo que no saben de mi”*

Tengo una fundación donde trabajamos en resocialización de presos en cárceles de Colombia.



**NO ESTOY ASOCIADO CON NINGUNA DE LAS
MARCAS QUE VOY A MOSTRAR.**

**SON SIMPLEMENTE BUENAS PRÁCTICAS DE LA
INDUSTRIA, PERO EXISTEN MUCHAS OTRAS.**

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Controles de Proyecto

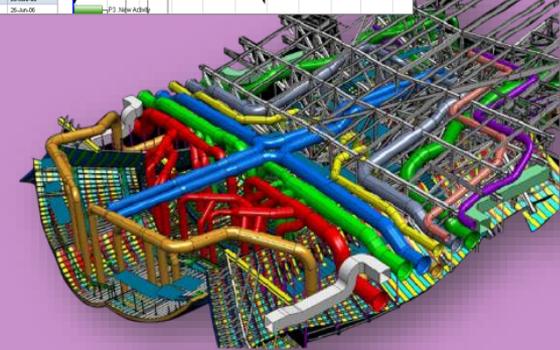
Control de
Tiempo/Costos

Modelación BIM

Programación de
Obra

Planeación y
Presupuesto

Colaboración y Control Documental



aconex Hotel VIP Resort | Majestic Builders | Mr Patrick O'Leary | Logout | -- Cross Project Search --

Tasks Documents Mail Tenders Workflows Directory Setup

Upload Document [Upload]

| | | | | |
|---------------|------------------------------|-----------------|------------|-----------|
| Document No * | ELEC-0002 | Auto-number | Revision * | A |
| Title * | Lighting Layout - Main Lobby | Type * | Drawing | |
| Status * | Approved | Discipline * | Electrical | |
| Building Zone | Events Centre | Work Package | | |
| Confidential | <input type="checkbox"/> | File | | Browse... |
| Print Size | | Revision Date * | 02/08/2010 | |
| Created By | Majestic Builders | Comments | | |

GESTIÓN DOCUMENTAL Y COLABORACIÓN

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Tasks Documents Mail Tenders Workflows Directory Setup

Upload Document

Upload

| | | | | |
|---------------|------------------------------|-------------|-----------------|------------|
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| Status * | Approved | | Discipline * | Electrical |
| Building Zone | Events Centre | | Work Package | |
| Confidential | <input type="checkbox"/> | | File | Browse... |
| Print Size | | | Revision Date * | 02/08/2010 |
| Created By | Majestic Builders | | Comments | |

aconex

Manage subcontractor submissions

Required by: **Majestic Project & Construction Management Limited**

Send to *

Patrick O'Leary - Majestic Builders

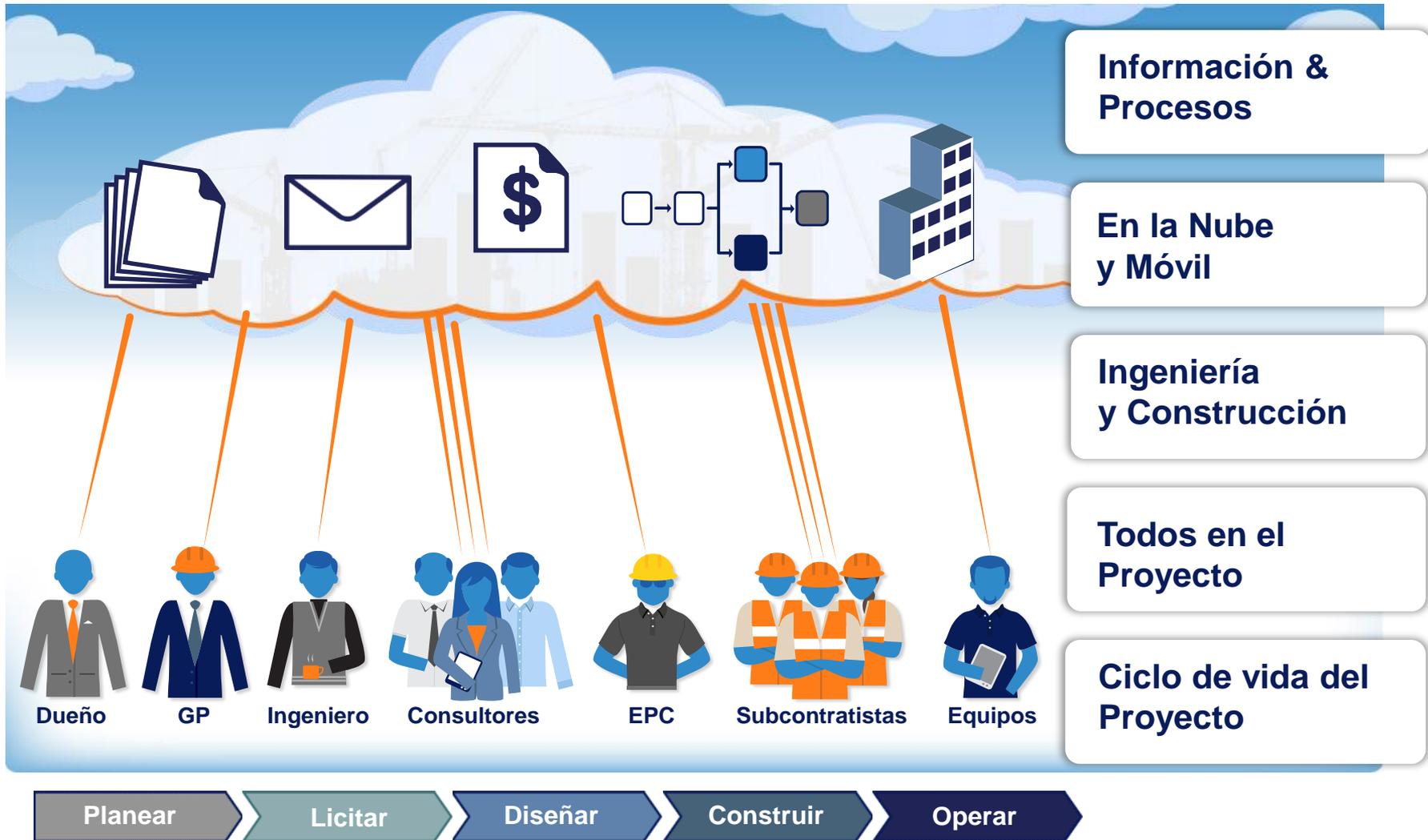
Transmittal Template [View/Edit](#)

Turnaround * 10 days to review documents

Total Documents 17

| Progress Summary | |
|---------------------|---------|
| Not Started | 5 (29%) |
| Submission Required | 1 (6%) |
| Submitted | 6 (35%) |
| Completed | 5 (29%) |

