



Market Considerations – RECs and RINs Overlap

By Rakesh Radhakrishnan
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Revenues from ongoing businesses.

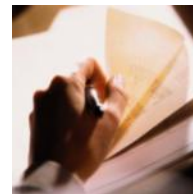
*Due to rounding, the sum of the business segments may not add to total division revenues.

FORMER PROFESSIONAL DIVISION: \$5.6B*



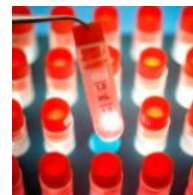
LEGAL: \$3.7B

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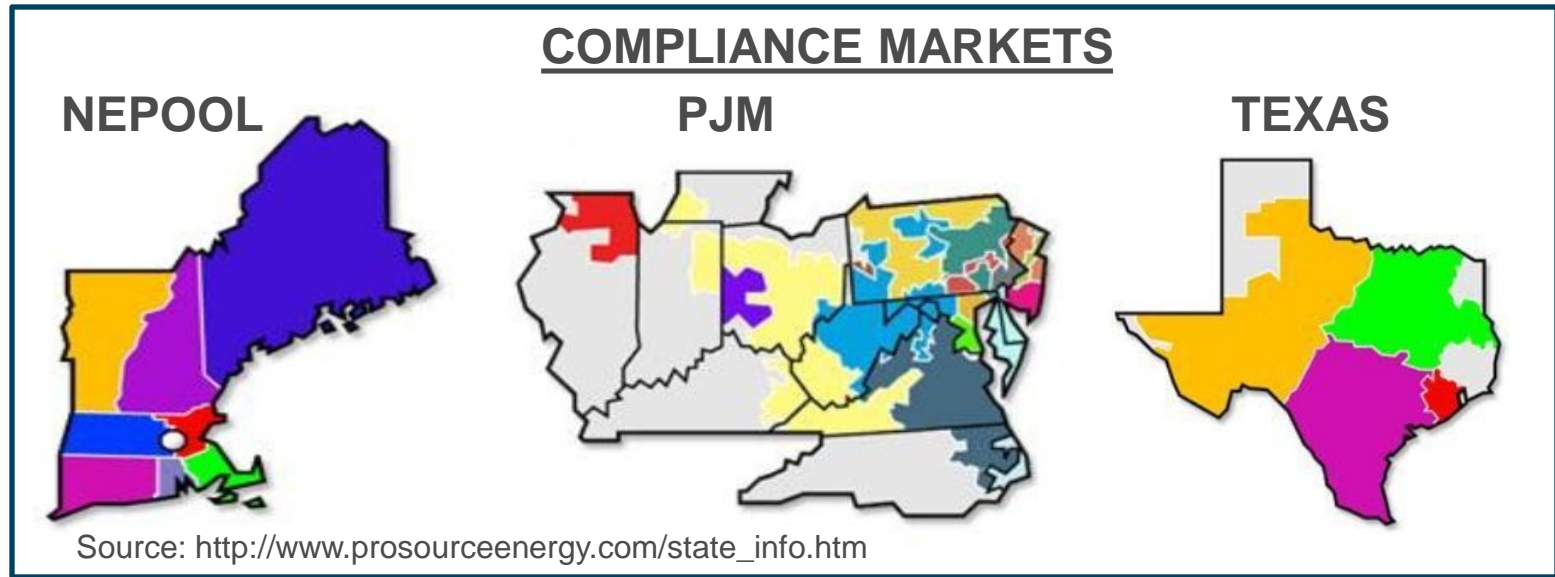
IP & SCIENCE: \$0.9B

- Informing healthcare decisions affecting over 150 million lives
- Used by over 20 million researchers worldwide

