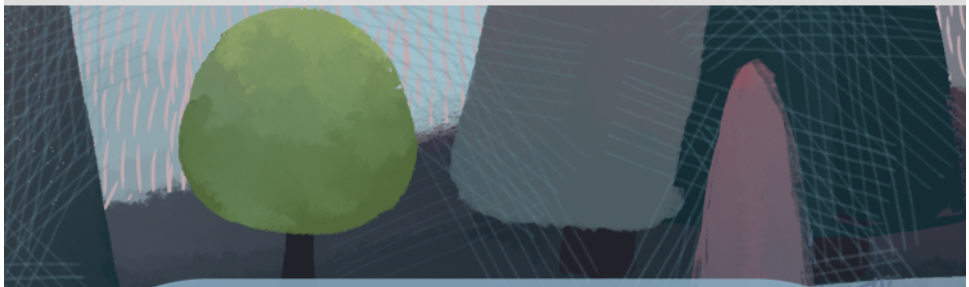
1/1

11

Offset: Afforestation



Science: Trees planted in non-forested areas naturally sequester (store) carbon as they grow.

Logistics: the carbon offset (compensating for other emissions by investing in another carbon reducing area) is counted immediately, but there are repeated risks throughout the life of a forest (like forest fires or land disputes). The government insures the investment.

Effect: 1.5% reduction in GHG emissions/Round. For each card in play, a chance roll must be rolled every round.

Investment can be renewed at a variable cost and the same AP.

0 $100,000 AP 2 R 11

1/1

12

Offset: Soil Carbon Storage

Science: Supporting sustainable farming outfits/practices encourages carbon sequestration in the soil; techniques include no-till farming, crop rotation, and cover cropping.

Logistics: investing in organic farming offsets presents a risk of economic failure (industrial farms are more efficient), as well as variability due to weather and unforeseen circumstances. The government insures the investment.

Effect: 1.5% reduction in GHG emissions/Round. For each farm offset in play a chance roll must be rolled every round.

Investment can be renewed at a variable cost and the same AP.

0 $100,000 AP 2 R 10

1/2

13

Green Ammonia (Ammonia Producer)

Science: Decarbonization of the ammonia production process requires changes to the hydrogen production process or development of carbon capture and storage.

Logistics: investing in green ammonia on two levels presents either considerable effort to integrate with existing carbon capture facilities and practices (to use the carbon rather than emit it), or to facilitate green electrolysis by investment in sustainable means of producing hydrogen.

Effect: 1.5% reduction in GHG/Round.

Investment at Level 1 places level 2 (2.1,2.2) into the player's hand (after time cost).

0 $250,000 AP 2 R 8

2.1/2

14

Green Hydrogen Ammonia (Ammonia Producer)

Science: green energy electrolysis replaces the fossil method of steam-methane reforming to produce the hydrogen needed in the ammonia production process without carbon emissions.

Logistics: Electrolysis units are expensive. Renewable energy (solar and wind) generation varies with environmental conditions, so storage must be considered to deal with this variability.

Effect: 1.5% reduction in GHG emissions/Round.

Investment can be renewed at less cost and less AP.

1

$450,000: $100,000

AP 2:1

R 8

2.2/2

Blue Hydrogen (Ammonia Producer)

15

Science: the carbon emissions from the process of steam-methane reforming are captured and stored or utilized rather than emitted, diminishing or eliminating carbon emissions from ammonia process.

Logistics: Investment here is into establishing/ integrating into existing networks that facilitate carbon capture, storage, and utilization. Capturing and transporting the carbon requires specific equipment, while utilizing has particular needs as per (3.1, 3.2, 3.3).

Effect: 1.5% reduction in GHG emissions/Round.

Investment into 2.2 puts 3.1, 3.2, and 3.3 into the player's hand (following time cost).

1 $450,000 AP 2 R 8

3.1/2

Carbon Utilization: Fuels and Chemicals (Ammonia Producer)

16

Science: converting waste CO_2 into industrial products like alcohols, polymers and plastics, and fuel.

Logistics: A partnership with companies or investors to incorporate up-cycled carbon into their products and produce on a certain scale. Future investment/ renewal improves this infrastructure.

Effect: 1% reduction in GHG emissions/Round.

Investment can be renewed at less cost and less AP

1

$350,000:
$150,000

AP 3:2

R 8

3.2/2

Carbon Utilization: Mineralization (Ammonia Producer)

17

Science: this process creates carbonate cement and mortar, recycling or up-cycling trapped carbon for construction materials.