Complete visibility of progress





Nueve de los top 10
EPCs globales

23 de ENR Top 25
firmas de diseño
globales

Todas las empresas
construcción e
ingeniería del
Fortune 500

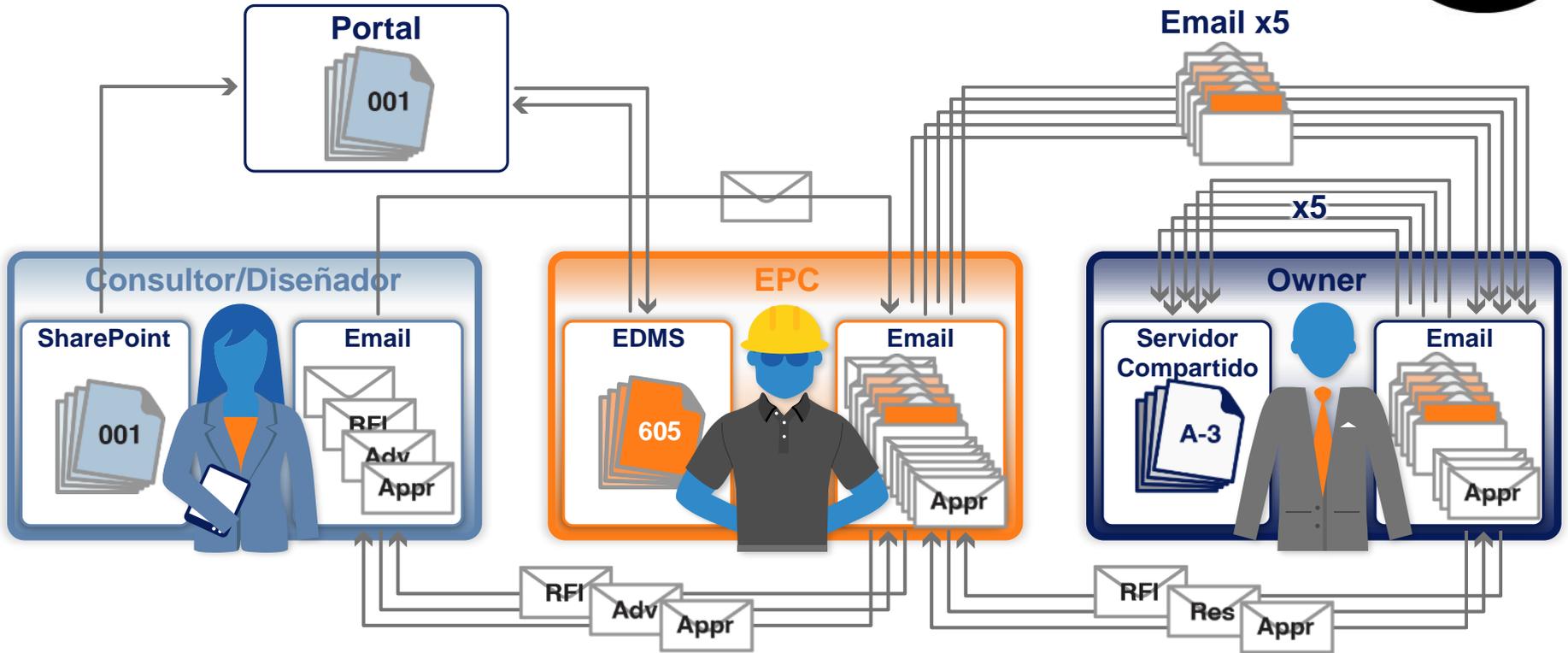


500,000 usuarios

US\$1.0 Tr en proyectos

70 países

Proceso actual de Colaboración



Pobre control de información



Docs en un lugar, decisiones en otro



Registro de auditoría incompletas



Redigitación múltiples veces



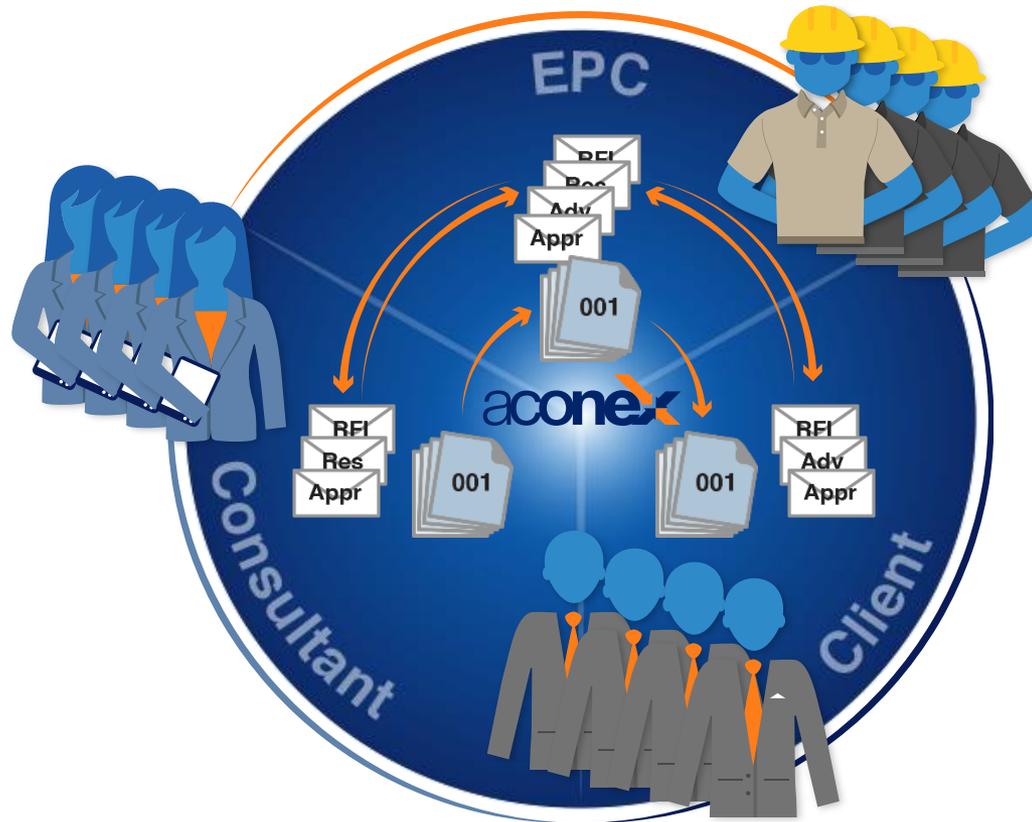
Información perdida o difícil de encontrar



No hay trazabilidad en todo el proyecto

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Control de Información en todo el proyecto



Docs y decisiones en un solo sitio



Trazabilidad de auditoría completa



Digitación única de documentos



Búsqueda fácil. No información perdida



Monitoreo de estado y progreso

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Minimizar Riesgos, Maximizar Retornos

Casos de Éxito:

Revisiones de diseño aceleradas
68% mas rápido que usando FTP
para un proyecto de US\$800m

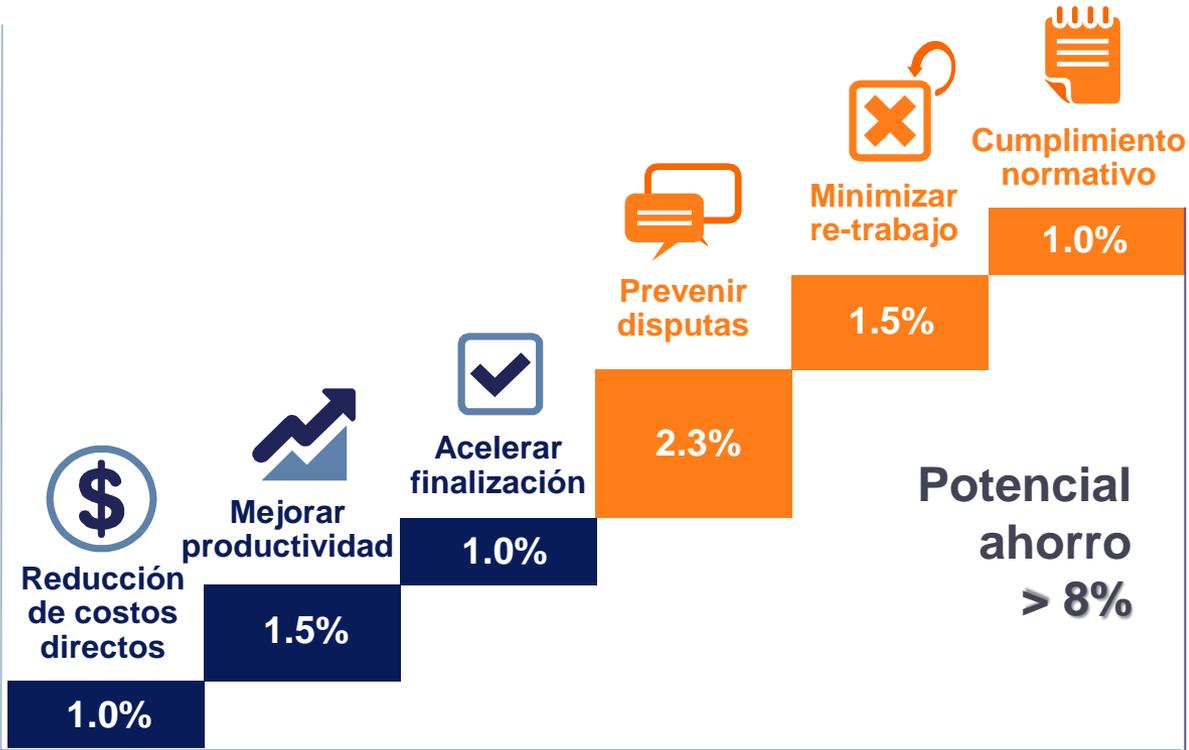
Control eficiente de documentos
84% (US\$628,000) ahorrado vs.
en proyecto de US\$268M

