Aggregation Approaches in the Voluntary Carbon Market: *Three ACR examples*

**EPRI Workshop #12**  
**San Francisco, CA**  
**March 15, 2012**
American Carbon Registry

• First U.S. GHG registry, founded 1996 by Environmental Resources Trust
  – 32 million tons CO$_2$e VERs issued to date
  – 2011: 2.9 million tons sold, retired and contracted, average price $5.51

• ACR functions:
  – Develop and approve protocols
  – Review and register projects
  – Oversee independent validation & verification
  – Transparent tracking of transactions and retirements

• Part of Winrock International
  – Strong focus on forest carbon (A/R, IFM, REDD), agriculture (N management, rice), livestock and grazing
Benefits of aggregation

- Reduce transaction costs by spreading fixed and semi-fixed costs across more acres or more tons
- Achieve required sampling precision with fewer plots per landholding
- Diversify risk of some types of reversals
- Provide greater flexibility in contractual arrangements and reversal risk mitigation
- Reduce uncertainty in protocols using process-based models
- Mechanism for standardized crediting, especially as aggregates increase in scale
- Mechanism for new approaches to additionality
Retrofitting pneumatic controllers (Chesapeake Energy)

- Five states, 2,700 individual controllers
- Single boundary, baseline, crediting period
- Practice-based performance standard for additionality
- Statistical sampling to set baseline and project emission rates
Aggregation guidance in ACR Forest Carbon Project Standard

• Geographic dispersion and large number of landowners may reduce reversal risks
• Baseline inventory and monitoring: 90/10 precision target applied at aggregate project level
• Verification also at aggregate level; risk-based approach with not all properties necessarily visited
• Aggregator takes on 40-year commitment to MRV and reversal risk mitigation; flexibility in landowner contracts
• Programmatic project (PoA):
  – Baseline scenario, additionality, geography, eligibility conditions specified up front; new lands added in phases
  – Multiple start dates and crediting periods
Programmatic aggregated afforestation (GreenTrees)

- 6,300 acres enrolled, 4,800 planted to date
  - Rolling start dates, crediting periods and minimum term
  - Single baseline - all Lower Mississippi marginal croplands
  - Single planting plan - bottomland hardwoods and cottonwood interplant at 604 tpa; cottonwoods thinned for biomass
  - Aggregator commits to ACR for MRV and risk mitigation over project term
Lessons to date

- Geographic dispersion has allowed aggregators to defend a smaller risk buffer deduction
- Similar lands, baseline land use, planting design, and stratified sampling make it possible to achieve precision at scale with a large number of small landowners
- ACR-aggregator agreement that allows flexibility in landowner contracts and risk mitigation is key to adoption
- Aggregation rules complement flexible risk mitigation options to allow aggregator to reduce landowner exposure to C market risks
- GHG program does end up with residual risk – minimal (?)
- Could this work for compliance forestry crediting?
Aggregation to reduce model uncertainty

• Some protocols use process-based biogeochemical models to predict spatially and temporally variable N₂O and CH₄ fluxes

• Aggregation of multiple owners not required, though likely; but multiple fields / acres required to reduce model structural uncertainty vs. measured validation data
  – *Fertilizer*: minimum 10 individual fields; *Rice*: minimum 5 fields or 1,000 acres

• More fields means lower uncertainty discount

• Greater the scale of uptake, better any model (Tier 1, 2 or 3) will do at predicting variable fluxes
Lessons from aggregation in agricultural projects

• Reduce costs of project development and verification
  – But better “front end” DNDC interface tools needed to make data management feasible for aggregators
  – Could such tools also reduce errors and facilitate verification?
  – Data links, remote sensing, iPad apps, photo documentation…

• Who should aggregate? Some distrust and lack of understanding, reluctance to share data and slim profits

• CIG rice: plenty of participants and acres, but profit margins slim and “early adopters” issue evident already

• CA tomatoes: a couple large pilot participants but are reluctant to commit 10 different fields, depending how defined – chicken and egg problem until proven
Back-of-envelope estimates for rice GHG reductions

• Assume:
  – 0.2 – 1 tCO₂e/acre reductions (DNDC-based estimates for Midsouth for early drain, straw removal, reduce winter flood, etc)
  – Small, medium and large aggregated projects
  – Prices $5, $10, $20 (voluntary market vs. possible California approval)
  – Verification costs increase only slightly with size
  – Aggregator takes on all project development cost and risk so requires 50-50 profit sharing

• 1,000 acre project yields no revenue to producers even at higher C prices

• Larger projects yield revenue to producers -- $10/acre for early drain at $20 carbon
Conclusions

• Clear transaction cost benefit
• Aggregation + quantification methods:
  – Reduce uncertainty and discounts when models used
  – Achieve precision thresholds via stratified sampling
  – Allow practice-based payments with performance-based credits
• Aggregation + reversal / invalidation risk mitigation:
  – Reduce some reversal risks
  – Important to pair with flexible contracting and risk mitigation
  – Can this work in compliance market?
• Aggregation + additionality:
  – Possible solutions to early adopter issue via proportional additionality or simply uniform payments
  – Facilitates standardized baseline setting and intensity metrics
Further information

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