Logistics: With existing connections to industrial partners in the construction industry, this process will go more smoothly. Future investment/renewal improves this infrastructure.

Effect: 1% reduction in GHG emissions/Round.

Investment can be renewed at less cost and less AP

1

$350,000:
$150,000

AP 3:2

R 8

3.3/2

Carbon Utilization: Bio Products/Algae (Ammonia Producer

18

Science: Algae bioreactors mix CO_2, wastewater, and sunlight to be further refined into products suitable for consumption like animal feed, supplements, and bio fuel.

Logistics: agricultural partners or proximate industries, pharmaceutical industry connections, as well as fuel subsidiaries or connections as part of oil refinement are all required here and require maintenance. Future investment/renewal improves this infrastructure.

Effect: 1% reduction in GHG emissions/Round.

Investment can be renewed at less cost and less AP.

1

$350,000: $150,000

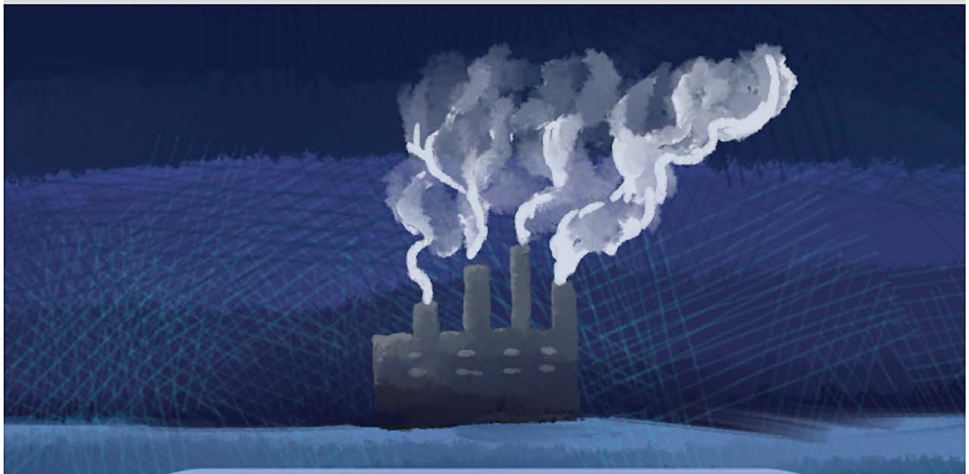
AP 3:2

R 8

1/1

19

Increase Production



Grow your business by increasing production. This generates more profit, but increases your emissions.

Logistics: Production increase of 1% = 1% emissions increase/round. Budget increases by 1%/round.

Effect: +1(%) emissions/round. +1(%) budget per round. For every extra percentage raised in a single play the risk goes up by 2.

2(%)

$350,000 (%)

AP 2(%)

R 12

1/1

20

Decrease Production

Reduce emissions by decreasing production. This also reduces your profit, potentially damaging stakeholder confidence.

Logistics: Production decrease of 1% = 1% emissions decrease/round. Budget decreases by 1%/round.

Effect: –1(%) emissions/round. –1(%) budget per round. For every additional percentage point raised per play, raise risk by 2.

Lorem Ipsum

2(%)

$350,000 (%)

AP 2(%)

R 12

1/1

21

Move Production

Move production to another facility outside of the Province. This means that your emissions are outside the regulatory market boundaries.

Logistics: Production move of 1% = 1% emissions decrease/round.