Agilidad en respuesta a RFIs
43% más rápido que el promedio
de la industria en EEUU

Mayor agilidad en licitaciones
50% de ahorro en tiempo
comparado con licitaciones previas

Tiempo de búsqueda reducido
60% vs. Sistema interno,
Constructor en proy. de US\$100M

Efficiente cumpl. de procesos
80% ahorro de tiempo vs.
Metodologías de procesos previos



Maximizar Retorno

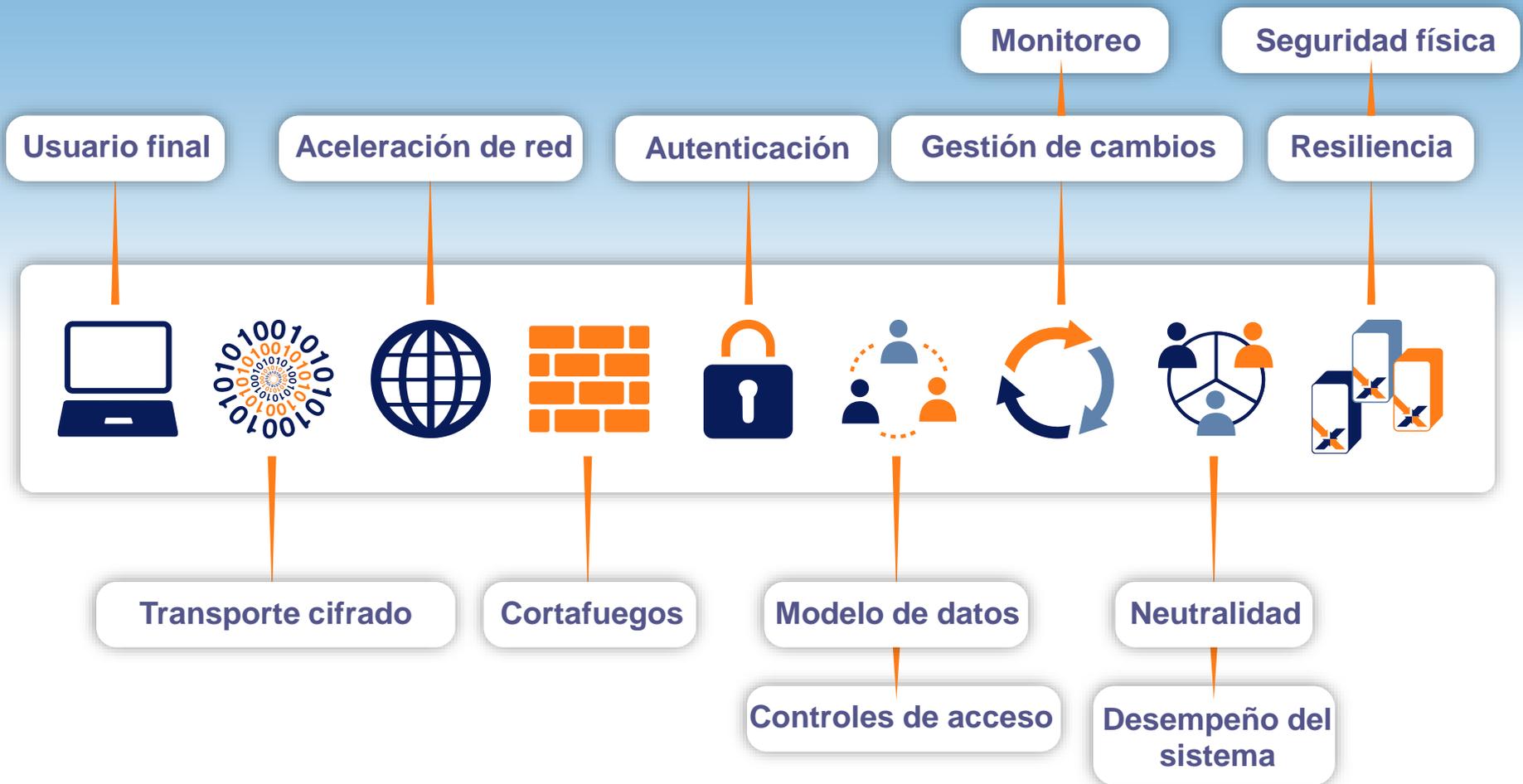
Minimizar Riesgos

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Certificación ISO 27001





Inspection and Issue Capture
Client / Contractor

BIM

BUILDING INFORMATION MODELLING

MODELACIÓN MULTIDIMENSIONAL PARAMETRIZADA

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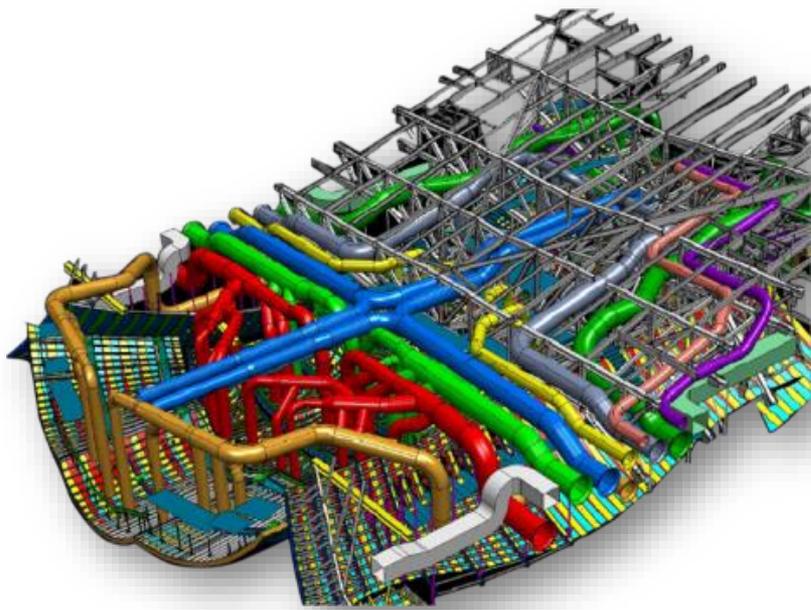
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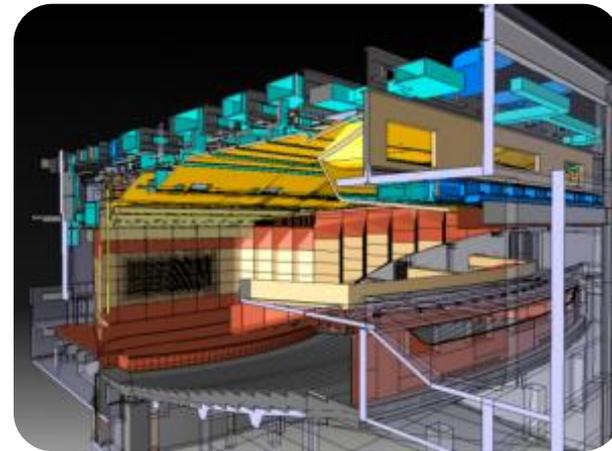


