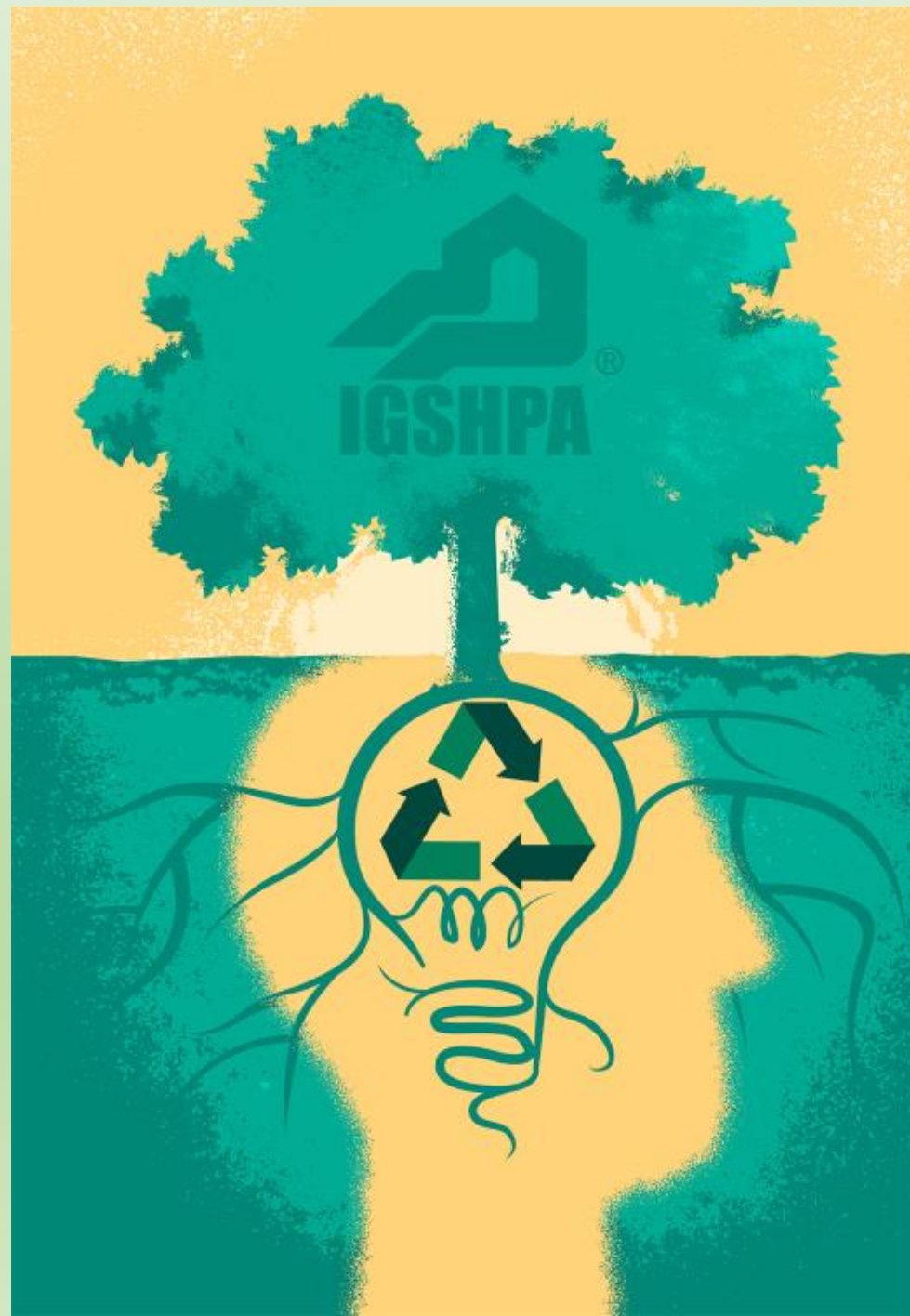


The Importance of Having a Commissioning Provider for GeoExchange Projects

The 5 Stages of Implementing a Quality & Cost Efficient Project



Geothermal: The Genius Renewable

Live at Groundwater
Week in partnership
with NGWA



Las Vegas, NV
December 5-7, 2023

SYSTEMS SHOULD WORK THE FIRST DAY THEY ARE HANDED OVER TO THE OWNER.

