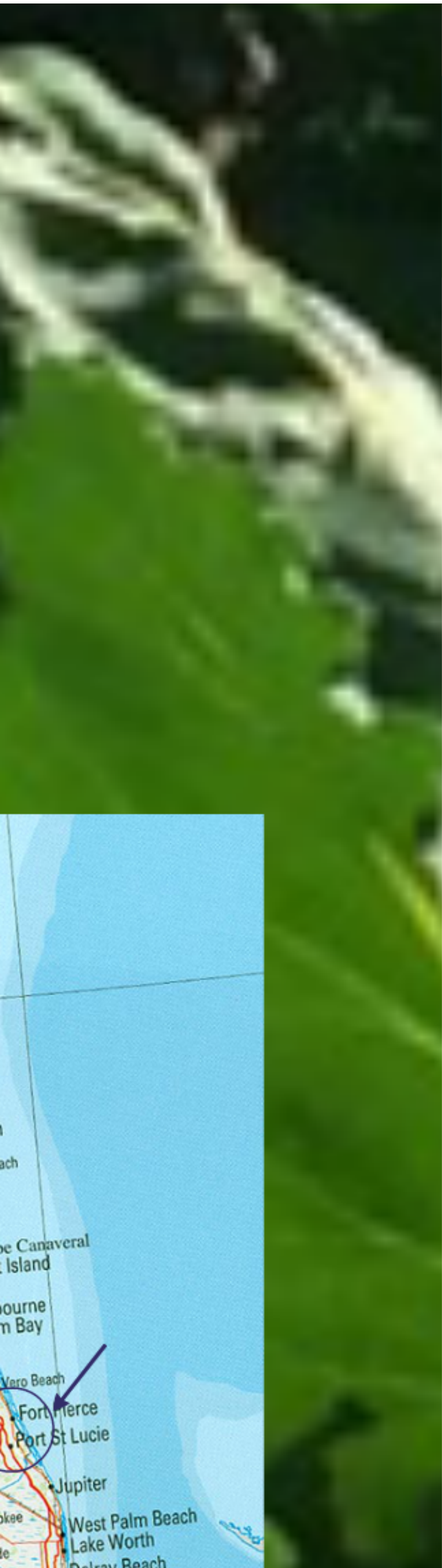

FARM to FLY
FROM THE GROUND UP

Florida

FARM to FLY

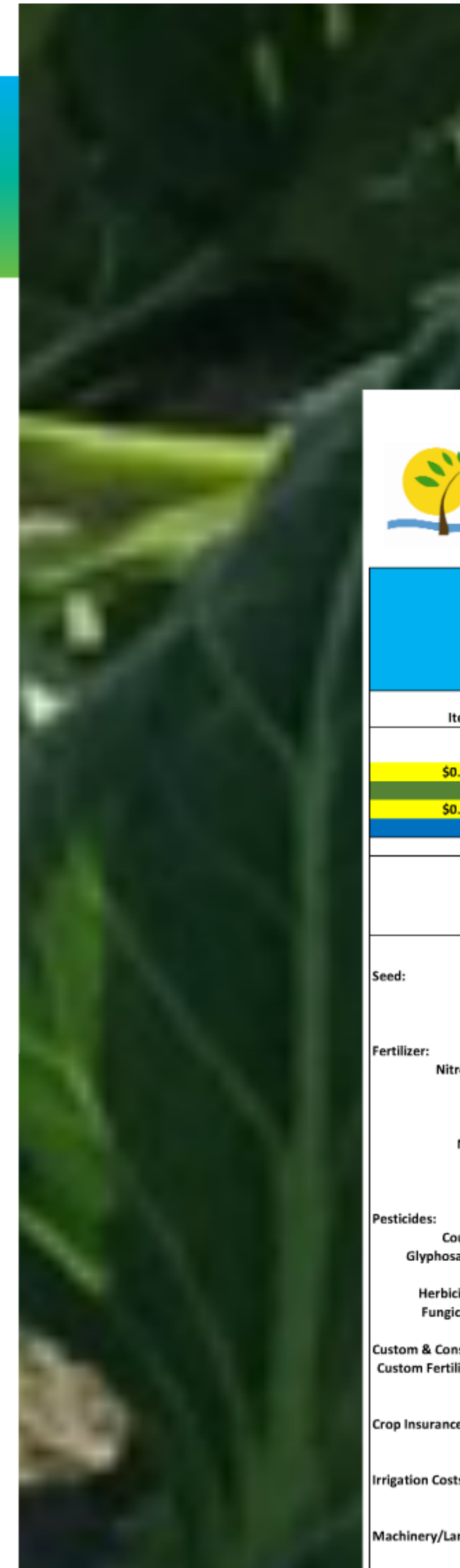
FROM THE GROUND UP



FARM to FLY
FROM THE GROUND UP

Look Whose Here..

Treasure Coast Research Park
2199 South Rock Rd., Ft. Pierce, FL 34986
772•467•3107 or info@tcerda.org
www.TreasureCoastResearchPark.com



UF UNIVERSITY of FLORIDA
IFAS

IRSC
INDIAN RIVER STATE COLLEGE

USDA Rural Development
Committed to the future of rural communities.

NSF

FedEx

REG
Life Sciences, LLC

TREASURE COAST
International Airport & Business Park

NATIONAL WILDLIFE FEDERATION

DEPARTMENT OF AGRICULTURE CONSUMER SERVICES
EST. 1868

CAAFI®
FUELING SOLUTIONS FOR SECURE & SUSTAINABLE AVIATION

ST. LUCIE COUNTY FLORIDA

USDA FSA

SFRC School of FOREST RESOURCES & CONSERVATION

SOUTH FLORIDA State College

jetBlue

USDA ARS
United States Department of Agriculture
Agricultural Research Service

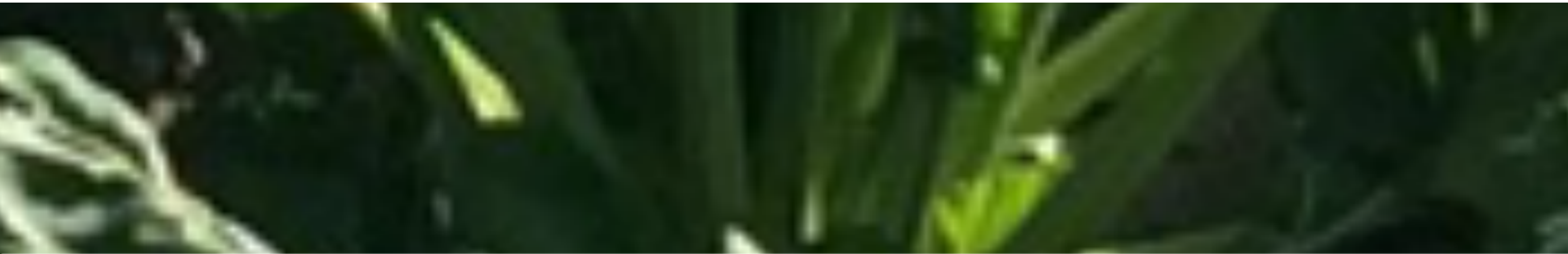
COUNTY OF MARTIN STATE OF FLORIDA

WENCK
Responsive partner.
Exceptional outcomes.

Plant Sensory Systems

Treasure Research
Move to a Climate of I

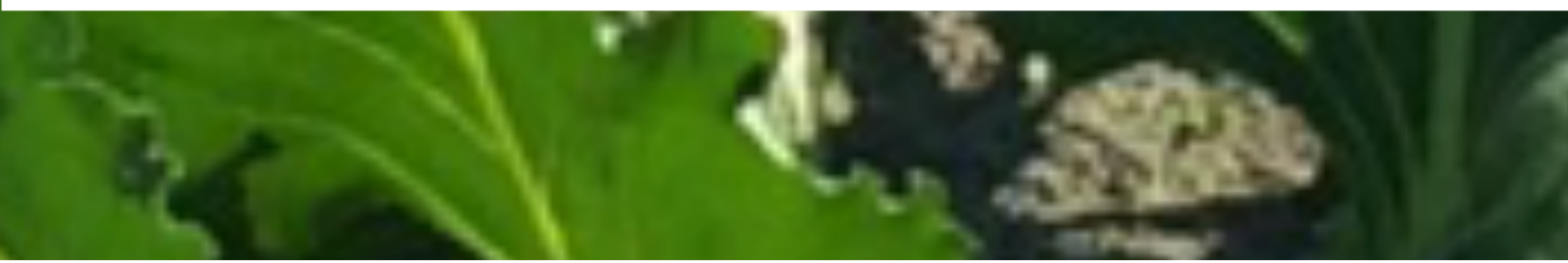
Dodds & Associ



USDA Rural Development

Committed to the future of rural communities.

Treasure Coast Research Park



USDA Rural Development
Committed to the future of rural communities.

Treasure Coast Research Park

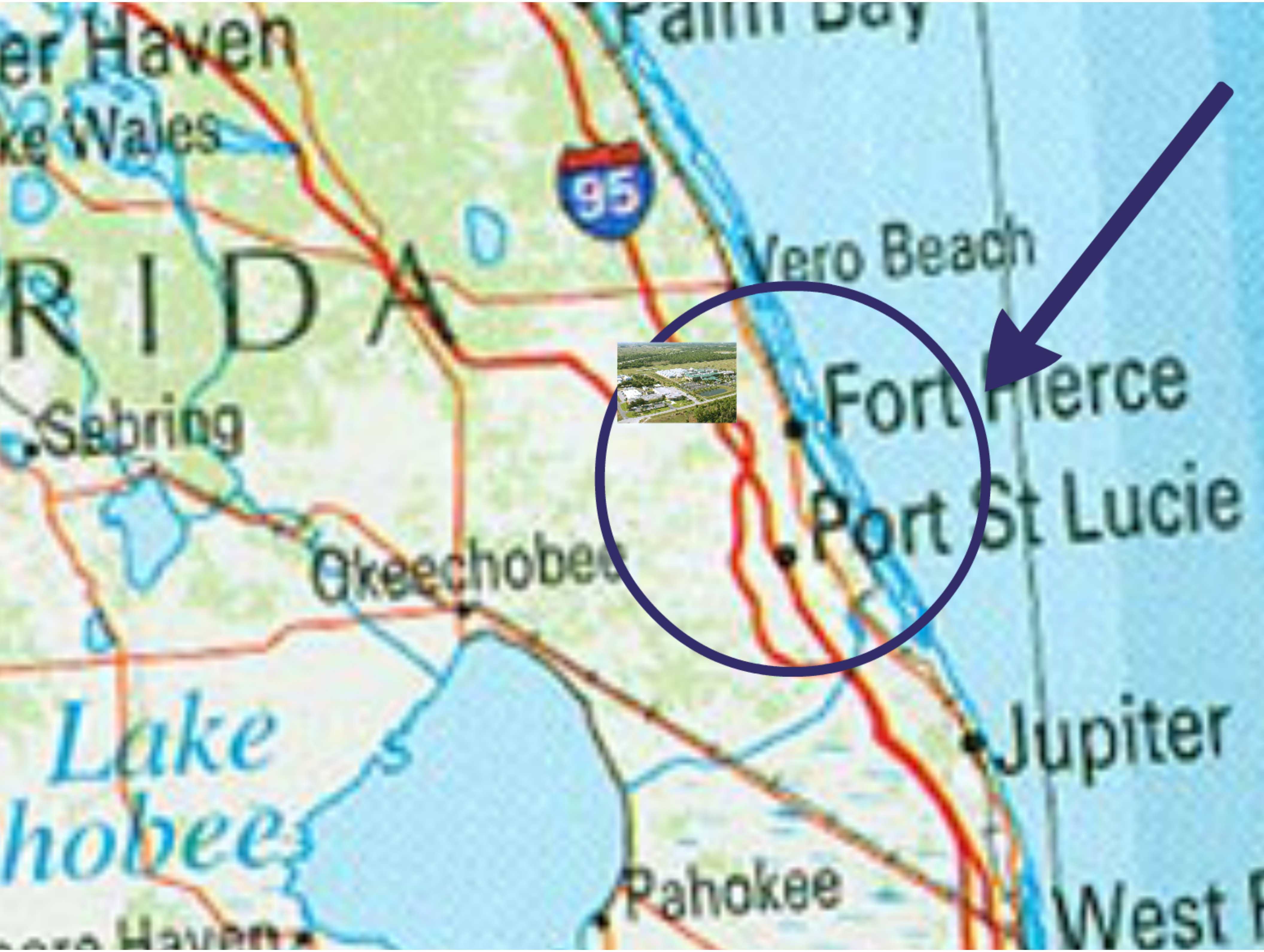
FARM to FLY
FROM THE GROUND UP

BIO

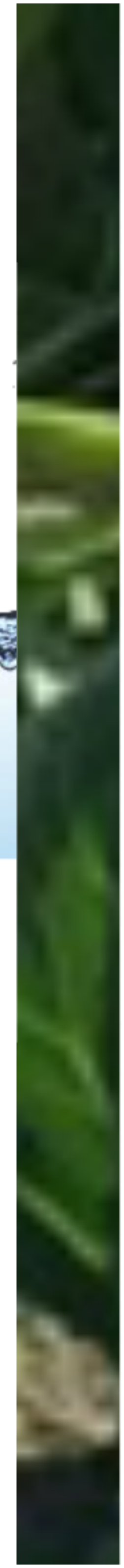
Food • Energy • Water


Andalusia
Enterprise
Opp
Dothan
Moultrie
Homerville
Brunswick
St Andrew Sound
Cumberland I
Atmore
Brewton
Bainbridge
Cairo
Thomasville
Valdosta
Okefenokee Swamp
Fernandina Beach
Crestview
Marianna
Chattahoochee
Mobile
Ferry Pass
Valparaiso
De Funiak Springs
Madison
Jacksonville
Daphne
Pensacola
Tallahassee
Live Oak
Jacksonville Beach
Gulf Shores
Fort Walton Beach
Lake City
Orange Park
Santa Rosa I
Panama City
Perry
Starke
St Augustine
Apalachee Bay
Port St Joe
Dog I
Apalachicola
Gainesville
Palatka
Palm Coast
Cape San Blas
St George I
Suwannee
Ormond Beach
Daytona Beach
Port Orange
New Smyrna Beach
Ocala
De Land
St Johns
Cedar Keys
Waccasassa Bay
Eustis
Deltona
Sanford
Leesburg
Titusville
Altamonte Springs
Cape Canaveral
Brooksville
Orlando
Merritt Island
Spring Hill
Kissimmee
Melbourne
Palm Bay
Haines City
Palm Harbor
Lakeland
Winter Haven
Brandon
Lake Wales
Clearwater
Largo
Tampa
Bartow
Vero Beach
FLORIDA
St Petersburg
Fort Pierce
Avon Park
Sebring
Port St Lucie
Bradenton
Tampa Bay
Okeechobee
Sarasota
Arcadia
Jupiter
Lake Okeechobee
Port Charlotte
Punta Gorda
Pahokee
Moore Haven
West Palm Beach
Lake Worth
North Fort Myers
Belle Glade
Delray Beach
Fort Myers
Boca Raton
Cape Coral
Coral Springs
Pompano Beach
Sanibel I
Bonita Springs
Fort Lauderdale
Hollywood
Naples
Big Cypress Swamp
Hialeah
Miami
Cape Romano
Miami Beach
Everglades City
Coral Gables
Kendall
The Everglades
Biscayne Bay
Homestead
Cape Sable
Key Largo
Islamorada
Florida Bay
FLORIDA KEYS
Marathon
Key West
Dry Tortugas
Marquesas Keys
of Florida


Pompano Bea
Fort Lauder
Hollywood
Hialeah
Miami
Miami Beach
Coral Gables
Kendall
Biscayne Bay
Homestead



95
Vero Beach
Fort Pierce
Port St Lucie
Sebring
Okeechobee
Jupiter
Pahokee
Lake
West



Our Partners

UF UNIVERSITY of FLORIDA IFAS

agriculture to remain sustai

Research at IFAS includes:
- Aquaculture
- Biological Control
- Citrus Best Managemen
- Environmental Horticult
- Post Harvest
- Water Quality

USDA ars

- Conduct applied and basi management of water usa control pests.
- Improve disease control fo minimize adverse effects o producers, state and feder
- Evaluation and study of in diseases; biological contro parasitoids, predators and study of plant resistance t of effects of plant products and molecular characteriz proteins and phytochemic
- Improve flavor, textural an extending shelf life and mic and tropical fruit and fruit
- Use chemical and other an which internal compositio storage or processing and

