

# Hydrogen and Making Dollars and Sense of the 2022 IRA Tax Credits

May 7, 2024



**AWMA Midwest Section  
2024 Technical Conference**

Lenexa, Kansas

Presented by Brian Petermann, P.E.

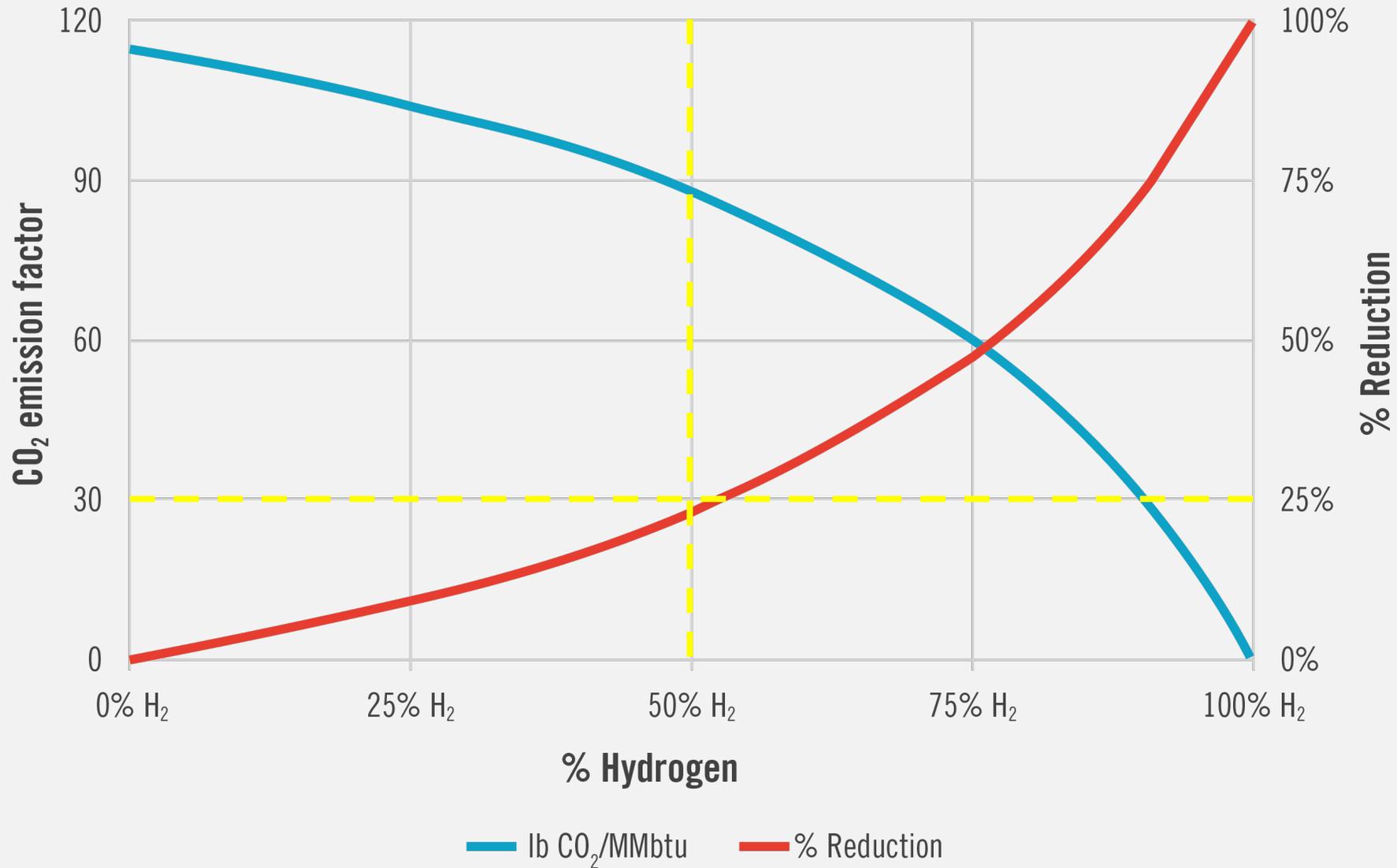
# Agenda

---

- » Hydrogen Quick Background
- » 2022 IRA Tax Credits for Clean Energy
  - Production Tax Credits (PTC)
  - Investment Tax Credits (ITC)
- » Putting it Together

