



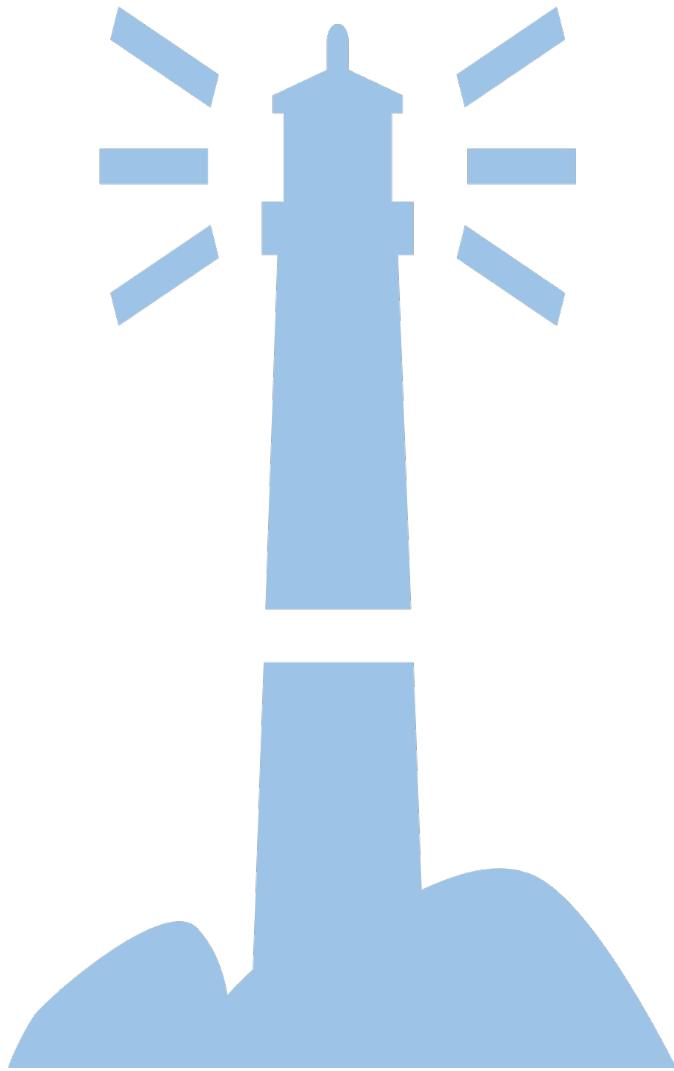
Greenhouse Gas Accounting in Regional Electricity Markets

CAISO EDAM GHG Work Group
February 8th, 2022

2019-21: Proposal from WRA

2022: WRA Outreach to Western States in partnership with Grid Lab; RNW; NWECC

Context and Relevance for West-Wide GHG Accounting



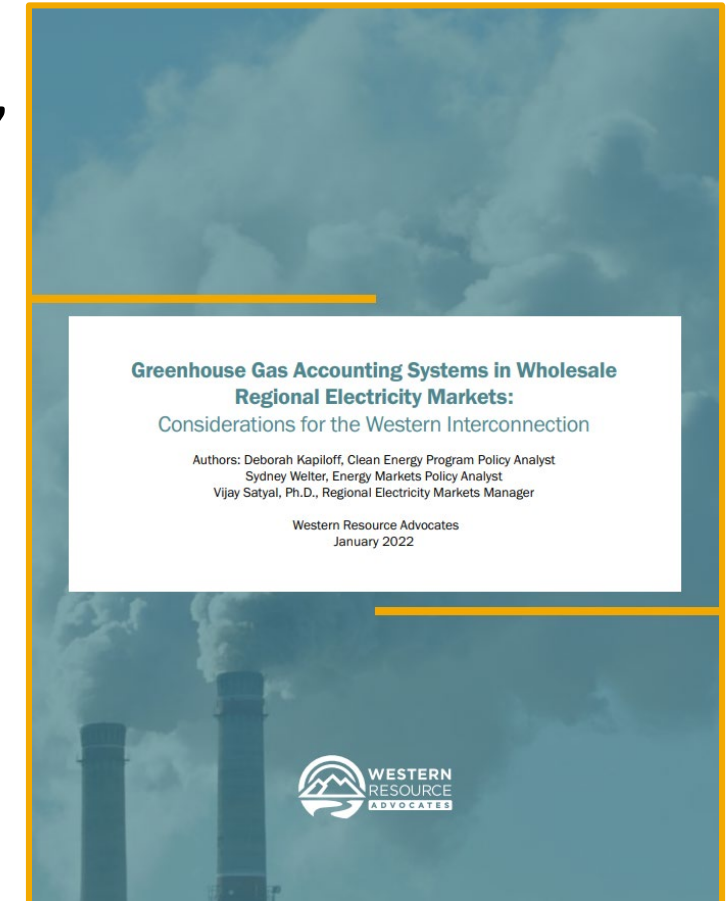
Reliably decarbonized
and cost-effective grid