Annual Estimated SJF Feedstock Yields and Inputs
South Florida

TCERDA

FARM to FLY
FROM THE GROUND UP

Full Season

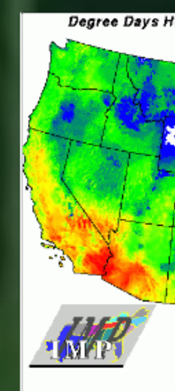
Item	Quantity Per Acre	Unit	Price or Cost	Value or Cost/Acre
Gross Return				
$0.090	Benola Root			
	12.34	ton		$ 2,221.20
$0.060	Cattle Feed			
	7.24	ton		$ 868.80
	80	ton	$ 38.63	$ 3,090.00
annual season				
Operating Inputs				
Seed:	47%			
Seed	29%	unit		$ 195.00
				$ 195.00
Fertilizer:				
Nitrogen - Preplant	40	lb	$ 0.34	$ 13.76
P205	200	lb	$ 0.48	$ 96.00
K20	80	lb	$ 0.46	$ 37.12
Micronutrients	2	ac	$ 10.00	$ 20.00
Nitrogen-Liquid	240	lb	$ 0.37	$ 88.32
				$ 255.20
Pesticides:				
Counter 15G L-N-L	28	lb	$ 2.15	$ 60.20
Glyphosate applications	192	oz	$ 0.18	$ 34.56
AMS	15	lb	$ 0.51	$ 7.65
Herbicide Application	6	ac	$ 7.00	$ 42.00
Fungicide Application	6	ac	$ 25.00	$ 150.00
				$ 294.41
Custom & Consultants:				
Custom Fertilizer Application	2	ac	$ 7.00	$ 14.00
Consultant	2	ac	$ 16.00	$ 32.00
				$ 46.00
Crop Insurance:				
NAD		ac		$ 100.00
				$ 100.00
Irrigation Costs:				
Irrigation	1	ac	$ 40.00	$ 40.00
				$ 40.00
Machinery/Land Pre & Spraying:				
Fuel - Diesel	35	gal	$ 3.70	$ 129.50
Lube	2	ac	$ 17.52	$ 35.04
Machinery Repairs	2	ac	$ 20.00	$ 40.00
				$ 204.54
Labor:				
Labor (Machine)	8	hr	$ 15.00	$ 120.00
Labor (Irrigation - cp)	1.8	hr	$ 10.20	$ 18.36
Labor (Other)	1	hr	$ 10.00	$ 10.00
				$ 148.36
Harvest Cost:				
Harvester Cost (Custom)		ton		$ 148.50
Hauling Charge	80	ton	$ 2.00	$ 160.00
Washing/Chipping	76	ton	$ 2.00	$ 152.00
Pelletizing/Bagging/Ensiling	7.24	ton	$ 6.00	$ 43.44
				$ 503.94
Total Cost per Season				$ (1,787.45)
Gross Return - from Above				$ 3,090.00
Net Gain (Loss)			73%	$ 1,302.55

Sweet Sorghum with Ratoon — May to October (6.5 months)

Item	Quantity Per Acre	Unit	Price or Cost	Value or Cost/Acre
Gross Return				
$0.090	Benola Root			
14.0%	5.88	ton	$ 180.00	$ 1,058.40
$0.075	Cattle Feed			
10.0%	4.2	ton	$ 120.00	$ 504.00
	42	ton	$ 37.20	$ 1,562.40
one full crop + ratoon crop				
no seed, fertilizer, or irrigation for ratoon crop with 1/2 yield				
Operating Inputs				
Seed:				
Swseet Sorghum Seed	0.75	unit	$ 10.00	$ 7.50
				$ 7.50
Fertilizer:				
Nitrogen - Preplant	20	lb	$ 0.34	$ 6.88
P205	100	lb	$ 0.48	$ 48.00
K20	40	lb	$ 0.46	$ 18.56
Micronutrients	1	ac	$ 10.00	$ 10.00
Nitrogen-Liquid	120	lb	$ 0.37	$ 44.16
				$ 127.60
Pesticides:				
Counter 15G L-N-L	14	lb	$ 2.15	$ 30.10
Glyphosate applications	96	oz	$ 0.18	$ 17.28
AMS	7.5	lb	$ 0.51	$ 3.83
Herbicide Application	3	ac	$ 7.00	$ 21.00
Fungicide Application	3	ac	$ 25.00	$ 75.00
				$ 147.21
Custom & Consultants:				
Custom Fertilizer Application	1	ac	$ 7.00	$ 7.00
Consultant	1	ac	$ 16.00	$ 16.00
				$ 23.00
Crop Insurance:				
NAD	0	ac	$ 40.00	$ -
				$ -
Irrigation Costs:				
Irrigation	0	ac	$ 40.00	$ -
				$ -
Machinery/Land Pre & Spraying:				
Fuel - Diesel	15	gal	$ 3.70	$ 55.50
Lube	1	ac	$ 17.52	$ 17.52
Machinery Repairs	1	ac	$ 20.00	$ 20.00
				$ 93.02
Labor:				
Labor (Machine)	6	hr	$ 15.00	$ 90.00
Labor (Irrigation - cp)	0	hr	$ 10.20	$ -
Labor (Other)	0.5	hr	$ 10.00	$ 5.00
				$ 95.00
Harvest Cost:				
Harvester Cost (Custom)	42	ton	$ 1.75	$ 73.50
Hauling Charge	42	ton	$ 2.00	$ 84.00
Washing/Chipping	38	ton	$ 2.00	$ 76.00
Pelletizing/Bagging/Ensiling	4.2	ton	$ 6.00	$ 25.20
				$ 258.70
Total Cost per Crop				$ (752.03)
Gross Return - from Above				$ 1,562.40
Net Gain (Loss)			108%	$ 810.38

Roundup Ready Benola Root — Mid-October to April (5.5 months)

Item	Quantity Per Acre	Unit	Price or Cost	Value or Cost/Acre
Gross Return				
$0.090	Benola Root			
17.0%	6.46	ton	$ 180.00	$ 1,162.80
$0.075	Cattle Feed			
8.0%	3.04	ton	$ 120.00	$ 364.80
	38	ton	$ 40.20	$ 1,527.60
one full crop				
Operating Inputs				
Seed:				
Roundup Ready Beet Seed	0.5	unit	$ 375.00	$ 187.50
* Includes fungicide & insecticide seed treatment				
				$ 187.50
Fertilizer:				
Nitrogen - Preplant	20	lb	$ 0.34	$ 6.88
P205	100	lb	$ 0.48	$ 48.00
K20	40	lb	$ 0.46	$ 18.56
Micronutrients	1	ac	$ 10.00	$ 10.00
Nitrogen-Liquid	120	lb	$ 0.37	$ 44.16
				$ 127.60
Pesticides:				
Counter 15G L-N-L	14	lb	$ 2.15	$ 30.10
Glyphosate applications	96	oz	$ 0.18	$ 17.28
AMS	7.5	lb	$ 0.51	$ 3.83
Herbicide Application	3	ac	$ 7.00	$ 21.00
Fungicide Application	3	ac	$ 25.00	$ 75.00
				$ 147.21
Custom & Consultants:				
Custom Fertilizer Application	1	ac	$ 7.00	$ 7.00
Consultant	1	ac	$ 16.00	$ 16.00
				$ 23.00
Crop Insurance:				
NAD	1	ac	$ 100.00	$ 100.00
				$ 100.00
Irrigation Costs:				
Irrigation	1	ac	$ 40.00	$ 40.00
				$ 40.00
Machinery/Land Pre & Spraying:				
Fuel - Diesel	20	gal	$ 3.70	$ 74.00
Lube	1	ac	$ 17.52	$ 17.52
Machinery Repairs	1	ac	$ 20.00	$ 20.00
				$ 111.52
Labor:				
Labor (Machine)	2	hr	$ 15.00	$ 30.00
Labor (Irrigation - cp)	1.8	hr	$ 10.20	$ 18.36
Labor (Other)	0.5	hr	$ 10.00	$ 5.00
				$ 53.36
Harvest Cost:				
Harvester Cost (Custom)	38	ton		$ 75.00
Hauling Charge	38	ton	$ 2.00	$ 76.00
Washing/Chipping	38	ton	$ 2.00	$ 76.00
Pelletizing/Bagging/Ensiling	3.04	ton	$ 6.00	$ 18.24
				$ 245.24
Total Cost per Crop				$ (1,035.43)
Gross Return - from Above				$ 1,527.60
Net Gain (Loss)			48%	$ 492.18



TCERDA

Annual Estimated SJF Feedstock Yields and Inputs
South Florida

FARM to F
FROM THE GROUN

Full Season

	Quantity Per Acre	Unit	Price or Cost	Value or Cost/Acre
Gross Return				
0	Benola Root			
	12.34	ton		$ 2,221.20
0	Cattle Feed			
	7.24	ton		$ 868.80
	80	ton	$ 38.63	$ 3,090.00

annual season

Operating Inputs

	Quantity Per Acre	Unit	Price or Cost	Value or Cost/Acre
	47%			
Seed	29%	unit		$ 195.00
				$ 195.00
en - Preplant	40	lb	$ 0.34	$ 13.76
P205	200	lb	$ 0.48	$ 96.00
K20	80	lb	$ 0.46	$ 37.12
icronutrients	2	ac	$ 10.00	$ 20.00
rogen-Liquid	240	lb	$ 0.37	$ 88.32
				$ 255.20
ter 15G L-N-L	28	lb	$ 2.15	$ 60.20
applications	192	oz	$ 0.18	$ 34.56
AMS	15	lb	$ 0.51	$ 7.65

Sweet Sorghum with Ratoon — May to October (6.5 months)

Item	Quantity Per Acre	Unit	Price or Cost	Value or Cost/Acre
Gross Return				
$0.090	Benola Root			
14.0%	5.88	ton	$ 180.00	$ 1,058.40
$0.075	Cattle Feed			
10.0%	4.2	ton	$ 120.00	$ 504.00
	42	ton	$ 37.20	$ 1,562.40

one full crop + ratoon crop

no seed, fertilizer, or irrigation for ratoon crop with 1/2 yield

Operating Inputs

Item	Quantity Per Acre	Unit	Price or Cost	Value or Cost/Acre
Seed:				
Swseet Sorghum Seed	0.75	unit	$ 10.00	$ 7.50
				$ 7.50
Fertilizer:				
Nitrogen - Preplant	20	lb	$ 0.34	$ 6.88
P205	100	lb	$ 0.48	$ 48.00
K20	40	lb	$ 0.46	$ 18.56
Micronutrients	1	ac	$ 10.00	$ 10.00
Nitrogen-Liquid	120	lb	$ 0.37	$ 44.16
				$ 127.60
Pesticides:				
Counter 15G L-N-L	14	lb	$ 2.15	$ 30.10
Glyphosate applications	96	oz	$ 0.18	$ 17.28
AMS	7.5	lb	$ 0.51	$ 3.83

Roundup Ready Benola Root — Mid-Octobe April (5.5 mo

Item	Quantity Per Acre	Unit	Price or Cost	
Gross Return				
$0.090	Benola Root			
17.0%	6.46	ton	$ 180.00	$
$0.075	Cattle Feed			
8.0%	3.04	ton	$ 120.00	$
	38	ton	$ 40.20	$

one full crop

Operating Inputs

Item	Quantity Per Acre	Unit	Price or Cost	
Seed:				
Roundup Ready Beet Seed	0.5	unit	$ 375.00	$
* Includes fungicide & insecticide seed treatment				
				$
Fertilizer:				
Nitrogen - Preplant	20	lb	$ 0.34	$
P205	100	lb	$ 0.48	$
K20	40	lb	$ 0.46	$
Micronutrients	1	ac	$ 10.00	$
Nitrogen-Liquid	120	lb	$ 0.37	$
				$
Pesticides:				
Counter 15G L-N-L	14	lb	$ 2.15	$
Glyphosate applications	96	oz	$ 0.18	$
AMS	7.5	lb	$ 0.51	$

Sweet Sorghum with Ratoon — May to October (6.5 months)

Item	Quantity Per Acre	Unit	Price or Cost	Value or Cost/Acre
Gross Return				
$0.090	Benola Root			
14.0%	5.88	ton	$ 180.00	$ 1,058.40
$0.075	Cattle Feed			
10.0%	4.2	ton	$ 120.00	$ 504.00
	42	ton	$ 37.20	$ 1,562.40

one full crop + ratoon crop

seed, fertilizer, or irrigation for ratoon crop with 1/2 yield

Item	Quantity Per Acre	Unit	Price or Cost	Value or Cost/Acre
Operating Inputs				
:				
Swseet Sorghum Seed	0.75	unit	$ 10.00	$ 7.50
				$ 7.50
lizer:				
Nitrogen - Preplant	20	lb	$ 0.34	$ 6.88
P205	100	lb	$ 0.48	$ 48.00
K20	40	lb	$ 0.46	$ 18.56
Micronutrients	1	ac	$ 10.00	$ 10.00
Nitrogen - Liquid	120	lb	$ 0.37	$ 44.16

Roundup Ready Benola Root — Mid-Octob April (5.5 m

Item	Quantity Per Acre	Unit	Price or Cost
Gross Return			
$0.090	Benola Roo		
17.0%	6.46	ton	$ 180.00
$0.075	Cattle Feed		
8.0%	3.04	ton	$ 120.00
	38	ton	$ 40.20

one full crop

Item	Quantity Per Acre	Unit	Price or Cost
Operating Inputs			
Seed:			
Roundup Ready Beet Seed	0.5	unit	$ 375.00
* Includes fungicide & insecticide seed treatment			
Fertilizer:			
Nitrogen - Preplant	20	lb	$ 0.34
P205	100	lb	$ 0.48
K20	40	lb	$ 0.46
Micronutrients	1	ac	$ 10.00
Nitrogen - Liquid	120	lb	$ 0.37

Fall Season

with

Item	Quantity Per Acre	Unit	Price or Cost	Value or Cost/Acre
Gross Return				
$0.090	Benola Root			
	12.34	ton		$ 2,221.20
$0.060	Cattle Feed			
	7.24	ton		$ 868.80
	80	ton	$ 38.63	$ 3,090.00

annual season

c

no seed

Operating Inputs

Seed:	47%			
Seed	29%	unit		$ 195.00
				$ 195.00
Fertilizer:				

Seed:

Sv

Fertilizer:

annual season

Operating Inputs

Seed:	47%					
Seed	29%	unit			$	195.00
					$	195.00
Fertilizer:						
Nitrogen - Preplant	40	lb	$	0.34	$	13.76
P205	200	lb	$	0.48	$	96.00
K20	80	lb	$	0.46	$	37.12
Micronutrients	2	ac	$	10.00	$	20.00
Nitrogen-Liquid	240	lb	$	0.37	$	88.32
					$	255.20
Pesticides:						
Counter 15G L-N-L	28	lb	$	2.15	$	60.20
Glyphosate applications	192	oz	$	0.18	$	34.56
AMS	15	lb	$	0.51	$	7.65
Herbicide Application	6	ac	$	7.00	$	42.00
Fungicide Application	6	ac	$	25.00	$	150.00
					$	294.41
Custom & Consultants:						
Custom Fertilizer Application	2	ac	$	7.00	$	14.00
Consultant	2	ac	$	16.00	$	32.00
					$	46.00
Crop Insurance:						
NAD		ac			$	100.00
					$	100.00
Irrigation Costs:						
Irrigation	1	ac	$	40.00	$	40.00
					$	40.00
Machinery/Land Pre & Spraying:						
Fuel - Diesel	35	gal	$	3.70	$	129.50
Lube	2	ac	$	17.52	$	35.04
Machinery Repairs	2	ac	$	20.00	$	40.00
					$	204.54
Labor:						
Labor (Machine)	8	hr	$	15.00	$	120.00
Labor (Irrigation - cp)	1.8	hr	$	10.20	$	18.36
Labor (Other)	1	hr	$	10.00	$	10.00
					$	148.36
Harvest Cost:						
Harvester Cost (Custom)		ton			$	148.50
Hauling Charge	80	ton	$	2.00	$	160.00
Washing/Chipping	76	ton	$	2.00	$	152.00
Pelletizing/Bagging/Ensiling	7.24	ton	$	6.00	$	43.44
					$	503.94
Total Cost per Season					$	(1,787.45)
Gross Return - from Above					$	3,090.00
Net Gain (Loss)				73%	$	1,302.55