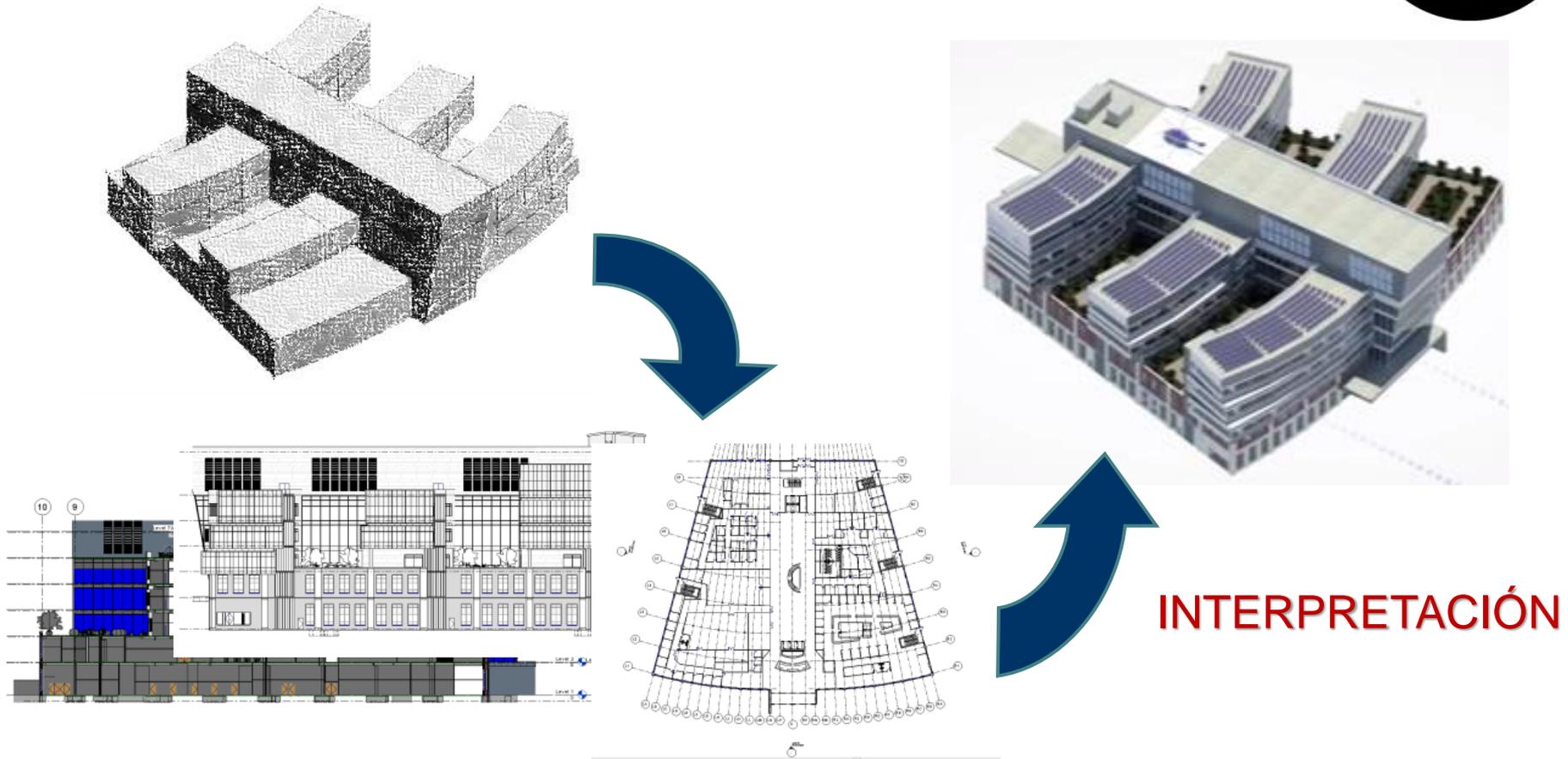
BIM – Modelación Multidimensional Parametrizada



“Si necesitas saber exactamente lo que vas a construir antes de empezar, seguramente nunca vas a comenzar”

