

# 2022 GLOBAL HIGH TECH & EMERGING MARKETS

Product/Service Type: 1,3-Propanediol (PDO)

Industry: Chemical Manufacturing

Equipment Code: 2022-10001

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# 2021

- *Market Reports*
- *Industry Trends*
- *Demographic Data*

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Regional Markets

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Belgium	BEL	Romania	ROU
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Canada	CAN	Saudi Arabia	SAU
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Egypt, Arab Rep.	EGY	Switzerland	CHE
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Germany	DEU	United Arab Emirates	ARE
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# Users' Guide

***Product/Service Type: 1,3-Propanediol (PDO)***

***Industry: Chemical Manufacturing***

## **About this Report**

This report covers the global forecast for 1,3-propanediol (pdo) produced in the 1,3-propanediol (pdo) industry.

More than 140 countries are featured in this report as well as global and regional summaries. Estimates on equipment or material sales (product shipments value) are published for six historical years and two forecast years. Product shipments include the total value of all products produced and shipped by all producers. For selected products, this can represent value of receipts, value of production, or value of work done.

These estimates product shipment values are also considered "market potentials" because the calculations assume efficient, free markets. Estimates can vary in countries with inefficient, closed markets with such issues as oppressive regulations and tariffs, black markets, and political problems impacted a regular business cycle.

Published annually, this report provides a unique and accurate estimate on market sizing for this equipment/material using a proprietary economic model that integrates historical trends (horizontal analysis) and longitudinal analysis of incorporated industries (vertical analysis).

Product shipments value are presented in US Dollars and local currency units for historical and forecast years.

Regional summaries include North America, Europe, Asia-Pacific, Latin America, Africa, and Middle East. Percent shares are presented for each region as a share of the global market.

Product shipments values are also broken down by related costs, such as cost of materials, cost of fuels/electricity and value added, as well as capital expenditures, such as expenditures on buildings, machinery, vehicles and computers.

This report does not list key players/companies in the market but focuses on a top-down and outlook view of the market despite the existing and entering of market companies.

# Users' Guide

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***Industry: Chemical Manufacturing***  
**Users' Guide**

Barnes Reports is a leading publisher of industry studies on U.S. and global industries and forecasts sales and employment demographics. As a way of making the most of this information, we have included a few suggestions and tips to aid users in processing and using this information.

Managers, planners, and market researchers use this information for a variety of activities:

- Sizing markets and segments – You can estimate the size of the regional markets you sell in and your company's market penetration into that market. You can do the same with the market segments in which you participate.
- Sales territory potential – You can estimate your market penetration and also the market potential in any regional area or market segment.
- Sales forecasting – With the estimates on the size of the industry, market researchers supporting a sales force can then estimate and forecast the future size of the industry.
- Advertising strategies – You can use this information for forecasting and estimating sales potential and target advertising campaigns.
- Competitive analysis – You will use the information to locate your possible competitors (if it is not already known), to estimate their size, growth and strengths and weaknesses and to see what market segments in which they participate.

We recognize that many managers today are asked to provide detailed analysis of their markets, sales territories, distribution channels, and product placements. We have organized these reports in a logical format making your market analysis and research tasks easy to accomplish.

# Definitions & Methodology

***Product/Service Type: 1,3-Propanediol (PDO)***

***Industry: Chemical Manufacturing***

## **Definitions**

This market comprises establishments primarily engaged in manufacturing 1,3-Propanediol (PDO). PDO (also called trimethylene glycol, 1,3-dihydroxypropane, or propylene glycol) is a clear and colorless liquid organic compound with the molecular formula  $C_3H_8O_2$ . It is soluble in water, alcohols, ethers, and formamide, but less soluble in benzene and chloroform.

The increasing application scope of polyesters using 1,3-propanediol and growing demand for polytrimethylene terephthalate (PTT) are the major driving factors for the market.