one full crop + ratoon crop

no seed, fertilizer, or irrigation for ratoon crop with 1/2 yield

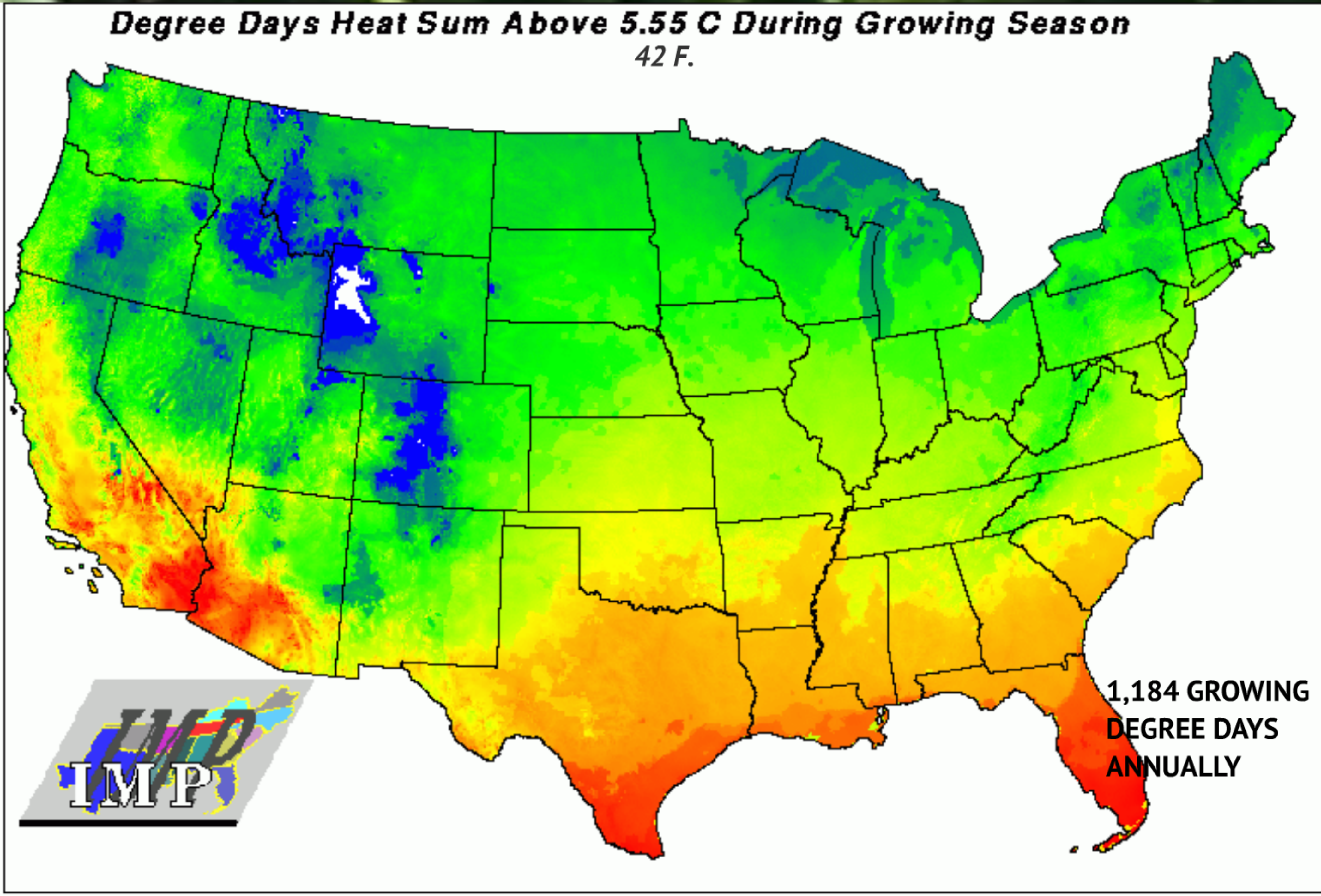
Operating Inputs

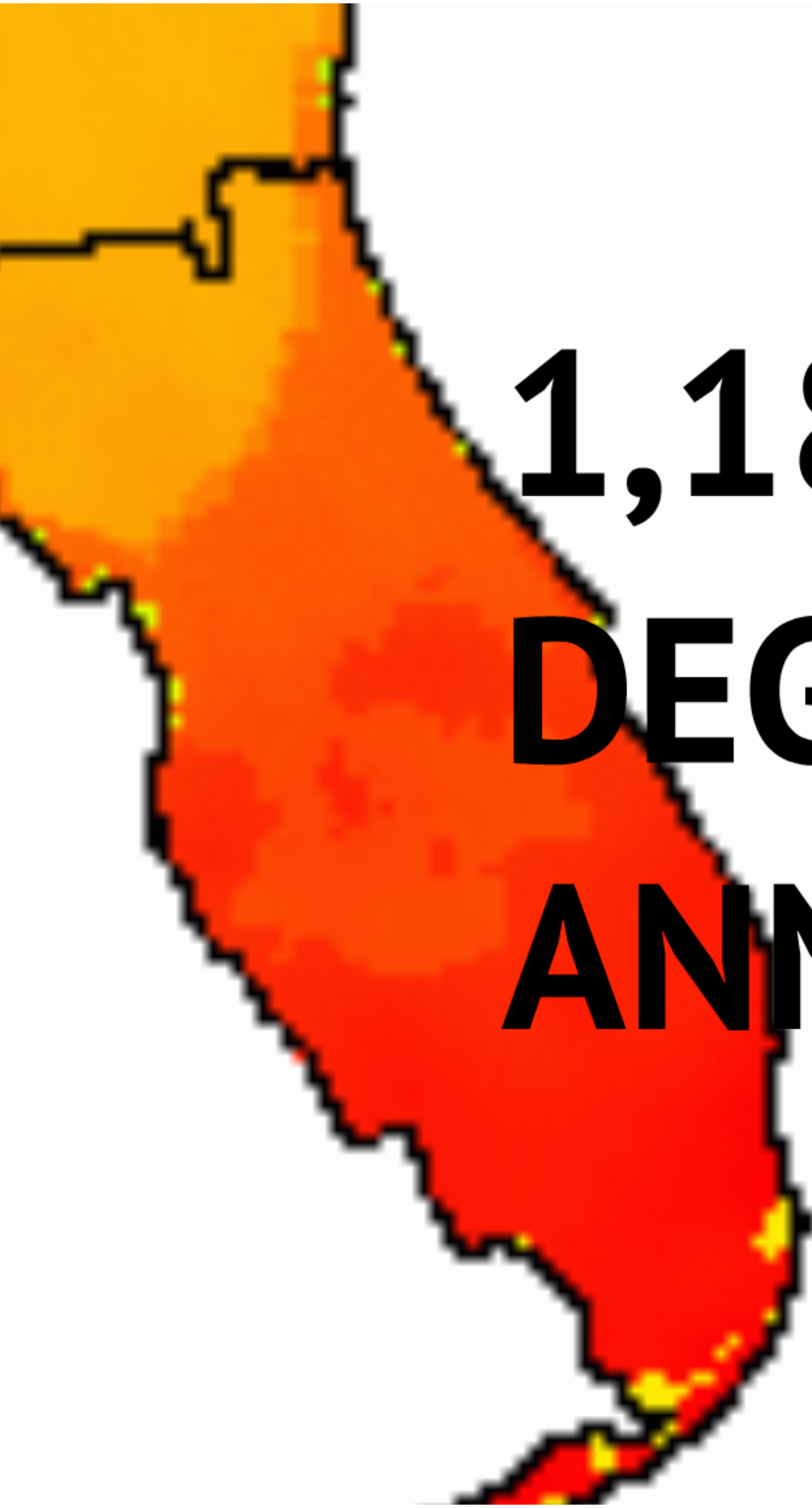
Seed:						
Swseet Sorghum Seed	0.75	unit	$	10.00	$	7.50
					$	7.50
Fertilizer:						
Nitrogen - Preplant	20	lb	$	0.34	$	6.88
P205	100	lb	$	0.48	$	48.00
K20	40	lb	$	0.46	$	18.56
Micronutrients	1	ac	$	10.00	$	10.00
Nitrogen-Liquid	120	lb	$	0.37	$	44.16
					$	127.60
Pesticides:						
Counter 15G L-N-L	14	lb	$	2.15	$	30.10
Glyphosate applications	96	oz	$	0.18	$	17.28
AMS	7.5	lb	$	0.51	$	3.83
Herbicide Application	3	ac	$	7.00	$	21.00
Fungicide Application	3	ac	$	25.00	$	75.00
					$	147.21
Custom & Consultants:						
Custom Fertilizer Application	1	ac	$	7.00	$	7.00
Consultant	1	ac	$	16.00	$	16.00
					$	23.00
Crop Insurance:						
NAD	0	ac	$	40.00	$	-
					$	-
Irrigation Costs:						
Irrigation	0	ac	$	40.00	$	-
					$	-
Machinery/Land Pre & Spraying:						
Fuel - Diesel	15	gal	$	3.70	$	55.50
Lube	1	ac	$	17.52	$	17.52
Machinery Repairs	1	ac	$	20.00	$	20.00
					$	93.02
Labor:						
Labor (Machine)	6	hr	$	15.00	$	90.00
Labor (Irrigation - cp)	0	hr	$	10.20	$	-
Labor (Other)	0.5	hr	$	10.00	$	5.00
					$	95.00
Harvest Cost:						
Harvester Cost (Custom)	42	ton	$	1.75	$	73.50
Hauling Charge	42	ton	$	2.00	$	84.00
Washing/Chipping	38	ton	$	2.00	$	76.00
Pelletizing/Bagging/Ensiling	4.2	ton	$	6.00	$	25.20
					$	258.70
Total Cost per Crop					$	(752.03)
Gross Return - from Above					$	1,562.40
Net Gain (Loss)				108%	$	810.38

c

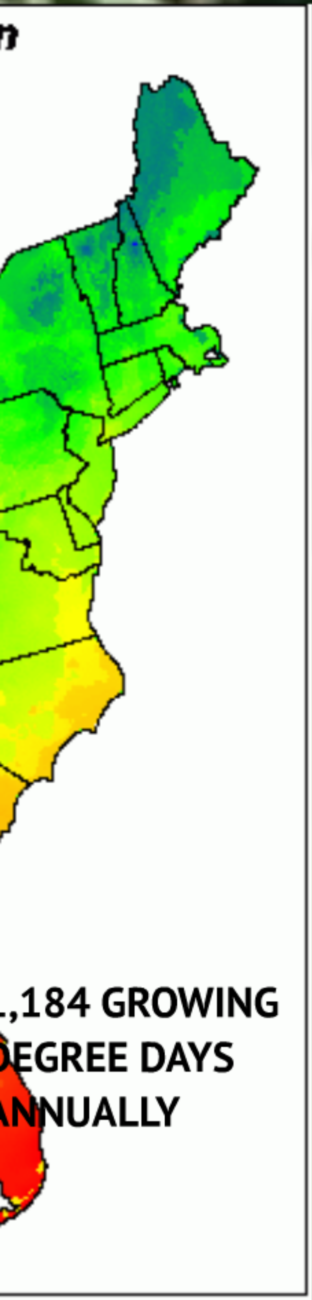
Seed:
Roundup Ready Bee
* Includes fungicide & insecticide
Fertilizer:
Nitrogen - Pr
Micronu
Nitrogen-
Pesticides:
Counter 15G
Glyphosate applic
Herbicide Applic
Fungicide Appli
Custom & Consultants:
Custom Fertilizer Appli
Cons
Crop Insurance:
Irrigation Costs:
Irri
Machinery/Land Pre &
Fuel -
Machinery R
Labor:
Labor (Ma
Labor (Irrigatio
Labor (
Harvest Cost:
Harvester Cost (Cu
Hauling C
Washing/Ch
Pelletizing/Bagging/E
Total Cost per Crop
Gross Return - fro
Net Gain (Loss)

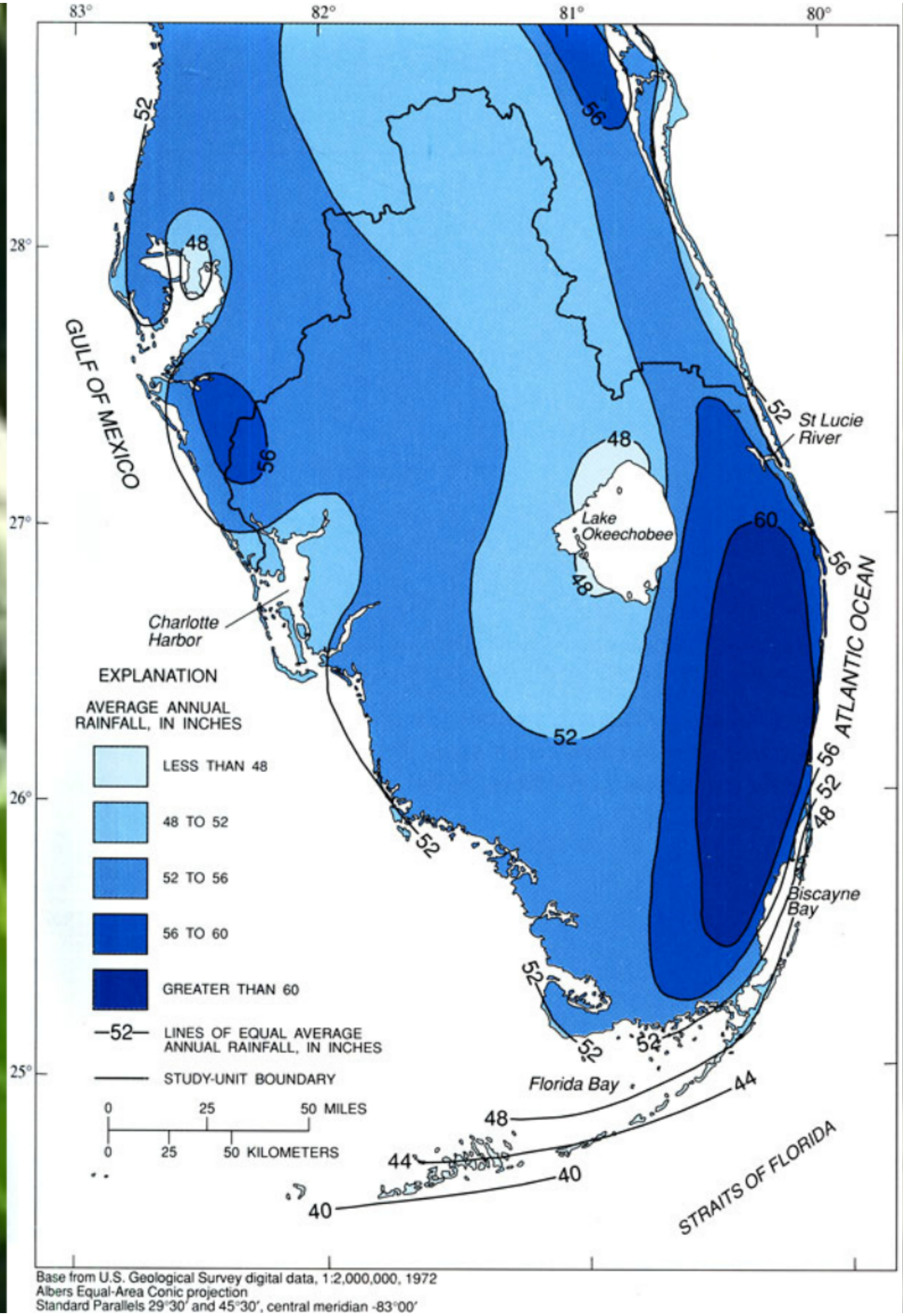
	$	503.94	
	$	(1,787.45)	Total
	$	3,090.00	Gross
$	$	1,302.55	Net C

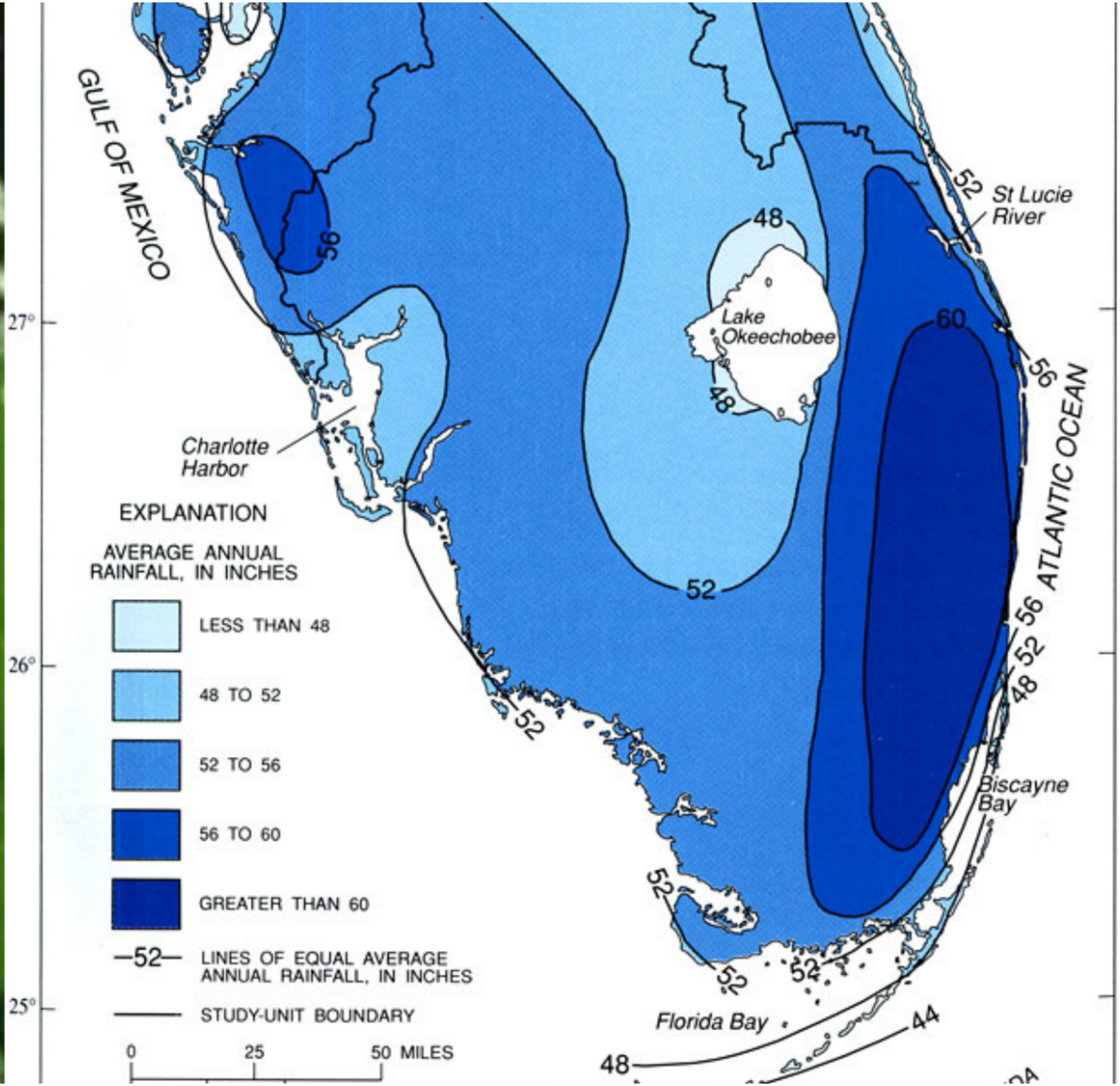

Degree Days Heat Sum Above 5.55 C During Growing Season
42 F.
1,184 GROWING
DEGREE DAYS
ANNUALLY
IMP



