



Renewables Procurement: Creating New Ways to Raise Sustainability

June 24th





LET'S GO BEYOND™

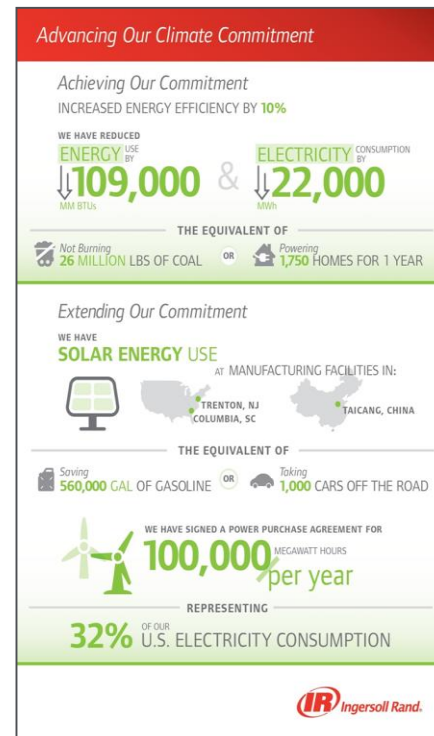
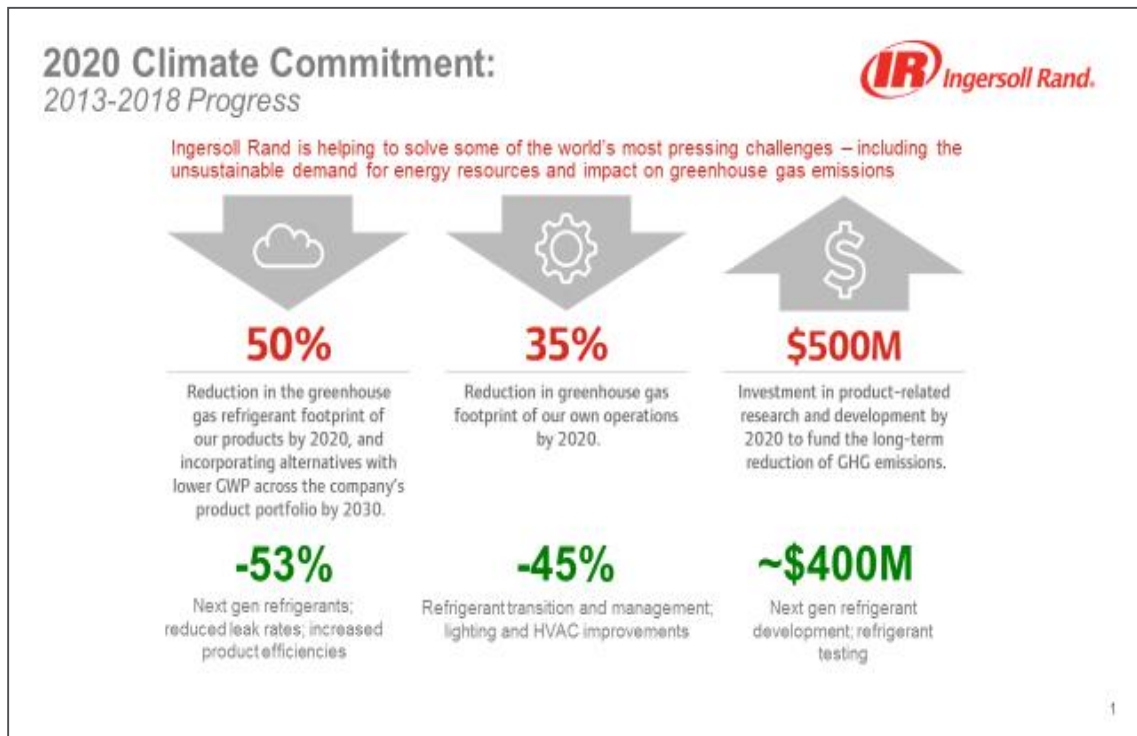
Our Mission:
Reducing the Energy Intensity of the World

Our Goal:
Reducing Customer Carbon Footprint by 1 Billion metric tons of CO₂ by 2030

Trane/IR Commitment and Accomplishments



Trane and the Ingersoll Rand companies have an aggressive climate plan:



The Most Sustainable Unit of Energy?