– Frank Gehry

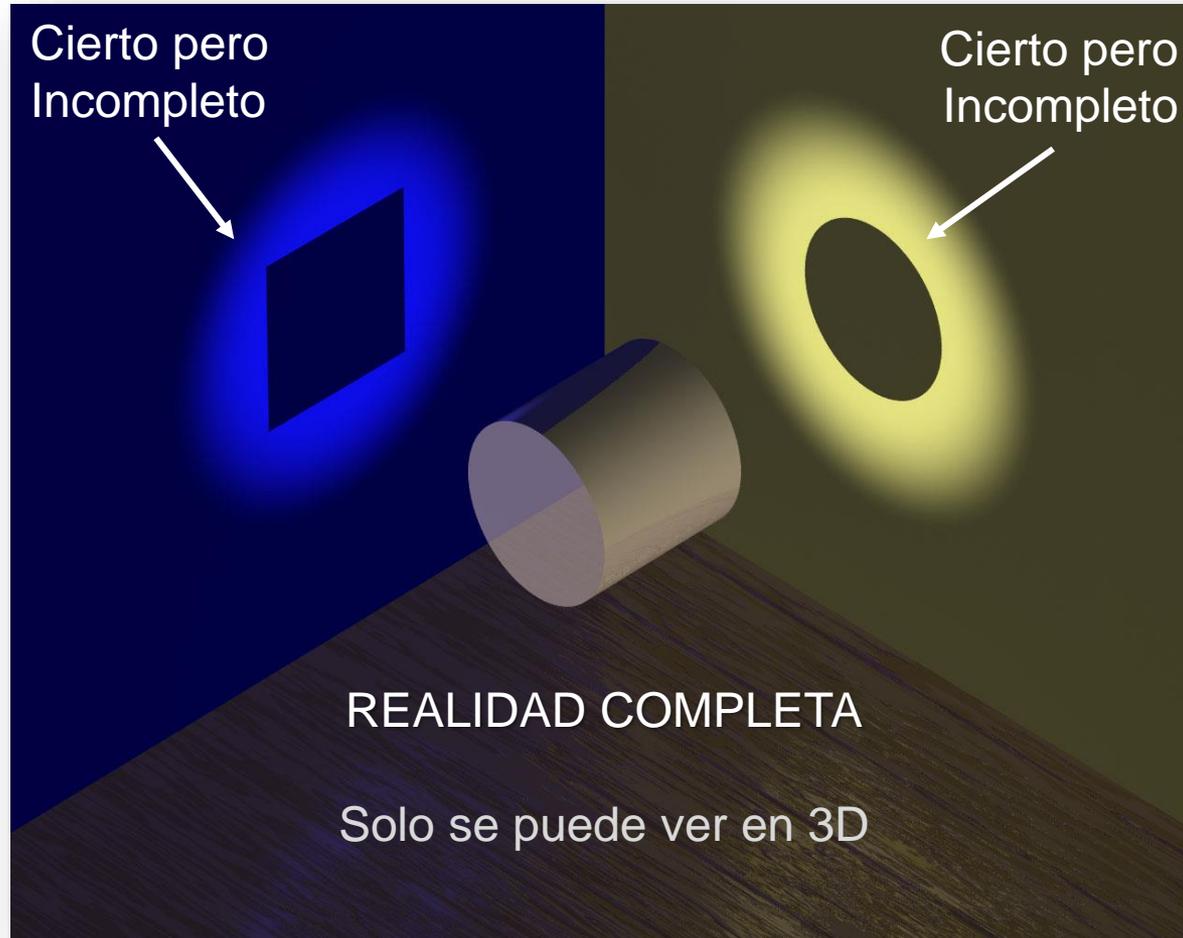


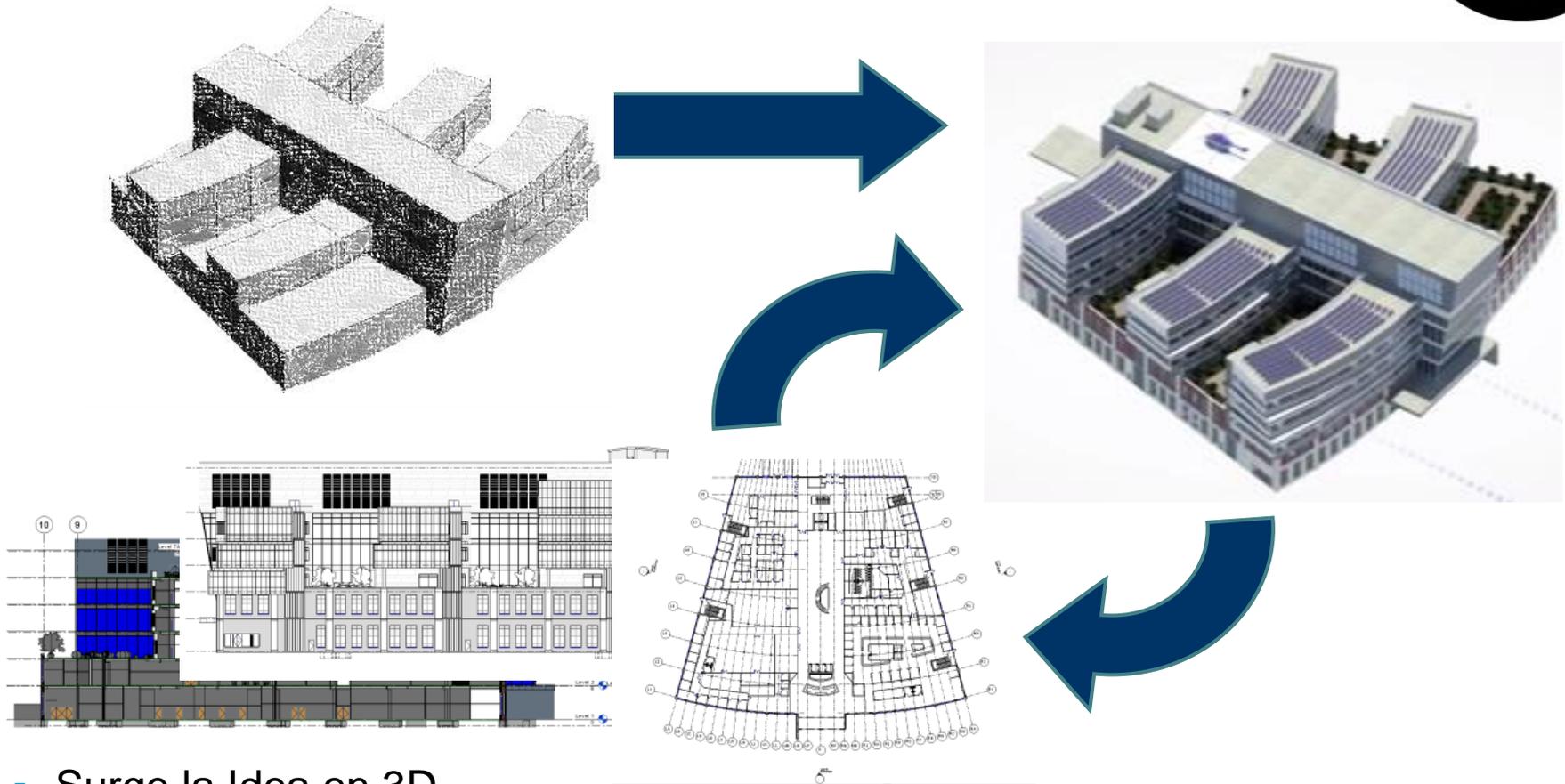


- Surge la Idea en 3D
- Se generan los planos del proyecto en 2D
- Se crea un modelo 3D para generar visualizaciones
- Planos y modelo son independientes entre sí

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- Surge la Idea en 3D
- Se crea el proyecto del edificio en 3D
- Se obtienen los planos del proyecto en base al edificio
- Planos y proyecto están integrados de forma bidireccional



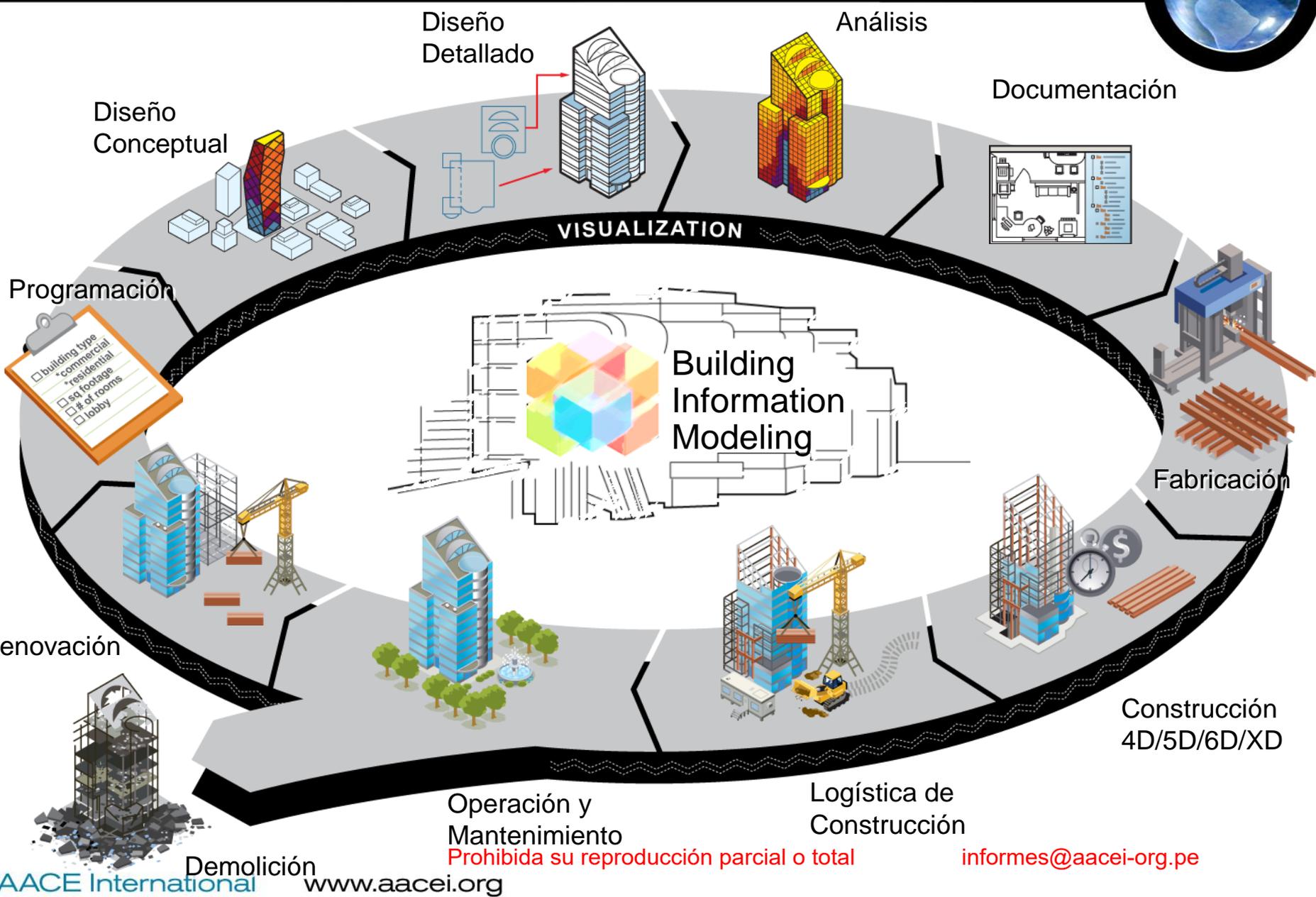
Hysan Place
Basement Excavation

Modelación 4D en Infraestructura

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Ciclo de Vida BIM





BIM es una **Metodología de Trabajo por Procesos**
no solo un **modelo REVIT**.



BIM Impact on Schedule and Project Duration

(According to Owners, Architects, Engineers and Contractors)

Dodge Data & Analytics, 2015

Very High High Medium

Improved Achievement of Planned Schedule Milestone Dates



Compressed Schedule Results in Accelerated Project Completion



BIM Impact on Cost Control and Reduction

(According to Owners, Architects, Engineers and Contractors)

Dodge Data & Analytics, 2015

Very High High Medium

Improved Process of Controlling Construction Costs



Reduced Final Construction Cost of Projects



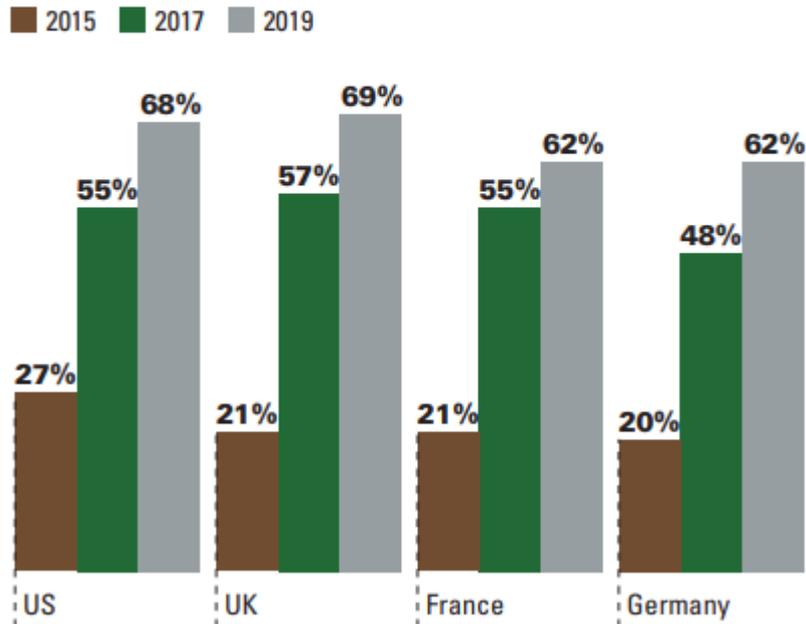
Prohibida su reproducción parcial o total. © Dodge Data & Analytics. Measuring the Impact of BIM on Complex Buildings. Informes@acei.org.pe

