

Carbon Credit Offerings

Q2 2023 Partanna Production Scenarios

Removal & Avoidance Credits

Partanna's technology has the ability to generate both avoidance and removal carbon offsets. Several scenarios of potential credit generation are illustrated here, with the supporting calculations:

- CMU block
- Applied CMU block with mortar
- 1,250 ft² home
- 100,000 m² pavers

Avoidance credits. Partanna's innovative carbon-negative building material is just as affordable, versatile, and durable as traditional cement. However its manufacturing process completely eliminates the use of Portland cement and is made from an alternative binder that uses natural or recycled ingredients, including materials reclaimed from brine and pozzolans such as steel slag. This binder is mixed with natural, recycled stones and cured at ambient temperature. Thus, the technology enables Partanna to generate avoidance credits from the displacement of cement.

Removal credits. Another major advantage is that this mix of materials can generate removal credits, through its absorption of CO₂ – both at production and throughout the life of the concrete. Approximately 20% of the removals occur during the initial curing period, and then the concrete continues to significantly absorb carbon over the next 20 years. Concrete made with this technology captures CO₂ directly from the air and mineralizes it in the concrete.

Timing of credit generation. Each scenario below breaks out how many removal credits are generated in the initial curing period and the remaining period over the material's lifetime, so that stakeholders can see how many credits would be available and according to what timeline.

CMU Block

Consider:

1. Each Partanna Masonry Unit = 0.0076 m³ volume of concrete, 38.5 lb (17.5 kg)
2. **Carbon Removal, 11.2 kg (24.6 lb):** Partanna block material testing confirms CO₂ absorption of 32 kg CO₂/mt/yr [1]

So, for one block:

$$17.5 \text{ kg} \times 0.001 \text{ mt/kg} \times 32 \text{ kg CO}_2/\text{mt/yr} \times 20 \text{ yrs} = 11.2 \text{ kg CO}_2$$

3. **Carbon Avoidance, 3.08 kg (6.83 lb):** Partanna Masonry Units avoid 405 kg CO₂/m³ [2]
So: 0.0076 m³ X 405 kg CO₂/m³ = 3.08 kg of CO₂ is avoided per block

Total Carbon Credit Potential (Avoidance + Removal) = 11.2 kg + 3.1 kg = 14.3 kg (31.4 lb) per block

Initial Period Total: 5.3 kg

Remaining Period Total Over Lifetime: 9 kg

Applied CMU Block

Consider:

1. **Carbon Removal, 22.6 kg (49.8 lb):** 11.2 kg (block, above) + 10.3 kg (mortar/filling) 10.1 kg (block) + [For Mortar/Filling] 11.2 kg CO₂/block X 1.02 kg mortar/kg block = 22.6 kg CO₂
2. **Carbon Avoidance, 6.22 kg (13.7 lb):** 3.08 kg (block, above) + 3.16 kg (mortar) 3.08 kg (block) + 3.1 kg CO₂/block X 1.02 kg mortar/kg block = 3.16 kg CO₂
3. **Total Carbon Credit Potential (Avoidance + Removal) = 28.8 kg (63.5 lb) per block**

Initial Period Total: 10.7 kg

Remaining Period Total Over Lifetime: 18.1 kg

1. Power, I., Rausis, K., Dostie, L., CO2 Mineralization Testing for Partanna Products, Trent University, December 2022.

2. Dupont EPD High Test CMU 900003403, Aug. 31, 2021, https://www.basalite-cmu.com/_files/ugd/31fd52_c399e811721a4fa4b9fe9cf4bd91c2e6.pdf

One House - 1,250 ft²

182.6 credits (79.9 Initial + 102.7 Lifetime); 128.4 Removal + 54.2 Avoidance

Consider:

1. Each Partanna House uses 3,000 applied CMU blocks
2. In addition to the mortar and fill for the applied CMU blocks, each Partanna home includes 62.9 m³ of Partanna concrete in the foundation, slab, porch, roof tiles, driveway and sidewalks.

Carbon Removal 128.4 credits (25.7 Initial + 102.7 Lifetime)

1. **Applied CMU blocks, 67.8 credits:** Each applied Partanna block, mortar and fill removes 22.6 kg (see above)

So, the blocks from each house 22.6 kg X 3,000 blocks/house= 67,800 kg CO₂ or 67.8 mt (credits)

2. **Foundations, footings, slab, porch, roof tiles, driveway and sidewalks, 60.6 credits:**

Partanna block material testing confirms CO₂ absorption of 32 kg CO₂/mt/yr [1]. Density of the concrete is 1,505 kg/m³(or 94 lb/ft³)

So: 62.9 m³ X 1,505 kg/m³ X 0.001 mt/kg X 32 kg CO₂/mt/yr X 20 yrs

= 60,585 kg or 60.6 mt CO₂ (credits)

The total removal is roughly equivalent to 12,230 trees [3]

1. Power, I., Rausis, K., Dostie, L., *CO₂ Mineralization Testing for Partanna Products*, Trent University, December 2022.