# Definitions & Methodology

***Product/Service Type: 1,3-Propanediol (PDO)***

***Industry: Chemical Manufacturing***

## **Methodology**

Barnes Reports' Global Manufacturing & Markets report series provide estimates of the size and characteristics of the largest equipment, materials and consumables by manufacturing industries in the largest 140 global countries. These estimates are produced by a proprietary economic model that is based on a number of sources and factors:

1. The size of U.S. manufacturing equipment, materials and consumables from the U.S. Economic Census over the last twenty years.
2. Estimate current and forecast size of U.S. equipment, materials and consumables using regression analysis.
3. Adjust estimates and forecasts using the most current U.S. manufacturing industry data and trends. This adjustment adds vertical (industry) analysis to the forementioned horizontal (trend) analysis.
4. Global estimates use trend GDP data and the ratio of manufacturing industries to GDP by country from World Bank databases to compare U.S. versus global countries size and trends.



# Executive Summary

**Product/Service Type: 1,3-Propanediol (PDO)**

## 2022 GLOBAL MANUFACTURING SECTOR FORECAST

The global economic forecast for 2022 is continuing to rebound from the decline in 2020 due to the COVID-19 crisis. Barnes Reports is forecasting 4.9 percent GDP growth from 2021 to 2022 globally. GDP forecasts for the largest countries include 5.5 percent for the United States, 6.6 percent for China, 7.6 percent for India, 2.5 percent for Japan and 4.9 percent for Germany.

The global manufacturing sector forecast for 2022 will be slightly lower than the growth in GDP. Barnes Reports is forecasting 3.7 percent global manufacturing sector growth from 2021 to 2022. The transportation manufacturing subsector will experience the highest growth of 6.0 percent.

A subsector that is trailing the sector average forecast growth from 2021 to 2022 is food and beverage manufacturing (1.0 percent).

NAICS CODE	INDUSTRY TITLE	2022 Sales (\$Mill)	2021-2022 % Change
311	Food and beverage manufacturing	6,129,000	1%
325	Chemical manufacturing	4,958,000	3%
332	Fabricated metal product mfg.	2,427,000	4%
333	Machinery manufacturing	2,444,000	3%
334	Computer and electronic product mfg.	2,275,000	6%
335	Electrical equip., appliance mfg.	881,000	5%
336	Transportation equipment mfg.	6,914,000	6%
339	Miscellaneous manufacturing	938,000	1%

The largest subsector in the manufacturing sector is the transportation equipment manufacturing subsector (6.9 trillion for 2022).

## Political Issues

Political issues in the United States in 2021 continue to divide the country. While Democrats hold power in the Executive branch and the House of Representatives, the Senate is divided with Republicans able to stop most bills. At the time of publication in late 2021, President Biden's approval rating is among the lowest since 1950.

# Executive Summary

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The President's low approval rating is mainly due to 1) a botched withdrawal from Afghanistan, 2) high inflation and gas prices, 3) high immigration rates, 4) low labor participation rates, and 5) COVID mandates. Racial issues continue to divide the country in schools and court rooms. Despite these issues, the President was able to pass the Infrastructure bill in November 2021 which many citizens like but supply shortages and a tight labor market will complicate building plans.

The supply chain crisis in late 2021 will continue into 2022, as West coast ports struggle to unload nearly 100 container ships from China and East Asian countries. A lack of truck drivers and port operators will not be corrected for months until 1) the labor participation rate increases and 2) COVID fears decrease. The supply chain problems are one major reason for the highest inflation rates that the U.S. has experienced since the 1970s.

## **Finance Issues**

While top investors say that the U.S. stock market likes a divided government, Barnes Reports is forecasting that the stock market will slow grow to new highs, but it will pullback if the Biden administration is able to pass new business regulations, restrictive environmental laws, and/or new corporate taxes and many investors will take earnings out of the market.

Capital equipment spending by businesses in other sectors, a key driver of manufacturing profitability, has been dropped off rapidly due to the undercertainty of the COVID virus. Equipment investment growth accelerated to 4.8 percent during 2017 in the United States according to the U.S. Census and Barnes Reports is forecasting 3.0 percent for 2021 and 2022.

Interest rates have been at the lowest rates in decades with the COVID virus. Barnes Reports is forecasting that the interest rates will remain at these low rates until either the housing market sales reach 2008 highs or inflation from stimulus spending raises gas, energy and/or food prices to 2019 levels.

