

Rethinking our Waste

Andre Henry APTRC Forum 2019

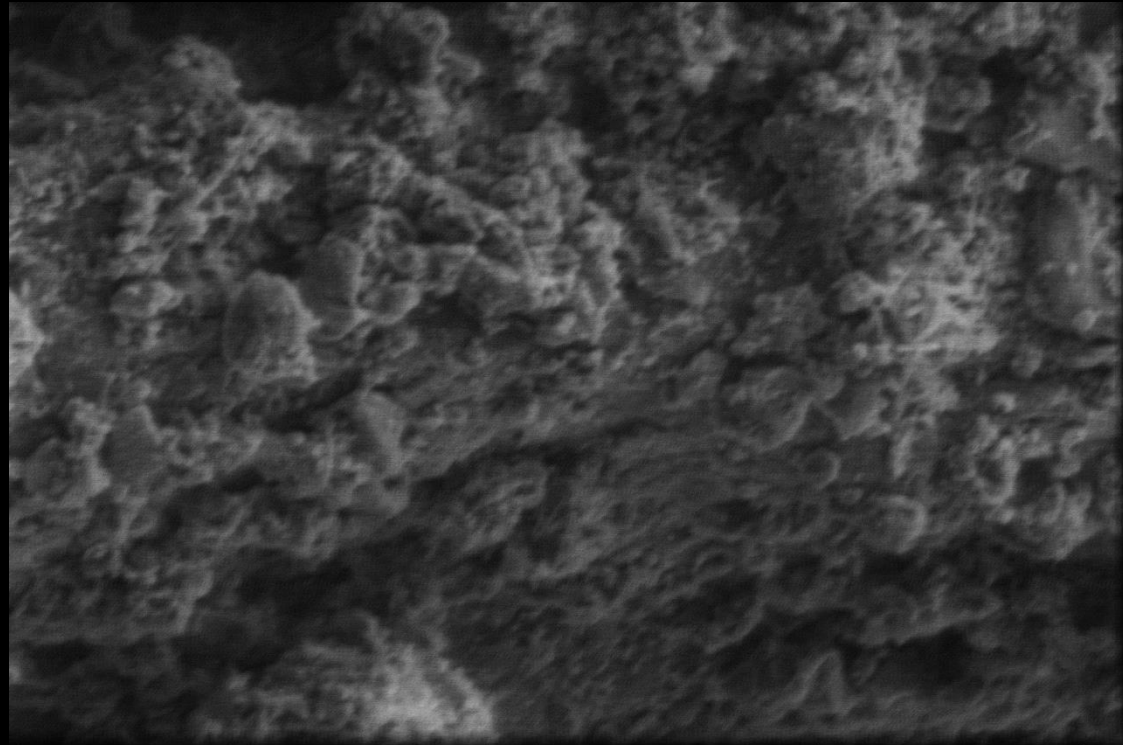
The Challenge

- **Australian growers average yields are 50-100% higher than Italian tomato producers; APTG's are paid 25-30% less per ton, and yet Italian cans are still being "sold" wholesale to Australian retailers at 20-30% lower prices.**
(Tomato News 2018)
- **We also don't have the efficiencies of scale of California**

The Opportunity- 2 options



Option 1- Material/ Product



11/1/2017 dwell HV mag □ HFW det spot WD pressure 10 µm
11:49:30 AM 300 ns 5.00 kV 10 000 x 41.4 µm LVD 8.0 11.9 mm 0.50 mbar Teneo

Option 1- Progress to Date



Our end Goal Option 1- Certified Building Product

- Certification to Australian Building Standards internal and external walls in Class 2 through 9 structures- Codemark Certification
- Non-structural applications, GreenStar Points
- Opportunity for vine supply agreement with industry- aiming for fixed rate in-paddock price



My Nuffield Scholarship



Thankyou

Why the Nuffield journey?

- New products and niche markets take time and money to develop
- Growers need profitability growth now
- Processors and growers face immediate challenges with rising water and energy costs
- We need an option with immediate SCALE

Option 2- Vine as an Energy source



1 ton of vine



420 litres of diesel

Option 2- Industries total energy balance

Operation/ Input:	Type of Energy used:	GJ Energy/ha:	Variation Potential:
Starter Fertiliser	Natural Gas	0.2	Lower estimate, up to 50% higher
Fertigation Nitrogen	Natural Gas	6.4	Lower estimate, up to 100% higher
Field Operations (tractor passes, irrigation pumping, harvest)	Diesel Fuel	27.4	+/- 10%