2. Dupont EPD High Test CMU 900003403, Aug. 31, 2021, https://www.basalite-cmu.com/_files/ugd/31fd52_c399e811721a4fa4b9fe9cf4bd91c2e6.pdf

3. For a medium growth, coniferous tree <https://www.epa.gov/indoor-air-quality-iaq/introduction-indoor-air-quality>

Carbon Avoidance, 54.2 credits

1. **Applied CMU blocks, 18.7 credits:** Each applied Partanna block avoids 6.24 kg (see above)

So, the blocks from each house avoid $6.24 \text{ kg} \times 3,000 \text{ blocks/house} = 18,720 \text{ kg CO}_2$ or 18.7 mt (credits)

2. **Foundations, footings, slab, porch, roof tiles, driveway and sidewalks, 25.5 credits:** Partanna concrete avoids $405 \text{ kg CO}_2/\text{m}^3$

So: $62.9 \text{ m}^3 \times 405 \text{ kg CO}_2/\text{m}^3 = 25,475 \text{ kg}$ or 25.5 mt (credits) of CO_2

3. **Additional avoidances from building process, 10 credits:** Conservatively, each Partanna house avoids 10 mt of CO_2 by eliminating the need for the following:

- Drywall
- Insulation
- Bitumen roofing
- Paint

4. **Total Carbon Credit Potential (Avoidance) = 18.7 mt + 25.5 mt + 10 mt (credits)**
= **54.2 credits per house**

Total Carbon Credit Potential (Avoidance + Removal) = 128.4 mt + 54.2 mt

= 182.6 credits per house

Initial Credits Total: 79.9

Remaining Credit Total Over Lifetime: 102.7

1. Power, I., Rausis, K., Dostie, L., *CO₂ Mineralization Testing for Partanna Products*, Trent University, December 2022.

2. Dupont EPD High Test CMU 900003403, Aug. 31, 2021, https://www.basalite-cmu.com/_files/ugd/31fd52_c399e811721a4fa4b9fe9cf4bd91c2e6.pdf

3. For a medium growth, coniferous tree <https://www.epa.gov/indoor-air-quality-iaq/introduction-indoor-air-quality>

Pavers - Installing 100,000 m² of Pavers

Consider:

1. Partanna pavers are 3 in. thick (0.2286 m).

So, 100,000 m² of pavers is made of 22,860 m³

2. Density of the concrete is 1,505 kg/m³ (or 94 lb/ft³)

So: 22,860 m³ X 1,505 kg/m³ X 0.001 mt/kg = 34,404 mt concrete is used in pavers

Carbon Removal 22,018 credits

3. Partanna block material testing confirms CO₂ absorption of 32 kg CO₂/mt/yr [1]

4. So, 34,404 mt X 32 kg CO₂/mt/yr X 20 yrs X 0.001 mt/kg = 22,018 mt CO₂ is removed from the atmosphere

That removal is roughly equivalent to 1.35 million trees

Carbon Avoidance, 9,258 credits

5. Partanna avoids 405 kg CO₂/m³

6. So: 22,860 m³ X 405 kg CO₂/m³ = 9,258,300 kg or 9,258 mt of CO₂ is potentially avoided from 100,000 m² of pavers

**Total Carbon Credit Potential (Avoidance + Removal) = 22,018 mt + 9,258 mt (credits)
= 31,276 credits**

Initial Credits Total: 13,661

Remaining Credit Total Over Lifetime: 17,614

1. Power, I., Rausis, K., Dostie, L., *CO₂ Mineralization Testing for Partanna Products*, Trent University, December 2022.

2. Dupont EPD High Test CMU 900003403, Aug. 31, 2021, https://www.basalite-cmu.com/_files/ugd/31fd52_c399e811721a4fa4b9fe9cf4bd91c2e6.pdf

3. For a medium growth, coniferous tree <https://www.epa.gov/indoor-air-quality-iaq/introduction-indoor-air-quality>

Trees Equivalency

Unlike a tree, Partanna's products do not need to be watered. In fact, with Partanna's brine-based technology, fresh water is not required at all.

Consider:

According to the U.S. EPA [3] CO₂ absorption equivalency for a medium-growth coniferous tree allowed to grow for 10 years is 23.2 lb CO₂ (10.5 kg)

So:

1. **1 CMU Block ≈ 1 tree:**

Each block removes 11.2 kg, which is equivalent one tree

2. **1 Applied CMU Block ≈ 2 trees:**

Each Applied CMU block removes 20.4 kg, which is equivalent to two trees

3. **1,250 ft² house ≈ 12,230 trees:**

Each 1,250 ft² home removes 128.4 mt, which is equivalent to 12,230 trees

4. **100,000 m² Pavers ≈ a forest of over 1.38 million trees:** 100,000 m² removes 22,018 mt (22,018,000 kg), which is equivalent to a forest with over 1.38 million trees

Note that this equivalency only factors in Partanna's net carbon removal. It does not account for the avoided emissions.

1. Power, I., Rausis, K., Dostie, L., *CO₂ Mineralization Testing for Partanna Products*, Trent University, December 2022.

2. Dupont EPD High Test CMU 900003403, Aug. 31, 2021, https://www.basalite-cmu.com/_files/ugd/31fd52_c399e811721a4fa4b9fe9cf4bd91c2e6.pdf

3. For a medium growth, coniferous tree <https://www.epa.gov/indoor-air-quality-iaq/introduction-indoor-air-quality>