Environmental Commodities

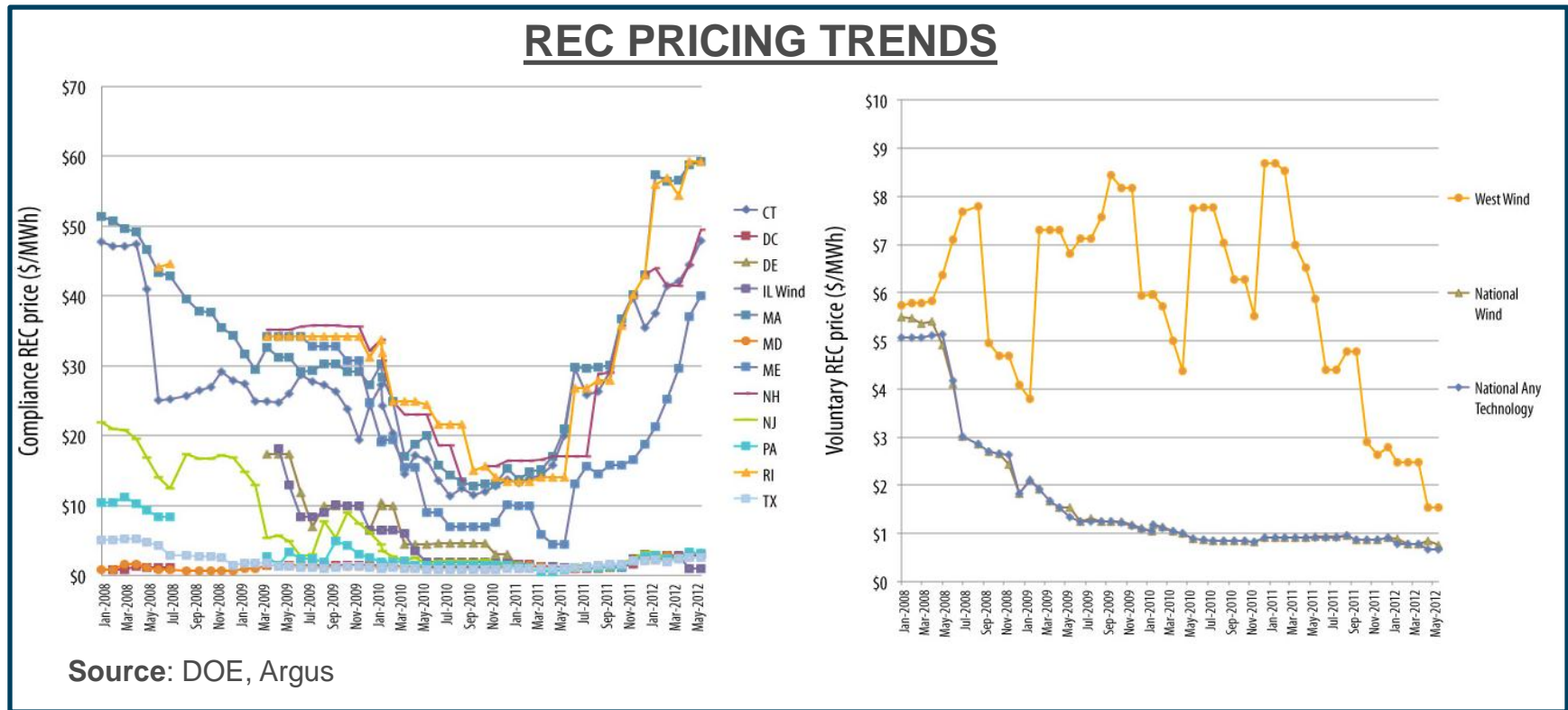
- **Renewable Energy Certificates (RECs)**
 - Based on MWh produced from renewable sources
 - Can have customized versions e.g. Solar REC (SREC), Low emission REC (LREC), Zero emission REC (ZREC) – latter two launched in CT
- **Renewable Index Numbers (RINs)**
 - Based on volume produced or displaced
 - Types based on approved pathways e.g. biodiesel RINs, ethanol RINs etc.
- **Carbon Allowances and Credits**
 - Based on amount of CO₂ deferred from fossil fuel based power or transportation
 - Types based on various mitigation measures e.g. ozone depleting substances, renewable projects etc.
- Energy Efficiency Credits
- Other Emissions (NO_x, SO_x)