# Executive Summary

***Product/Service Type: 1,3-Propanediol (PDO)***

## **Labor Issues**

The U.S. labor market is recovering from the COVID virus, but the labor participation rate remains low as working age citizens are 1) staying home due to COVID fears and 2) retiring early. Barnes Reports is forecasting a stubborn low participation rate and a drag from more restrictive northern states. The retail and hospitality and transportation sectors will have even lower participation.

More open states such as Florida, Texas, and other southern and midwestern states will boost the employment rate as those citizens are more willing to balance the risk of the virus with the need to work and keep the economy healthy.

# Executive Summary

**Product/Service Type: 1,3-Propanediol (PDO)**

## **SUBSECTOR 311: Global Food and beverage manufacturing**

NAICS CODE	INDUSTRY TITLE	2022 Sales (\$Mill)	2021-2022 % Change
31111	Animal food manufacturing	339,530,000	0%
31121	Flour milling and malt manufacturing	84,000,000	-5%
31122	Starch and vegetable fats and oils manufacturing	338,890,000	-2%
31123	Breakfast cereal manufacturing	71,460,000	3%
31131	Sugar manufacturing	84,840,000	6%
31134	Nonchocolate confectionery manufacturing	90,510,000	9%
31135	Chocolate and chocolate confectionery manufacturing	106,460,000	0%
31141	Frozen food manufacturing	231,200,000	2%
31142	Fruit and vegetable canning, pickling, and drying	237,690,000	-1%
31151	Dairy product (except frozen) manufacturing	750,440,000	2%
31152	Ice cream and frozen dessert manufacturing	52,990,000	2%
31161	Animal slaughtering and processing	1,397,980,000	1%
31171	Seafood product preparation and packaging	88,020,000	1%
31181	Bread and bakery product manufacturing	287,200,000	2%
31182	Cookie, cracker, and pasta manufacturing	120,750,000	-3%
31183	Tortilla manufacturing	27,640,000	2%
31191	Snack food manufacturing	285,280,000	3%
31192	Coffee and tea manufacturing	68,550,000	-4%
31193	Flavoring syrup and concentrate manufacturing	92,530,000	6%
31194	Seasoning and dressing manufacturing	169,920,000	5%
31199	All other food manufacturing	229,310,000	5%

# Executive Summary

**Product/Service Type: 1,3-Propanediol (PDO)**

## **SUBSECTOR 311: Global Food and beverage manufacturing (continued)**

NAICS CODE	INDUSTRY TITLE	2022 Sales (\$Mill)	2021-2022 % Change
31211	Soft drink and ice manufacturing	229,610,000	-4%
31212	Breweries	188,780,000	0%
31213	Wineries	104,170,000	-5%
31214	Distilleries	95,360,000	4%
31223	Tobacco manufacturing	355,710,000	6%
TOTAL		6,128,820,000	1%

The food and beverage manufacturing subsector globally is projected to be \$6.1 trillion in 2022, growing by 1 percent from 2021 to 2022.

The nonchocolate confectionary industry is forecast to have the highest growth rate globally from 2021 to 2022 in the subsector (9 percent) followed by the tobacco manufacturing industry (6 percent).

The largest global industries in this subsector are the animal slaughtering and processing industry (\$1.4 trillion for 2022) and the dairy product manufacturing industry (\$750 billion).

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**Product/Service Type: 1,3-Propanediol (PDO)**

## SUBSECTOR 325: Global Chemical manufacturing

NAICS CODE	INDUSTRY TITLE	2022 Sales (\$Mill)	2021-2022 % Change
32511	Petrochemical manufacturing	435,400,000	7%
32512	Industrial gas manufacturing	84,030,000	14%
32513	Synthetic dye and pigment manufacturing	34,250,000	-1%
32518	Other basic inorganic chemical manufacturing	230,480,000	6%
32519	Other basic organic chemical manufacturing	707,230,000	1%
32521	Resin and synthetic rubber manufacturing	746,410,000	7%
32522	Artificial and synthetic fibers and filaments manufacturing	33,960,000	-2%
32531	Fertilizer manufacturing	92,570,000	-2%
32532	Pesticide and other agricultural chemical manufacturing	89,850,000	1%
32541	Pharmaceutical and medicine manufacturing	1,391,060,000	2%
32551	Paint and coating manufacturing	161,540,000	1%
32552	Adhesive manufacturing	124,550,000	10%
32561	Soap and cleaning compound manufacturing	231,320,000	1%
32562	Toilet preparation manufacturing	264,090,000	0%
32591	Printing ink manufacturing	28,180,000	3%
32592	Explosives manufacturing	21,450,000	10%
32599	All other chemical product and preparation manufacturing	281,910,000	4%
TOTAL		4,958,280,000	3%

The chemical manufacturing subsector globally is projected to be \$4.9 billion in 2022, growing by 3 percent from 2021 to 2022.

