

Inventory of phosphorus “recovery and /or recycling” facilities operating or under construction at or downstream of wastewater treatment installations

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| Technology | Location and operator | Operational since | Recovered material or product | Qty/a in tons |
|---|---|-------------------|-------------------------------|---------------|
| Onsite wastewater treatment plants | | | | |
| AD-HAP (since 2014 by Hitachi Zosen) | Senboku Blackwater TP (JP), Senboku City | 2007 | | 15 |
| | Totsugawa Village (JP) | 2008 | | 2 |
| | Seihokugo Environment Improvement Assoc. (JP) | 2009 | HAP | 40 |
| | Kushimoto Town (JP) | 2011 | (from Night Soil) | 11 |
| | Shimanto Town (JP) | 2011 | | 11 |
| | Kofu Town (JP) | 2015 | | 4 |
| AirPrex® | MG-Neuwerk (DE), Niersverband | 2009 | | 100 |
| | Wassmannsdorf (DE), Berliner Wasserbetriebe | 2010 | | 350 |
| | Echten (NL), Drents Overijsselse Delta | 2013 | | n.i. |
| | Amsterdam-West (NL), Waternet | 2014 | | 500 |
| | Salzgitter Nord (DE), ASG | 2015 | | 50 |
| | Uelzen (DE), SE Uelzen | 2015 | | n.i. |
| | Tianjin (CN), Tianjin CEPG | 2015 | | offline |
| | Wolfsburg (DE), SE Wolfsburg | 2017 | Struvite | (50) |
| | Liverpool, OH (USA), Medina County | 2018 | | --* |
| | Savage, MD (USA), Howard County | 2018 | | --* |
| | Denver, CO (USA), Denver Metro | 2019 | | --* |
| | Ft. Collins, CO (USA) | 2019 | | --* |
| | Göppingen (DE), SE Göppingen | 2020 | | -- |
| Haifa (IL), Haifa District Industries Association | 2022 | | -- | |
| Erlangen (DE), EBE Erlangen | 2023 | | -- | |
| ANPHOS® | Well (NL), EcoFuels, (biomass digestion) | 2005 | | n.i. |
| | Odiliapeel (NL), Peka Kroef | 2006 | | 400 |
| | Kruiningen (NL), Lamb Weston Meijer | 2003 | | 650 |
| | Bergen op Zoom (NL), Lamb Weston Meijer | 2007/16 | | 290 |
| | Budrio (IT), Pizzoli | 2010 | Struvite | 150 |
| | Haps (NL), Waterschap Aa en Maas | 2011 | | n.i. |
| | Oosterbierum (NL), Lamb Weston Meijer | 2016 | | 580 |
| | Den Bosch (NL), Waterschap Aa en Maas | 2018 | | n.i. |
| | Asturias (ES), Longas | 2018 | | n.i. |
| Tiel (NL), Waterschap Rivierenland | 2019 | | n.i. | |
| Crystalactor® | Nanjing (CN), Royal Haskoning DHV | 2010 | Struvite | n.i. |
| EloPhos® | Lingen (DE), SE Lingen | 2016 | Struvite | -- |
| Gifhorn | Gifhorn (DE), ASG (mothballed) | 2007 | Struvite/CaP | -- |
| J-Oil | Yokohama (JP), J-Oil Mills Co. | | HAP | 260 |
| JSA | Kawasaki (JP), Japan Synthetic Alcohol Co. | 1998 | HAP | n.i. |
| KURITA | Fukuoka North, South and Wasui (JP), Fukuoka C. | 1997 | Struvite | 120 |
| Kyowa Hakko | Hofu (JP), Kyowa Hakko Bio Corp. | 2006 | HAP | 90 |
| Multiform™ (acquired by Ostara) now called PEARL Fx | Yakima, WA (USA) | 2012 | | n.i. |
| | Boise, ID (USA) | 2015 | | n.i. |
| | Massey, MD (USA), Jones Family Farms (dairy) | 2019 | Struvite | n.i. |
| | Green Bay, WI (USA) | 2019 | | n.i. |
| | Paso Robles, CA (USA), City of Paso Robles | 2019 | | 75 |