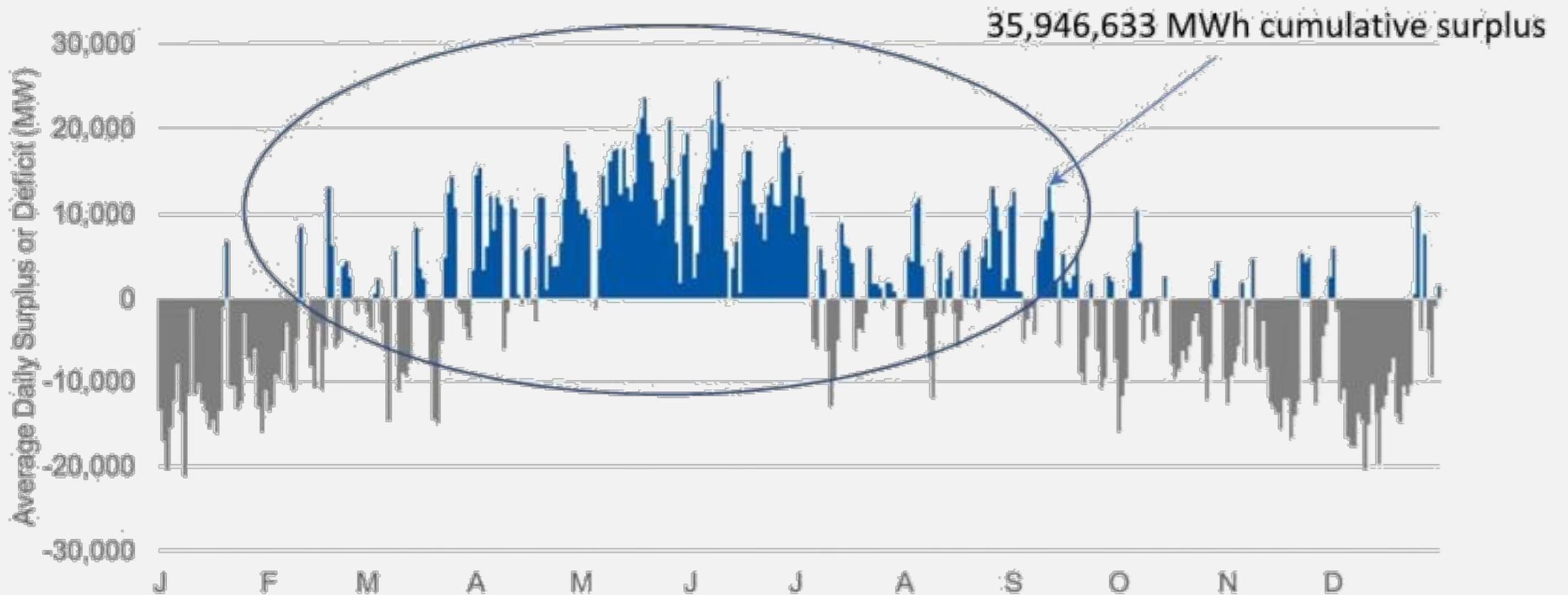
# Hydrogen Quick Background

# Issue: CO<sub>2</sub> Emission Reduction Push



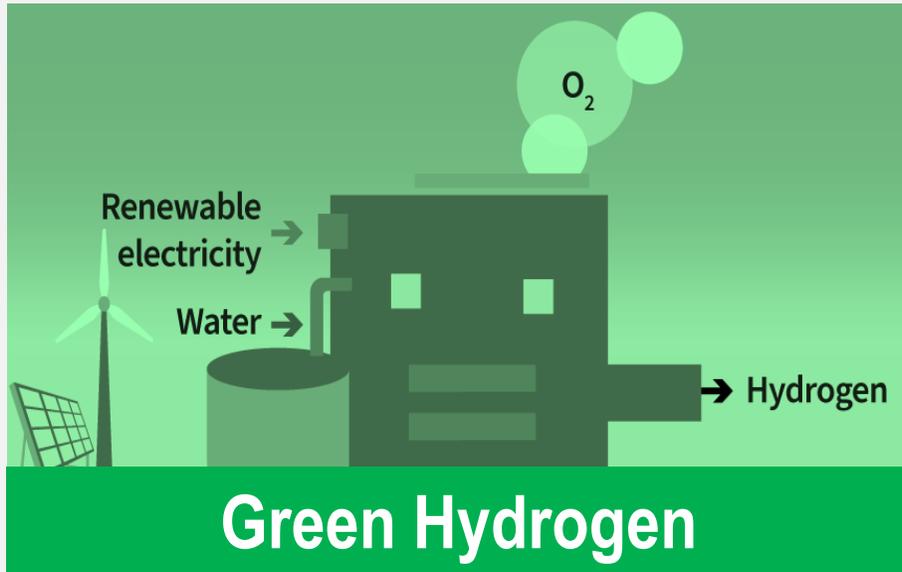
# Issue: Variability of Renewables vs Demand