-ASHRAE Standard 202 Commissioning Process for Buildings and Systems

A Commissioning Provider's (CxP) mission is to create **Quality** based projects. They facilitate:

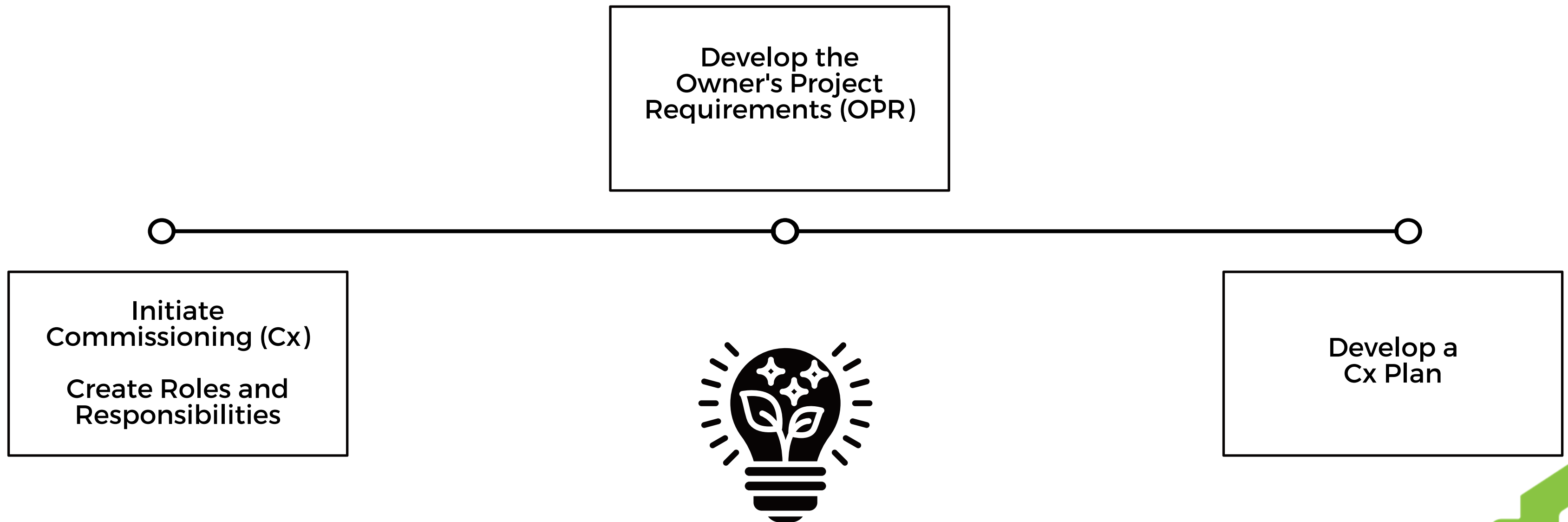
- Detailed Owner's Project Requirements (OPR)
- In-depth site inspections
- Cross team communications
- Precise and complete inspection and testing plan (ITP)
- Centralized documentation and confident O&M handoff
- Ongoing system monitoring, support and functional validation

