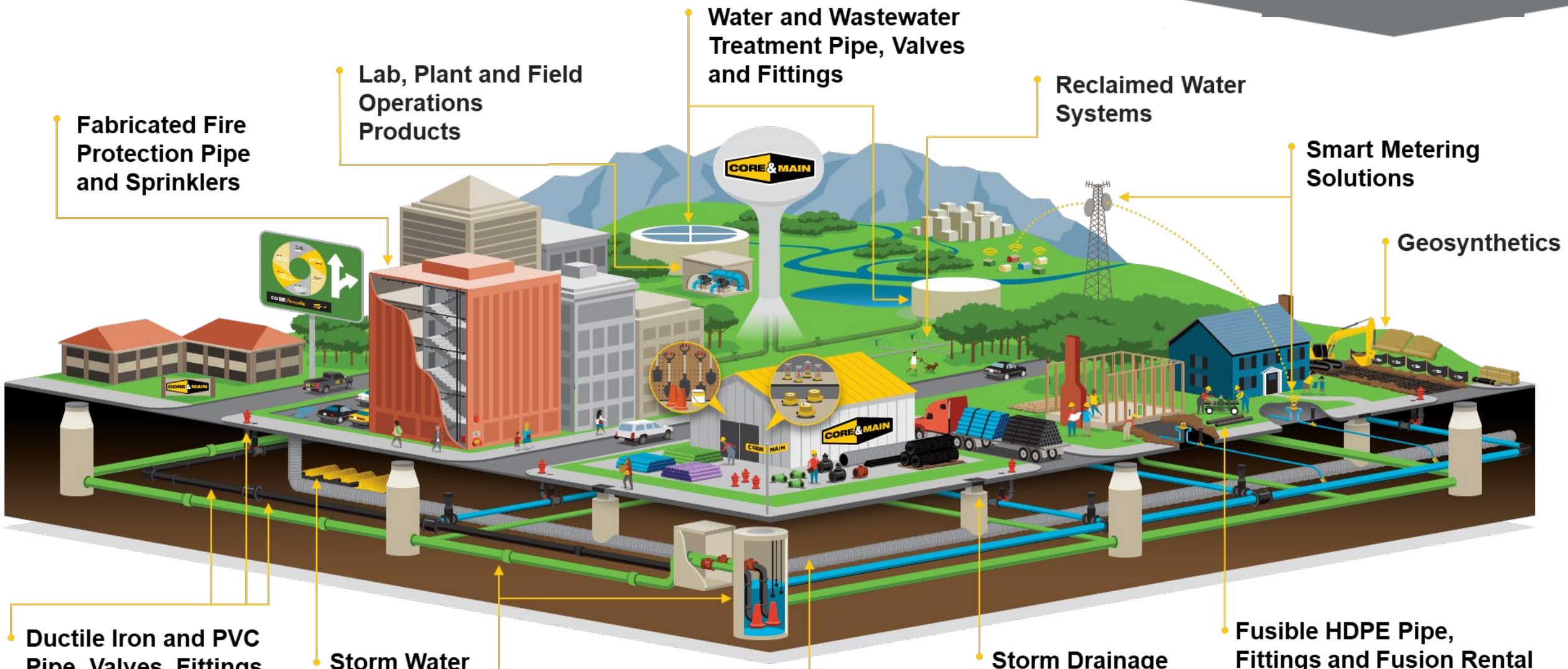
Practical Uses of AI in Water and Wastewater Utilities