REC Markets



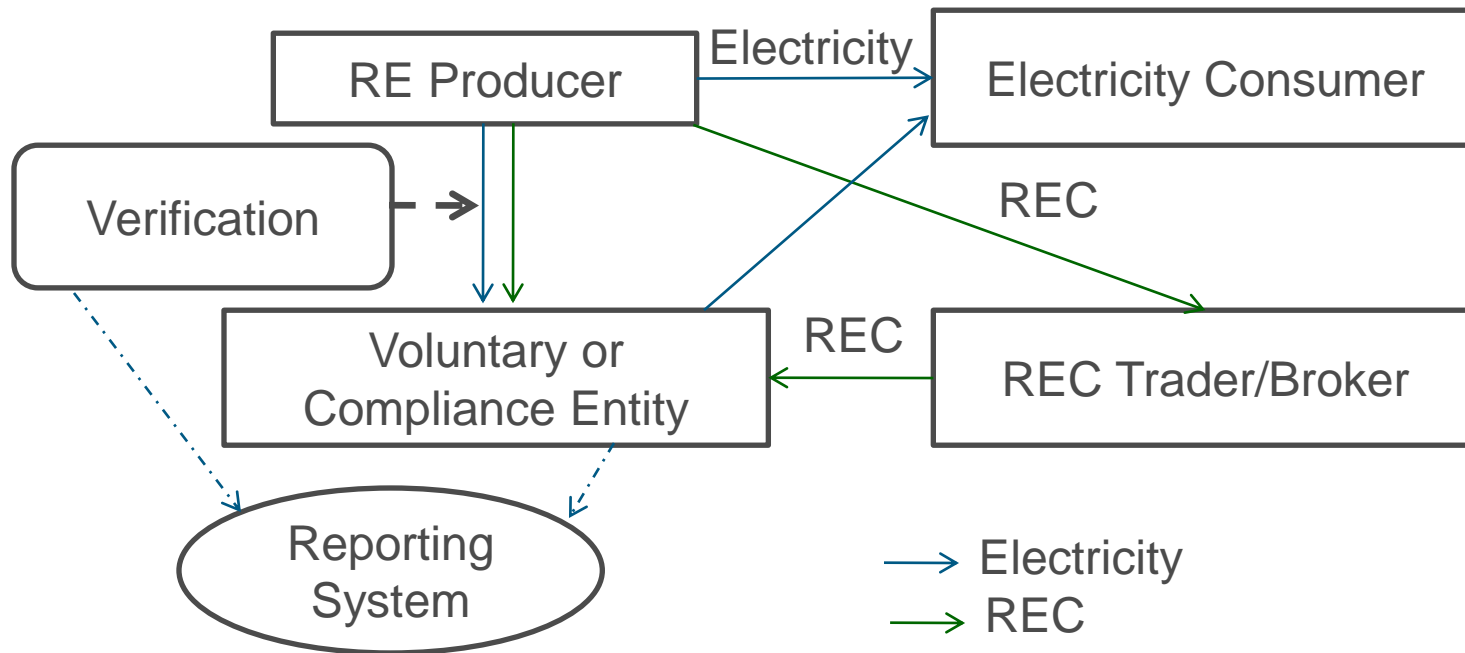
- Voluntary markets include:
 - Green – e programs : National and Western Electricity Coordinating Council
 - Utility green electricity programs

REC Market Trends



- Compliance REC prices appear to be increasing in places like CT, MD etc. based on anticipated shortages relative to RPS.
- Voluntary REC prices continue to crash.