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The Beginning

Stage 1



5 Stages of Cx

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Examples

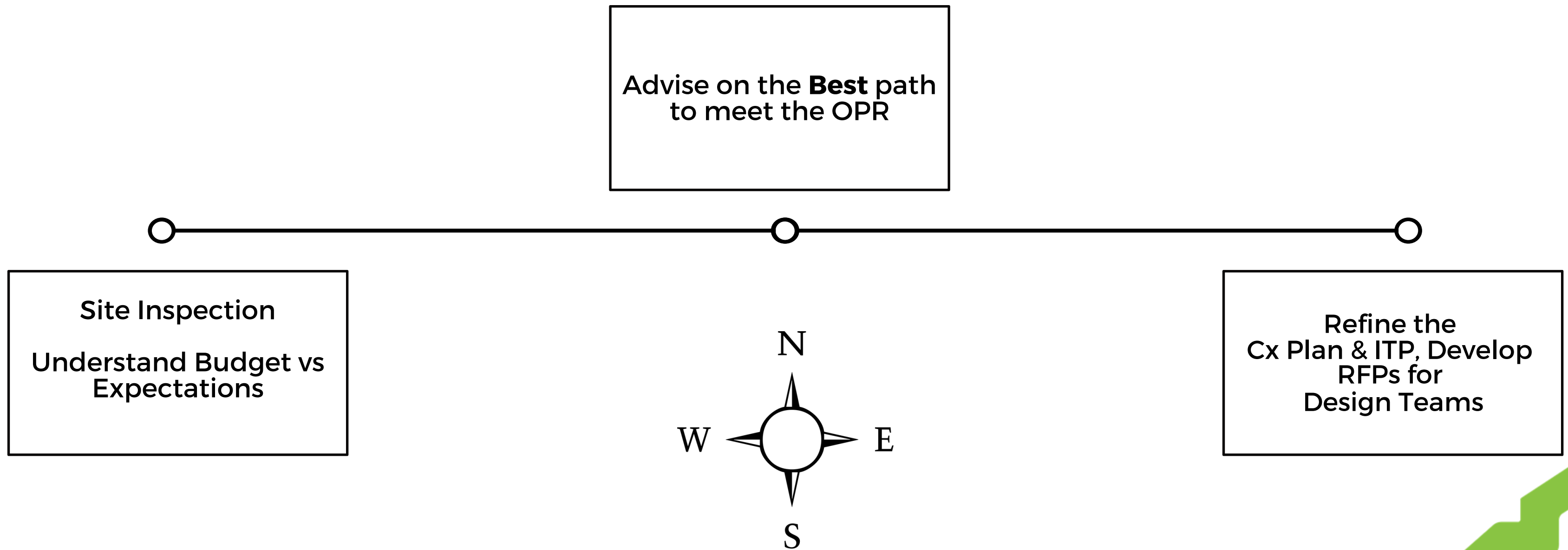
Stage 1

Industrial Pressure Equipment QA/QC Inspection

Fire Hall with OPR not met

Preliminary Investigation

Stage 2



5 Stages of Cx

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Examples

Stage 2

Remote Project in Coastal BC

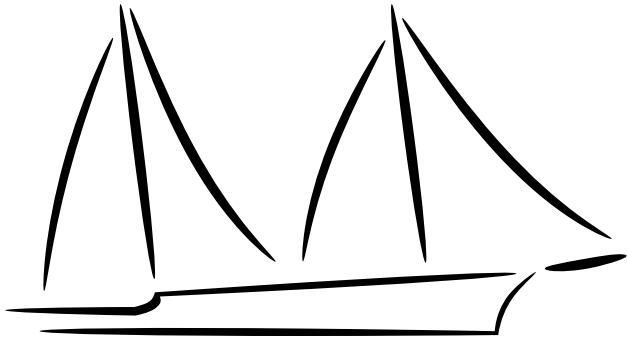
District Energy System with Unique Opportunity