1,184 GROWING DEGREE DAYS ANNUALLY


,184 GROWING
EGREE DAYS
ANNUALLY


83°
82°
81°
80°
28°
27°
26°
25°
GULF OF MEXICO
ATLANTIC OCEAN
STRAITS OF FLORIDA
St Lucie River
Lake Okeechobee
Charlotte Harbor
Biscayne Bay
Florida Bay
EXPLANATION
AVERAGE ANNUAL RAINFALL, IN INCHES
LESS THAN 48
48 TO 52
52 TO 56
56 TO 60
GREATER THAN 60
—52— LINES OF EQUAL AVERAGE ANNUAL RAINFALL, IN INCHES
STUDY-UNIT BOUNDARY
0 25 50 MILES
0 25 50 KILOMETERS
Base from U.S. Geological Survey digital data, 1:2,000,000, 1972
Albers Equal-Area Conic projection
Standard Parallels 29°30′ and 45°30′, central meridian -83°00′


GULF OF MEXICO
ATLANTIC OCEAN
St Lucie River
Lake Okeechobee
Charlotte Harbor
Biscayne Bay
Florida Bay
27°
26°
25°
48
52
56
60
44
EXPLANATION
AVERAGE ANNUAL RAINFALL, IN INCHES
LESS THAN 48
48 TO 52
52 TO 56
56 TO 60
GREATER THAN 60
—52— LINES OF EQUAL AVERAGE ANNUAL RAINFALL, IN INCHES
STUDY-UNIT BOUNDARY
0
25
50 MILES

Kickoff Summary Report

3. Supply Chain Development Targets to achieve Sustainable BioChem Feedstock Market

2017 Stage I (100 acres)	April – May	June – July	August September	
a. Grower	sugar 1,000 tons			
b. Processors		ethanol 100,000 gallons		
c. End users - Aviation			SAJ	33,500 gallons
d. End users - Transportation			Renewable Diesel	33,500 gallons

2018 Stage II (1,000 acres)	April – May	June – July	August September	
a. Grower	sugar 10,000 tons			
b. Processors		ethanol 1,000,000 gallons		
c. End users - Aviation			SAJ	335,000 gallons
d. End users - Transportation			Renewable Diesel	335,000 gallons

2019 Stage III (10,000 acres)	April – May	June – July	August September	
a. Grower	sugar 100,000 tons			
b. Processors		ethanol 10,000,000 gallons		
c. End users - Aviation			SAJ	3,500,000 gallons
d. End users - Transportation			Renewable Diesel	3,500,000 gallons

FULL SCALE COMMERCIAL CULTIVATION AND PROCESSING

2020 Stage IV (50,000 acres)	April – May	June – July	August September	
a. Grower	sugar 500,000 tons			
b. Processors		ethanol 50,000,000 gallons		
c. End users - Aviation			SAJ	17,500,000 gallons
d. End users - Transportation			Renewable Diesel	17,500,000 gallons

n Feedstock Market

ugust September

J 33,500 gallons

l 33,500 gallons

ugust September

J 335,000 gallons

l 335,000 gallons

ugust September

J 3,500,000 gallons

l 3,500,000 gallons

ROCESSING

ugust September

J 17,500,000 gallons

l 17,500,000 gallons

USDA Rural Development

Committed to the future of rural communities.

Treasure Coast Research Park

FARM to FLY

FROM THE GROUND UP

5/24/2016

DRAFT

Target Supply Chain Yield Improvement (crop, sugar content, ethanol conversion, jet fuel conversion)

V.4	Year	1	2	3	4	5	6	7	8	9
	Annual Improvement	3%	103%	106%	109%	113%	116%	119%	123%	127%
Initial Yields	Feedstock crop (tons/acre)	80.0	82.4	84.9	87.4	90.0	92.7	95.5	98.4	101.3
15.4%	Sugar processing (tons)	12.3	12.7	13.1	13.5	13.9	14.3	14.7	15.2	15.6
58.7%	Feed Co-product (tons)	7.2	7.5	7.7	7.9	8.1	8.4	8.6	8.9	9.2
47.0%	Bio-ethanol processing (tons)	5.8	6.0	6.2	6.3	6.5	6.7	6.9	7.1	7.3
29.0%	Sustainable Jet Aviation processing (tons)	3.6	3.7	3.8	3.9	4.0	4.1	4.3	4.4	4.5
TOTAL SUPPLY CHAIN YIELD IMPROVEMENT			103%	106%	109%	113%	116%	119%	123%	127%
Sustainable Jet Aviation Fuel (gallons/acre)		1,145	1,180	1,215	1,251	1,289	1,328	1,367	1,408	1,451
equivalent Bio-ethanol (gallons/acre)		1,450	298,690	922,951	2,851,919	8,812,430	27,230,409	84,141,964	259,998,668	803,395,884
Acres		1	200	600	1,800	5,400	16,200	48,600	145,800	437,400
	Feedstock crop (tons)	80.0	16,480	50,923	157,353	486,220	1,502,419	4,642,475	14,345,249	44,326,819
	Sugar (tons)	12.3	2,542	7,855	24,272	74,999	231,748	716,102	2,212,755	6,837,412
	Feed Co-Product	7.2	1,491	4,609	14,240	44,003	135,969	420,144	1,298,245	4,011,577
	Bio-ethanol (tons)	5.8	1,195	3,692	11,408	35,250	108,922	336,568	1,039,995	3,213,584
	Sustainable Jet Aviation (tons)	3.6	737	2,278	7,039	21,750	67,207	207,670	641,699	1,982,849
TOTAL Sustainable Jet Aviation (gallons)		1,145	236,000	729,000	2,252,000	6,960,000	21,506,000	66,454,000	205,344,000	634,512,000
Breakeven Analysis assuming 2 1/2 crops & annual % cost reduction of:		-3.0%								
	Seed	$ 195	$ 189	$ 183	$ 178	$ 173	$ 167	$ 162	$ 158	$ 153
	Fertilizer	$ 255	$ 248	$ 240	$ 233	$ 226	$ 219	$ 213	$ 206	$ 200
	Pesticides	$ 294	$ 286	$ 277	$ 269	$ 261	$ 253	$ 245	$ 238	$ 231
	Consultants	$ 46	$ 45	$ 43	$ 42	$ 41	$ 40	$ 38	$ 37	$ 36
	Insurance & Irrigation	$ 140	$ 136	$ 132	$ 128	$ 124	$ 120	$ 117	$ 113	$ 110
	Machinery, Fuel	$ 205	$ 198	$ 192	$ 187	$ 181	$ 176	$ 170	$ 165	$ 160
	Labor	$ 148	$ 144	$ 140	$ 135	$ 131	$ 127	$ 124	$ 120	$ 116
	Harvest	$ 504	$ 489	$ 474	$ 460	$ 446	$ 433	$ 420	$ 407	$ 395
2.0%	Profit	$ 1,303	$ 1,329	$ 1,355	$ 1,382	$ 1,410	$ 1,438	$ 1,467	$ 1,496	$ 1,526
Gross Feedstock - cost/acre		$ 3,090	$ 3,062	$ 3,037	$ 3,014	$ 2,992	$ 2,973	$ 2,956	$ 2,940	$ 2,927
gross - cost/# sugar		$ 0.125	$ 0.120	$ 0.116	$ 0.112	$ 0.108	$ 0.104	$ 0.100	$ 0.09[illegible]	$ 0.094
$150	Cattle feed	$ 1,086	$ 1,086	$ 1,086	$ 1,086	$ 1,086	$ 1,086	$ 1,086	$ 1,086	$ 1,086
Net of Feedstock - cost/acre		$ 2,004	$ 1,976	$ 1,951	$ 1,928	$ 1,906	$ 1,887	$ 1,870	$ 1,854	$ 1,841
NET - cost/# sugar		$ 0.081	$ 0.078	$ 0.075	$ 0.071	$ 0.069	$ 0.066	$ 0.063	$ 0.06[illegible]	$ 0.059
Feedstock Cost/Sustainable Jet Fuel Gallon									**DRAFT**	
		$ 1.75	$ 1.68	$ 1.61	$ 1.54	$ 1.48	$ 1.42	$ 1.37	$ 1.32	$ 1.27
Processing Cost/Sustainable Jet Fuel Gallon									**DRAFT**	
		Demonstration			Scale up			FULL SCALE		
	Utilities	$ 0.45	$ 0.45	$ 0.45	$ 0.35	$ 0.35	$ 0.35	$ 0.30	$ 0.28	$ 0.26
	Labor	$ 0.38	$ 0.38	$ 0.38	$ 0.34	$ 0.34	$ 0.34	$ 0.29	$ 0.28	$ 0.25
	Capital recovery	$ 0.35	$ 0.35	$ 0.35	$ 0.30	$ 0.30	$ 0.30	$ 0.25	$ 0.23	$ 0.21
	Chemicals	$ 0.25	$ 0.25	$ 0.25	$ 0.20	$ 0.20	$ 0.20	$ 0.18	$ 0.16	$ 0.14
	Logistics	$ 0.20	$ 0.20	$ 0.20	$ 0.20	$ 0.20	$ 0.20	$ 0.16	$ 0.14	$ 0.12
	Admin	$ 0.20	$ 0.20	$ 0.20	$ 0.20	$ 0.20	$ 0.20	$ 0.16	$ 0.14	$ 0.12
	Profit	$ 0.14	$ 0.14	$ 0.14	$ 0.15	$ 0.15	$ 0.15	$ 0.16	$ 0.17	$ 0.18
	SUBTOTAL	$ 1.97	$ 1.97	$ 1.97	$ 1.74	$ 1.74	$ 1.74	$ 1.50	$ 1.40	$ 1.28
Production - Cost/Sustainable Jet Fuel Gallon										
SUBTOTAL		$ 3.71	$ 3.64	$ 3.57	$ 3.28	$ 3.22	$ 3.16	$ 2.87	$ 2.72	$ 2.55
RFS - D5 RIN Credit		$0.75	$0.75	$0.75	$0.75	$0.75	$0.75	$0.75	$0.75	$0.75
NET Wholesale - Cost/Sustainable Jet Fuel Gallon										
TOTAL		$2.96	$2.89	$2.82	$ 2.53	$ 2.47	$ 2.41	$ 2.12	$ 1.97	$ 1.80

V.4	Year	1	2	3	4
	Annual Improvement	3%	103%	106%	109
Initial Yields	Feedstock crop (tons/acre)	80.0	82.4	84.9	
15.4%	Sugar processing (tons)	12.3	12.7	13.1	
58.7%	Feed Co-product (tons)	7.2	7.5	7.7	
47.0%	Bio-ethanol processing (tons)	5.8	6.0	6.2	
29.0%	Sustainable Jet Aviation processing (tons)	3.6	3.7	3.8	
TOTAL SUPPLY CHAIN YIELD IMPROVEMENT			103%	106%	
Sustainable Jet Aviation Fuel (gallons/acre)		1,145	1,180	1,215	
equivalent Bio-ethanol (gallons/acre)		1,450	298,690	922,951	2,85
	Acres	1	200	600	1,80
	Feedstock crop (tons)	80.0	16,480	50,923	15
	Sugar (tons)	12.3	2,542	7,855	2
	Feed Co-Product	7.2	1,491	4,609	1
	Bio-ethanol (tons)	5.8	1,195	3,692	1
	Sustainable Jet Aviation (tons)	3.6	737	2,278	
TOTAL Sustainable Jet Aviation (gallons)		1,145	236,000	729,000	2,252,

	145,800	437,400
475	14,345,249	44,326,819
102	2,212,755	6,837,412
144	1,298,245	4,011,577
568	1,039,995	3,213,584
670	641,699	1,982,849
00	205,344,000	634,512,000

	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Consultants	$ 46	$ 45	$ 43	$ 42	$ 41	$ 40	$ 38	$ 37	$ 36
	Insurance & Irrigation	$ 140	$ 136	$ 132	$ 128	$ 124	$ 120	$ 117	$ 113	$ 110
	Machinery, Fuel	$ 205	$ 198	$ 192	$ 187	$ 181	$ 176	$ 170	$ 165	$ 160
	Labor	$ 148	$ 144	$ 140	$ 135	$ 131	$ 127	$ 124	$ 120	$ 116
	Harvest	$ 504	$ 489	$ 474	$ 460	$ 446	$ 433	$ 420	$ 407	$ 395
2.0%	Profit	$ 1,303	$ 1,329	$ 1,355	$ 1,382	$ 1,410	$ 1,438	$ 1,467	$ 1,496	$ 1,526
	Gross Feedstock - cost/acre	$ 3,090	$ 3,062	$ 3,037	$ 3,014	$ 2,992	$ 2,973	$ 2,956	$ 2,940	$ 2,927
	gross - cost/# sugar	$ 0.125	$ 0.120	$ 0.116	$ 0.112	$ 0.108	$ 0.104	$ 0.100	$ 0.097	$ 0.094
$150	Cattle feed	$ 1,086	$ 1,086	$ 1,086	$ 1,086	$ 1,086	$ 1,086	$ 1,086	$ 1,086	$ 1,086
	Net of Feedstock - cost/acre	$ 2,004	$ 1,976	$ 1,951	$ 1,928	$ 1,906	$ 1,887	$ 1,870	$ 1,854	$ 1,841
	NET - cost/# sugar	$ 0.081	$ 0.078	$ 0.075	$ 0.071	$ 0.069	$ 0.066	$ 0.063	$ 0.061	$ 0.059

Feedstock Cost/Sustainable Jet Fuel Gallon

DRAFT

$ 1.75	$ 1.68	$ 1.61	$ 1.54	$ 1.48	$ 1.42	$ 1.37	$ 1.32	$ 1.27

Processing Cost/Sustainable Jet Fuel Gallon

DRAFT

	Demonstration			Scale up			FULL SCALE		
Utilities	$ 0.45	$ 0.45	$ 0.45	$ 0.35	$ 0.35	$ 0.35	$ 0.30	$ 0.28	$ 0.26
Labor	$ 0.38	$ 0.38	$ 0.38	$ 0.34	$ 0.34	$ 0.34	$ 0.29	$ 0.28	$ 0.25
Capital recovery	$ 0.35	$ 0.35	$ 0.35	$ 0.30	$ 0.30	$ 0.30	$ 0.25	$ 0.23	$ 0.21
Chemicals	$ 0.25	$ 0.25	$ 0.25	$ 0.20	$ 0.20	$ 0.20	$ 0.18	$ 0.16	$ 0.14
Logistics	$ 0.20	$ 0.20	$ 0.20	$ 0.20	$ 0.20	$ 0.20	$ 0.16	$ 0.14	$ 0.12
Admin	$ 0.20	$ 0.20	$ 0.20	$ 0.20	$ 0.20	$ 0.20	$ 0.16	$ 0.14	$ 0.12
Profit	$ 0.14	$ 0.14	$ 0.14	$ 0.15	$ 0.15	$ 0.15	$ 0.16	$ 0.17	$ 0.18
SUBTOTAL	$ 1.97	$ 1.97	$ 1.97	$ 1.74	$ 1.74	$ 1.74	$ 1.50	$ 1.40	$ 1.28

Production - Cost/Sustainable Jet Fuel Gallon

SUBTOTAL	$ 3.71	$ 3.64	$ 3.57	$ 3.28	$ 3.22	$ 3.16	$ 2.87	$ 2.72	$ 2.55
RFS - D5 RIN Credit	$0.75	$0.75	$0.75	$0.75	$0.75	$0.75	$0.75	$0.75	$0.75

NET Wholesale - Cost/Sustainable Jet Fuel Gallon

TOTAL	$2.96	$2.89	$2.82	$ 2.53	$ 2.47	$ 2.41	$ 2.12	$ 1.97	$ 1.80

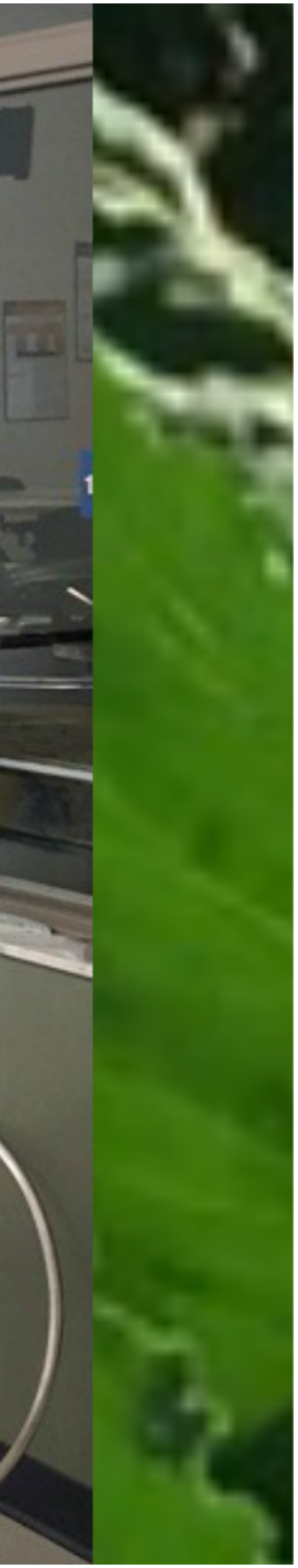
	$	1,303	$	1,32
cre	$	3,090	$	3,06
r	$	0.125	$	0.12
	$	1,086	$	1,08
/acre	$	2,004	$	1,97
r	$	0.081	$	0.07

1,496	$	1,526
2,940	$	2,927
0.097	$	0.094
1,086	$	1,086
1,854	$	1,841
0.061	$	0.059

AFT

$ 1.80


1
Chopped E Beets
2
Liquified E Beets
(Cellulase + Pectinase)
after Yeast Fermentation
3
Filtered E Beets
Beer
4
Distilled E Beet
Ethanol



Draft MOU

INDUSTRY PARTNER
Memorandum of Understanding Between
Treasure Coast Education, Research and Development Authority ("TCERDA")
And **XXXX Corporation**
("Industry Partner")

Treasure Coast Education, Research and Development Authority's mission is to improve Food Energy and Water security in Florida's Treasure Coast. TCERDA collaborates with universities, colleges, government agencies, non-profit organizations, local civic groups, businesses and national industry partners in order to bring world leading applied research and business leadership to the leading challenges facing Florida. TCERDA is an active partner to prepare the Treasure Coast students to enter the work force with the confidence and ability to assume leadership positions in the dynamic technological landscape in Florida, the nation, and the world.