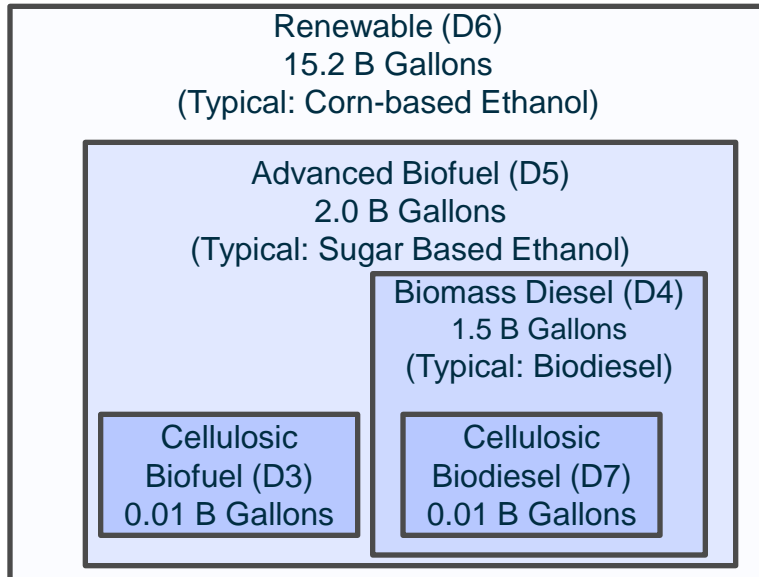
Mechanics of REC Market



- Independent certification agencies verify the validity of RECs (e.g. Green-e).
- Several independent marketers and brokers will sell RECs and as expected voluntary or compliance entities can also sell RECs.
- There are seven major regional tracking systems that assures validity and retirement of RECs.

RIN Market

- Compliance market launched at the national level.
- Individual targets for each fuel type revised annually.



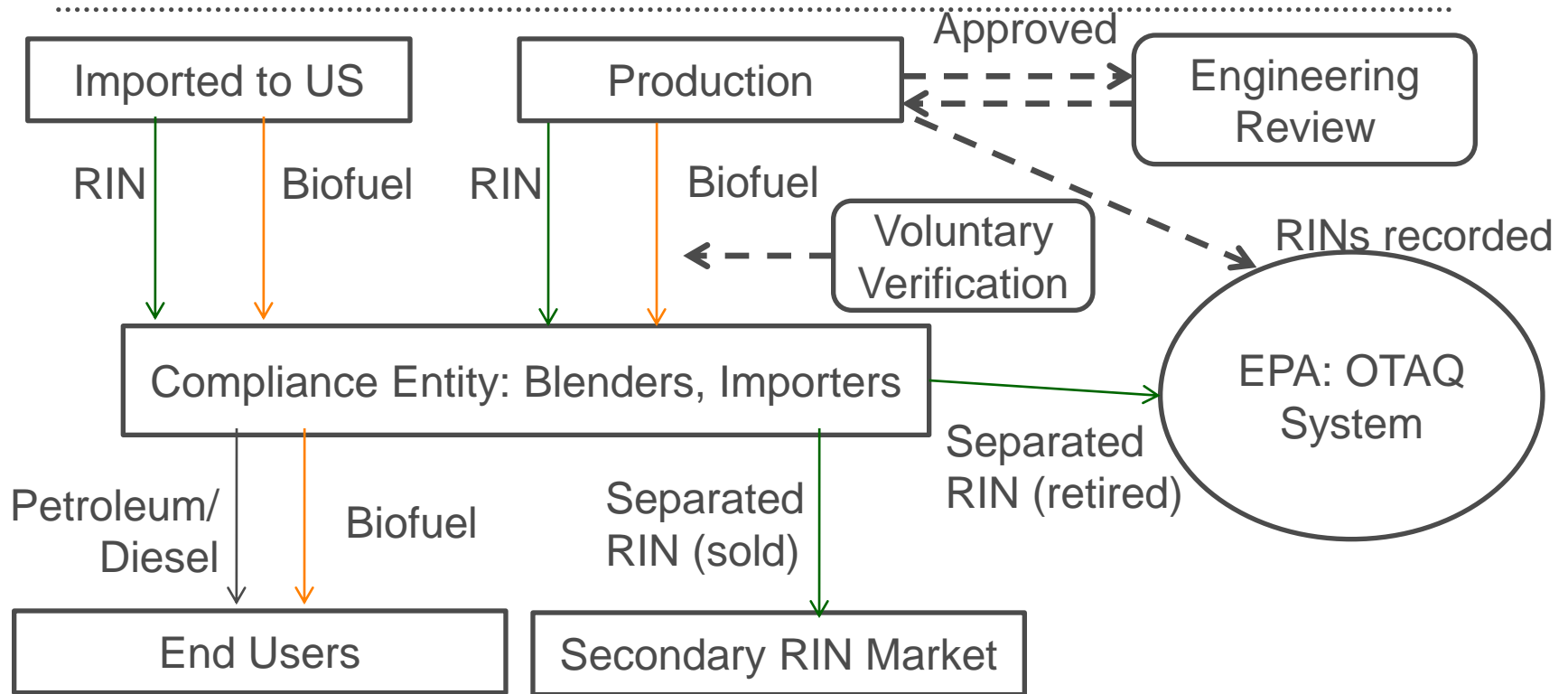
Type	2011				2012				
	Target (Cumulative)	Target (Incremental)	RIN Production	Price Range	Target (Cumulative)	Target (Incremental)	RIN Production (July YTD)	FY RIN Production Run-rate	Price Range (Sep YTD)
D3, D7	0.01	0.01	0.00	\$1.13	0.01	0.01	0.00	0.00	\$0.78
D4	1.20	1.20	1.67	\$0.88 - \$1.97	1.50	1.50	1.05	1.80	\$0.96 - \$1.60
D5	1.35	0.14	0.23	\$0.43 - \$1.27	2.00	0.49	0.16	0.27	\$0.33 - \$0.86
D6	13.95	12.60	13.59	\$0.00 - \$0.05	15.20	13.20	7.75	13.29	\$0.01 - \$0.05