| | | | | |
|-----------------------------|---|-------------|-----------------------------|----------------------|
| Multi-Solid | Hagenow (DE), AZV Hagenow & Umlandgemeinden | 2023 | Struvite | (100) |
| NASKEO | Castres (FR) | 2015 | Struvite | 25 |
| | Harelbeke (BE), Agristo | 2008 | | 250 |
| | 2x Niewkuerke (BE), Clarebout Potatoes | 2009/12 | | 650 |
| | Waasten (BE), Clarebout Potatoes | 2012 | | n.i. |
| | Geel (BE), Genzyme | 2014 | | 80 |
| NuReSys® | Leuven (BE), Aquafin | 2013 | Struvite | 50 |
| | Land van Cuijk (NL), Logisticon | 2015 | | 150 |
| | Apeldoorn (NL), Vallei & Veluwe | 2016 | | 550 |
| | Braunschweig Steinhof (DE), SE BS / AVB | 2019 | | --* |
| | Pima County, Tres Rios WRF, AZ (USA) | 2021 | | --* |
| NutriTec® (Sustec, DMT) | Zutphen (NL), SaNiPhos® GMB | 2010 | Struvite & DAS | offline |
| | Tigard, OR (USA), Clean Water Services | 2009 | | 760 |
| | Suffolk, VA (USA), Hampton Roads Sanit. District | 2010 | | 400 |
| | York, PA (USA), City of York | 2010 | | 270 |
| | Hillsboro, OR (USA), Clean Water Services | 2012 | | 1000 |
| | Slough (UK), Thames Water | 2012 | | 130 |
| | Saskatoon, SK (CDN), City of Saskatoon | 2013 | | 500 |
| | Madison, WI (USA), Madison Metro. Sew. Distr. | 2014 | | 1000 |
| | Burford, GA (USA), Gwinnett County | 2015 | | 1000 |
| | Amersfoort (NL), Vallei & Veluwe | 2015 | | 500 |
| PEARL® (OSTARA) | Edmonton, AB (CDN), EPCOR Water Services | 2015 | Struvite | 2500 |
| | Stickney, IL (USA), Metro. Water Recl. Chicago | 2016 | (Crystal Green®) | 7700 |
| | Reno, NV (USA), Cities of Reno and Sparks | 2016 | | 500 |
| | Madrid (ES), Canal de Isabel II | 2016 | | 500 |
| | Winchester, VA (USA), F. Winchester Service A. | 2016 | | 500 |
| | St. Cloud, MN (USA), City of St. Cloud | 2018 | | 500 |
| | Atlanta, GA (USA), City of Atlanta | 2018 | | 1000 |
| | Jarocin (PL), City of Jarocin | 2021 | | (130) |
| | Tel Aviv, (IL), Shafdan WWTP, Mey Ezor Dan | 2021 | | (5000) |
| | Ottestad (NO), Hias WWTP, Hias IKS | 2022 | | (250) |
| | Dublin (IE), Ringsend WWTP, Irish Water | 2023 | | (5000) |
| PhosForce (Veolia) | Schönebeck (DE), OEWA Wasser & Abwasser GmbH | 2023 | Struvite/ Brushite (DCP) | (1000) customized |
| | 7 plants installed in Japan between 1989 and 2011 with capacities between 80-500 m³/d | 1989 | | n.i. |
| | -- | 1992 | | n.i. |
| | -- | 1995 | | n.i. |
| PHOSNIX® (Hitachi Zosen) | Lake Shinji-East (JP), Matsue City (1998) | 1998 | Struvite | 125 |
| | -- | 2000 | | n.i. |
| | -- | 2009 | | n.i. |
| | -- | 2011 | | n.i. |
| | Kinan Environment Improvement Association (JP) | 2014 | | n.i. |
| PHORWater | Calahorra (ES), El Cidacos | 2015 (demo) | Struvite | n.i. |
| | Olburgen (NL), Waterstromen (municipal & food) | 2006 | | 400 |
| | Lomm (NL), Waterstromen (food) | 2007 | | 260 |
| | China (brewery) | 2011 | | (1100) |
| PHOSPAQ™ | Poland (bio-ethanol) | 2011 | Struvite | (500) |
| | Nottingham (UK), Severn Trent Water | 2012 | | 730 |
| | USA (confidential) | 2013 | | (800) |
| | Hünfeld (DE), BFG-IAR Hünfeld GmbH (dairy) | 2014 | | 730 |
| | China (food processing) | 2015 | | (1400) |