- *Decarbonization needs*
- *Changing resource mix*
- *Grid economics*
- *Clean energy policies*
- *States' goals/criteria*

- **WRA perspective:** Grid economics warrants change, so regional coordination for energy needs is timely.
- **WRA & Western PIOs:** Great strides and respect state compliance criteria for GHGs, REC policies, etc.

Purpose: To develop an attribute-based GHG accounting framework that meets Western states' needs and facilitates *robust, practical, and transparent* accounting through a *singular* system.

WRA 2021 Deliverables: Updated whitepaper w/ FAQ, three factsheets, issue brief and matrix, initial design team session.



Need for West-wide GHG Accounting

Overall Recognition of Challenges:

- Lack of consistency in “accounting” for GHG emissions that are associated with energy transfers across the West (CARB, 2021).
- Co-mingling (unintentional) of RECs for GHG measurement in some western states’ RPS laws.
- Need for understanding how GHG accounting can take place that is NOT competing with western states’ state-specific goals / needs... BUT, still allow for/facilitate regional dispatch of power in market constructs.

Our Goal: Propose a framework – platform and protocols – to account for GHG emissions at a regional level:

- **Accounting** – calculating/auditing/book-keeping (Market function or not – debatable)
- **Tracking** – piece together/unearth/run down/trace (Reporting/settlement function – non debatable)

Policy Goals and End-State

*Develop a GHG accounting system in the West that provides a **framework and data** for state policy compliance while supporting market transactions and potential market expansion.*

Desired end-state:

- Tracking and accounting of the GHG emissions associated with electricity dispatched and delivered via markets
- Optimization include a least-cost multi-utility resource dispatch
- Accounting captures attributes associated with power transacted or contracted

Key question: How can a system **track GHG attributes regionally** whether a part of the market design or external to it, but also give states the detailed emissions profiles they need to meet their GHG reductions and policy goals?

What do we propose?