The one you don't use – no \$s, no GHG



The one you produce – as a by-product of your process

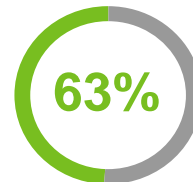


The one you procure – specify renewable

Market Trends



80% of the world's top 250 companies include corporate responsibility data in their annual reports, up from 44% in 2011. ¹



63% of Fortune 100 companies committed to at least one climate or clean energy target by 2016 ²

154

Companies have committed to RE100 (100% renewable energy).⁴

Utility-scale Offsite Renewable Energy (ORE) procurement for corporate buyers is projected to be expected to reach

2.7 GW | **\$3.1B**

in 2027 in North America ³

1. The KPMG Survey of Corporate Responsibility Reporting 2017

2. World Wildlife Fund, Calvert Investments, CDP, and Ceres, Power Forward 3.0: How the Largest U.S. Companies Are Capturing Business Value while Addressing Climate Change, [April 2017](#).

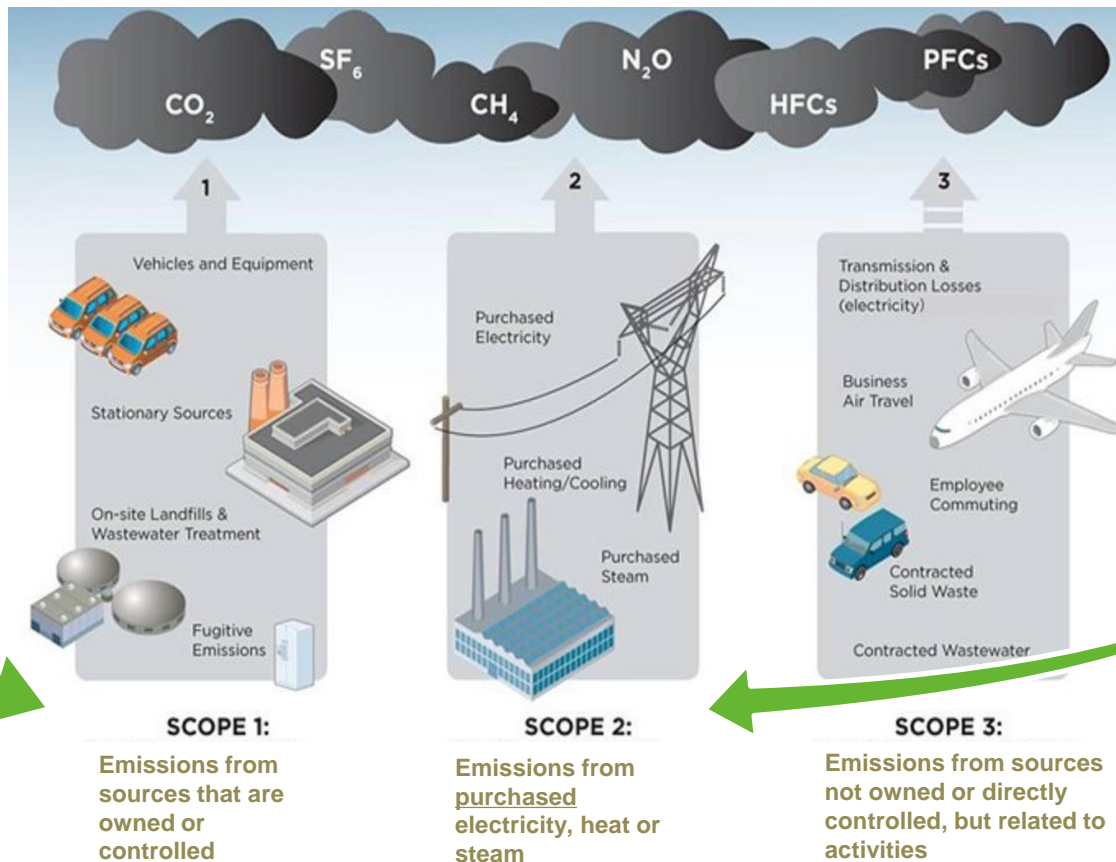
3. Navigant report "Corporate Utility-Scale Offsite Renewable Energy Procurement Solutions" Q2, 2018