Daily Renewable Energy Generation Surpluses and Deficits, Mixed Renewable Scenario

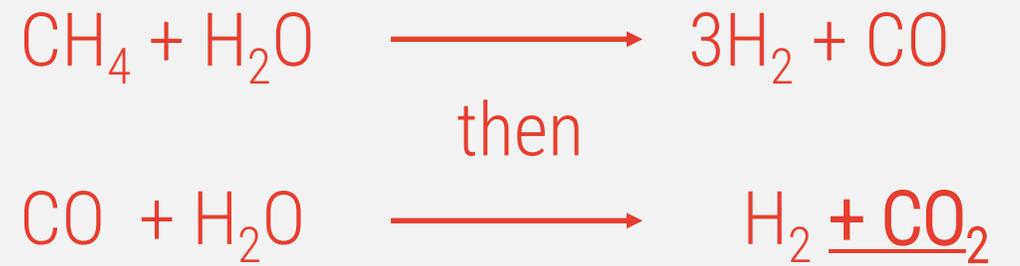
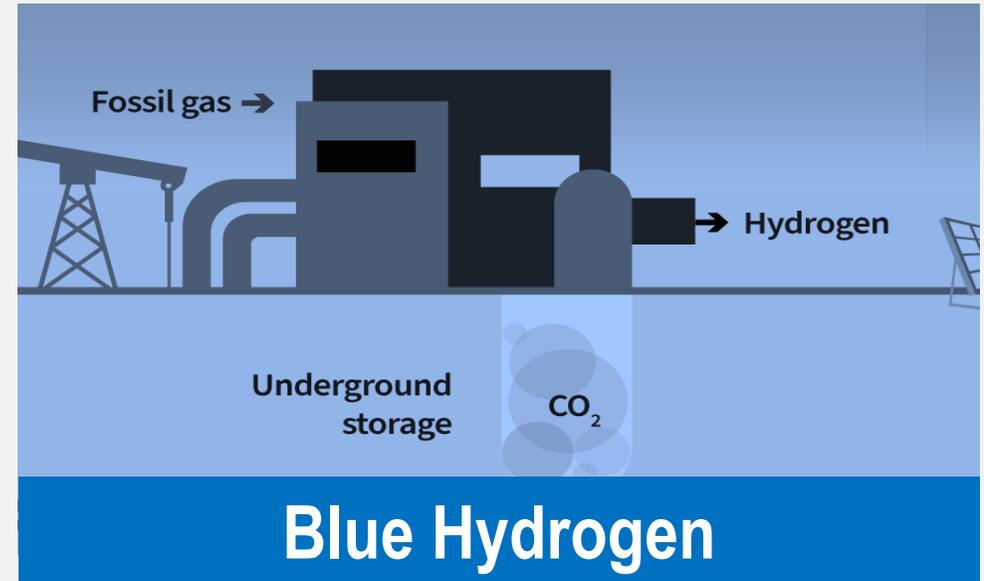