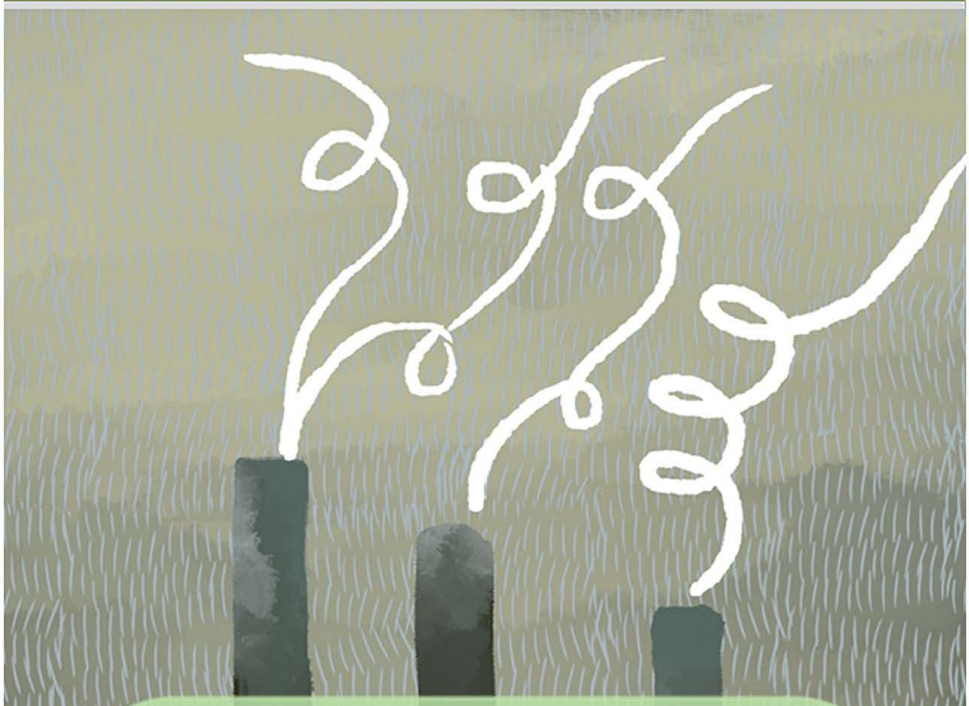
Effect: –1(%) emissions/round. Risk goes up by 3 for every additional percentage moved.

2(%) $100,000 AP 1(% R 7

1/1

22

Buy Emission Credits



Purchase emissions credits from the market to reduce your emissions/round.

Logistics: Price of carbon ($) multiplied by # of tonnes in credit = price of credit.

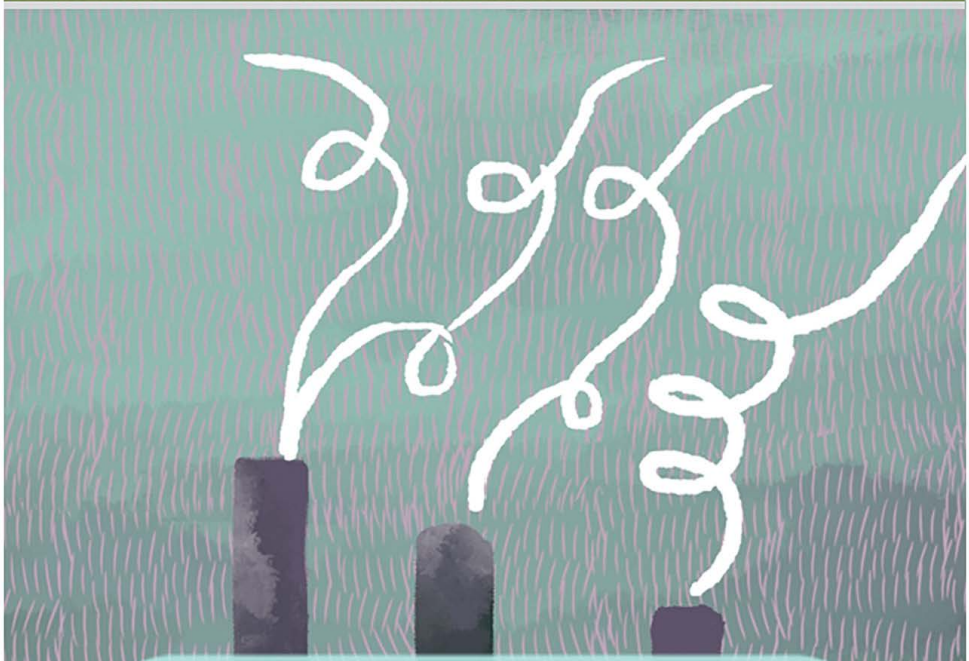
Effect: reduce GHG emissions/round by the credit's amount.

1 (#) -CB (# of tonnes) AP 1 R 0

1/1

23

Sell Emission Credits



Sell emission credits to the market. You receive cash, but this will increase your emission reduction target.

Logistics: Price of carbon at time of sale ($) determines sale price ($ multiplied by # of tonnes sold).

Effect: Add the # of tonnes sold to your emissions/round.

1(#)

+CB (# of tonnes)

AP 1

R 0