Overall Vision for West-wide GHG Accounting and Tracking

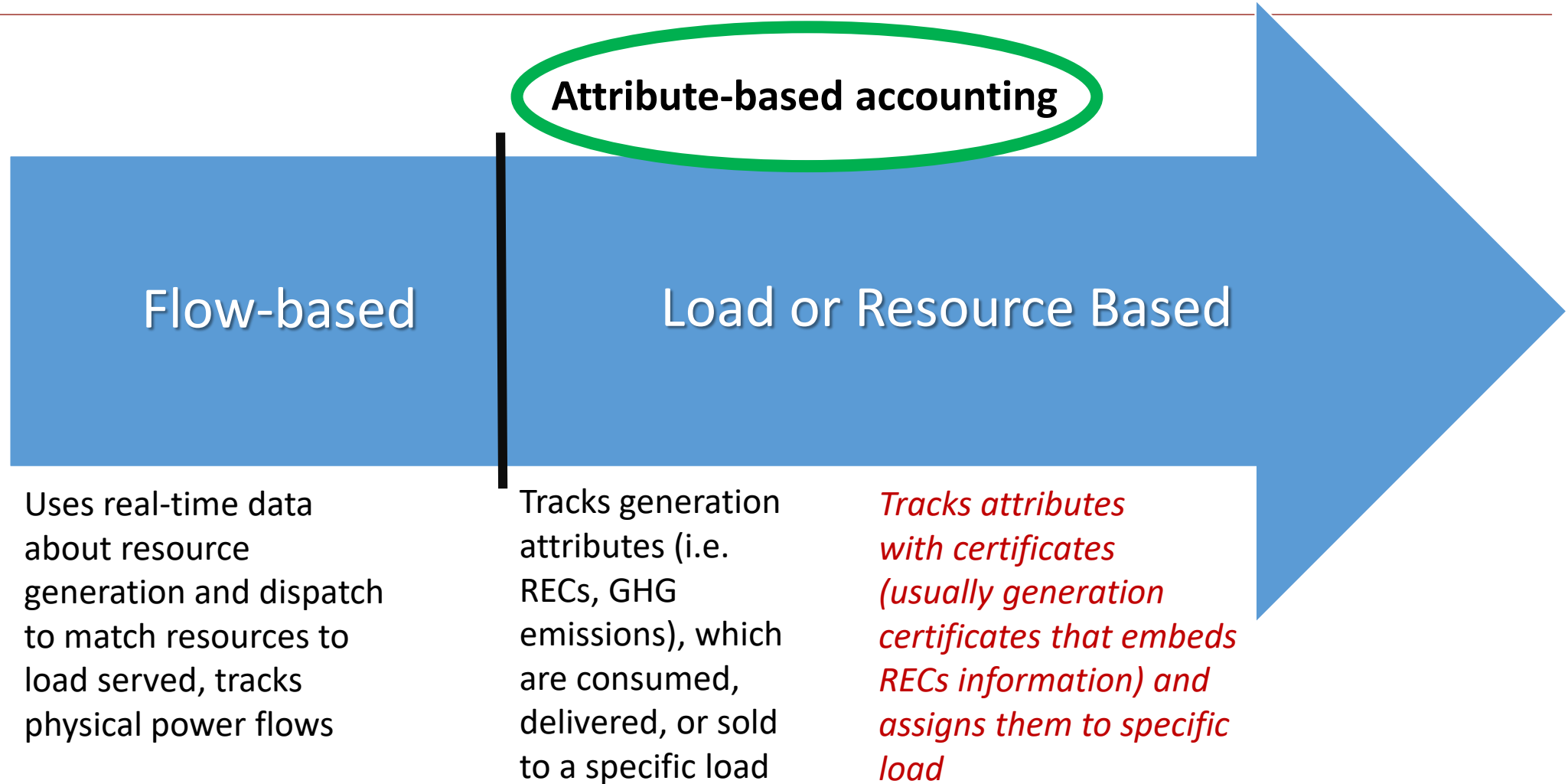
Consumption Based Accounting

- Focus on attributes
- Load served entities
- Better if real-time fuel mix data is available

West-Wide all Generation Tracking

- Expand WREGIS
- Leverage existing REC instrument and processes
- Expanded best practices

Partial Spectrum of Existing GHG Accounting Approaches



Consumption-Based Accounting

Measuring *delivered Renewable Energy*, and *Direct Emissions consumed*, delivered, sold to, or serving a specific electric load or retail consumer(s).

Potential confusion: Sometimes consumption-based accounting is used as an umbrella term, other times it is used interchangeably with flow-based or load-based accounting.



GHG terms defined!

Real-time matching/flow-based:

Using real-time data about resource generation and dispatch to attempt to identify which resources are serving load and using this to attribute RECs, emissions, etc.

Resource-based:

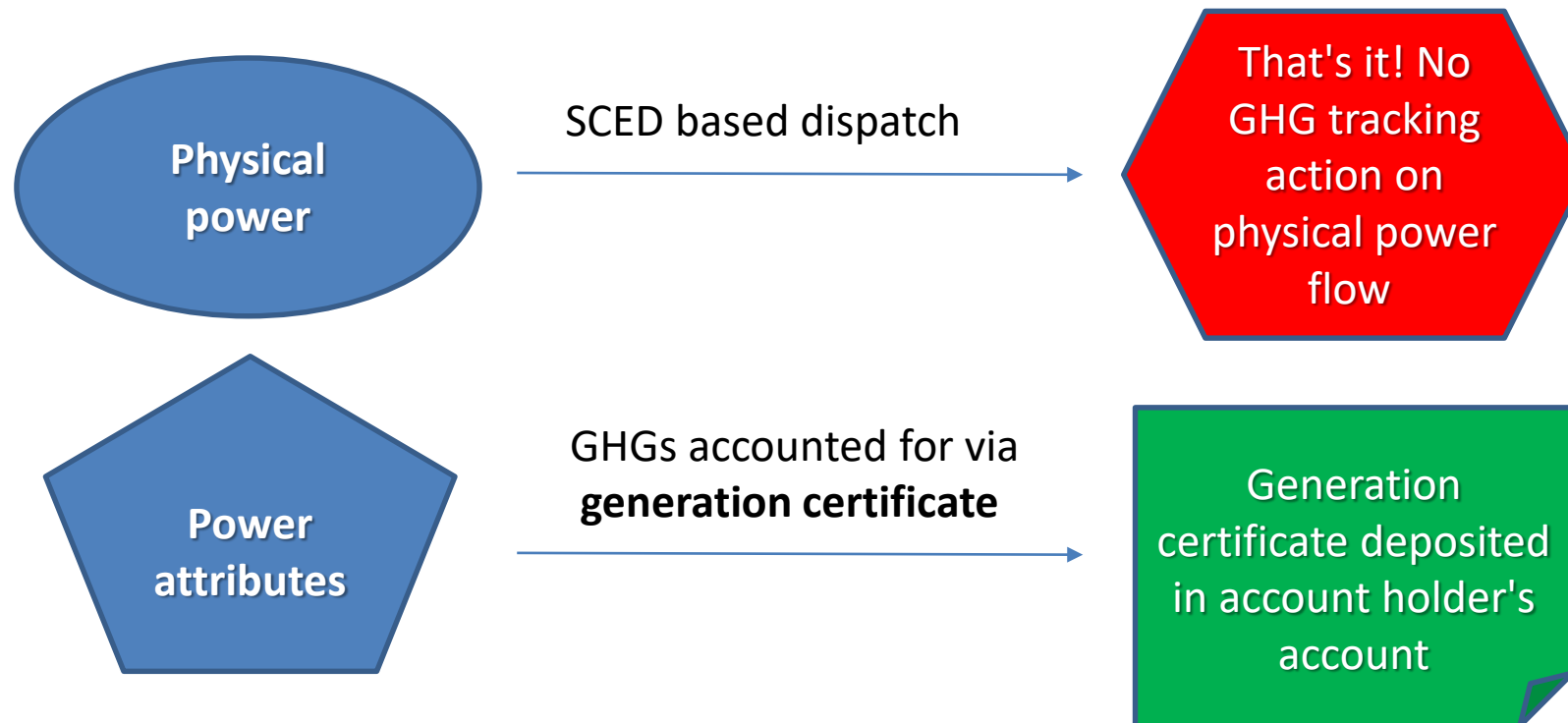
Tracking attributes with certificates (usually generation certificates) and assigning them to load

Consumption (Load-based):

Tracking generation attributes, such as RECs and GHG emissions, which are not physically delivered on the grid but are **consumed, delivered, or sold to, or serving load.**

Attribute-Based Accounting

- Attributes of the power embodied and transacted in a certificate
- Option to include eligibility criteria for attribute-based accounting
- Syncs with future regionally coordinated and predictable energy transfers in West



Generation Certificates In Practice

All - Generation certificates are used by RTOs to track generation attributes, including environmental attributes.

For imports, this field will show a certificate's original registry.

Type of generation signified here, as well as whether or not the generation is renewable and there is an associated REC. Possibility to include emissions rate here or elsewhere.

Generator ID links to a specific generator, which has an available emissions rate even if the information is not explicitly included on a generation certificate.