4. RE 100 (as of October 2018 <http://there100.org/companies>)

Energy and EPA Reporting

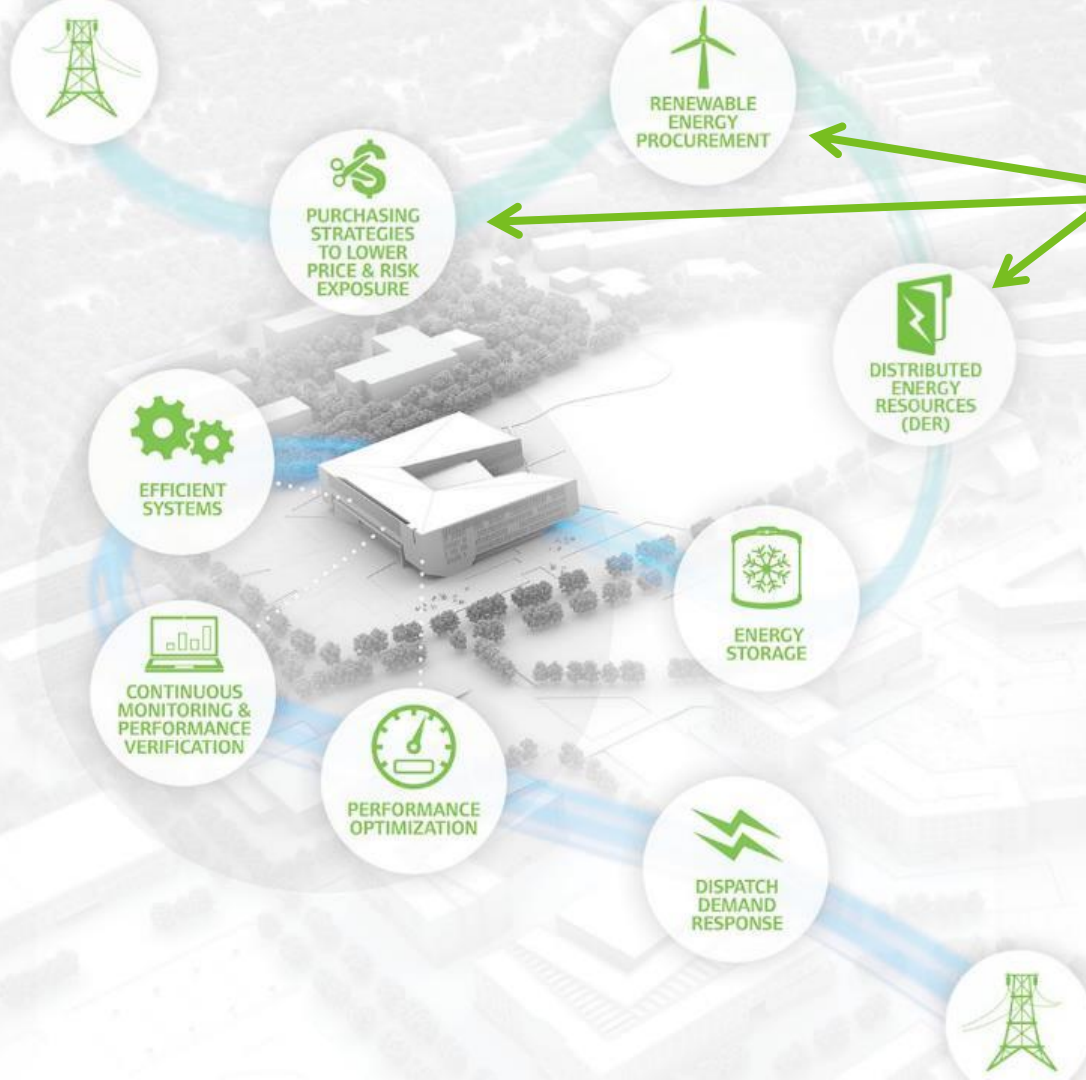


Combustion of fuel for building or process heat is Scope 1!



Electricity generated offsite and consumed by the end user is Scope 2

Energy “Supply Side” Impacts on Sustainability



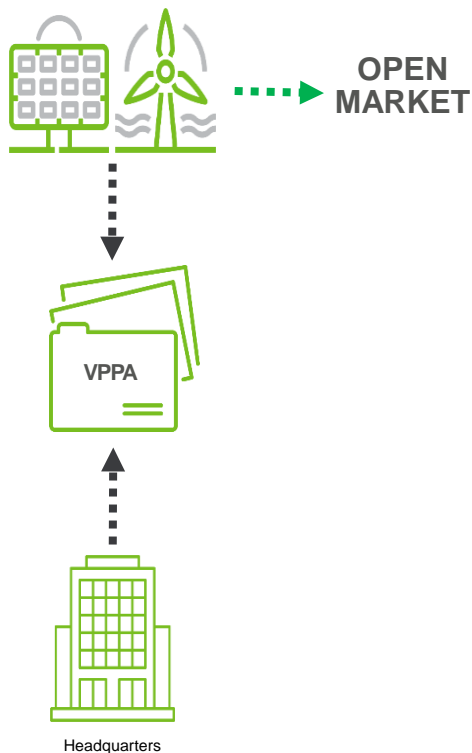
Case Study – Ingersoll Rand Virtual Power Purchase Agreement

In mid-2018, Ingersoll Rand signed an agreement for approximately 100,000 MWh of wind power annually, from a new wind farm in Baylor County, Texas.