Denominated in billion gallons ethanol equivalent gallons, rounded to nearest 0.01 billion gallon

Prices in USD per RIN gallon for that year's vintage; D3 and D7 are the waiver prices

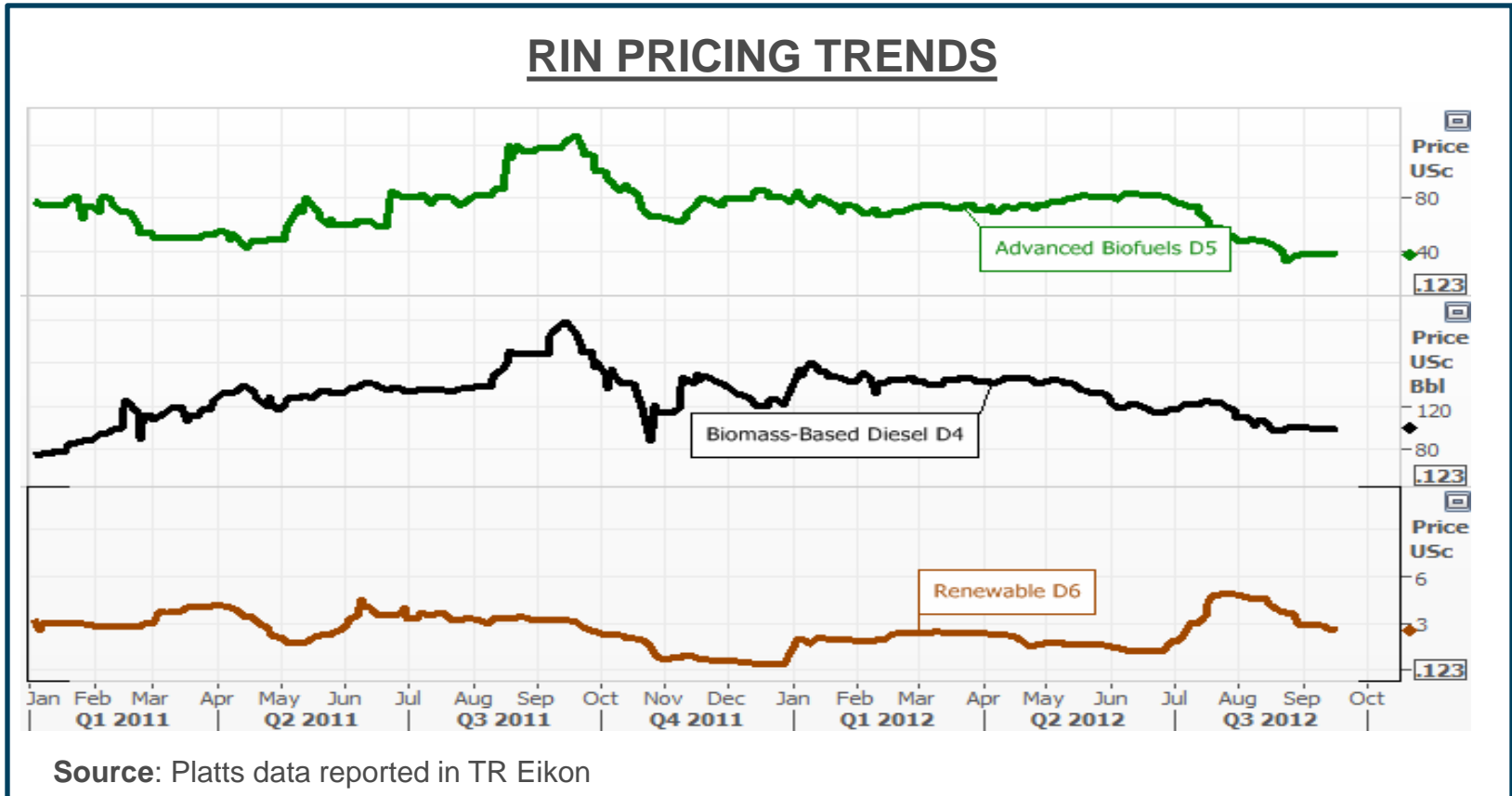
Source: EPA, Platts

Mechanics of Current RIN Market