Generation certificates are unique for each MWh of generation and are searchable in a central database by characteristics listed on the generation certificate.

| Identifier | Display Order | Data Type | Length | Range of Codes | Comments |
|----------------------|---------------|---------------|--------|---|--|
| Originating Registry | 1 | Alpha-numeric | 3 | NYG, GIS, PJM, and NAR | Used to identify originating registry |
| Unit type | 2 | Alpha-numeric | 4 | REC = Renewable Energy Certificate CERT = Non-Renewable Certificate issued for a Generating Unit | Used to identify if the generation is Renewable or Non Renewable |
| Generator ID | 3 | Numeric | 6 | 1-999999 | Unique ID assigned to each Project record in NYGATS |
| State | 4 | Alpha-numeric | 2 | Location of Generating Unit pulled from Static Data (i.e. NY) | State abbreviation identifying the State in which the generation occurred. |
| Vintage Month | 5 | Numeric | 2 | 01-12 | The month in which the generation occurred. |
| Vintage Year | 6 | Numeric | 4 | 00-99 | The year in which the generation occurred. |
| Batch Number | 7 | Numeric | 5 | Numeric value assigned to each batch of credits created 1 – 99,999 unique per originating generator or project per vintage. | |
| Serial Block Start | 8 | Numeric | 9 | Numeric values assigned by registry from 1 - 999,999,999. | A number to identify the first Certificate in a block of Certificates. |

Source: NYGATS Operating Rules

Eastern Regional Markets: Summary

| | ISO-NE | NY-ISO | PJM |
|---|---|--|---|
| RGGI membership | Yes, all states | Yes | Some states, not all |
| Data management system | Administered by APX - tracks all electricity generated in footprint | Administered by APX - real-time fuel mix data for all electricity generated in footprint | Administered by PJM Environmental Information Service -tracks all generation in footprint |
| Import GHG policy | Assigns system mix GHG rate by importing area | Assigns GHG rate based on latest eGRID data for source's Power Control Area | Assigns GHG rate based on latest eGRID data for source's Power Control Area |
| Undifferentiated system power | GHG rate based on eGRID data | GHG rate based on residual rate from real-time fuel mix | GHG rate based on eGRID data |
| Transactions supported within the data management system | REC registry, lumping | Fuel-mix information, REC registry | REC registry |

Value Proposition for Attribute-based Accounting

Attribute-based accounting offers:

- **Practical** accounting that **does not track physical power flows** and **captures regional transactions**
- **Flexibility** in compliance with state requirements
- **Consistency** regardless of transaction and/or resource type
- **Transparency** in accounting
- A **credible and functional** framework for ensuring that greenhouse gases and renewable resources (as represented by RECs) are accurately accounted for

EDAM Specific Recommendations and Request



Let's not re-invent the wheel:

Expanded WREGIS to include “All-Generation Attributes Tracking”

- **Role and function of WREGIS will not be ignored** - RECs do NOT necessarily 100% help track/manage “GHG emissions” consistently, across all U.S. western states – Dual uses of RECs currently.
 - **Recommendation:** Leverage and expanding its capability – *Practical, cheaper and brand recognition already exists.*
- **All generation tracking (outside or in - market) - A single instrument of tracking** – creates generation certificate for each MWh that is produced from all generating resources.
- **Agreement between market operator, generators and reporting entity** – Clear market design rules with dispatch practices that enable cost-effective trading, clear communication about REC retirements, and facilitate post-dispatch transparent reporting.

Questions for EDAM Stakeholders & CAISO Staff



Why can't an all-generation certificate be created "pre-dispatch" and reconciled "post-dispatch"?

- **Scenario 1: GHG accounting be "part of the market functions" – If existing metered data includes or can include:**
 - Emission attributes
 - For RE – REC ID (if RPS eligible),
 - For all generation (RE, Clean (non-RE) and fossil fuel) - Gen. ID
- **Scenario 2: GHG accounting "external" to market function – Current metered data does not include the above**
 - Understand why all-generation certificates tracking CANNOT be part of the market dispatch and post-dispatch reporting?
- **Our goal / preference:** One instrument for reporting that would allow for compatibility of information access and reporting for:
 - *Western states' compliance*
 - *All market participants and BA's*
 - *CAISO*
 - *Other market operators coordination for centralized information sharing*

Recommended Best Practices for Reporting

Compatibility with state policies and goals

Alignment with federal requirements

Guidelines for transacted unspecified power and associated REC attribution

Consistency of accounting systems in regional electricity markets with multiple states' policies

Singularity of an accounting methodology across a regional wholesale electric market