- This single transaction reduces IR's U.S. Scope 2 GHG emissions from electricity by 32 percent
- No capital expenditure or upfront costs
- Expected to generate significant revenue from power sales.
- Project began deliveries June 1, 2019



Virtual Power Purchase Agreement (VPPA)



Office location



Office location



Contract between buyer & renewable energy generator.
Energy sold to local wholesale market.



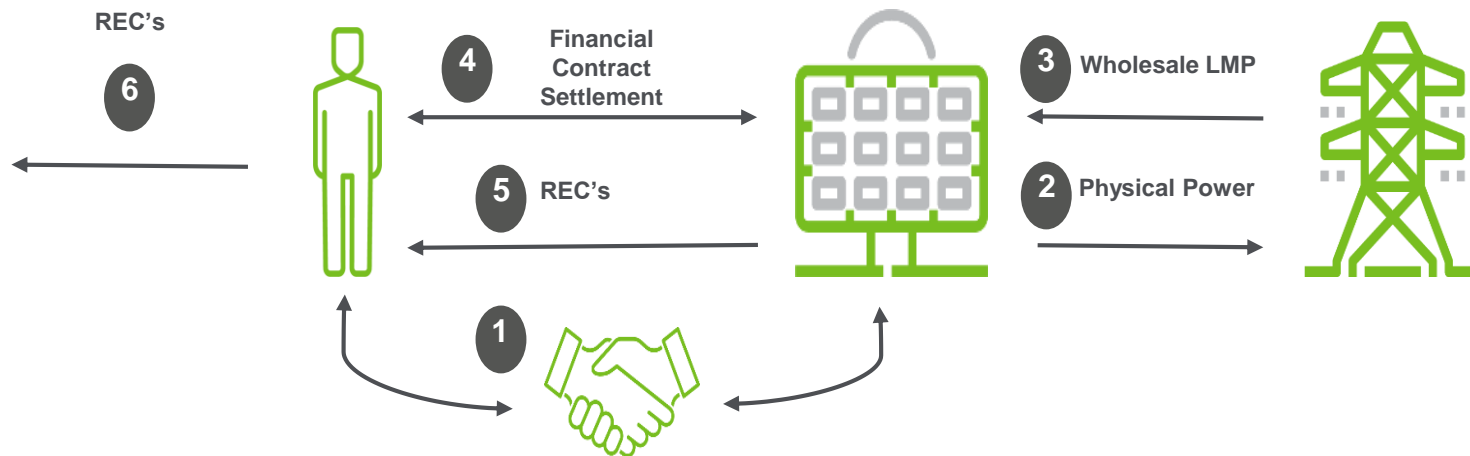
No actual physical transfer of energy between electricity generator & buyer