Quality Assurance & Documentation

Stage 3

Ensure that
the Cx Plan
is Being Followed

Ensure the Design
Meets the OPR



Collect and Control
Documents Including
Basis of Design

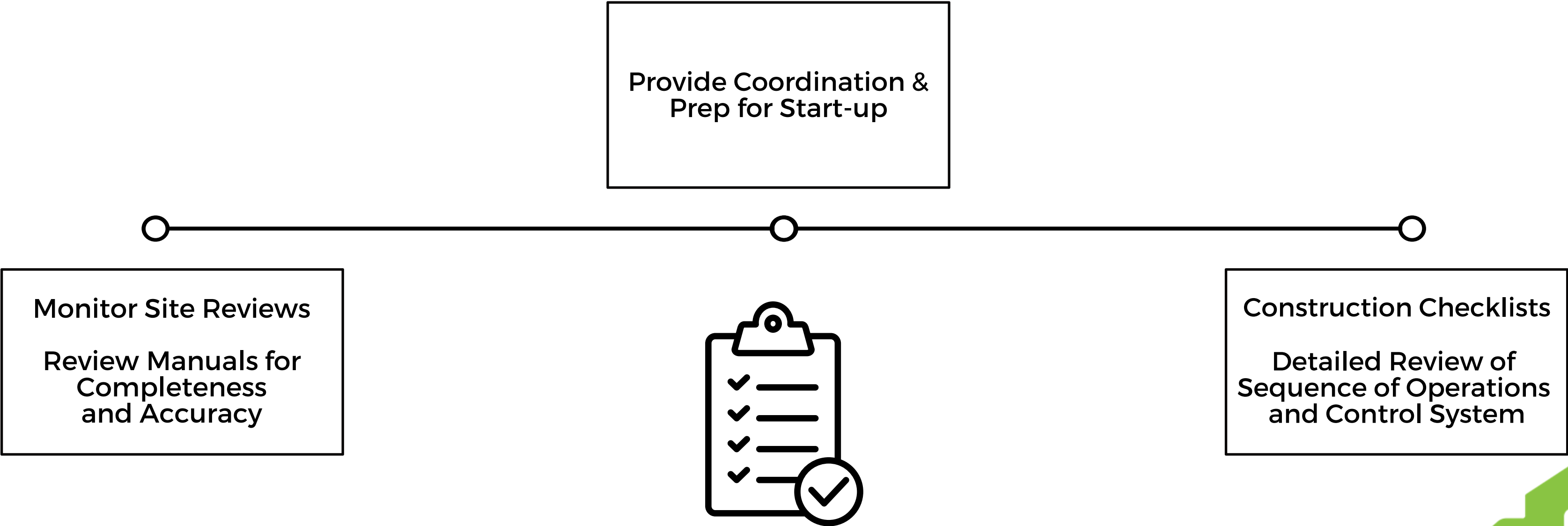
5 Stages of Cx

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Quality Assurance & Documentation

Stage 3 Continued



5 Stages of Cx

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Examples

Stage 3

Continuity of document control for client with a lot of change-over

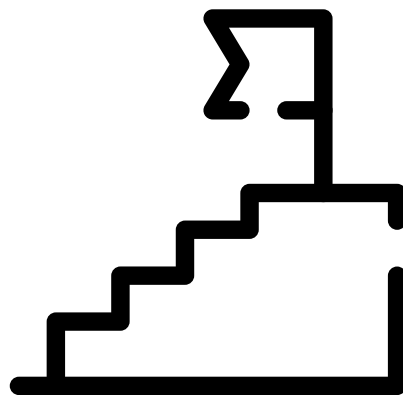
Remote village administration building with no Cx

Start-Up

Stage 4

Make Sure it Works

Simulate all Modes of Operation and Watch Changes Between Modes



Not Working?
Repair & Repeat

Working?
See you at Stage 5!