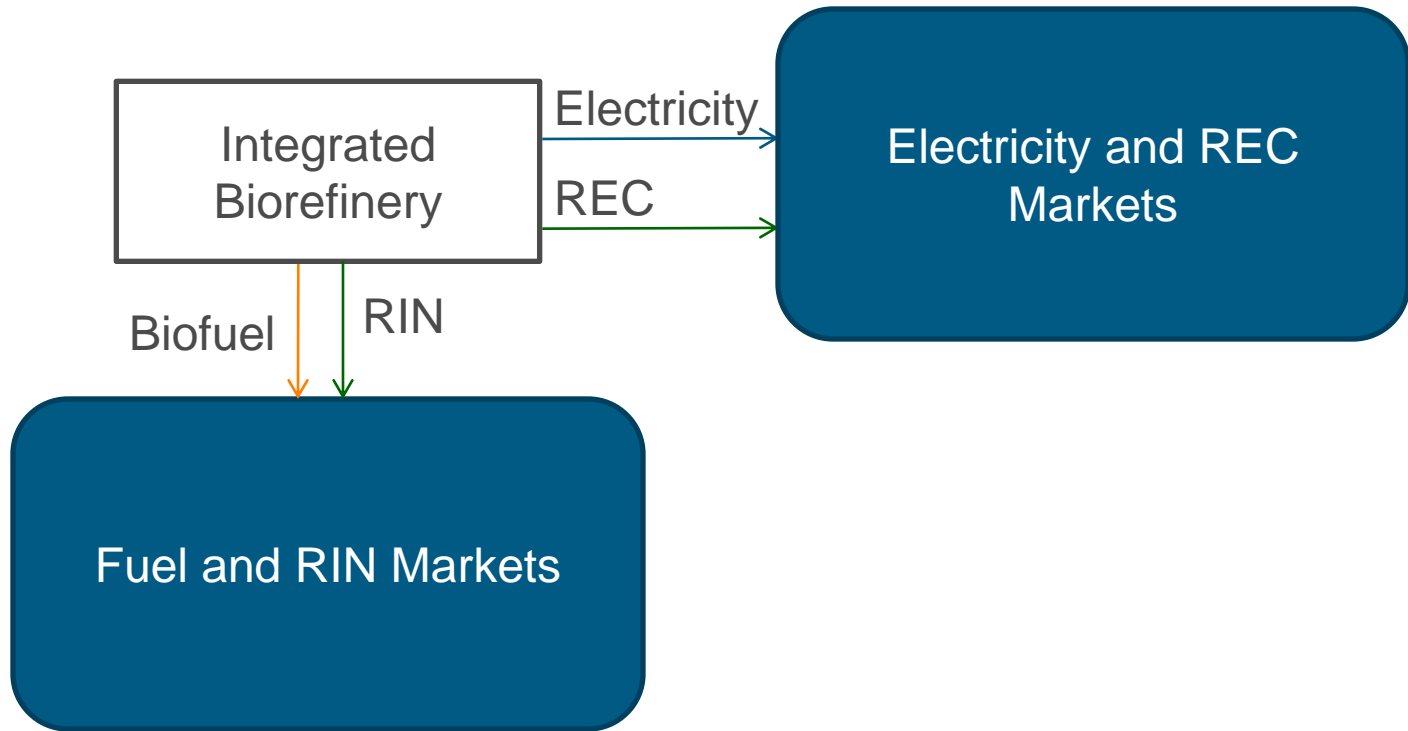
- Areas of potential fraud: initially recording RINs incorrectly, and separating RINs before they are blended
- Voluntary Verification now being used to combat fraud (RIN Integrity Network, RINPlus, Independent verifiers)