# Executive Summary

*Product/Service Type: 1,3-Propanediol (PDO)*

## **SUBSECTOR 325: Global Chemical manufacturing (continued)**

The industrial gas manufacturing industry is forecast to have the highest growth rate globally from 2021 to 2022 in the subsector (14 percent) followed by the explosives manufacturing industry (10 percent).

The largest global industries in this subsector are the pharmaceutical and medicine manufacturing industry (\$1.4 trillion for 2022) and the resin and synthetic rubber manufacturing industry (\$740 billion).

# Executive Summary

**Product/Service Type: 1,3-Propanediol (PDO)**

## **SUBSECTOR 326: Global Plastics and rubber products manufacturing**

NAICS CODE	INDUSTRY TITLE	2022 Sales (\$Mill)	2021-2022 % Change
32611	Plastics packaging materials and unlaminated film and sheet manufacturing	245,920,000	1%
32612	Plastics pipe, pipe fitting, and unlaminated profile shape manufacturing	143,870,000	6%
32613	Laminated plastics plate, sheet (except packaging), and shape manufacturing	29,970,000	6%
32614	Polystyrene foam product manufacturing	67,060,000	6%
32615	Urethane and other foam product (except polystyrene) manufacturing	75,860,000	4%
32616	Plastics bottle manufacturing	70,370,000	1%
32619	Other plastics product manufacturing	683,220,000	3%
32621	Tire manufacturing	145,150,000	5%
32622	Rubber and plastics hoses and belting manufacturing	36,310,000	3%
32629	Other rubber product manufacturing	115,650,000	2%
<b>TOTAL</b>		<b>1,613,380,000</b>	<b>3%</b>

The plastics and rubber products manufacturing subsector globally is projected to be \$1.6 trillion in 2022, growing by 3 percent from 2021 to 2022.

The plastics pipe, pipe fitting, and unlaminated profile shape mfg. industry is forecast to have the highest growth rate globally from 2021 to 2022 in the subsector (6 percent) followed by the laminated plastics plate, sheet (except packaging), and shape mfg. industry (6 percent).

The largest global industries in this subsector are the other plastics product manufacturing industry (\$683 billion for 2022) and the plastics packaging materials and unlaminated film and sheet manufacturing industry (\$245 billion).



# Executive Summary

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## **SUBSECTOR 332: Global Fabricated Metal Product manufacturing**

NAICS CODE	INDUSTRY TITLE	2022 Sales (\$Mill)	2021-2022 % Change
33211	Forging and stamping	212,050,000	2%
33221	Cutlery and handtool manufacturing	57,150,000	0%
33231	Plate work and fabricated structural product manufacturing	355,980,000	7%
33232	Ornamental and architectural metal products manufacturing	320,470,000	6%
33241	Power boiler and heat exchanger manufacturing	51,870,000	4%
33242	Metal tank (heavy gauge) manufacturing	55,800,000	3%
33243	Metal can, box, and other metal container (light gauge) manufacturing	120,430,000	3%
33251	Hardware manufacturing	59,860,000	4%
33261	Spring and wire product manufacturing	66,870,000	4%
33271	Machine shops	261,670,000	4%
33272	Turned product and screw, nut, and bolt manufacturing	217,080,000	6%
33281	Coating, engraving, heat treating, and allied activities	172,640,000	2%
33291	Metal valve manufacturing	228,660,000	4%
33299	All other fabricated metal product manufacturing	246,090,000	1%
<b>TOTAL</b>		<b>2,426,620,000</b>	<b>4%</b>

The fabricated metal product manufacturing subsector globally is projected to be \$2.4 trillion in 2021, growing by 4 percent from 2021 to 2022.

The plate work and fabricated structural product manufacturing industry is forecast to have the highest growth rate globally from 2021 to 2022 in the subsector (7 percent) followed by the spring and wire product manufacturing industry (4 percent).