- Adequate information for participating entities to comply with their state's policies.
- Compliance with mandatory reporting requirements for applicable federal programs.
- Guidelines for unspecified power to avoid misleading environmental attributes.
- Setting up a system for markets which is compatible or interoperable with state policies or mandates.
- Use one accounting methodology across a market, avoids double counting, market fragmentation and info getting "lost in translation." *CARB presentation

Phase One: Q1-Q2 2022

Part One: Outreach to States with RNW and NWECA

- Western states' regulators, policymakers, decision-makers
- Identify state-specific needs for attributes framework

Part Two: Develop Platform for Attribute Criteria

- Partner w/ GridLab to model attributes, dispatch scenarios
- Create platform, consider host

Key Stakeholders for Phase One Input

- Utilities
- State agency staff
- Public interest organizations
- Center for the New Energy Economy, Western Governors' Association, and other entities

EDAM Specific Recommendations and Request



Open-ended Questions: WRA Concerns / Views

- **Should all-generation tracking be required “pre and post-dispatch” or only “out-of-market” settlement only? Open for feedback.**

- **Should EDAM dispatch be based of GHG zones or not that is “states” only – Unsure. Recommend considering LSEs’ or BA level point of determination for accounting.**
 - GHG zones that are simply allocated to “carbon pricing” states may not support CES goals

 - Creates extra transaction costs and incentive to avoid dispatching energy into GHG “state” zones

- **Will unspecified emissions approach allow for all-generation tracking post-dispatch to be facilitated? Unlikely - TBD.**



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Purpose and Key Deliverables

Purpose: *To develop an attribute-based greenhouse gas accounting framework that meets Western states’ needs and facilitates robust, practical, and transparent accounting through a singular system.*

Key Deliverables:

1. Q1-Q2 2022: Conduct “western states” focused outreach to solicit feedback from Western state regulators, planners, and decision-makers on state-specific GHG tracking approach, compliance criteria and views of attribute-based framework.
2. Q1-Q2 2022: Design a platform for attribute-based emissions across the West.
3. Q3-Q4 2022: Leverage western states’ perspectives into testing and review of “attribute-based” emissions framework – criteria for best practices.

Strategic Goal: Develop, in partnership with investor- and publicly- owned utilities, a GHG accounting platform that reflects dispatch conditions and addresses double-counting and leakage.

NY-ISO Overview and Tracking

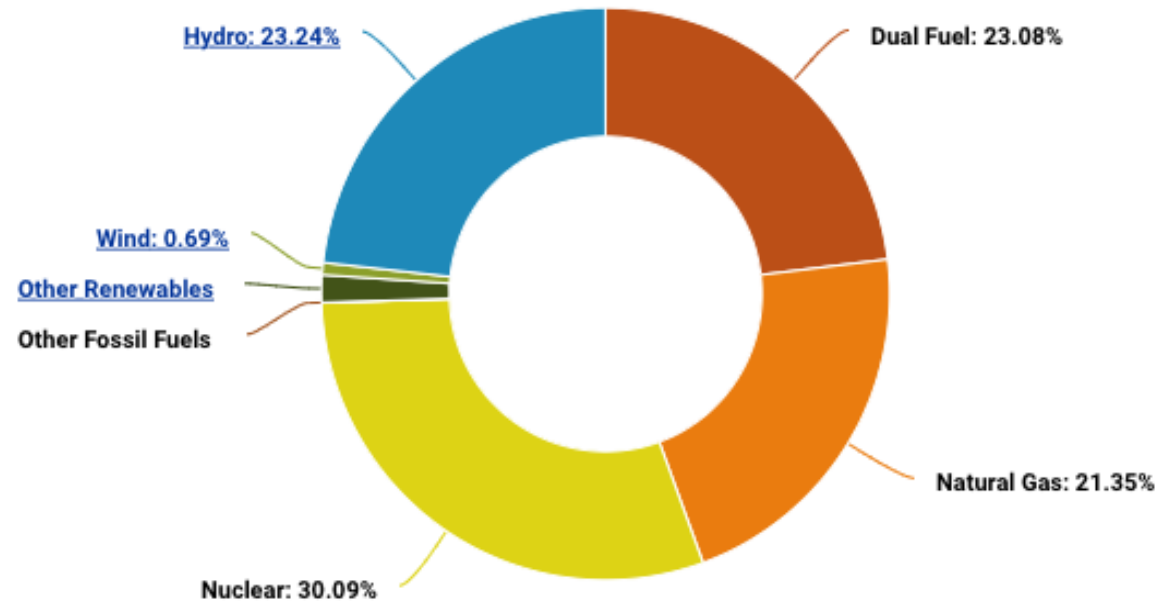
GHG Tracking

- Not done directly, but NYGATS (NY Generation Attribute Tracking System) tracks all generation in the state making for a de facto production-based system