RIN Market Trends



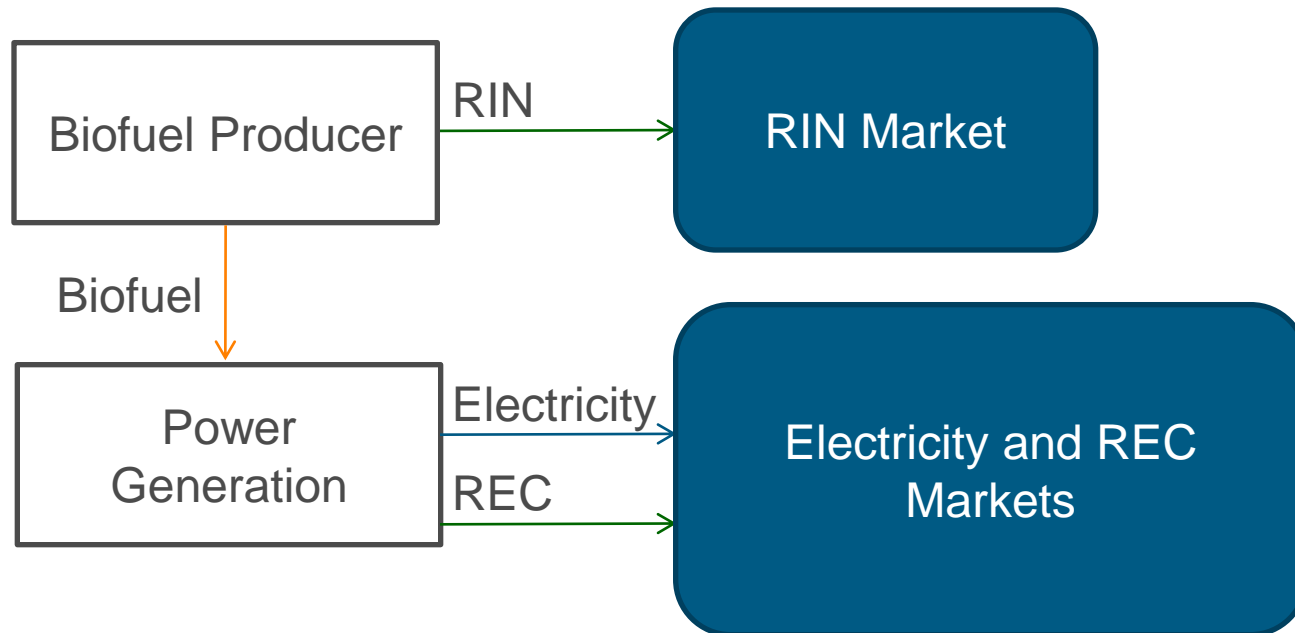
- Prices decreasing due to some uncertainty surrounding RFS 2.
- Additional market uncertainty due to cases of RIN fraud.