<https://www.construction.com/toolkit/reports/measuring-impact-bim-complex-buildings>



Use of BIM on 50% or More Transportation Infrastructure Projects (According to Engineers and Contractors by Country)

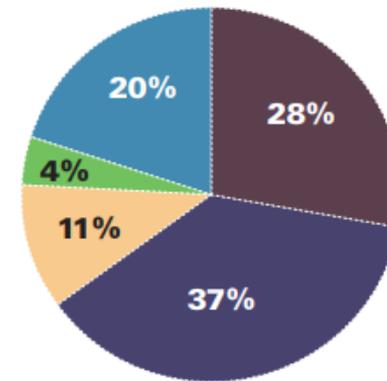
Dodge Data & Analytics, 2017



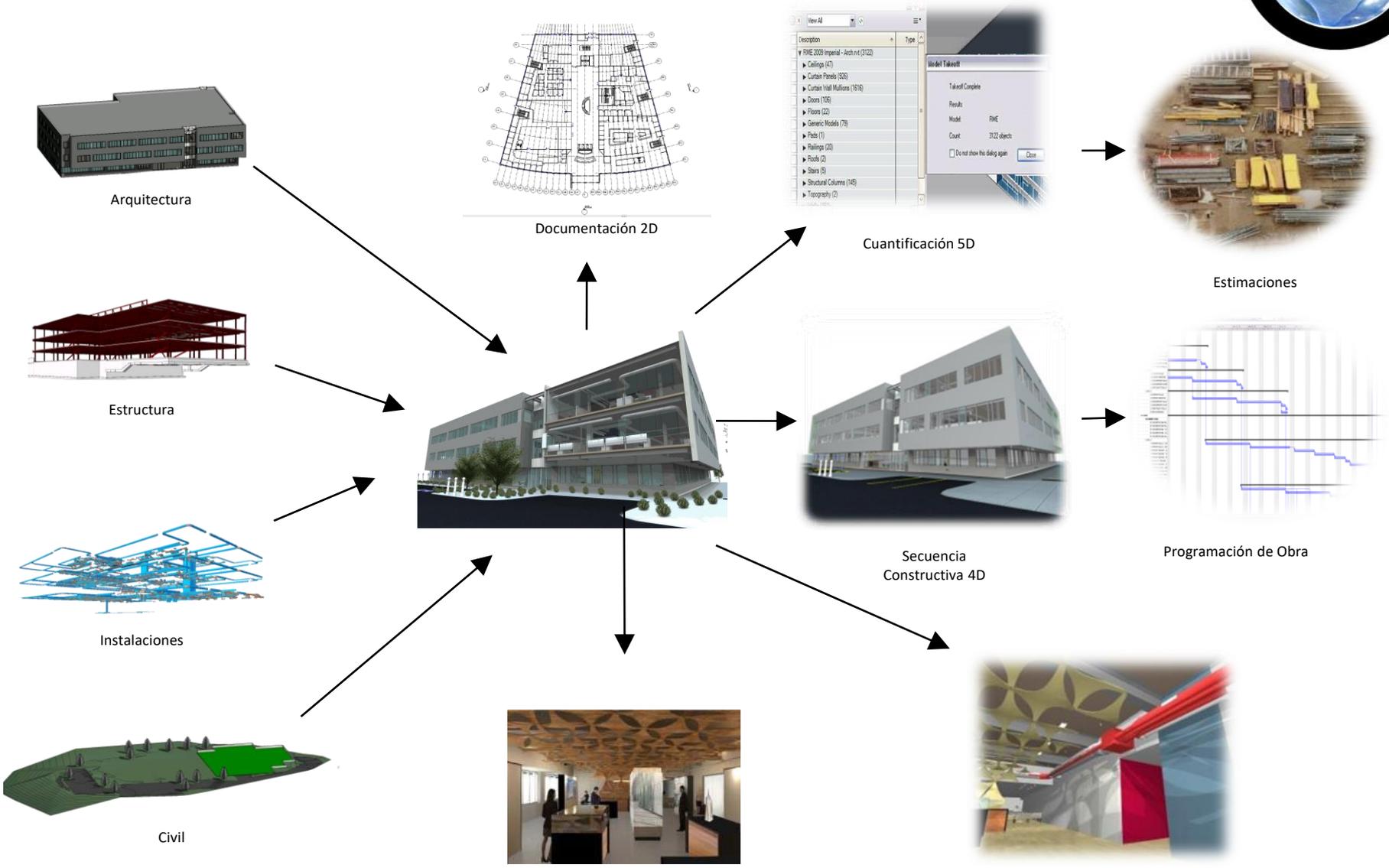
Perceived ROI on BIM for Transportation Infrastructure (According to All BIM Users)

Dodge Data & Analytics, 2017

- Positive ROI of 25% or More
- Positive ROI Under 25%
- Break-Even
- Negative ROI
- Not Sure



BIM - Flujo de Trabajo



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CONTROLES DE PROYECTO

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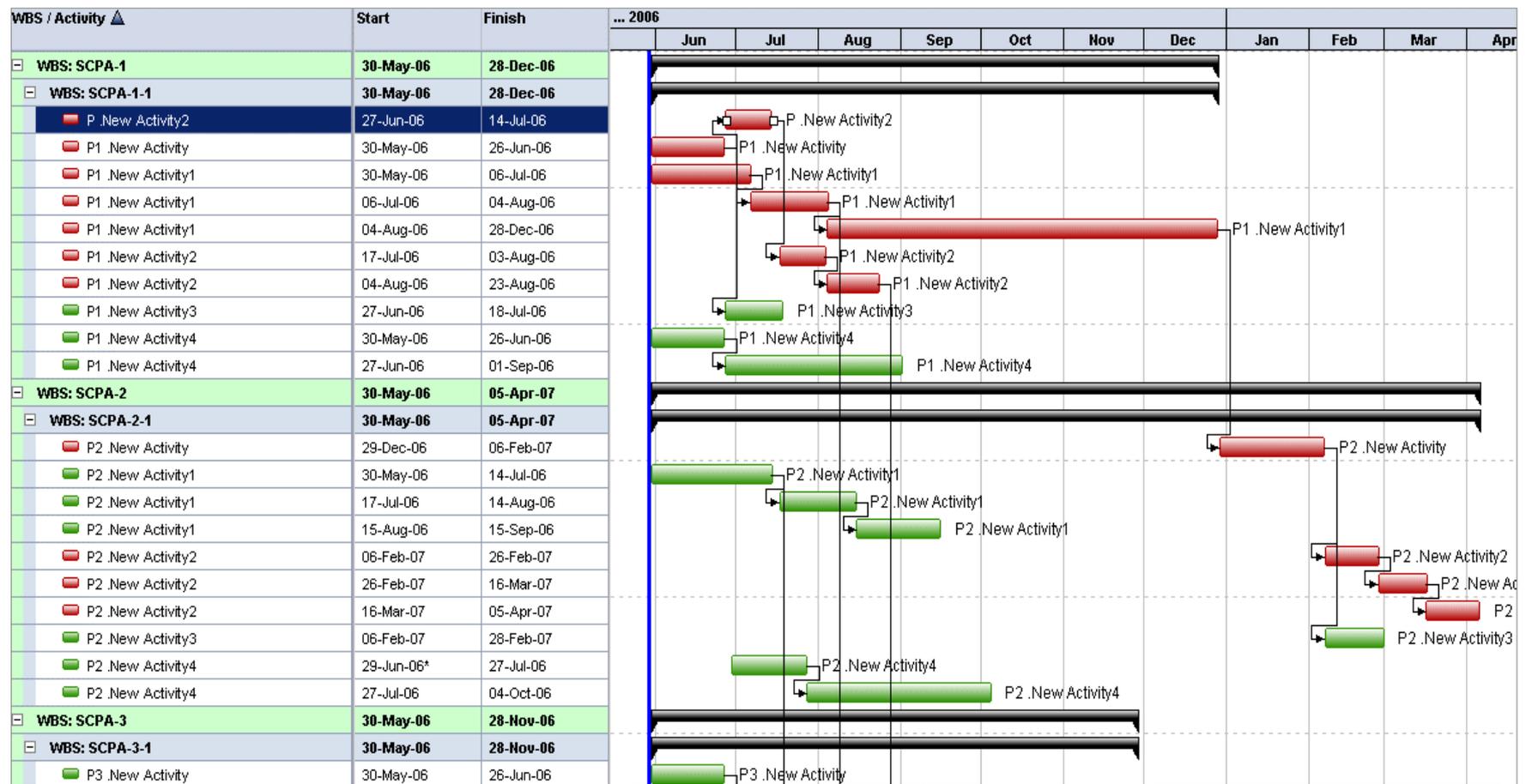
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Ruta Critica (Multiples Proyectos)

Mayor Control, Mejores Decisiones



PRIMAVERA Welcome, Bruce (V.P. of Construction)

Personal Workspace Related Actions Select an action...