Output/ Production:	Form of Energy:	GJ Energy/ha:	Variation Potential:
Tomatoes	Calorific energy	81	+80%/-30%
Tomato Vine	Calorific energy	148	+50%/-30%

We don't use >60% of the energy we produce.
Need high value use from low value vine

Option 2- Fertiliser highest value

- Averaging N inputs (fertigation + basal)= 194kgN/ha
- Input cost of >\$630,000/season (lower side estimate)
- We already have an industry suited to using liquid UAN or anhydrous with fixed pumping sites for fertigation

Option 2- Fertiliser Production

Step 1

- Collect/ Bale vine
- Gasify it to produce CH₄

Step 2

- Use SMR to produce Hydrogen from CH₄
- Use PSA to produce Nitrogen from air

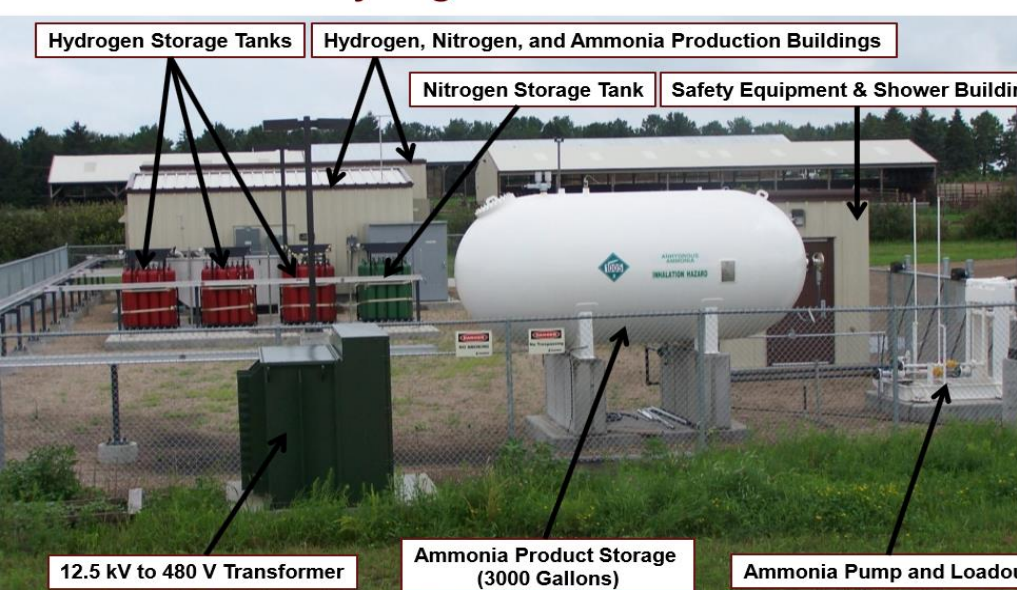
Step 3

- Combine Nitrogen and Hydrogen
- Produce NH₃ (Ammonia)