Case I – Integrated Biorefinery



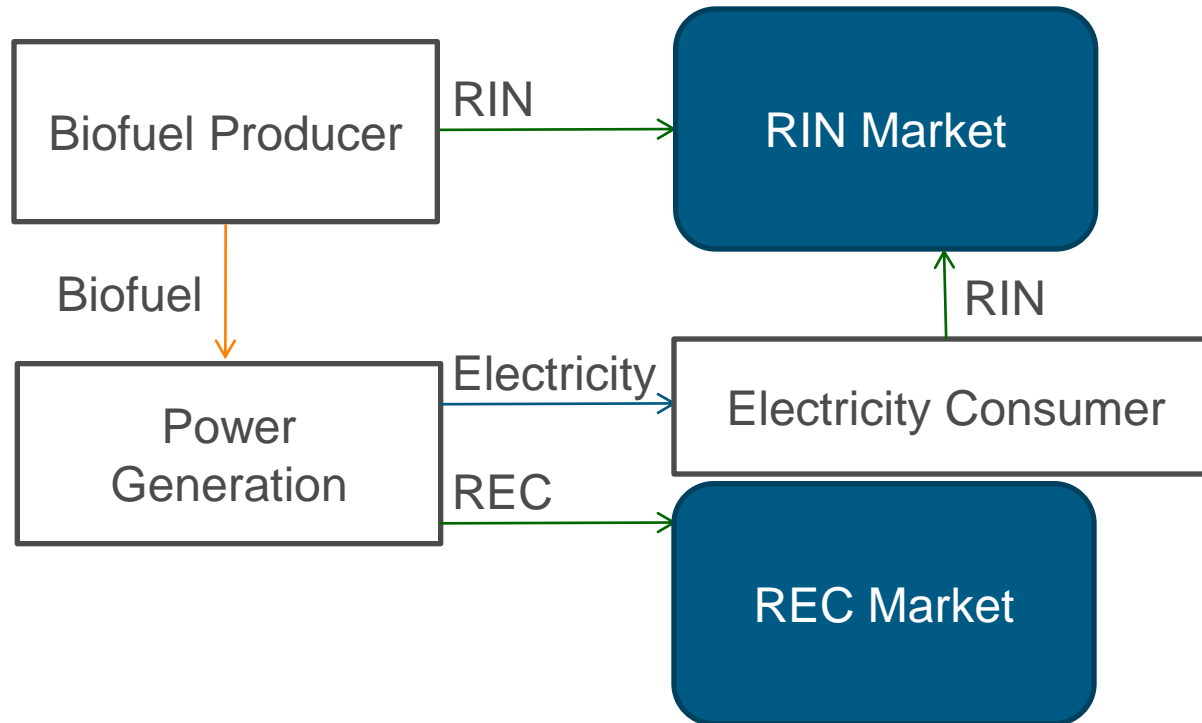
- Clearly defined pathways to fuel and RIN production as well as electricity and REC production.
- If refinery owner has compliance goals could use for internal purposes and sell “extra units” into the market or bank it during a compliance period.

Case II – Biofuel to Power Generation



- Since RIN attribute is associated with the fuel, need to figure out how much of it is converted to a REC at the power generation facility and RINs associated with that amount needs to be retired.
- If extra unused fuel is supplied to a third party, RINs associated with that amount of fuel may need to be transferred.

Case III – Biofuel to Electric Vehicles



- RIN generated by electricity consumer by providing MWh to Electric Vehicles that displaces fossil fuels.
- Needs resolution by eliminating MWh that was used to generate RINs from the REC quota.

Summary of Key Market Considerations

- **Double Counting and Retirement Issues**
 - If RINs and RECs are coproduced through one “stream” making sure attributes are separated appropriately is important
 - If one instrument is used for compliance and hence “retired” need to assure other instrument is not still taking credit for the retired instrument

- **Market Implementation Issues**
 - If instruments are produced in different regions with different policy domains, tracking/reporting becomes complex because multiple reporting systems need to talk to each other
 - Conflicting policies may need to be resolved (e.g. related to what is considered eligible versus ineligible)
 - Complexity increases even more if other instruments are also traded in the market (e.g. carbon, energy efficiency credits)

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