5 Stages of Cx

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Examples

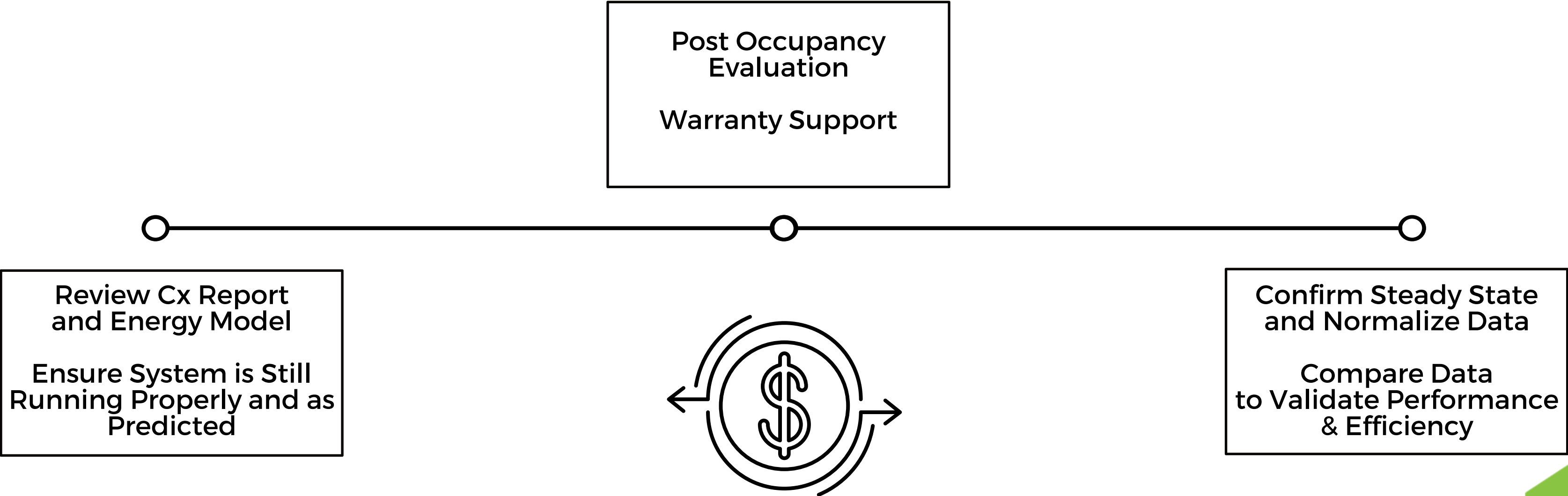
Stage 4

Distillery tank valves crossed over and air in system

Aquatic Center open loop groundwater system required replacement

Monitoring & Verification

Stage 5



5 Stages of Cx

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Examples

Stage 5

Simultaneous heating and cooling system optimization

District energy system that was difficult to repair and then remediate

COMMISSIONING BEGINS AT PROJECT INCEPTION AND CONTINUES FOR THE LIFE OF THE FACILITY.

-ASHRAE Standard 202 Commissioning Process for Buildings and Systems

Every Geo project is unique.

A qualified Commissioning Provider has the experience and expertise to ensure a consistent approach while providing customized solutions and verified results.

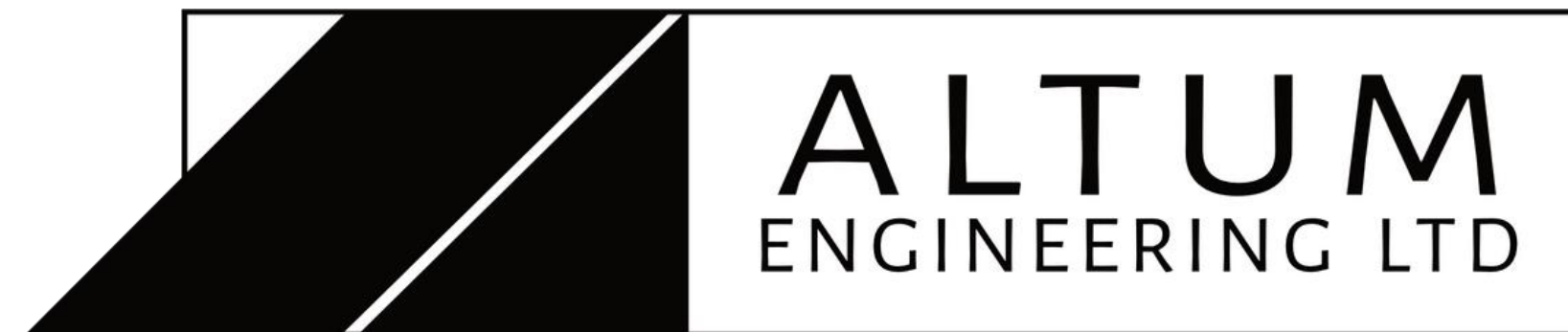
The upfront cost of including a CxP at the beginning of a project can ensure costly mistakes are avoided and OPR are met.

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Thank You

Daniel Booy, Dipl.T., P.Eng., Certified Energy Auditor
www.altum.eco



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