| | | | | |
|---|--|---------------------|--------------------------------|-------------------------------------|
| | China (ethanol) | 2016 | | (90) |
| | Tilburg (NL), Waterchap de Dommel | 2016 | | 340 |
| | UK (municipal) | 2017 | | (600) |
| PhosphoGREEN (SUEZ) | Aaby (DK), Aarhus Water | 2013 | | 110 |
| | Herning (DK), Herning Water | 2016 | | 106 |
| | Marselisborg (DK), Aarhus Water | 2018 | Struvite | 302 |
| | Villiers Saint Frederic (FR), SIARNC | 2019 | | 43 |
| | Sausheim (FR), Mulhouse | 2019 | | 88 |
| P-RoC | Bachgau (DE), Markt Großostheim | 2025 | CaP at CSH | (40) |
| REPHOS® (delivered by NuReSys) | Altentreptow (DE), Remondis Aqua (dairy) | 2006 | Struvite | 200 |
| Rintoru® | Mobile unit applying A-CSH to recover P | -- | CaP at CSH | -- |
| STRUVIA™ | Helsingør Southcoast (DK) | 2015 | Struvite | 40 |
| Swing | Higashi-Nada, Kobe City (JP), Swing Corp. | 2012 | Struvite | 130 |
| Downstream wastewater treatment plants and ashes | | | | |
| Ash2®Phos | Schkopau (DE), Phosphorgewinnung Schkopau GmbH (EasyMining & Gelsenwasser AG) | 2024 | | (15.000) |
| | Helsingborg (SE), EasyMining Sweden AB | 2025 | HAP | (15.000) |
| AshDec® | Altenstadt (DE), Emter GmbH | 2024 | Calcined phosphate | (16.000)** |
| EUPHORE® | Mannheim (DE), MVV Energie AG | 2022/23 | Improved ash | (14.000)** |
| Fertiliser industry | Various companies already apply or consider use of secondary P sources | tested and intended | Commercial fertilisers | Mixed in*** |
| Glatt® PHOS4green | Haldensleben (DE), SERAPLANT GmbH Bound to premium ash input (fertiliser grade) | 2021 | SSP, MCP, NPS | Intended (60.000)*** fertilisers |
| KUBOTA | 2 plants (4 furnaces) (JP), municipal (Input: 60-80 t/d dewatered sludge) | 2014 | P rich slag | 1.200-1.500 |
| METAWATER | Gifu North (JP), Gifu City | 2010 | | 300 |
| | Akisato (JP), Tottori City | 2013 | HAP | 150 |
| Nippon PA | Chiba (JP), Nippon Phosphoric Acid | 2009 | H ₃ PO ₄ | n.i. |
| TetraPhos® | Hamburg (DE), Hamburger Phosphorrecyclinggesellsch. mbH | 2021 | | (7.000) |
| | Lünen (DE), Remondis TetraPhos® GmbH | 2025 | H ₃ PO ₄ | (5.800) |

Product/ P recycle column footnotes :

*P recycles (i.e. Struvite) are not extracted/harvested, but potentially adapted in future

** P remains in the ash matrix, heavy metals are partially depleted by additive dosage and thermal treatment (thermo-chemical ash modification)

*** sludge ashes are mixed with other materials to form the P recycles (heavy metals are diluted, but not separated)

Any full-scale facility missing? Please let me/us know!

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