Ken Hayes - Senior Business Development Manager
Core & Main





Products and Services

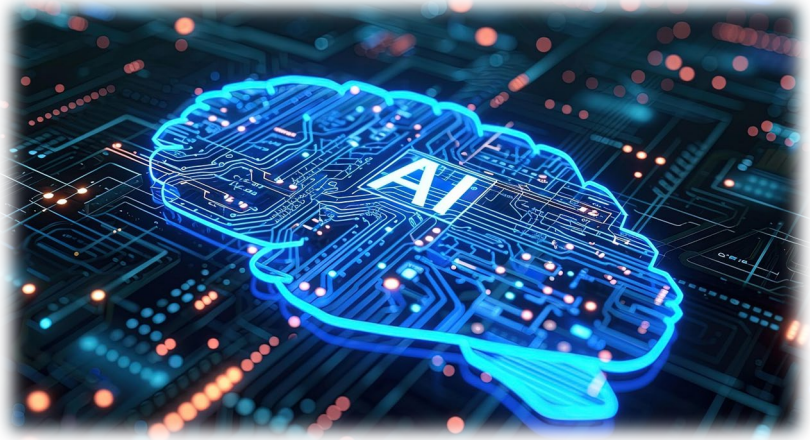


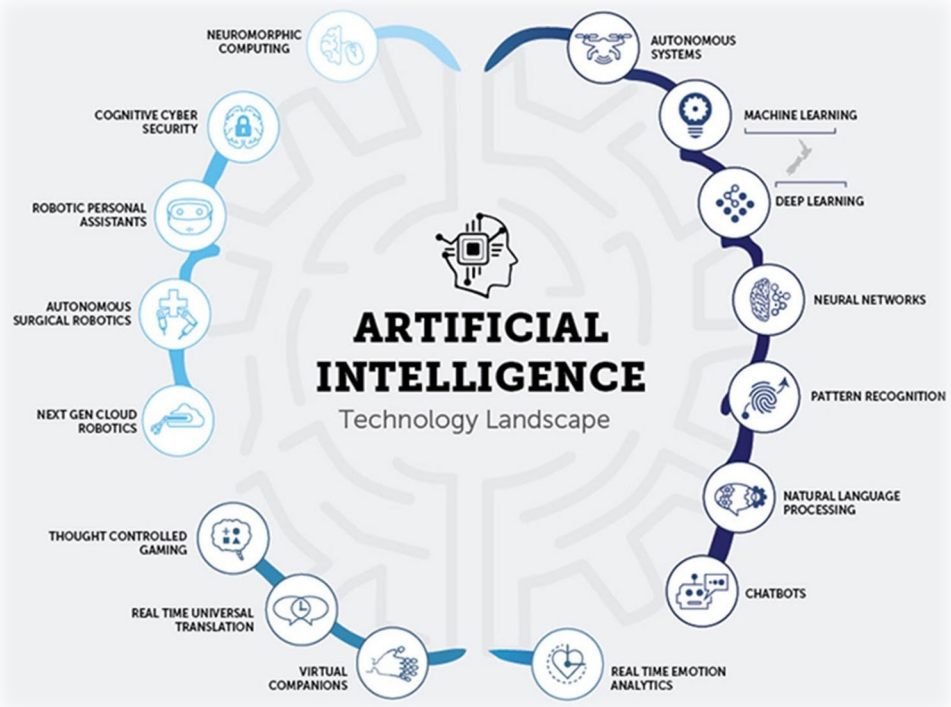
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AI Agenda

- Brief Explanation of AI
- Why do Utilities Need AI
- Practical Utility Uses
- Context Prompting
- Where to Start







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AI Explained in Plain English

AI is a software platform that learns patterns from examples and uses those patterns to make useful predictions or generate new content.

AI LEARNS PATTERNS

It studies millions of examples, like reading every book in a library, to learn how language and ideas connect.

AI PREDICTS RESPONSES

Given a request or prompt, it predicts the most useful, accurate response based on patterns it learned.