# Production “Colors”

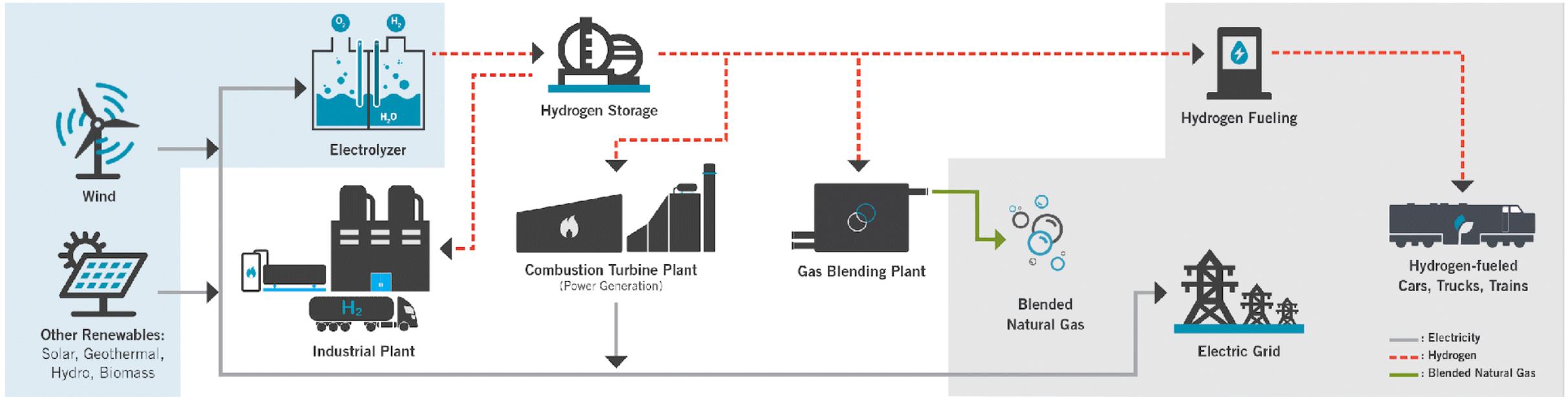
Renewables With Electrolysis



Natural Gas SMR (Gray) With CCS



# Green Hydrogen: Sun + Wind + Water = Clean Energy



Keys = **Technology + Time + \$\$\$**

# **Clean Energy and Carbon Capture Tax Credits**

# Clean Energy Tax Credits in IRA

---

- » What good are taxes??
- » Some modified
- » Some new
- » Goal: promote clean energy for decarbonization

# Clean Energy and Carbon Management Tax Credits

	<b>Tax Code</b>	<b>Tax Credit</b>
45 PTC	<b>45Q</b>	<b>Carbon capture and sequestration</b>
	<b>45V</b>	<b>Clean hydrogen production</b>
	45X	Advanced manufacturing production
	<b>45/45Y</b>	<b>Clean electricity production</b>
	45Z	Clean transportation fuel production (inc. SAF)
48 ITC	<b>48C</b>	<b>Advanced energy project</b>
	<b>48/48E</b>	<b>Clean electricity investment</b>

# PTC: 45Q – Carbon Capture and Sequestration

---

- » Extends construction start to 12/31/2032
- » Lowers minimum metric ton (MT) captured threshold
- » Increases tax credit, per MT
  - \$60/MT: captured and reused
  - \$85/MT: captured and geologic stored
  - \$130/MT: direct air captured and reused
  - \$180/MT: direct air captured and geologic stored
- » Can't “stack” with 45V or 48C
- » Guidelines issued 12/2022

# PTC: 45/45Y – Clean Electricity Production

---

- » Extends [45] renewable electric prod credit through 2024
- » 45Y Technology neutral 2025 - 2032 (?)
- » Requires zero or negative GHG emission (w/CCS)
- » 1.5 cents per kilowatt hour (kw/hr)
- » Can't "stack" with 48E ITC for clean energy projects

# PTC: 45V – Clean Hydrogen Production

---

- » New 10-year incentive production tax credit
- » Construction starts by 2033
- » Technology neutral
- » Can't "stack" with 48E or 45Q (CCS) tax credits
- » Recent controversy over solar/wind supply attributes

# PTC: 45V Clean Hydrogen Production (based on Proposed Regulation 12/22/23)

<b>Tier</b>	<b>Carbon Intensity Range*</b> (kg CO <sub>2</sub> /kg H <sub>2</sub> )	<b>Tax Credit</b> (\$/kg H <sub>2</sub> )
1	0 – 0.45	3
2	0.45 – 1.5	1
3	1.5 – 2.5	0.75
4	<i>2.5 – 4.0</i>	<i>0.60</i>

\* CI score follows guidelines for model and how to incorporate “existing” wind/solar/nuclear

# PTC: 45V – 12/22/23 Proposed Criteria for EACs

---

- » EAC = Energy Attribute Certificate
- » Three criteria to qualify for H2 credit (**Three Pillars**)
  1. Incrementality
  2. Deliverability
  3. Temporal matching

# ITC: 48/48E – Energy Production Investment

---

- » Extends [48] investment credit through 2024
  - 30% with PWA
- » 48E Clean Electric: Technology neutral 2025+
- » Requires zero or negative GHG emission
- » 6% base credit
  - Up to 30% with 5x bonus
  - 10% bonus for specific requirements
- » Can't “stack” with 45 PTC

# ITC: 48C – Advanced Energy Project Investment

---

- » Promotes US manufacturing capacity of clean energy tech
  - Re-equip, expand, or new manufacturing facility
  - Clean energy technology
- » \$10B available through applications to DOE
  - Round 1 starts 5/31/2023: \$4 billion (due 7/31/23)
  - Subsequent rounds
- » 6% base credit
  - Up to 30% with 5x bonus
- » Can't "stack" with 48, 48E, 45Q, 45V