# Executive Summary

*Product/Service Type: 1,3-Propanediol (PDO)*

## **SUBSECTOR 332: Global Fabricated Metal Product manufacturing (continued)**

The largest global industries in this subsector are the plate work and fabricated structural product manufacturing industry (\$355 billion for 2022) and the ornamental and architectural metal products manufacturing industry (\$320 billion).

# Executive Summary

**Product/Service Type: 1,3-Propanediol (PDO)**

## **SUBSECTOR 333: Global Machinery manufacturing**

NAICS CODE	INDUSTRY TITLE	2022 Sales (\$Mill)	2021-2022 % Change
333111	Farm machinery and equipment manufacturing	125,830,000	-3%
333112	Lawn and garden tractor and home lawn and garden equipment manufacturing	45,480,000	-1%
333120	Construction machinery manufacturing	222,690,000	4%
333131	Mining machinery and equipment manufacturing	20,540,000	-1%
333132	Oil and gas field machinery and equipment manufacturing	63,340,000	-5%
333241	Food product machinery manufacturing	37,380,000	4%
333242	Semiconductor machinery manufacturing	99,570,000	21%
333243	Sawmill, woodworking, and paper machinery manufacturing	24,740,000	4%
333244	Printing machinery and equipment manufacturing	10,740,000	1%
333249	Other industrial machinery manufacturing	100,880,000	3%
333314	Optical instrument and lens manufacturing	30,350,000	2%
333316	Photographic and photocopying equipment manufacturing	6,550,000	-6%
333318	Other commercial and service industry machinery manufacturing	101,270,000	-2%
333413	Industrial and commercial fan and blower and air purification equipment manufacturing	36,690,000	1%

# Executive Summary

**Product/Service Type: 1,3-Propanediol (PDO)**

## **SUBSECTOR 333: Global Machinery manufacturing (continued)**

NAICS CODE	INDUSTRY TITLE	2022 Sales (\$Mill)	2021-2022 % Change
333414	Heating equipment (except warm air furnaces) manufacturing	24,850,000	0%
333415	Air-conditioning and warm air heating equipment and commercial and industrial refrigeration equipment manufacturing	205,200,000	2%
333511	Industrial mold manufacturing	44,500,000	4%
333514	Special die and tool, die set, jig, and fixture manufacturing	72,780,000	7%
333515	Cutting tool and machine tool accessory manufacturing	32,160,000	1%
333517	Machine tool manufacturing	54,590,000	5%
333519	Rolling mill and other metalworking machinery manufacturing	23,950,000	3%
333611	Turbine and turbine generator set units manufacturing	84,130,000	0%
333612	Speed changer, industrial high-speed drive, and gear manufacturing	19,310,000	0%
333613	Mechanical power transmission equipment manufacturing	35,500,000	8%
333618	Other engine equipment manufacturing	169,020,000	3%
333912	Air and gas compressor manufacturing	51,690,000	-1%
333913	Measuring and dispensing pump manufacturing	160,710,000	10%
333921	Elevator and moving stairway manufacturing	29,110,000	11%
333922	Conveyor and conveying equipment manufacturing	70,220,000	5%

# Executive Summary

**Product/Service Type: 1,3-Propanediol (PDO)**

## **SUBSECTOR 333: Global Machinery manufacturing (continued)**

NAICS CODE	INDUSTRY TITLE	2022 Sales (\$Mill)	2021-2022 % Change
333923	Overhead traveling crane, hoist, and monorail system manufacturing	49,290,000	2%
333924	Industrial truck, trailer, and stacker machinery manufacturing	77,860,000	8%
333991	Power-driven handtool manufacturing	20,270,000	1%
333992	Welding and soldering equipment manufacturing	27,920,000	-1%
333993	Packaging machinery manufacturing	51,710,000	7%
333994	Industrial process furnace and oven manufacturing	13,900,000	-1%
333995	Fluid power cylinder and actuator manufacturing	52,470,000	4%
333996	Fluid power pump and motor manufacturing	32,730,000	9%
333997	Scale and balance manufacturing	6,920,000	4%
333999	All other miscellaneous general purpose machinery manufacturing	107,440,000	3%
<b>TOTAL</b>		<b>2,444,280,000</b>	<b>3%</b>

The machinery manufacturing subsector globally is projected to be \$2.4 trillion in 2022, growing by 3 percent from 2021 to 2022.