Location, Future pricing expectations, Length of contract, Additionality

One VPPA could satisfy most or all of organization's renewable energy goals

How VPPA's Work

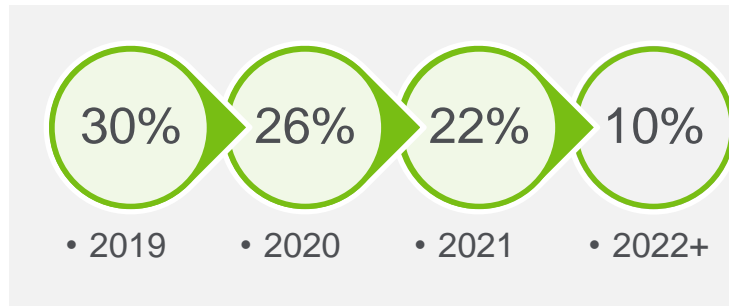


1. Agree to fixed price PPA for power and RECs
2. Developer delivers power from project to Electric Grid
3. Developer is paid the market price for power. (LMP)
4. Developer and Customer settle financially for difference
5. Developer delivers RECs to Customer
6. Customer retires RECs to meet environmental reporting or swaps for value

Why Now?

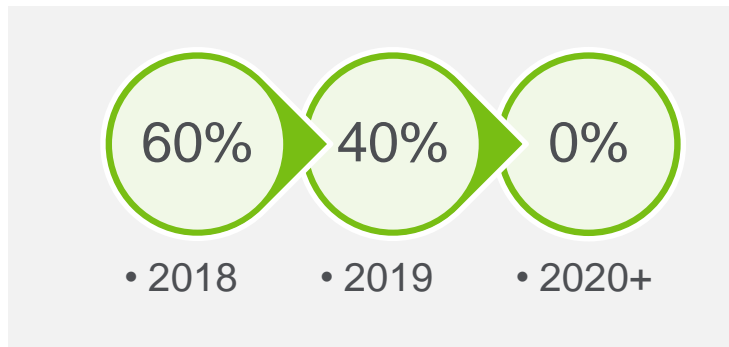


Solar Investment Tax Credit (ITC) Step Down



Based on a %
of the eligible
investment

Wind Production Tax Credit (PTC) Step Down



Credit per kWh
produced based
on 1.5¢/kWh in
1993 dollars.

20% Reduction in Wind PTC is equivalent to \$5/MWh.