Schedule Performance

Legend: Critical Warning Acceptable Exceptional

| | To Date | | Forecast at Completion | |
|---|------------|----------------|------------------------|-----------------|
| | Schedule | Cost | Schedule | Cost |
| Facilities Division Business Line | ★ 19 early | 🟢 155,619 over | 🟢 on schedule | 🟢 533,939 over |
| 9 Pacific Drive - Lofty Heights | ★ 23 early | 🟢 62,392 over | 🟢 on schedule | 🟢 34,339 under |
| Autumn Breezes Assisted Living Center | ★ 12 early | 🟢 53,896 over | 🟢 on schedule | ⚠️ 543,328 over |
| Lincoln Hospital Project Trauma Ward - April update | 🟢 1 late | 🟢 37,118 over | 🟢 9 late | 🟢 23,150 over |
| Office Building Addition | 🟢 0 late | 🔴 2,213 over | 🟢 on schedule | 🟢 1,800 over |

Page: 1 of 1

Resource Analysis Chart

Allocation for All Resources Team by Project
05-Mar-08 to 21-Dec-11

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Personal Workspace Related Actions Select an action...

Autumn Breezes Assisted Living Center

Legend: Critical Warning Acceptable Exceptional

| | To Date | | Forecast at Completion | |
|---------------------------------------|---------------|----------------|------------------------|-----------------|
| | Schedule | Cost | Schedule | Cost |
| Autumn Breezes Assisted Living Center | ★ 12 early | 🟢 53,896 over | 🟢 on schedule | 🟢 543,328 over |
| Milestones | | 🟢 on budget | 🟢 on schedule | on budget |
| Building 1 | ★ 16 early | 🟢 53,725 over | ⚠️ 12 late | ⚠️ 512,100 over |
| Building 2 | ★ 16 early | 🟢 10,952 over | 🟢 3 late | 🟢 11,056 over |
| Building 3 | 🟢 3 early | 🟢 16,780 over | 🟢 3 early | 🟢 16,780 over |
| Building 4 | 🟢 on schedule | 🟢 128 under | 🟢 on schedule | 🟢 128 under |
| Garage 1 | 🟢 2 early | 🟢 3,520 over | 🟢 2 late | 🟢 3,520 over |
| Garage 2 | 🟢 on schedule | 🟢 on budget | 🟢 on schedule | 🟢 on budget |
| Roads, Utilities & Pavers | ★ 13 early | ★ 30,952 under | 🟢 on schedule | 🟢 0 over |
| Landscape & Irrigation | No Progress | No Progress | No Progress | No Progress |

Page: 1 of 1

Mayor Control, Mejores Decisiones



PRIMAVERA Welcome, Bruce (V.P. of Construction)

Personal Workspace Related Actions Select an action...

Building 1

Legend: ✘ Critical ⚠ Warning ✔ Acceptable ★ Exceptional

| | To Date | | Forecast at Completion | |
|-------------------|---------------|---------------|------------------------|----------------|
| | Schedule | Cost | Schedule | Cost |
| Building 1 | ★ 16 early | ✔ 53,725 over | ⚠ 12 late | ⚠ 512,100 over |
| Structure | ✔ on schedule | ✔ on budget | ✔ on schedule | ✔ on budget |
| Roof | ✔ on schedule | ✔ on budget | ✔ 5 late | ✔ on budget |
| Envelope | ✔ 5 early | ✔ on budget | ✔ 8 early | ✔ on budget |
| Interior Finishes | ★ 14 early | ✔ 53,725 over | ⚠ 12 late | ✘ 512,100 over |
| Pool & Courtyard | No Progress | No Progress | No Progress | No Progress |

Page: 1 of 1

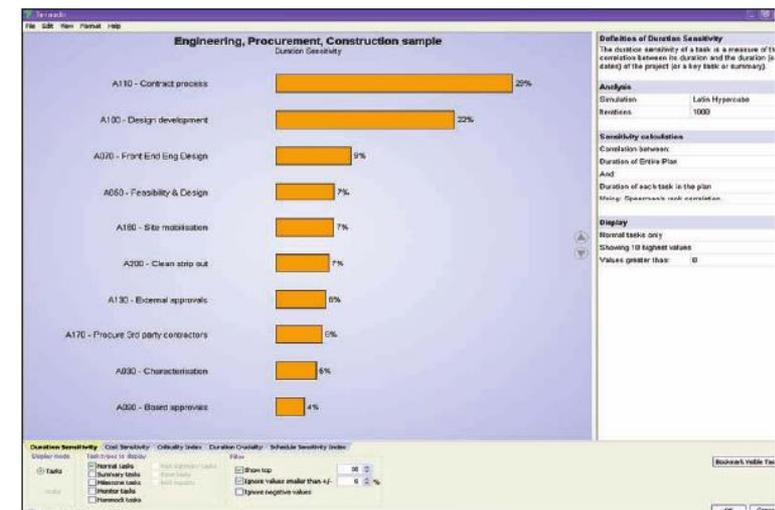
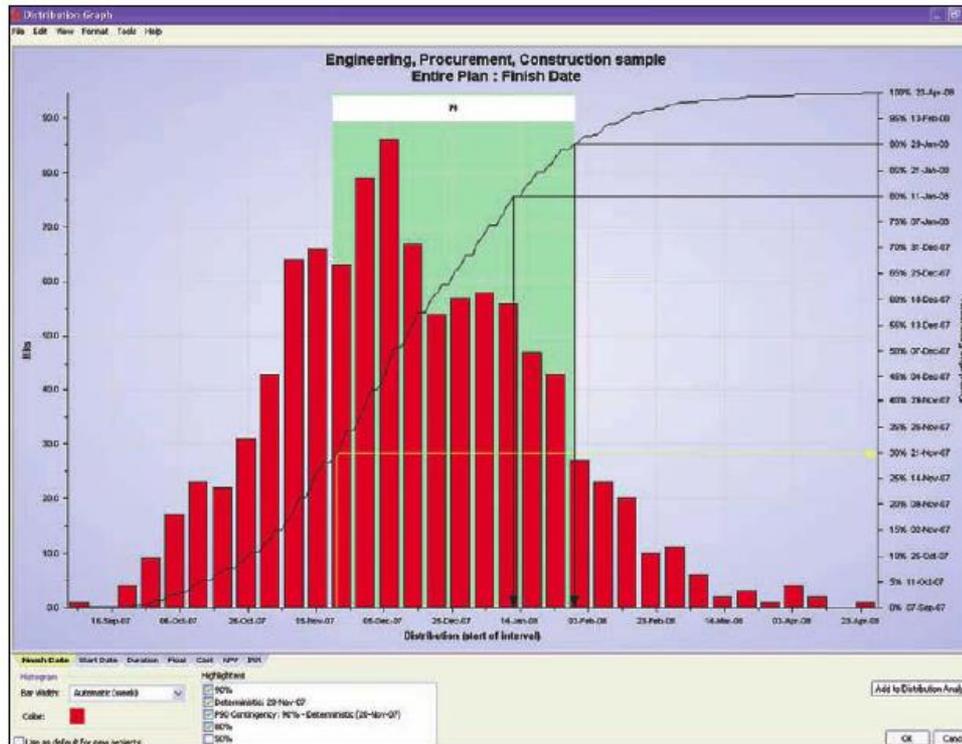
| | To Date | | Forecast at Completion | |
|-------------------|---------------|---------------|------------------------|----------------|
| | Schedule | Cost | Schedule | Cost |
| Building 1 | ★ 16 early | ✔ 53,725 over | ⚠ 12 late | ⚠ 512,100 over |
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| Pool & Courtyard | No Progress | No Progress | No Progress | No Progress |