The Elevator and moving stairway manufacturing industry is forecast to have the highest growth rate globally from 2021 to 2022 in the subsector (8 percent) followed by the Packaging machinery manufacturing industry (5 percent).

The largest global industries in this subsector are the air-conditioning and warm air heating equipment and commercial and industrial refrigeration equipment manufacturing industry (\$216 billion for 2022) and the construction machinery manufacturing industry (\$150 billion).

# Executive Summary

**Product/Service Type: 1,3-Propanediol (PDO)**

## **SUBSECTOR 334: Global Computer and electronic product manufacturing**

NAICS CODE	INDUSTRY TITLE	2022 Sales (\$Mill)	2021-2022 % Change
33411	Computer and peripheral manufacturing	136,360,000	2%
33421	Telephone apparatus manufacturing	21,090,000	-5%
33422	Radio and television broadcasting equipment manufacturing	153,420,000	1%
33429	Other communications equipment manufacturing	28,440,000	3%
33431	Audio and video equipment manufacturing	18,910,000	2%
33441	Semiconductor manufacturing	718,740,000	6%
334510	Electromedical and electrotherapeutic apparatus manufacturing	286,120,000	11%
334511	Search, detection, navigation, guidance, aeronautical, and nautical system and instrument manufacturing	397,390,000	8%
334512	Automatic environmental control manufacturing for residential, commercial, and appliance use	25,850,000	10%
334513	Instruments and related products manufacturing for measuring, displaying, and controlling industrial process variables	71,680,000	3%
334514	Totalizing fluid meter and counting device manufacturing	35,050,000	2%
334515	Instrument manufacturing for measuring and testing electricity and electrical systems	93,550,000	7%
334516	Analytical laboratory instrument manufacturing	114,530,000	2%
334517	Irradiation apparatus manufacturing	60,210,000	2%
334519	Other measuring and controlling device manufacturing	106,870,000	10%
<b>TOTAL</b>		<b>2,268,210,000</b>	<b>6%</b>

# Executive Summary

*Product/Service Type: 1,3-Propanediol (PDO)*

## **SUBSECTOR 334: Global Computer and electronic product manufacturing (continued)**

The computer and electronic product manufacturing subsector globally is projected to be \$2.2 trillion in 2022, growing by 6 percent from 2021 to 2022.

The electromedical apparatus manufacturing industry is forecast to have the highest growth rate globally from 2021 to 2022 in the subsector (11 percent) followed by the automatic environmental control manufacturing industry (10 percent).

The largest global industries in this subsector are the semiconductor manufacturing industry (\$718 billion for 2022) and the search, detection, navigation, guidance, aeronautical, and nautical system and instrument manufacturing industry (\$397 billion).

# Executive Summary

**Product/Service Type: 1,3-Propanediol (PDO)**

## **SUBSECTOR 335: Global Electrical equipment, appliance, and component manufacturing**

NAICS CODE	INDUSTRY TITLE	2022 Sales (\$Mill)	2021-2022 % Change
33511	Electric lamp bulb and part manufacturing	20,290,000	11%
33512	Lighting fixture manufacturing	80,540,000	4%
33521	Small electrical appliance manufacturing	24,820,000	3%
33522	Major appliance manufacturing	138,790,000	5%
33531	Electrical equipment manufacturing	291,800,000	6%
33591	Battery manufacturing	62,180,000	2%
33592	Communication and energy wire and cable manufacturing	58,190,000	-2%
33593	Wiring device manufacturing	101,350,000	4%
33599	All other electrical equipment and component manufacturing	102,780,000	4%
<b>TOTAL</b>		<b>880,740,000</b>	<b>5%</b>

The electrical equipment, appliance, and component manufacturing subsector globally is projected to be \$880 billion in 2021, growing by 5 percent from 2021 to 2022.

The electric lamp manufacturing industry is forecast to have the highest growth rate globally from 2021 to 2022 in the subsector (11 percent) followed by the small electrical equipment manufacturing industry (6 percent).