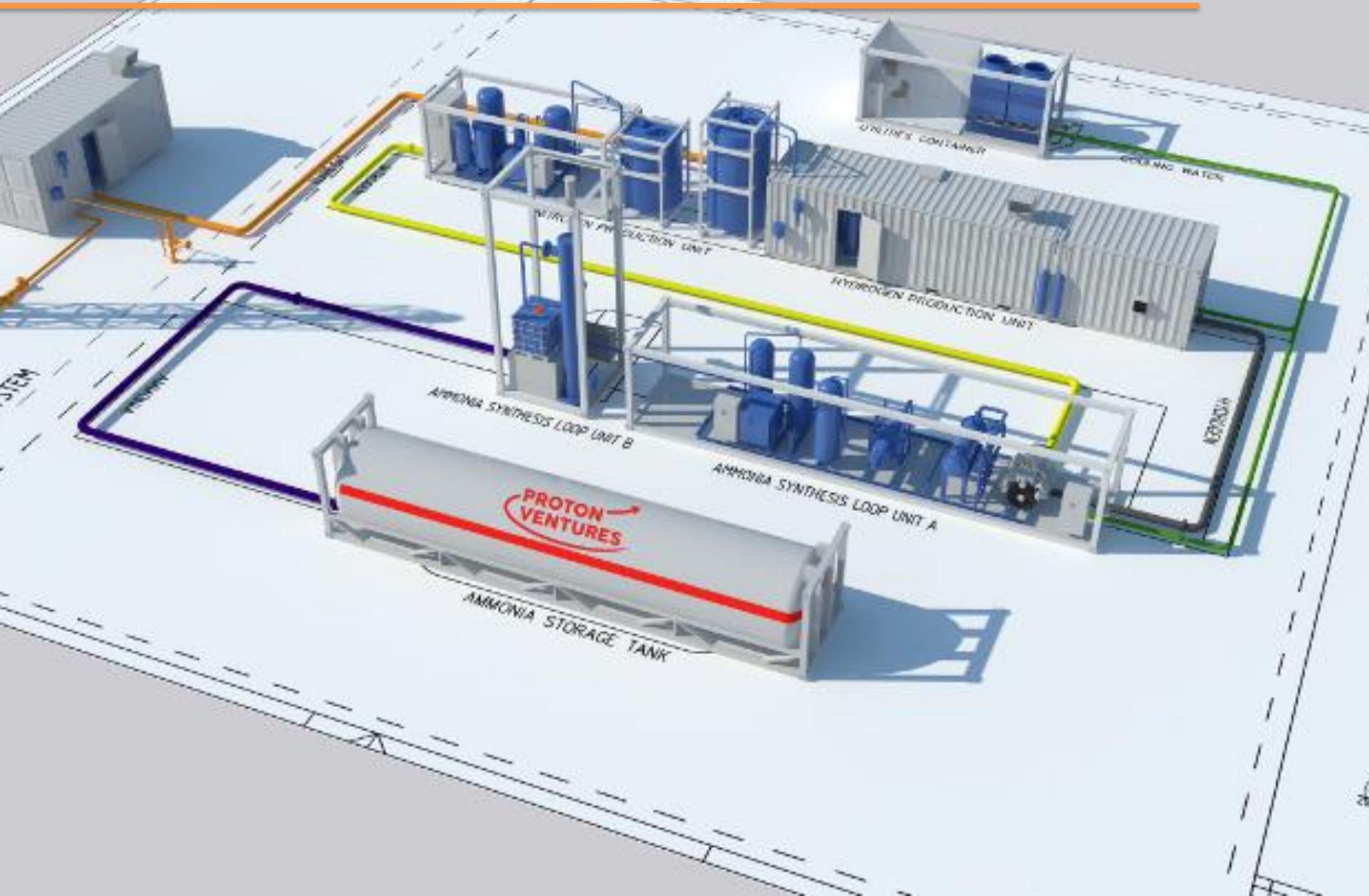
Option 2- UOM and Schmuecker farm

- Applications are already in place, we could do it at a larger scale to gain efficiencies

Renewable Hydrogen and Ammonia Pilot Plant



Option 2- Fertiliser Production



Option 2- Suggested work for APTRC

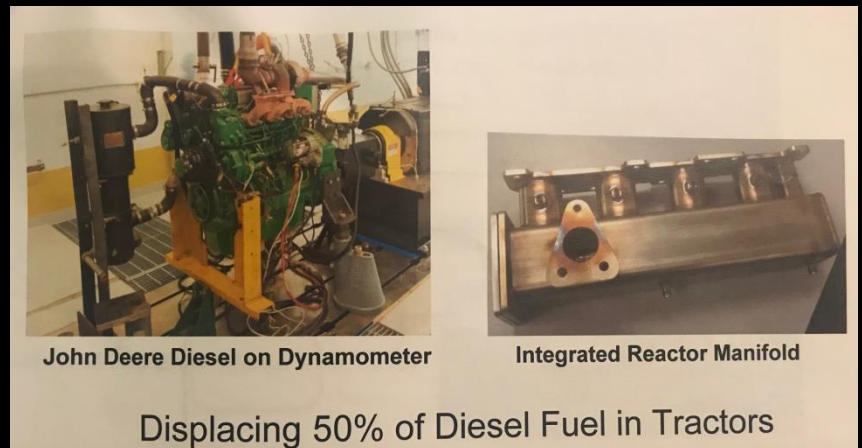
- 1-Explore/ Apply for funding through ARC and ARENA
- 2-Commence specific project with ANU (or equiv.) to define gasifier temperature and air flow settings for maximum CH₄ yield per kg dry vine biomass
- 3- Commence industry project to define vine volume for each grower

If the tests are positive.....

- Develop a business case for growers/ industry related suppliers to invest in as a stand alone corporate entity- % shareholdings
- Secure ARENA funding to minimise CAPEX and secure debt/ risk

Ammonia Marketplace considerations

- Existing NH_3 demand largely satisfies plant scale
- Excess sold to market or use through irrigation pumpsets- (50% diesel replacement when running at load)
- External markets beneficial but not critical



Thanks

Any questions?