This Memorandum of Understanding memorializes the intent of the parties to create a mutually beneficial, collaborative relationship that will lead to joint endeavors. Such endeavors may include the Industry Partner assisting the TCERDA in feasibility studies, guiding sustainable jet fuel development, serving on advisory boards, leading workshops, offering industry insight and analysis, providing internships for students, supporting the efforts of TCERDA, conducting joint research in sustainable jet fuel feedstock and bioprocessing pathways, collaborating in supply chain and product development, and mutual general support in any such endeavors. Specific tasks that are of special interest to **XXXX** are enumerated on Exhibit I.

Consequently, **XXXX** and TCERDA provide this non-binding letter as a statement of their interest to continue to explore the Proposed Project. Any joint projects or undertaking between the parties that shall require or impose any legally binding obligation on either party will be set forth in a separate, written agreement. The parties hereby acknowledge this Memorandum of Understanding by the signatures below:

Treasure Coast Education, Research and Development Authority (TCERDA):	**XXXX Corporation**:
______________________	______________________
Ben DeVries, CEO	Title: ____________________
Date: __________________	Date: ____________________

Proposed Project Goals

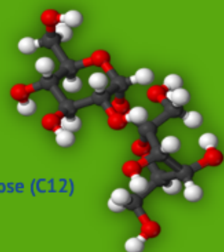
XXXX has an interest in working with TCERDA to create a sustainable jet fuel supply chain in Florida, including purchasing Sustainable Jet Aviation (SJA) Fuel from a bioprocessing facility in Florida ("Project"). **XXXX'** interest in the Project beyond additional discussions is conditioned upon the Project's realization of:

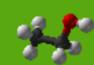
- Capacity to deliver 500,000 to 15,000,000 gallons of SJA annually;
- Cultivation of 500 to 15,000 acres of Advanced Biochem feedstock crops sufficient to assure production and timely contract delivery;
- Construction of one or more bioprocessing facilities to convert sugar feedstocks into an ASTM International approved synthesized hydrocarbon turbine fuel;
- Guarantees by the State of Florida regarding the supply and pricing of feedstock under these contracts;
- State and local financial support for the plant's utilities and infrastructure;
- Offtake agreements for 75% of the plant's design volume;
- The extension of the federal RFS2 legislation and approval of a pathway to enable RIN capture; and
- Stakeholders' assistance with obtaining regulatory and environmental approvals.

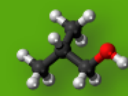
The parties further agree that they will collaborate in good faith to finalize the following:

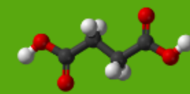
- Quantity/type of fuel
- Quality
- Project timeline; product delivery timeline

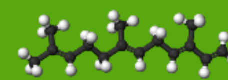
Advanced BioFuel (ABF) and BioPlastic Molecules from Sucrose


Sucrose (C12)


Ethanol (C2)


Butenol (C4)


Succinic Acid (C4)


Farnasene (C15)

ABF root crops	
Sucrose (C12)	15-18%
Pulp	7 - 8%
Water	78-74%

Florida Commercial Aviation
State GDP $61.9B (8.44%) & 930,000 jobs (9.4%)

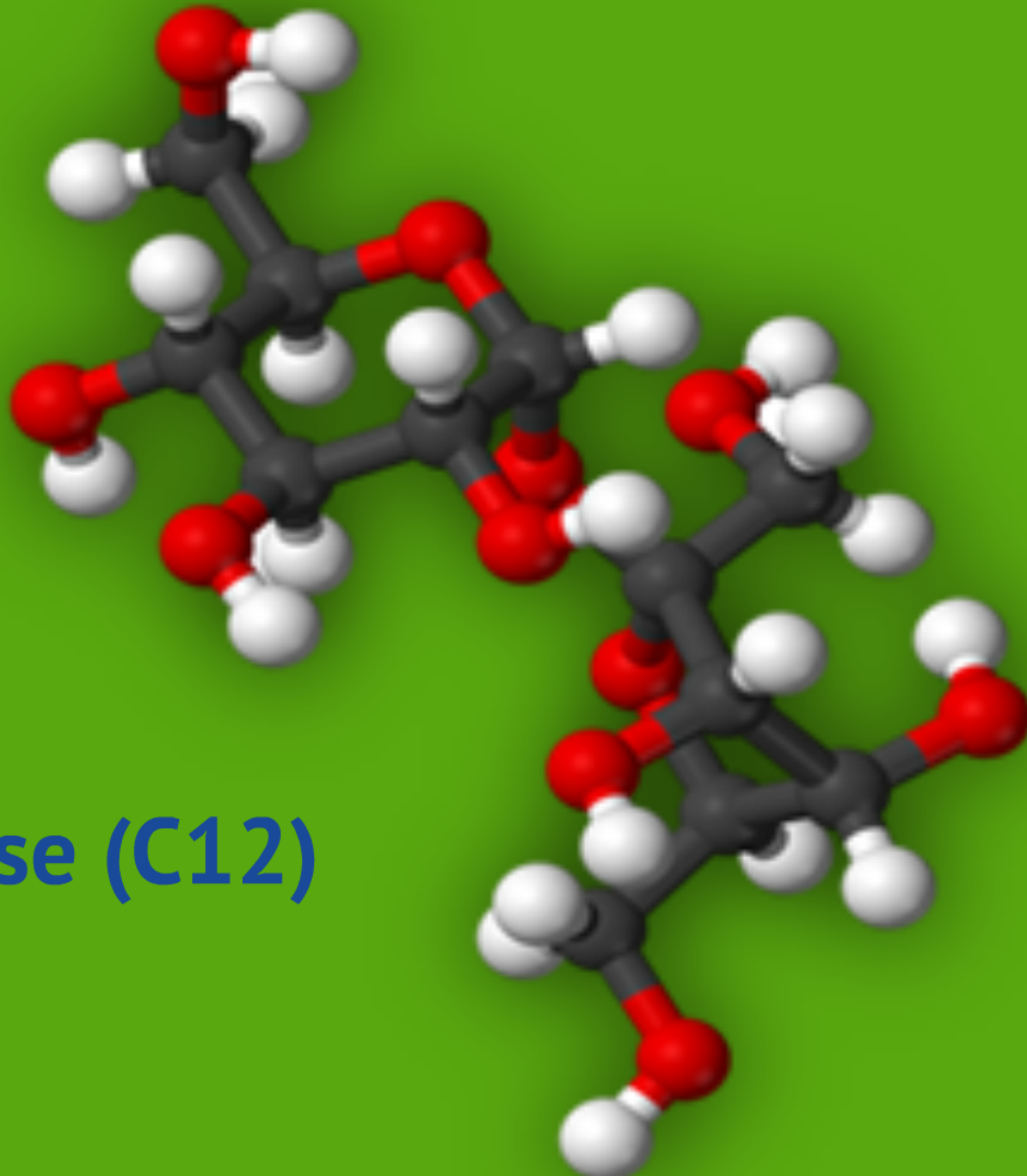
- Florida spends $42 billion for 290 million barrels of petroleum annually, 90% in transportation.
- 100 million people visit Florida annually.
- 20+ million people live in Florida.
- Florida aviation consumes 4.9 million gallons jet fuel/day.

US Commercial Airlines use of ABF "Drop-In" Sustainable Jet Fuels is forecast to grow to 8 billion gallons per year by 2030

FedEx

jetBlue

American Airlines



Sucrose (C12)

Et

ABE root crops

ABF root crops

Sucrose (C12)	15-18%
Pulp	7 - 8%
Water	78-74%

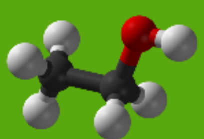
Beta Vulgaris


Sorghum

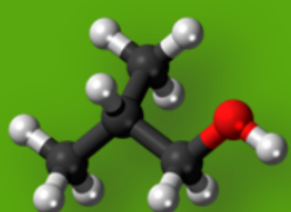
FARM to FLY

FROM THE GROUND UP

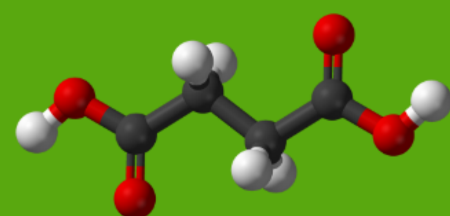
Advanced BioFuel (ABF) and BioPlastic Molecules from Sucrose



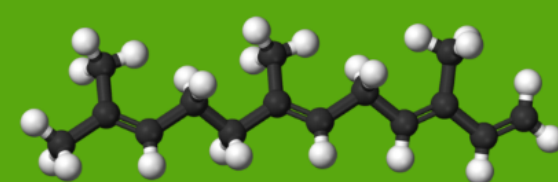
Ethanol (C2)



Butenol (C4)

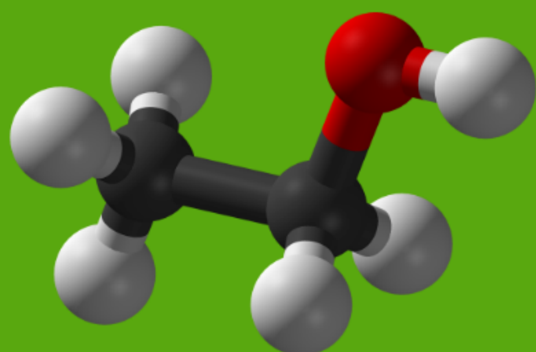


Succinic Acid (C4)

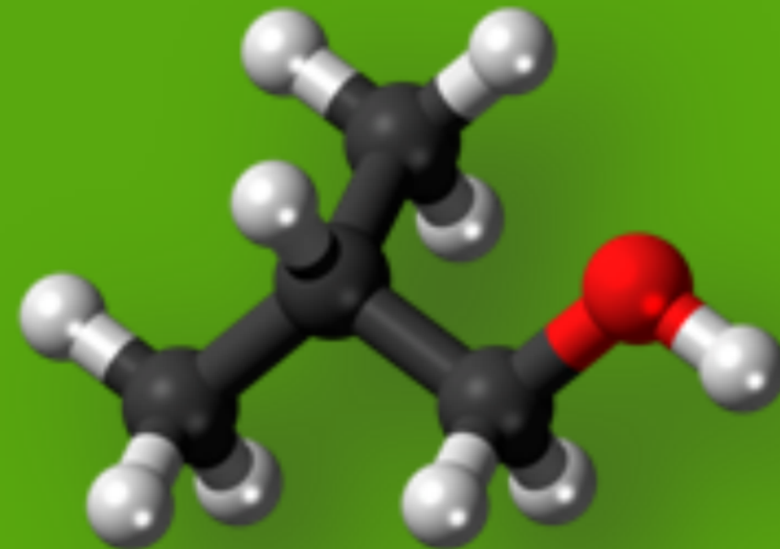


Farnasene (C15)

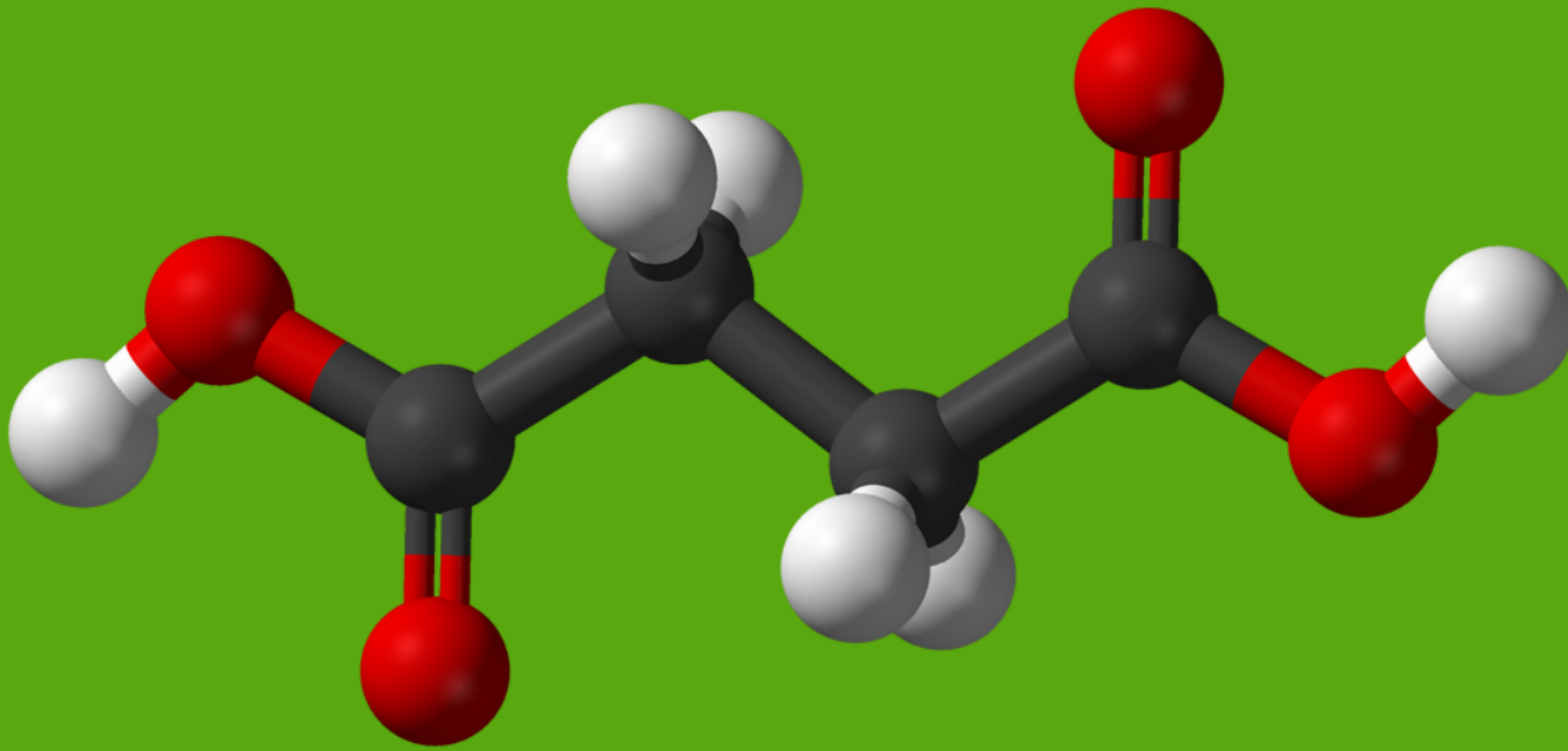
Florida Commercial Aviation



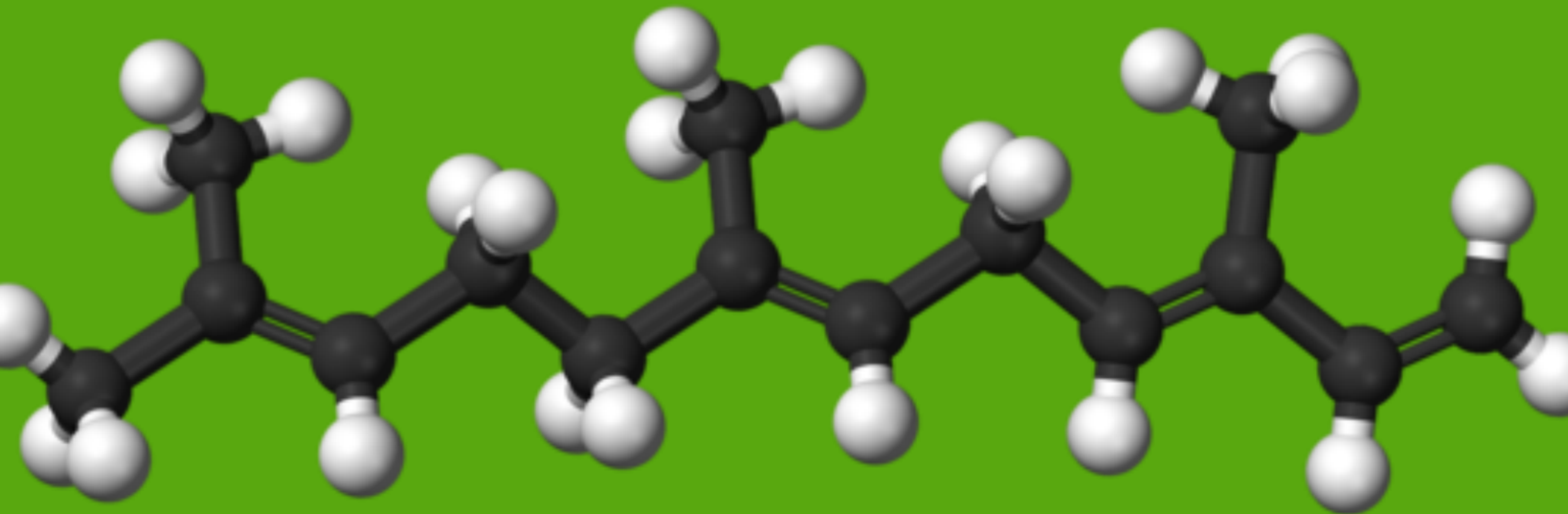
Ethanol (C2)