NYGATS

- NY-ISO [data interface](#)
 - Connected with PJM and NE-ISO for imports
 - Real-time fuel mix data for energy generated within NY state

Energy generated within New York State



<https://www.nyiso.com/real-time-dashboard>

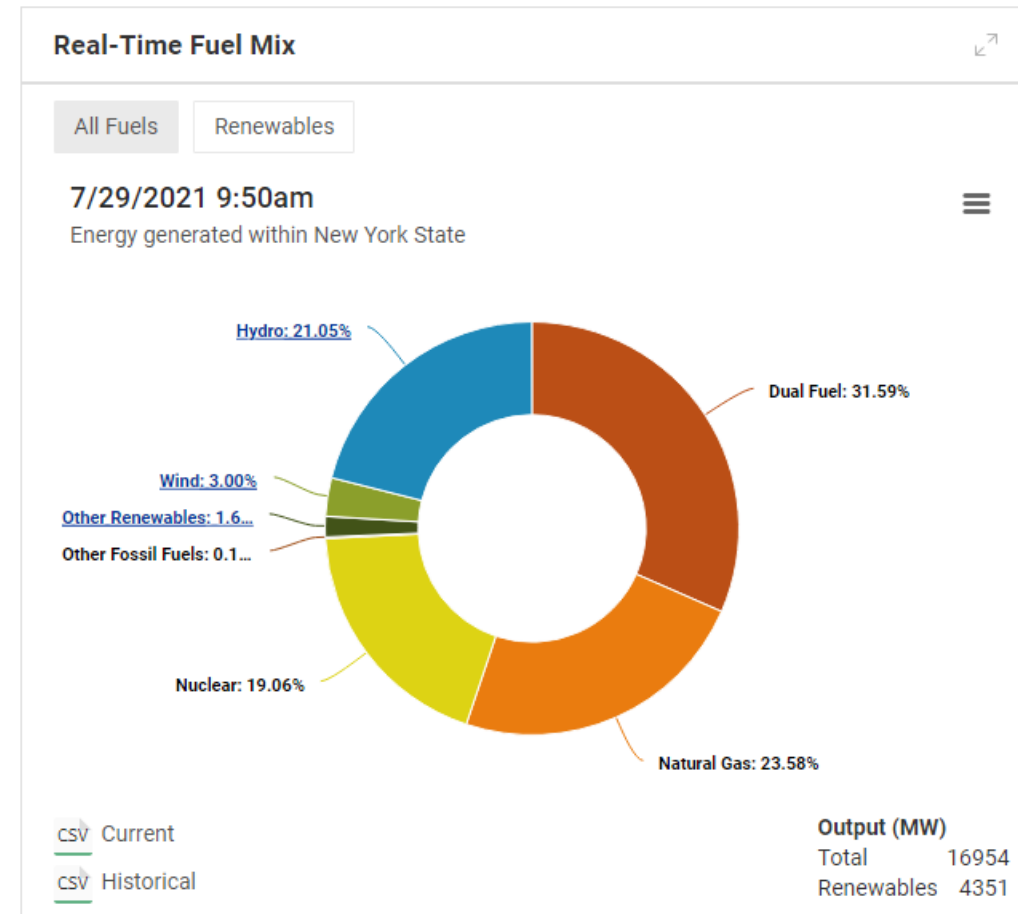
Generation Certificates cont.

Other existing and possible data fields on generation certificates:

- State RPS/CES eligibility
- Fuel source
- Generation emissions rate
- Associated REC ID information
- Default emissions rate based on fuel source (when specific generator data is unavailable)

What about null power/system mix power?

- System mix certificates with residual thermal rate for the whole market
- Can be dynamic or static data



Source: NYISO Real-time dashboard