AI CREATES WEIGHTS

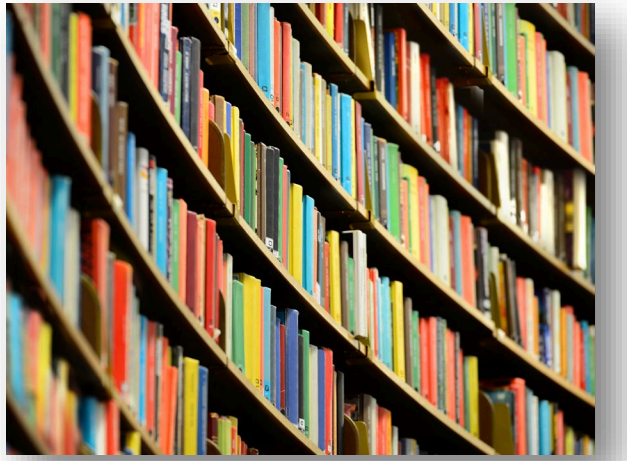
It doesn't understand the world — it recognizes patterns. It assigns **weights** to these patterned connections.

Large Language Model - LLM

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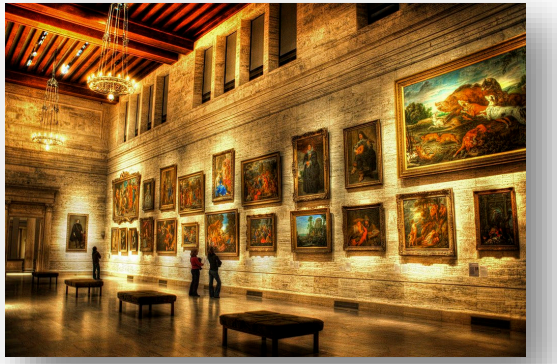
The Best Analogy I Know

Imagine a new intern who reads
every book, document, article, and website ever written,
consumes every picture, drawing, photograph, no matter the format - and keeps on making connections - but has never held a job or lived in the real world.



Brilliant at patterns: Can summarize, draft, translate, explain — instantly

Misses context: Doesn't know what it doesn't know — confidently wrong



If you remember one thing:
AI is a brilliant tool – not an expert.

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AI: By The Numbers

- Workers who reported using A.I. as part of their jobs in 2023: **30 percent**
- Workers who reported using A.I. as part of their jobs in 2025: **76 percent**

- Estimated number of American workers exposed to A.I. who may need to transition to new jobs: **11 million**
- Jobs today that did not exist 25 years ago: **20 percent**

- Amazon, Google, Microsoft and Meta are spending on A.I. infrastructure this year: **$700 billion**
- Share of the world's electricity that data centers currently consume: **1.5 percent**

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Why Do Utilities Need AI?

Workforce Pressure



Problem

Retirement of experienced staff and difficulty recruiting replacements

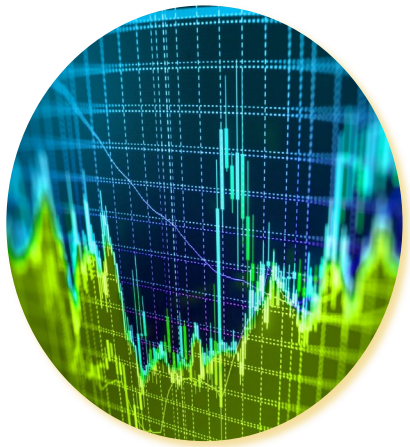
Proprietary data



Problem

AMI, SCADA, CIS, and GIS data are siloed, vendor specific, and under-utilized

Vast amounts of data



Problem

Satellite, USGS, NOAA, IOT and other datasets are hard to integrate

Application Overload



Problem

Every vendor has an application to display and control their application

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Practical Utility Uses of AI

Operational Support & Knowledge Management

- **Standard Operating Procedures (SOPs)**
  Draft, organize, and update SOPs for maintenance, repairs, inspections, and emergency response

- **Training and Onboarding**
  Generate training guides, quizzes, and role-specific knowledge bases for new employees or contractors

- **Regulatory Report Drafting**
  Assist with preparing compliance reports by summarizing data or drafting narrative sections

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Practical Utility Uses of AI

Asset & Maintenance Management

- **Preventive Maintenance Scheduling**
  Interpret SCADA and GIS logs to suggest maintenance schedules or flag anomalies needing attention