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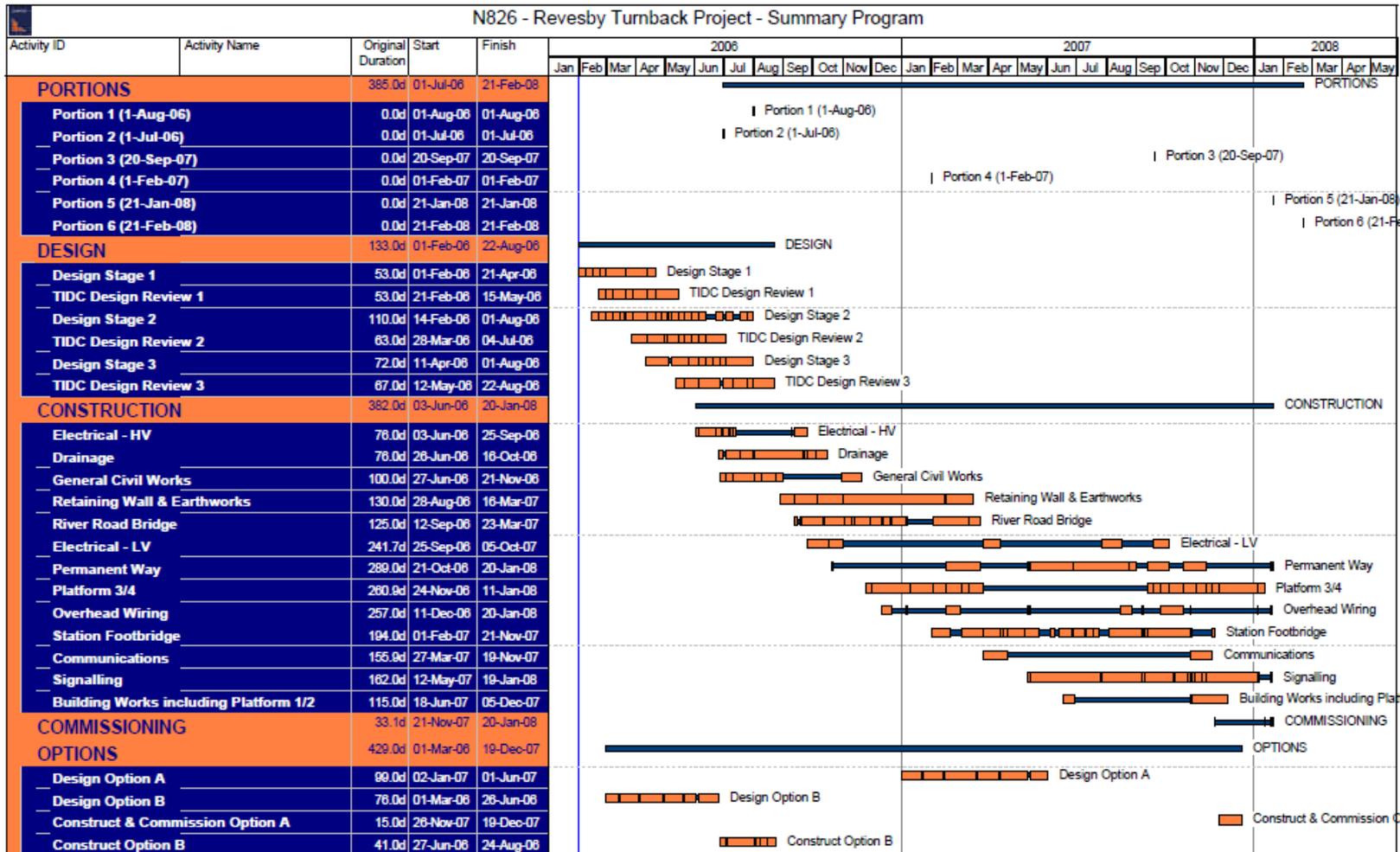
Metodología Montecarlo





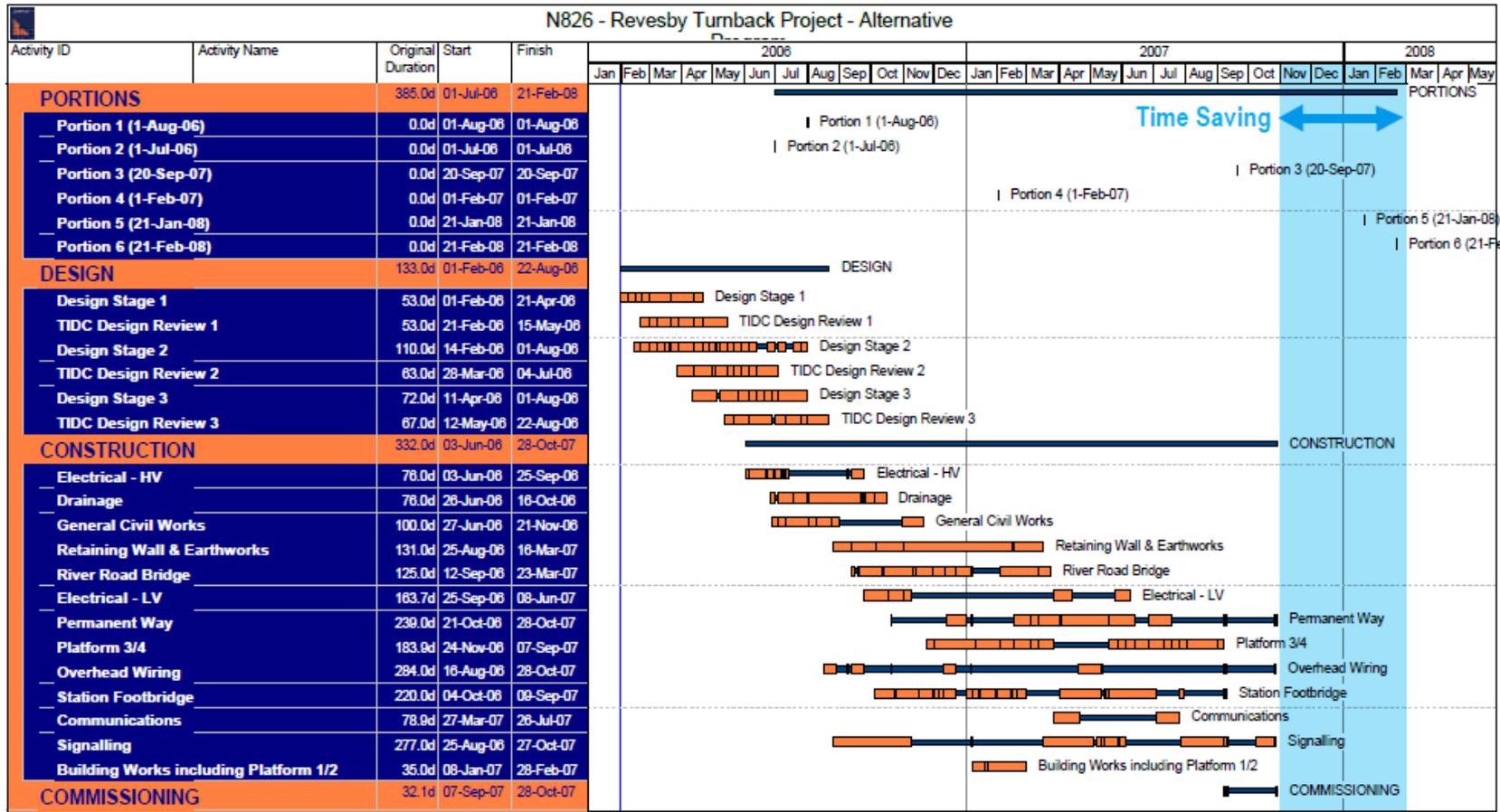
REVESBY STATION – Sydney, Australia

Programa de Licitación





REVESBY STATION – Análisis de Alternativas



RECLAMACIONES Y DISPUTAS

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