Virtual Renewable Natural Gas (NG) Agreements

- Organic waste is gathered from multiple local/regional sources
- A central processing plant converts it to pipeline quality NG
- Sold into wholesale gas market
- Buyer pays fixed price, gets paid index wholesale price (similar to electricity VPPA)
- Buyer gets environmental attributes (called RINs)
- RINs are used to meet Scope 1 reporting requirements
- Environmental attributes may also provide an extra revenue stream

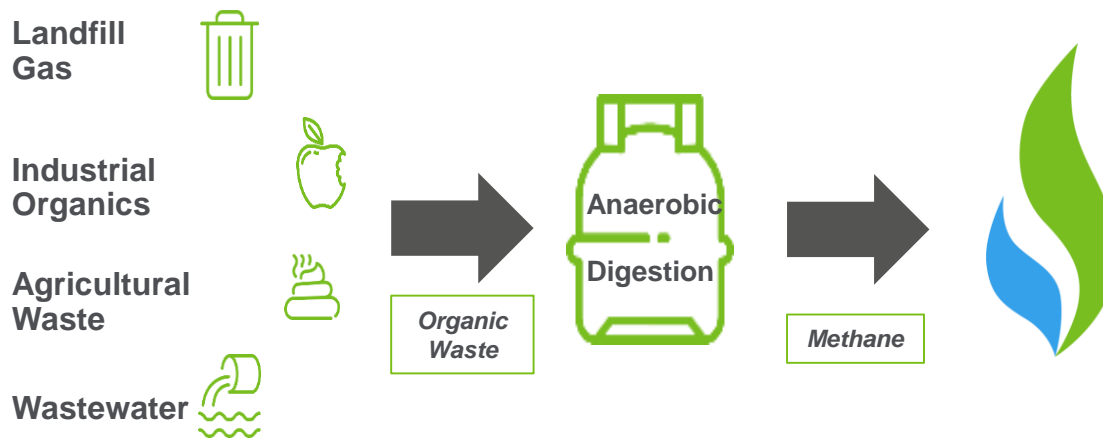
BREAKING NEWS

While natural gas is about 50% cleaner than traditional coal technologies, it still emits roughly 117 pounds of CO2 per million Btu's.

And, fugitive methane that is leaked from gas wells and pipelines is 34 times more potent at trapping heat than CO2!

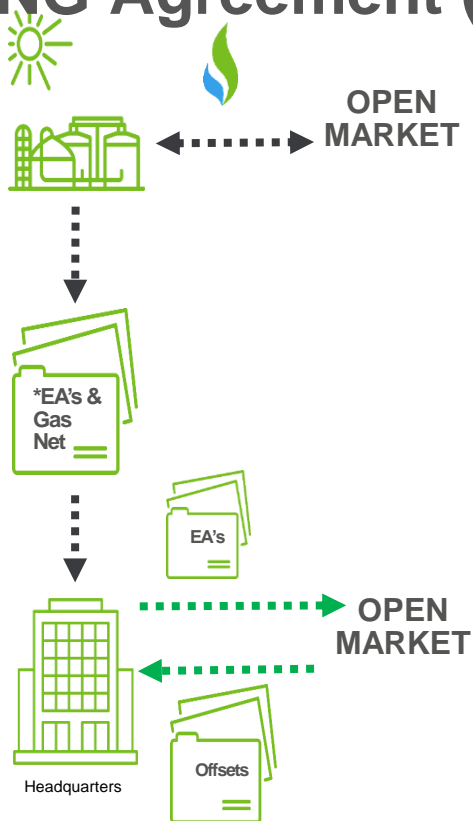
Renewable natural gas will be a key component of future sustainability efforts.

What is it?



- Waste – Landfill gas
- Industrial – Organic waste biogas
- Agriculture – Ag residue biogas (manure, energy crops)
- Sewage – Wastewater treatment biogas

Virtual RNG Agreement (VRNGA)



Office location



Office location



Contract between buyer & renewable energy producer.
Energy sold to local wholesale market.