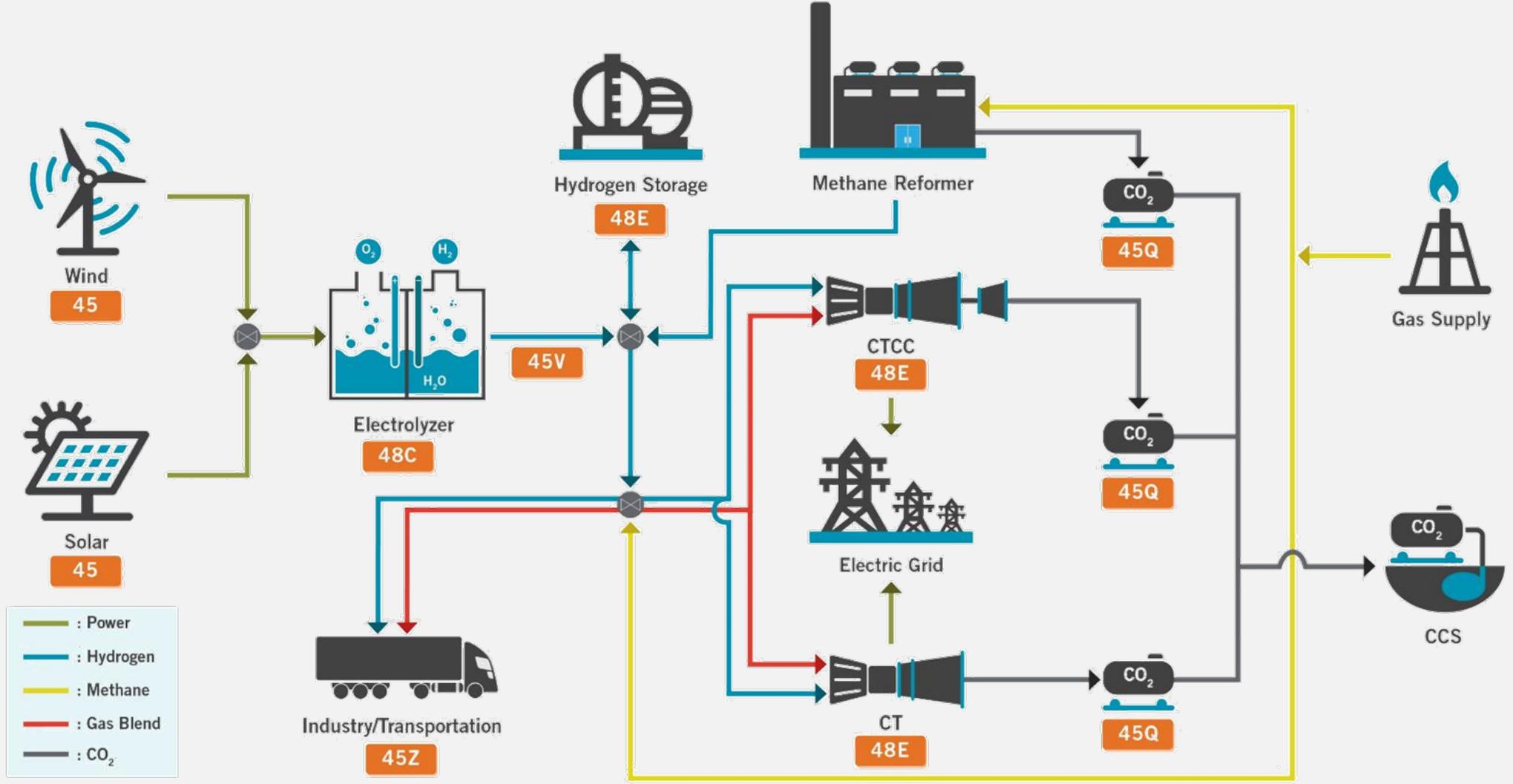
# ITC/PTC Guidelines from IRS

---

- » Many issued
  - Prevailing wage and apprenticeship 4/4/23
  - Low-income communities 8/10/23
  - Advanced Energy Project Credit 5/31/23
- » <https://www.irs.gov/credits-and-deductions-under-the-inflation-reduction-act-of-2022>
- » Careful interpretation needed

# Putting It Together

# Green Hydrogen and IRA Tax Credits



# Thank You



**Brian Petermann, P.E.**

(913) 402-4217

[brian.petermann@powereng.com](mailto:brian.petermann@powereng.com)