The largest global industries in this subsector are the electrical equipment manufacturing industry (\$291 billion for 2021) and the major appliance manufacturing industry (\$138 billion).



# Executive Summary

**Product/Service Type: 1,3-Propanediol (PDO)**

## **SUBSECTOR 336: Global Transportation equipment manufacturing**

NAICS CODE	INDUSTRY TITLE	2022 Sales (\$Mill)	2021-2022 % Change
336111	Automobile manufacturing	708,540,000	2%
336112	Light truck and utility vehicle manufacturing	1,556,840,000	8%
33612	Heavy duty truck manufacturing	159,140,000	-1%
33621	Motor vehicle body and trailer manufacturing	388,110,000	9%
33631	Motor vehicle gasoline engine and engine parts manufacturing	271,830,000	7%
33632	Motor vehicle electrical and electronic equipment manufacturing	167,480,000	3%
33633	Motor vehicle steering and suspension components (except spring) manufacturing	109,940,000	4%
33634	Motor vehicle brake system manufacturing	83,770,000	6%
33635	Motor vehicle transmission and power train parts manufacturing	275,020,000	5%
33636	Motor vehicle seating and interior trim manufacturing	177,800,000	0%
33637	Motor vehicle metal stamping	243,790,000	3%
33639	Other motor vehicle parts manufacturing	359,560,000	-1%
336411	Aircraft manufacturing	1,208,240,000	9%
336412	Aircraft engine and engine parts manufacturing	301,560,000	7%
336413	Other aircraft parts and auxiliary equipment manufacturing	193,930,000	-1%
336414	Guided missile and space vehicle manufacturing	115,940,000	3%

# Executive Summary

**Product/Service Type: 1,3-Propanediol (PDO)**

## **SUBSECTOR 336: Global Transportation equipment manufacturing (continued)**

NAICS CODE	INDUSTRY TITLE	2022 Sales (\$Mill)	2021-2022 % Change
336415	Guided missile and space vehicle propulsion unit and propulsion unit parts manufacturing	108,290,000	10%
336419	Other guided missile and space vehicle parts and auxiliary equipment manufacturing	8,260,000	2%
33651	Railroad rolling stock manufacturing	54,840,000	-8%
33661	Ship and boat building	242,310,000	4%
33699	Other transportation equipment manufacturing	178,960,000	10%
TOTAL		6,914,150,000	6%

The transportation equipment manufacturing subsector globally is projected to be \$6.9 trillion in 2022, growing by 6 percent from 2021 to 2022.

The guided missile propulsion manufacturing industry is forecast to have the highest growth rate globally from 2021 to 2022 in the subsector (10 percent) followed by the aircraft manufacturing industry (9 percent).

The largest global industries in this subsector are the light truck and utility vehicle manufacturing industry (\$1.5 trillion for 2022) and the aircraft manufacturing industry (\$1.2 trillion).

# Executive Summary

**Product/Service Type: 1,3-Propanediol (PDO)**

## **SUBSECTOR 339: Global Miscellaneous manufacturing**

NAICS CODE	INDUSTRY TITLE	2022 Sales (\$Mill)	2021-2022 % Change
33911	Medical equipment and supplies manufacturing	573,560,000	2%
33991	Jewelry and silverware manufacturing	43,660,000	1%
33992	Sporting and athletic goods manufacturing	62,640,000	1%
33993	Doll, toy, and game manufacturing	11,340,000	6%
33994	Office supplies (except paper) manufacturing	16,830,000	-1%
33995	Sign manufacturing	73,630,000	0%
33999	All other miscellaneous manufacturing	155,970,000	0%
<b>TOTAL</b>		<b>937,630,000</b>	<b>1%</b>

The miscellaneous manufacturing subsector globally is projected to be \$0.9 trillion in 2022, growing by 1 percent from 2021 to 2022.

The doll, toy and game manufacturing industry is forecast to have the highest growth rate globally from 2021 to 2022 in the subsector (6 percent) followed by the medical supplies manufacturing industry (2 percent).

The largest global industries in this subsector are the medical equipment and supplies manufacturing industry (\$573 billion for 2022) and the sign manufacturing industry (\$73 billion).