No actual physical transfer of energy between producer & buyer

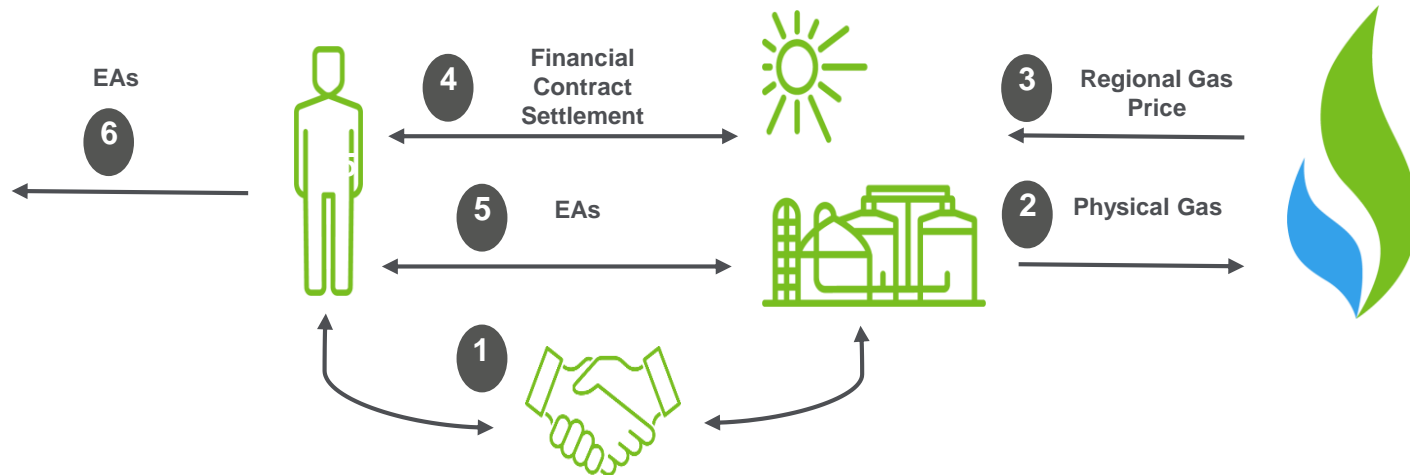


Location, Future pricing expectations,
Length of contract, Additionality

*EA's = Environmental Attributes

One VRNGA could satisfy most or all of organization's thermal renewable energy goals

How VRNGA's Work

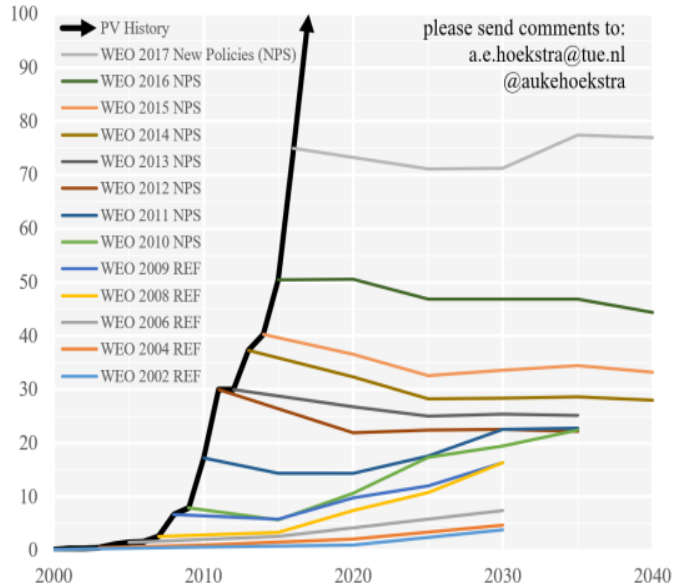


1. Agree to fixed price for gas and environmental attributes (EA)
2. Developer delivers gas from project to pipeline (fixed for floating swap)
3. Developer is paid the market price for gas
4. Developer and Customer settle financially for difference
5. Developer delivers environmental attributes to Customer
6. Customer retires EA's to meet environmental reporting or swaps for value

Lower installed costs and higher production rates have driven an exponential growth in solar power:



Annual PV additions: historic data vs IEA WEO predictions
In GW of added capacity per year - source International Energy Agency - World Energy Outlook



Renewable Natural Gas may be on the cusp of a similar growth trend as technology improves, processing equipment becomes cheaper and more efficient, and as wholesale gas markets develop products to address needs.



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