- **Work Order Summarization**
  Summarize technician notes or maintenance logs to identify patterns or recurring issues

- **Field Technician Assistant**
  On mobile devices, AI can answer technical questions about pump specs, valve replacements, or hydrant flows

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Practical Utility Uses of AI

Data Analysis & Decision Support

- **Consumption Pattern Analysis**
  Explain anomalies in water usage and wastewater trends and offer potential causes (e.g., leaks, irrigation surges, blockages)

- **Capital Planning Support**
  Draft justifications for capital improvement plans or compare infrastructure upgrade options using input data

- **Board and Council Presentations**
  Draft presentations and talking points on strategy and budget needs for council/board meetings

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Practical Utility Uses of AI

Proposal & Procurement Support

- **RFP and RFQ Drafting**
  Assist in preparing scope-of-work documents for metering upgrades, consulting services, or construction bids

- **Grant Application Support**
  Generate initial drafts or summaries for state/federal grant applications based on utility project goals

- **Vendor Comparison Summaries**
  Summarize product specs or service offerings from vendors to assist in procurement evaluations

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The 3 Ingredient Prompt Formula

CONTEXT + TASK + FORMAT = GREAT OUTPUT

1. CONTEXT

WHAT: Who you are and what situation you're in

AI has no idea who you are. Without context, it assumes a generic audience and gives generic answers.

Example: "I'm a nurse explaining discharge instructions to patients with limited health literacy..."

2. TASK

WHAT: Exactly what you want it to do

Vague tasks produce vague results. Be specific about the action, the scope, and any constraints.

Example: "...write a one-page summary of these OSHA instructions in plain understandable English, 8th grade reading level."

3. FORMAT

WHAT: How you want the output structured

AI can produce an essay, give it bullet points, a table, a numbered list -or any combination. Whatever you tell it.

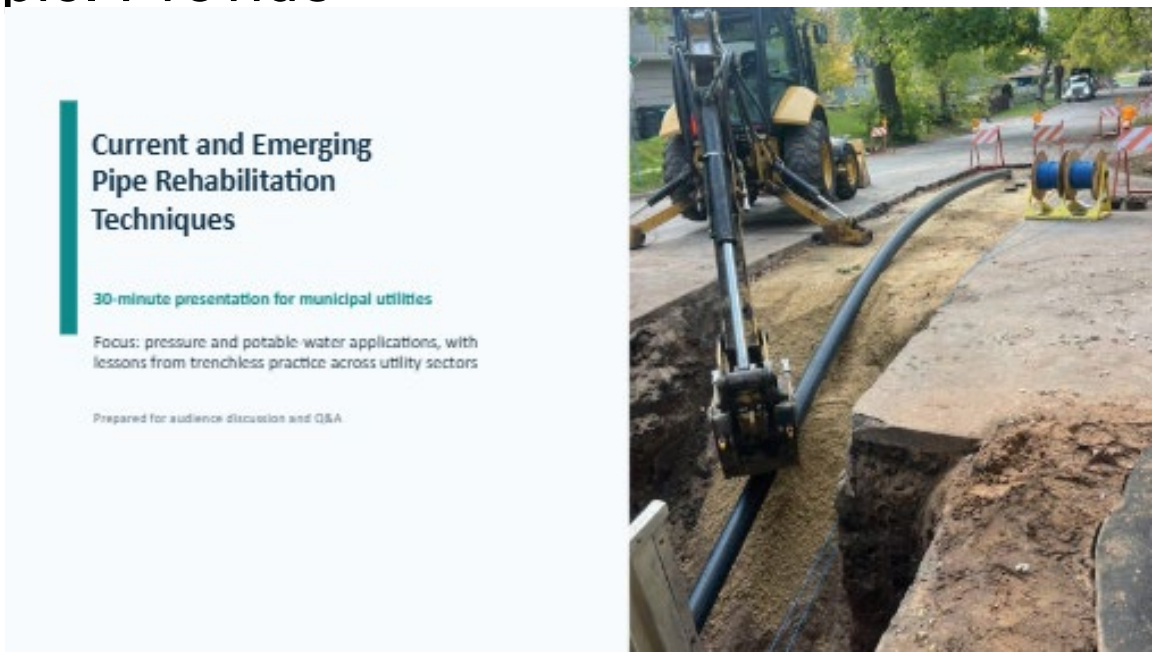
Example: "Use bullet points. Maximum 5 bullets. One sentence each. Format in a professional looking Word document."