Butenol (C4)

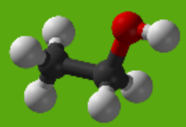


Succinic Acid (C4)

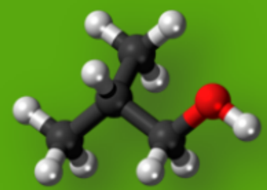


Farnasene (C15)

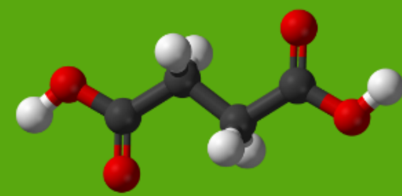
Advanced BioFuel (ABF) and BioPlastic Molecules from Sucrose



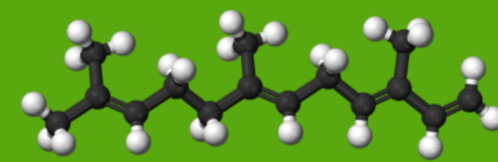
Ethanol (C2)



Butenol (C4)



Succinic Acid (C4)



Farnasene (C15)

Florida Commercial Aviation
State GDP $61.9B (8.44%) & 930,000 jobs (9.4%)

Florida spends $42 billion for 290 million barrels of petroleum annually, 90% in transportation.

100 million people visit Florida annually.

20+ million people live in Florida.

Florida aviation consumes 4.9 million gallons jet fuel/da

ABF root crops	
ucrose (C12)	15-18%
ulp	7 - 8%
ater	78-74%

Florida Commercial Aviation
State GDP $61.9B (8.44%) & 930,000 jobs (9.4%)

- Florida spends $42 billion for 290 million barrels of petroleum annually, 90% in transportation.
- 100 million people visit Florida annually.
- 20+ million people live in Florida.
- Florida aviation consumes 4.9 million gallons jet fuel,

US Commercial Airlines use of ABF "Drop-In" Sustainable Jet Fuels is forecast to grow to 8 billion gallons per year by 2030

FedEx

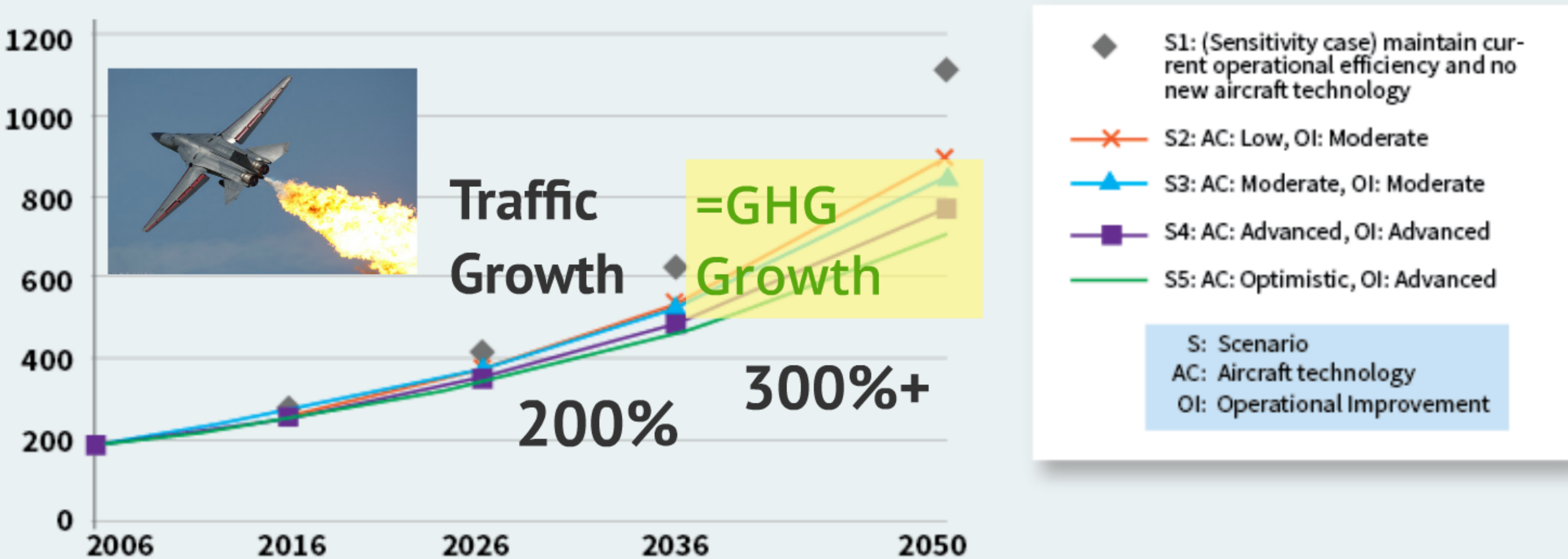
jetBlue

American Airlines


FARM to FLY
FROM THE GROUND UP
Airlines for America
We Connect the World
International Civil Aviation Organization
CAAFI
GO GREEN
SJF Feedstock
Global aircraft fuel burn (International and domestic traffic)
Traffic Growth
GHG Growth
200%
300%+
{Mind the Gap}
Aviation Emissions Exceed Goals Even With Optimistic Technology Uptake
Replacing one barrel of fossil jet fuel with Sustainable Jet Fuel (SJF) eliminates ONE HALF TON OF CO2
Jet Fuel
Advanced BioFuel Carbon Cycle
Fossil Jet Fuel GHG Cycle
ABF root crop cultivation and SJF processing will help Florida meet air standards of the U.S. Clean Air Act.
Florida aviation adds 2,865 cubic miles of CO2 annually
One Miami to LA flight per day adds 41 cubic miles of CO2 annually

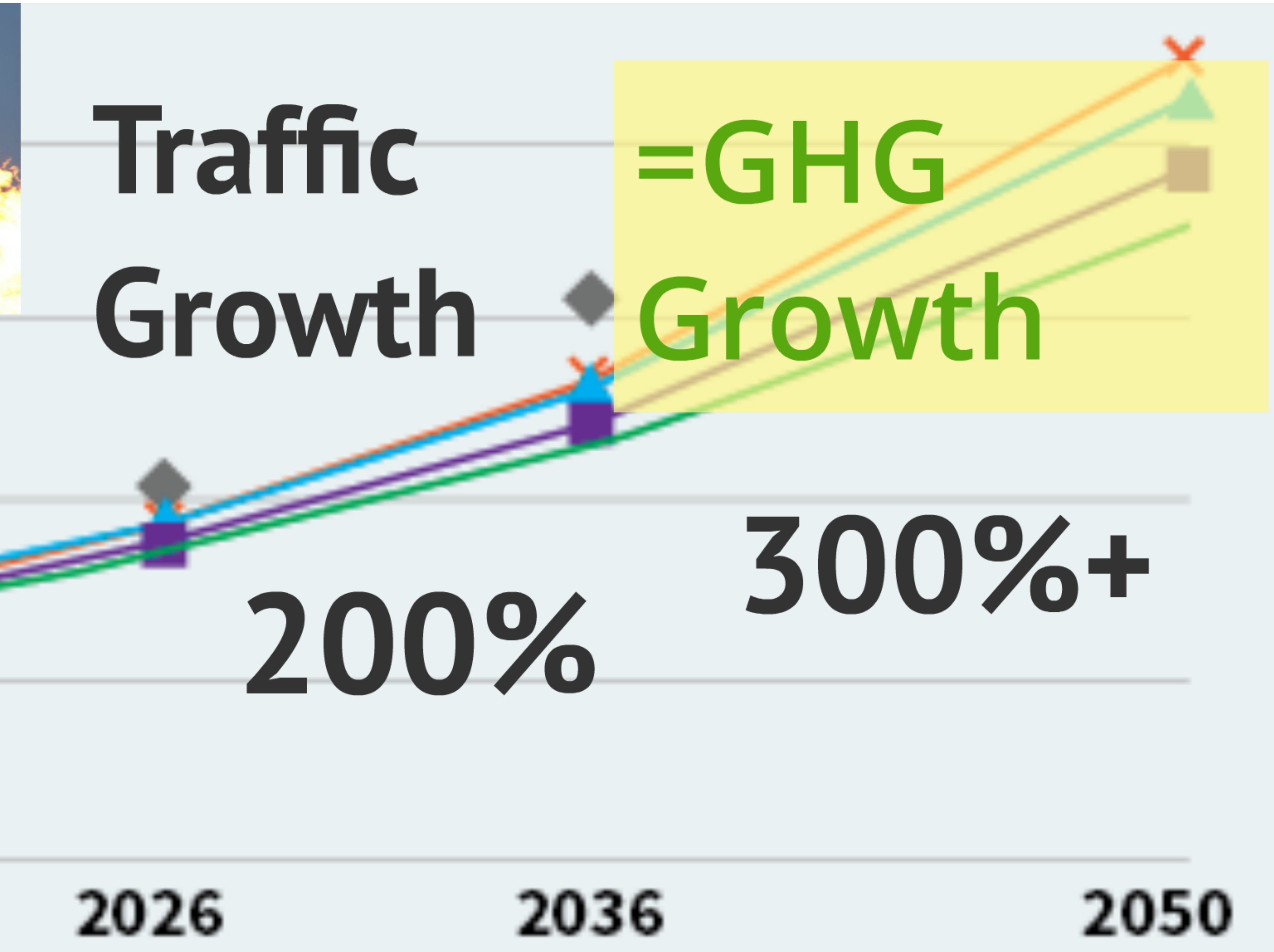
Airlines for America®
We Connect the World
ICAO • OACI • ИКАО
International
Civil
Aviation
Organization
ICAO AVIATION AND SUSTAINABLE
ALTERNATIVE FUELS
WORKSHOP
ICAO Headquarters, Montréal, Canada
18 to 20 October 2011
CAAFI®
GO GREEN

Global aircraft fuel burn (International and domestic traffic)

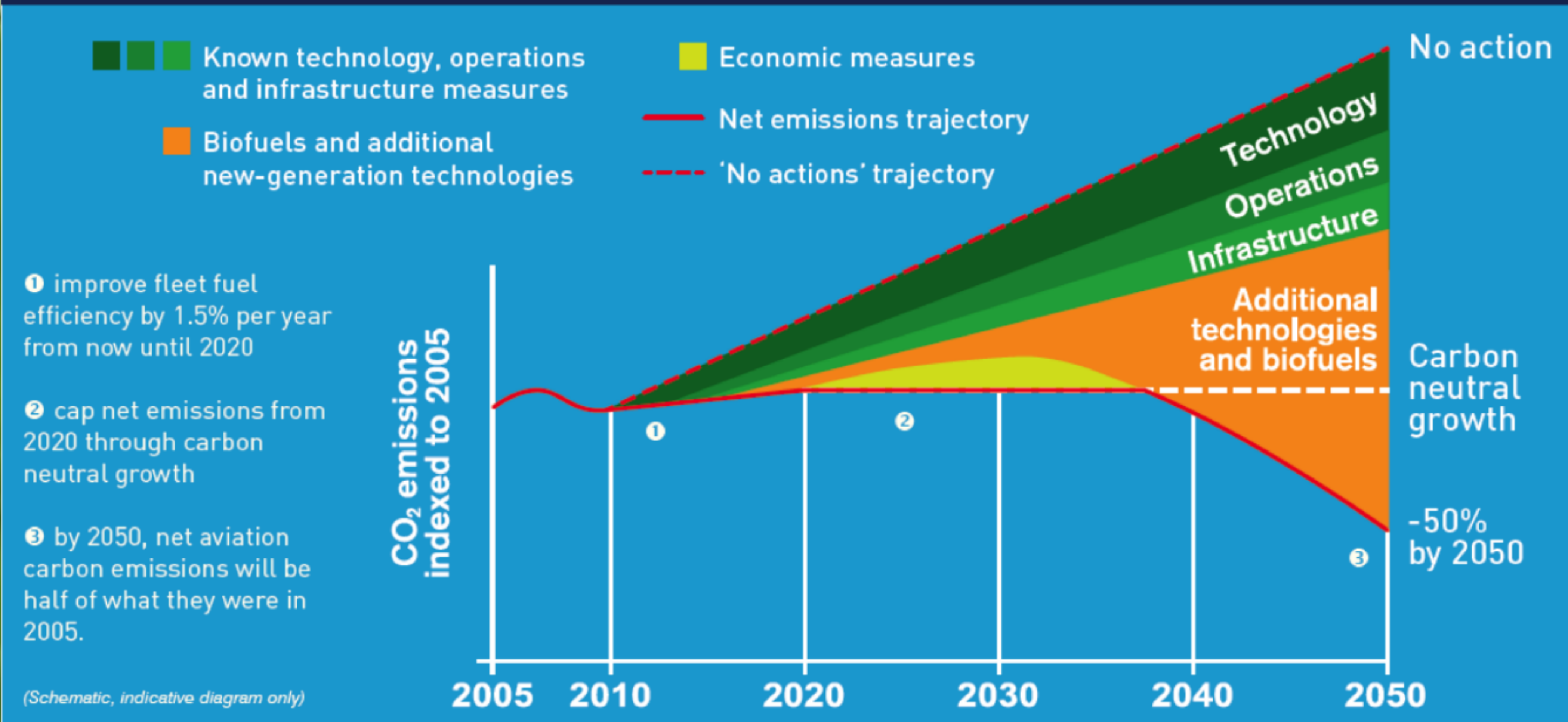


Note: Results were modelled for 2006, 2016, 2026 and 2036, then extrapolated to 2050

Source: International Civil Aviation Organization, ICAO Environmental Report 2010
Transport & Environment

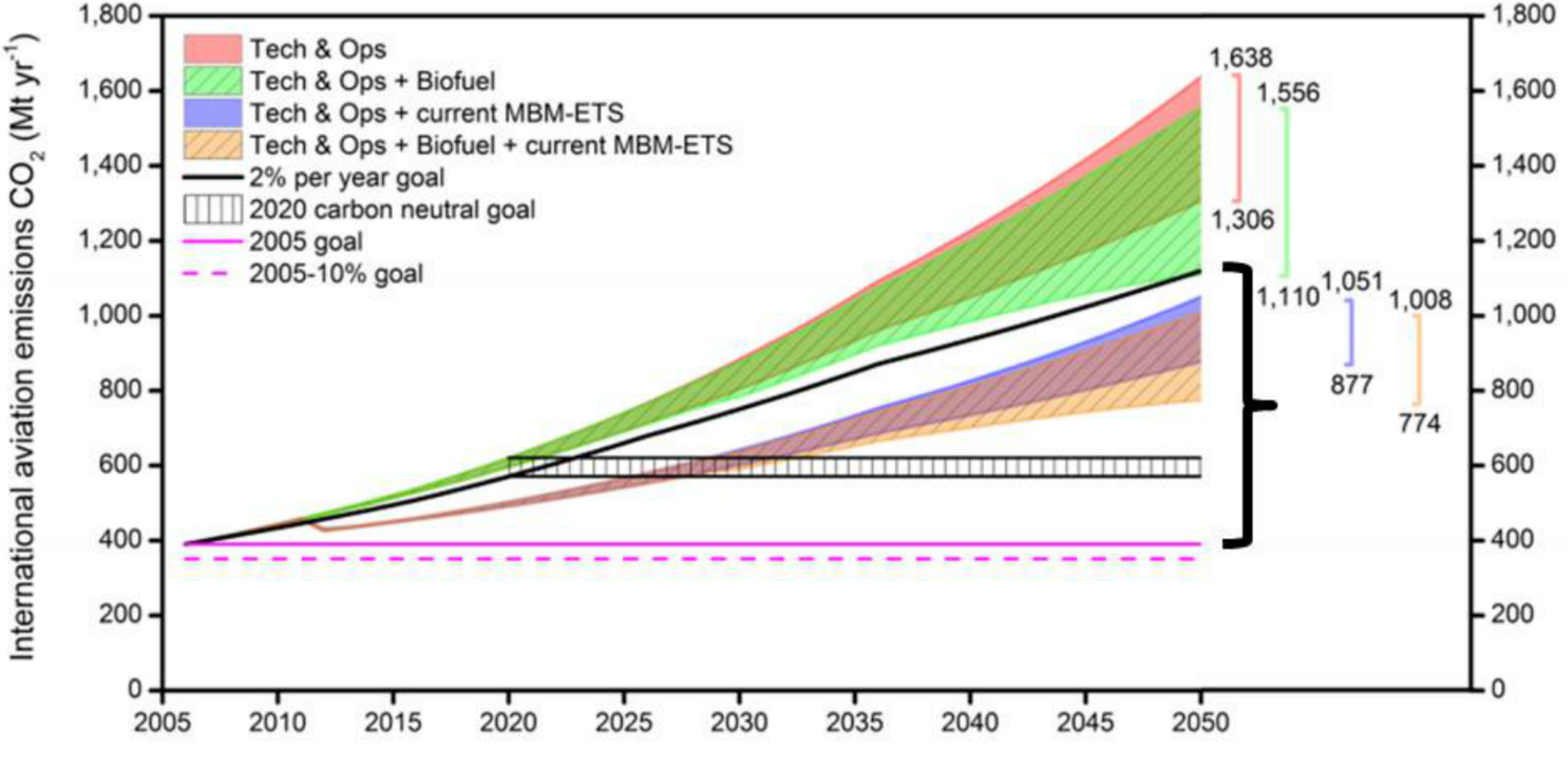

Traffic
Growth
=GHG
Growth
200%
300%+
2026
2036
2050

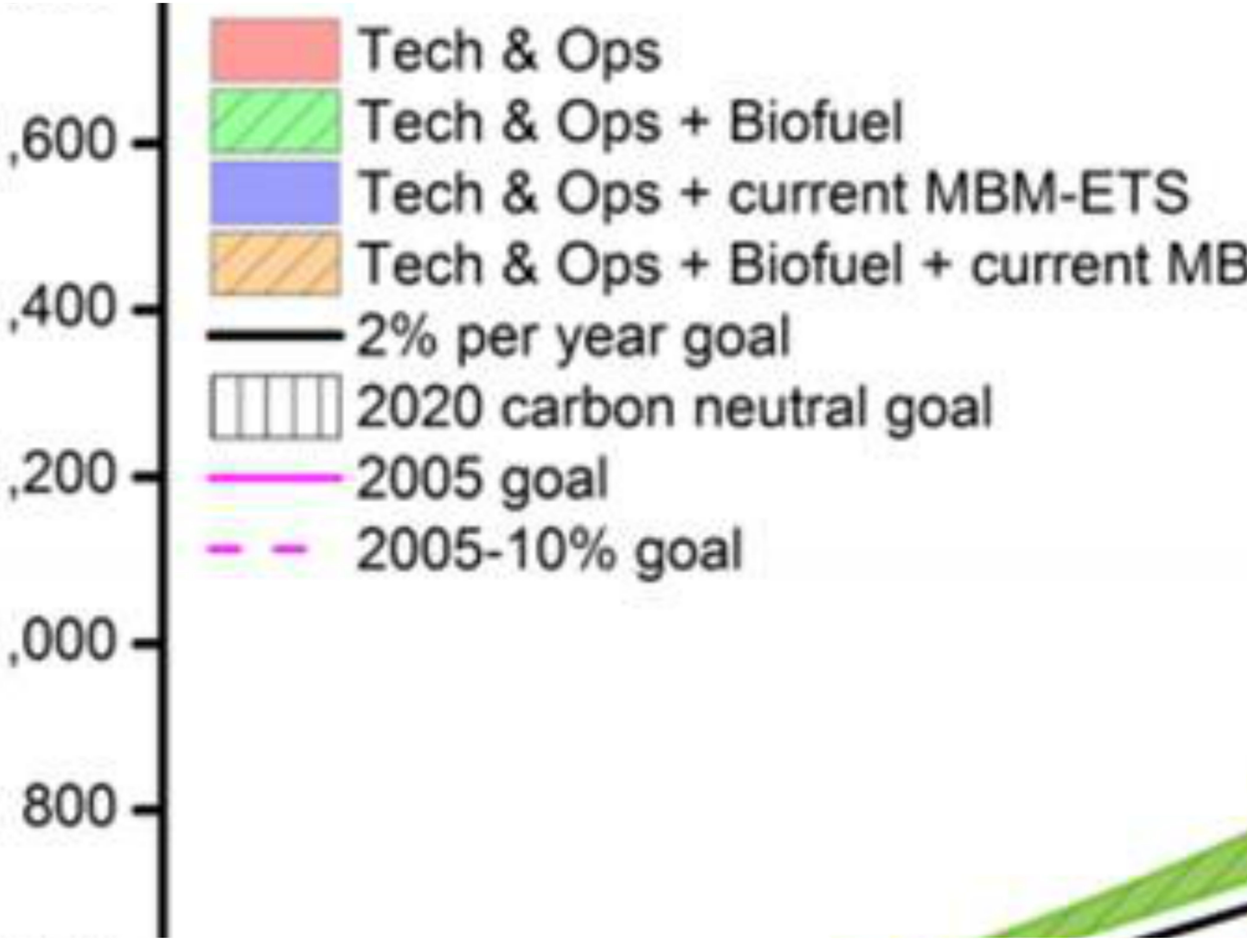
MAPPING OUT THE INDUSTRY COMMITMENTS



{Mind the Gap}

Aviation Emissions Exceed Goals Even With Optimistic Technology Uptake





Tech & Ops
Tech & Ops + Biofuel
Tech & Ops + current MBM-ETS
Tech & Ops + Biofuel + current MB
2% per year goal
2020 carbon neutral goal
2005 goal
2005-10% goal
,600
,400
,200
,000
800

TCERDA

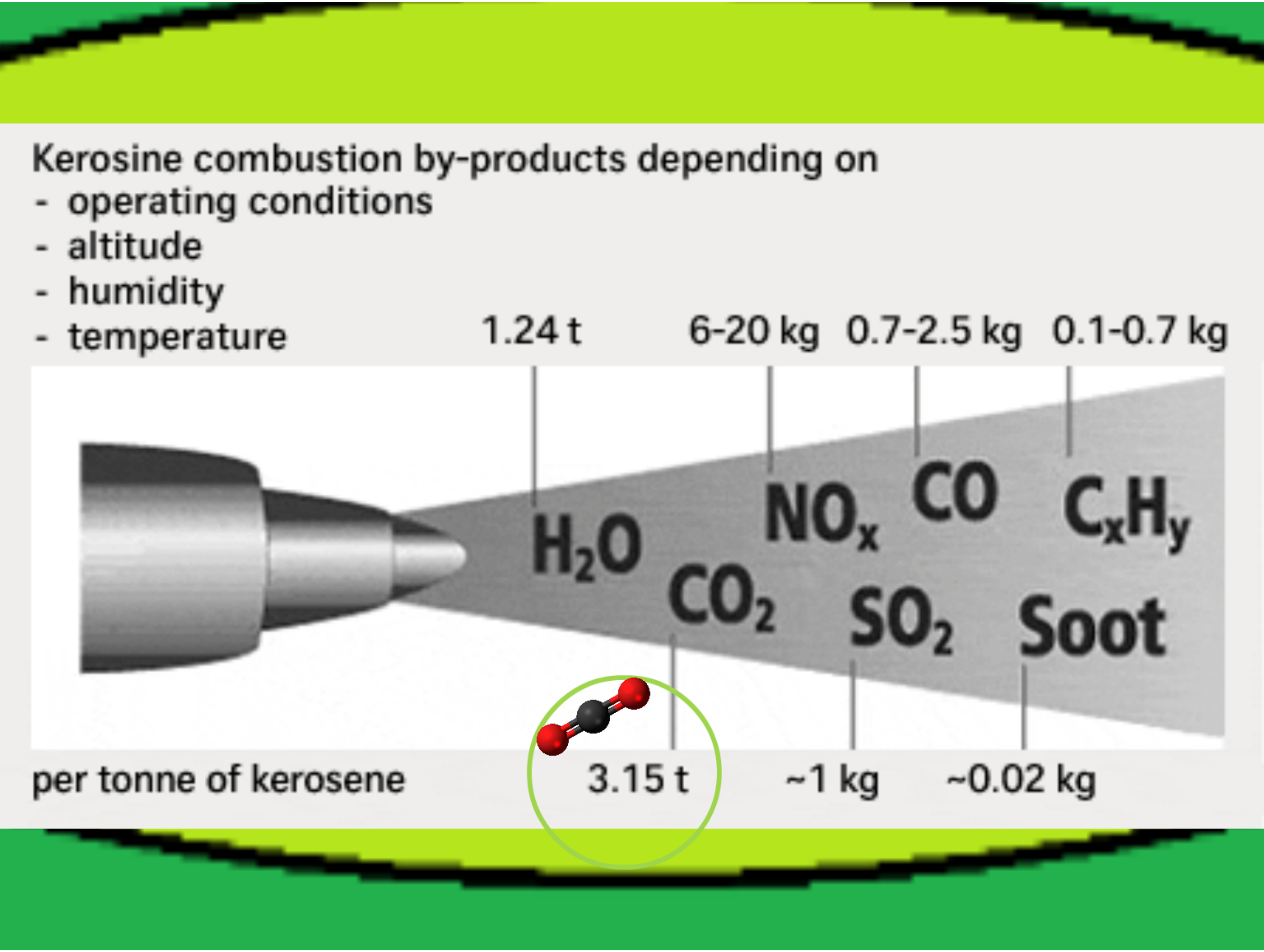
Jet Fuel

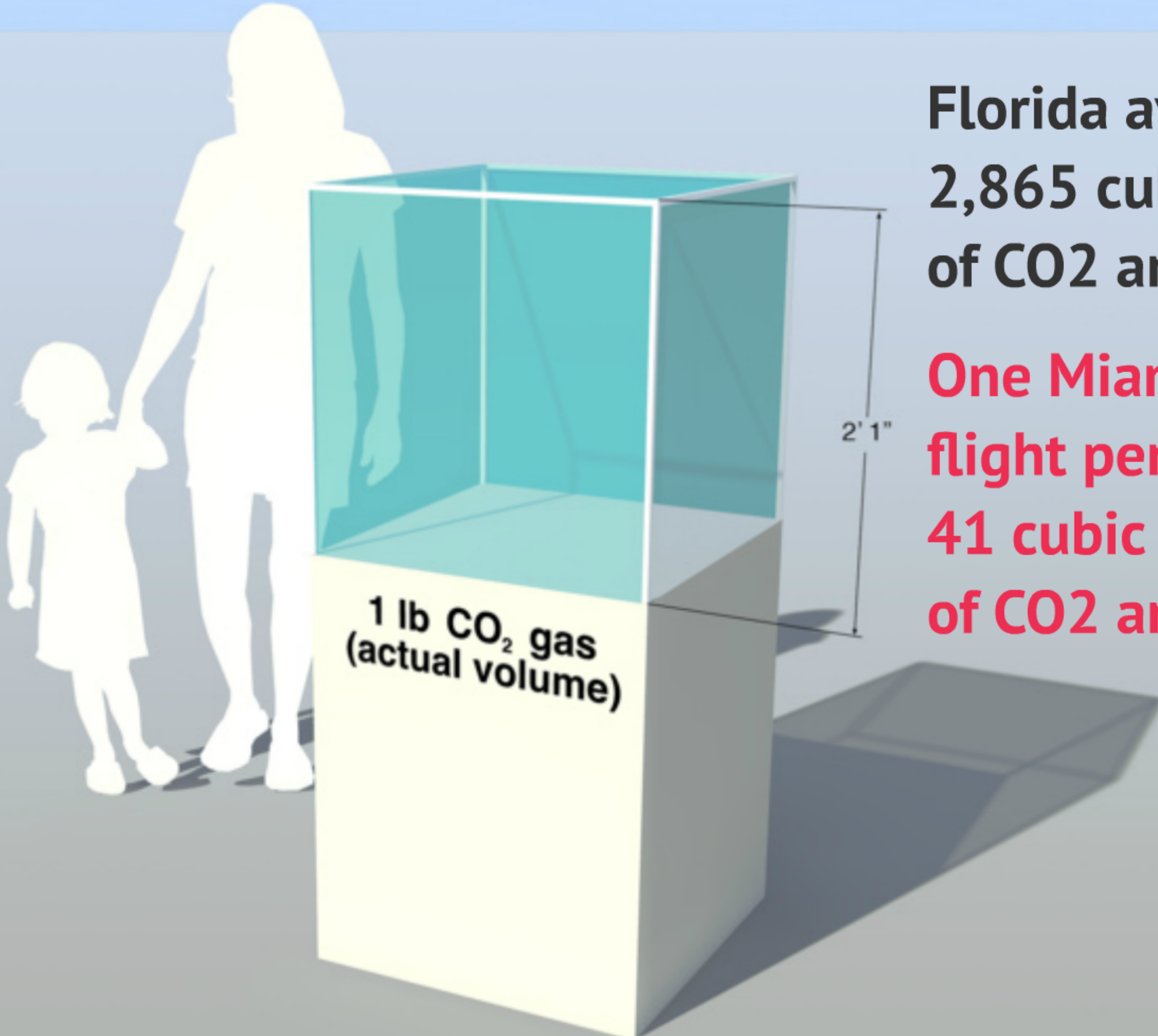
FARM to FLY
FROM THE GROUND UP

	Florida	US Domestic	World
barrels/year	32,807,000	522,552,250	1,898,507,350
barrels/day	89,882	1,431,650	5,201,390
gallons / year	1,804,385,000	28,740,373,750	104,417,904,250
gallons /day	4,943,521	78,740,750	286,076,450
pounds/gallon	6.8	6.8	6.8
pounds/day	33,615,940	535,437,100	1,945,319,860
#CO2/#jet fuel	3.1	3.1	3.1
#CO2/DAY	104,209,413	1,659,855,010	6,030,491,566
#CO2/Year	38,036,435,800	605,847,078,650	2,201,129,421,590
2015	6.3%	100.0%	363.3%

	Florida
barrels/year	32,807,000
barrels/day	89,882
gallons / year	1,804,385,000
gallons /day	4,943,521
pounds/gallon	6.8
pounds/day	33,615,940
#CO2/#jet fuel	3.1

[illegible]		
pounds/day	33,615,940	
#CO2/#jet fuel	3.1	
#CO2/DAY	104,209,413	
#CO2/Year	38,036,435,800	
2015	6.3%	


Kerosine combustion by-products depending on
- operating conditions
- altitude
- humidity
- temperature
1.24 t
6-20 kg
0.7-2.5 kg
0.1-0.7 kg
H_2O
NO_x
CO
C_xH_y
CO_2
SO_2
Soot
per tonne of kerosene
3.15 t
~1 kg
~0.02 kg