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An Effective Context Prompt

You are an experienced water and sewer civil engineer. You are presenting on water pipe rehabilitation for municipal utilities. Produce a 30-minute PowerPoint presentation on current and emerging pipe rehabilitation techniques. Include three questions that the audience can ask pertaining to this topic. Provide potential answers to those questions.

- Produced with ChatGPT
- Plus version
- Thinking Mode
- Creation 12 minutes
- Verification, Edits, Notes took 90 minutes



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Context Prompt Examples

Prompt 1 — Field Operations SOP

You are a senior water utility operations specialist with deep knowledge of AWWA standards, EPA Safe Drinking Water Act requirements, and state primacy agency regulations. Write a Standard Operating Procedure for [**TASK** — e.g., "performing a routine distribution system flushing program"]. The SOP is for use by certified water distribution operators at a public water utility serving approximately [POPULATION] connections. Structure the document with: purpose and scope, applicable regulatory references, required PPE and safety precautions, tools and materials, step-by-step procedure, water quality monitoring and documentation requirements, public notification considerations, and recordkeeping/reporting obligations. Write at a level appropriate for an operator with a [Grade/Class] certification. Flag any steps that require supervisor sign-off, confined-space entry permits, or traffic control. Use clear imperative language and number each step. **Format** the results in a professional word document with heading and sections and provide sources.

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Context Prompt Examples

Prompt 2 — Treatment Plant / Compliance SOP
You are a water treatment plant superintendent experienced in water treatment, regulatory compliance, and operator training. **Draft a Standard Operating Procedure** for [PROCESS — e.g., "chemical feed system calibration and adjustment" or "monthly bacteriological sampling"]. The audience is treatment operators and lab technicians at a [TREATMENT TYPE] facility under state and EPA oversight. Include: purpose, scope, definitions, roles and responsibilities, regulatory and permit references (e.g., SDWA, NPDES, state operating permit conditions), safety and chemical handling precautions (reference applicable SDS), required instruments and their calibration standards, the detailed procedure, acceptance criteria and corrective actions for out-of-range results, sampling chain-of-custody, and documentation/retention requirements. Note any steps tied to compliance deadlines or reportable events, and indicate where deviations must be escalated. **Format** the results in a professional word document and provide sources

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Context Prompt Examples

Prompt 3 — AMI Customer Communications

You are the general manager of a water and wastewater utility with 12000 customers. **Draft a customer communication strategy** for AMI for a small water utility: key messages, FAQs, bill insert language, website talking points, and a plan for handling concerns (privacy, radio frequency, costs). Include a timeline that starts 90 days before deployment and runs through 90 days after. **Include media ready copy.**

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Where To Start

AI Readiness Assessment

- Identify 3-5 priority use cases ranked by impact, feasibility, and outcome
- Identify and map the current workflows associated with those use cases
  - Focus on tasks that are required
  - Focus on decisions that must be made during the workflow
  - Specify what success looks like in completing the workflow – what are the results
  - Do the results of this workflow integrate into another one

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Where To Start

AI Discussion

- Identify repetitive tasks within the workflow
- Is there a predictive element to the workflow
- Where within the workflow is human decision required
- What are the risks in using AI agents
- Identify low hanging AI fruit

ChatGPT

Google Gemini



Claude

IRWA ILLINOIS RURAL WATER ASSOCIATION

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AI Deployment









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ChatGPT

Claude

perplexity



Grok

Copilot



Google Gemini

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AI for Everyday People

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