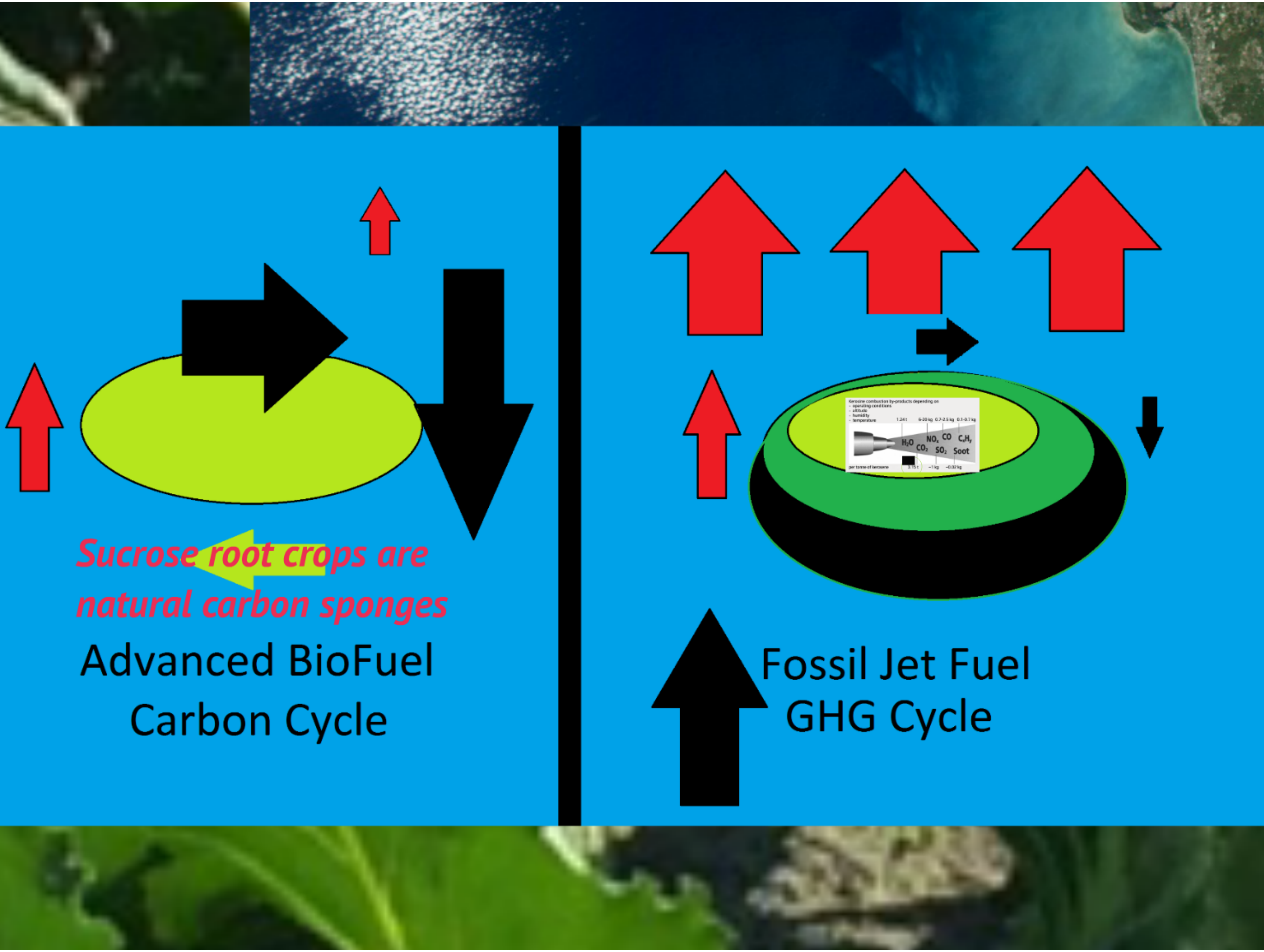
Florida aviation adds 2,865 cubic miles of CO2 annually

One Miami to LA flight per day adds 41 cubic miles of CO2 annually

SJF Feedstock

Sucrose root crops are natural carbon sponges

Advanced BioFuel Carbon Cycle

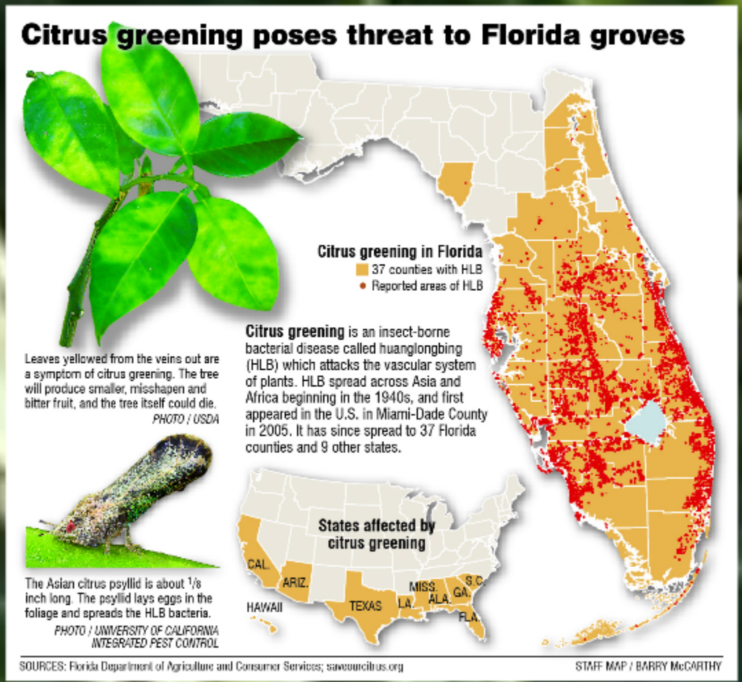


Sucrose root crops are natural carbon sponges
Advanced BioFuel Carbon Cycle
Kerosine combustion by-products depending on
- operating conditions
- altitude
- humidity
- temperature
1.24 t
6-20 kg
0.7-2.5 kg
0.1-0.7 kg
H_2O
NO_x
CO
C_xH_y
CO_2
SO_2
Soot
per tonne of kerosene
3.15 t
~1 kg
~0.02 kg
Fossil Jet Fuel GHG Cycle


Replacing one barrel of
fossil jet fuel with
Sustainable Jet Fuel (SJF)
eliminates
ONE HALF TON OF CO2


ABF root crop cultivation and SJF processing will help Florida meet air standards of the U.S. Clean Air Act.

FARM to FLY
FROM THE GROUND UP



- Since 2004, Florida lost over 50 million citrus trees with annual lost sales of over $1.5 billion per year.
- The HLB disease is present in every citrus grove in Florida and is a worldwide scourge with NO known practical treatment.

Florida currently has 6,000 square miles of fallow fields with the capacity to grow BOTH food and energy

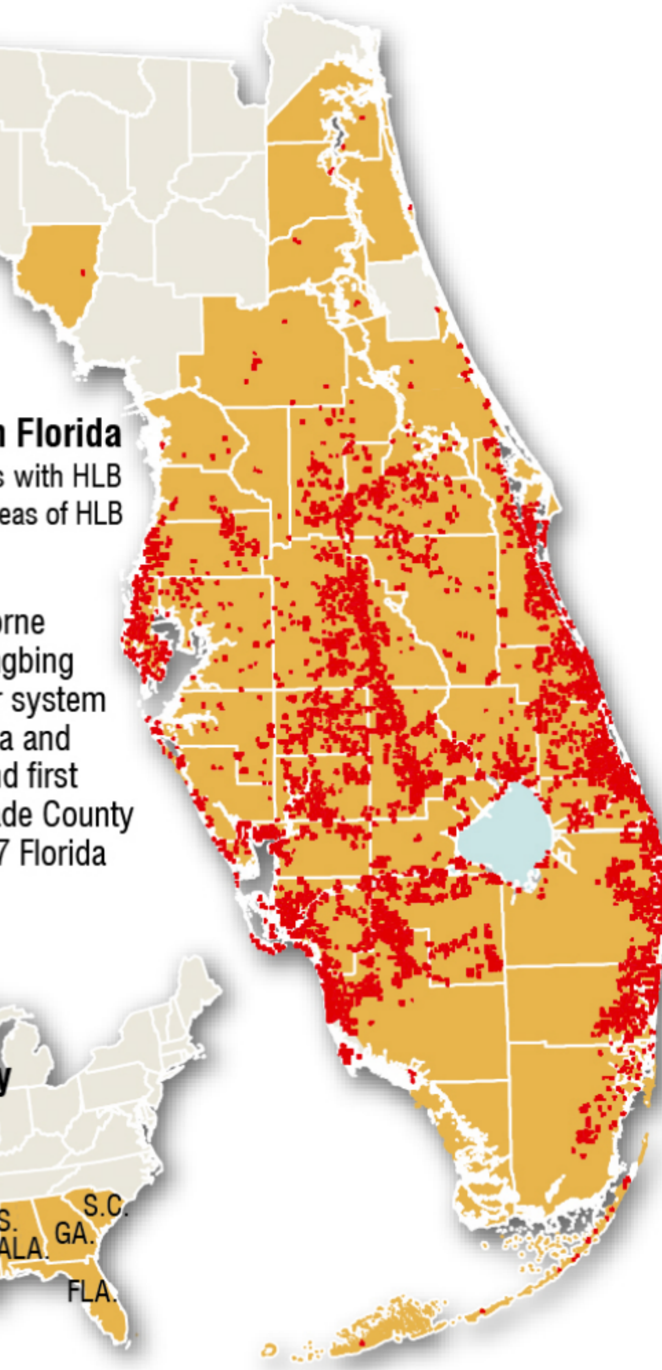
Citrus greening poses threat to Florida groves

Leaves yellowed from the veins out are a symptom of citrus greening. The tree will produce smaller, misshapen and bitter fruit, and the tree itself could die.

PHOTO / USDA

The Asian citrus psyllid is about 1/8 inch long. The psyllid lays eggs in the foliage and spreads the HLB bacteria.

PHOTO / UNIVERSITY OF CALIFORNIA INTEGRATED PEST CONTROL



Citrus greening is an insect-borne bacterial disease called huanglongbing (HLB) which attacks the vascular system of plants. HLB spread across Asia and Africa beginning in the 1940s, and first appeared in the U.S. in Miami-Dade County in 2005. It has since spread to 37 Florida counties and 9 other states.

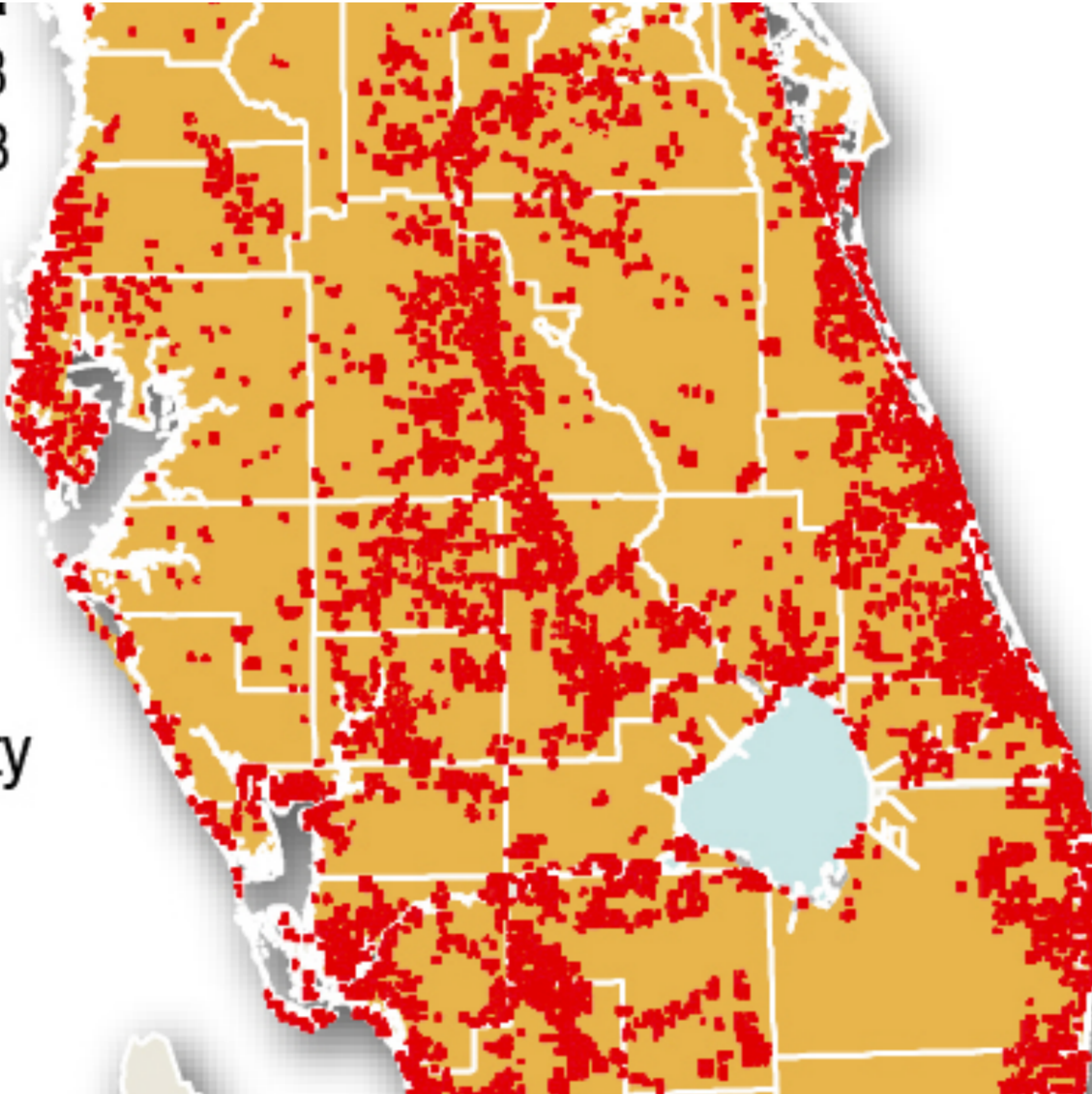
SOURCES: Florida Department of Agriculture and Consumer Services; saveourcitrus.org

STAFF MAP / BARRY McCARTHY

The Asian citrus psyllid is about $^{1}/_{8}$
inch long. The psyllid lays eggs in the

th HLB
of HLB

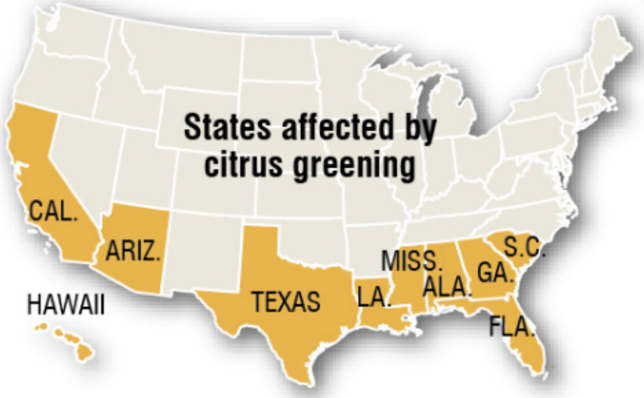
ng
stem
nd
rst
County
orida

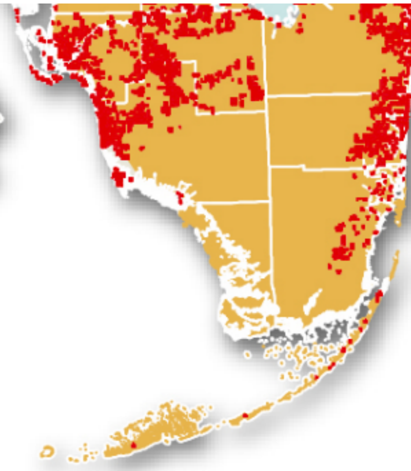


- Since 2004, Florida lost over 50 million citrus trees with annual lost sales of over $1.5 billion per year.
- The HLB disease is present in every citrus grove in Florida and is a worldwide scourge with NO known practical treatment.

Asian citrus psyllid is about 1/8
long. The psyllid lays eggs in the
ge and spreads the HLB bacteria.
PHOTO / UNIVERSITY OF CALIFORNIA INTEGRATED PEST CONTROL

counties and 9 other states.





CES: Florida Department of Agriculture and Consumer Services; saveourcitrus.org

STAFF MAP / BARRY McCARTHY

- The HLB disease
  citrus grove in
  worldwide scourg
  practical t

Florida currently has 6,000 square miles of fallow fields with the capacity to grow BOTH food and energy

FARM to FLY

FROM THE GROUND UP

Goal: Build an Integrated ABF Supply Chain with the help of the Seed Producer - Grower - Processor - Air Carrier - Traveler

*Potential **"Drop In Molecule"** Market*

- 440,000 acres of Fallow Citrus Fields
- 4 season crop rotation
- 44,500,000 tons crop harvest
- 6,300,000 tons industrial sugar
- 4,000,000 tons feed co-product
- 550,000,000 gallons SJ Fuel/biochemicals
- $1.1 Billion Annual Sales
- 35,000 direct jobs 70,000 indirect jobs
- $2.80 Billion Annual Economic Impact
- Remove 873 cubic miles of CO2/year

FARM to FLY

FROM THE GROUND UP

Goal: Build an Integrated ABF Supply Chain with the help of the Seed Producer - Grower - Processor - Air Carrier - Traveler

*Potential **"Drop In Molecule"** Market*

- 440,000 acres of Fallow Citrus Fields
- 4 season crop rotation
- 44,500,000 tons crop harvest
- 6,300,000 tons industrial sugar

*Potential "**Drop In Molecule**" Market*

- 440,000 acres of Fallow Citrus Fields
- 4 season crop rotation
- 44,500,000 tons crop harvest
- 6,300,000 tons industrial sugar
- 4,000,000 tons feed co-product
- 550,000,000 gallons SJ Fuel/biochemicals
- $1.1 Billion Annual Sales
- 35,000 direct jobs 70,000 indirect jobs
- $2.80 Billion Annual Economic Impact
- Remove 873 cubic miles of CO2/year

373 cubic miles of

Your Innovation Destination

Treasure Coast Research Park.com

a TCERDA development

BIO

2199 South Rock Road, Fort Pierce, FL 34945
Phone: **772.467.3107** • Email: **info@tcerda.org**


FLORIDA
Bartow
Vero Beach
Avon Park
Sebring
Fort Pierce
Port St Lucie
Okeechobee
Arcadia
Jupiter
Lake Okeechobee
Pahokee
West Palm Beach
Moore Haven
Lake Worth
Belle Glade
Fort Myers
Delray Beach
Coral Springs
Boca Raton
Pompano Beach
Bonita Springs
Fort Lauderdale
Hollywood
Naples
Big Cypress Swamp
Hialeah
Miami
Miami Beach
Everglades City
Coral Gables
Kendall
95
75