# Global Markets

**Product/Service Type: 1,3-Propanediol (PDO)**

**Industry: Chemical Manufacturing**

**Market Size by Year (US\$ Millions)**

Country Name	2016	2017	2018	2019	2020	2021	2022	2023
Argentina	16.5	14.1	11.5	10.6	8.8	8.1	7.4	6.7
Australia	15.1	13.2	14.5	14.5	13.3	14.1	14.6	15.2
Austria	11.9	12.1	13.5	13.6	13.0	14.2	15.2	16.3
Bangladesh	6.0	7.4	8.6	10.5	11.2	14.0	17.1	20.9
Belgium	11.1	10.8	11.7	11.9	11.0	11.8	12.5	13.1
Brazil	36.2	37.2	32.3	35.0	31.3	32.9	33.6	34.4
Canada	32.8	34.7	36.9	39.4	39.3	44.8	49.7	55.2
Chile	5.0	5.0	5.5	5.2	5.1	5.6	5.9	6.3
China	556.6	617.6	676.5	702.7	709.7	807.2	901.0	1,005.1
Czech Republic	8.7	8.9	9.9	10.5	10.3	11.5	12.7	14.0
Denmark	7.9	7.2	8.1	8.8	8.1	8.8	9.5	10.2
Egypt, Arab Rep.	9.7	6.6	7.1	8.9	7.8	8.4	8.9	9.4
Finland	6.7	6.6	7.1	7.1	6.6	7.1	7.4	7.8
France	47.4	44.4	48.2	50.2	47.4	52.0	55.6	59.4
Germany	132.4	129.1	140.9	138.6	135.9	149.8	160.8	172.6
Hungary	5.0	4.7	5.1	5.3	5.1	5.7	6.1	6.6
India	59.1	67.5	69.2	70.3	69.9	77.6	84.7	92.3
Indonesia	31.4	35.1	36.2	40.5	40.9	47.5	53.7	60.7
Ireland	17.3	18.2	21.7	23.5	23.0	26.4	29.7	33.4
Israel	6.7	7.3	7.7	7.9	7.8	8.6	9.4	10.3
Italy	51.3	50.2	54.7	54.8	53.8	59.7	64.5	69.7
Japan	159.7	172.7	179.8	192.2	194.1	205.9	224.5	244.7
Korea, Rep.	69.5	76.7	80.2	76.6	78.5	87.6	95.2	103.5
Malaysia	11.3	11.9	13.5	14.4	14.7	17.2	19.5	22.1
Mexico	37.7	34.2	37.0	40.4	37.9	41.9	45.2	48.7
Netherlands	15.8	15.8	17.8	18.0	17.4	19.3	20.9	22.6
Nigeria	7.2	5.6	6.7	9.5	8.4	9.7	11.0	12.4
Norway	5.0	4.4	4.5	4.7	4.4	4.8	5.2	5.5
Pakistan	5.9	6.3	6.7	6.4	6.2	6.8	7.2	7.6
Philippines	9.8	10.9	11.6	12.8	13.1	15.3	17.5	19.9
Poland	16.7	15.9	17.2	18.2	17.0	18.6	19.9	21.2
Puerto Rico	8.4	8.6	8.4	9.1	8.6	9.5	10.2	11.0
Romania	6.5	7.2	7.9	7.8	8.3	9.5	10.7	12.0
Russian Federation	32.1	32.9	38.0	40.3	38.9	43.7	48.2	53.1
Saudi Arabia	14.4	15.2	17.6	18.3	19.5	23.0	26.5	30.5

# Global Markets

**Product/Service Type: 1,3-Propanediol (PDO)**

**Industry: Chemical Manufacturing**

**Market Size by Year (US\$ Millions)**

Country Name	2016	2017	2018	2019	2020	2021	2022	2023
Singapore	10.0	11.0	13.5	13.4	14.6	17.5	20.3	23.7
South Africa	7.3	7.2	7.6	7.6	7.3	8.0	8.6	9.1
Spain	29.1	25.7	27.9	28.0	26.1	28.5	30.5	32.6
Sweden	13.0	12.2	12.7	12.6	11.7	12.4	12.9	13.4
Switzerland	21.4	21.3	22.4	24.5	23.6	26.5	29.0	31.7
Thailand	18.7	21.3	23.7	25.6	26.2	30.4	34.7	39.5
Turkey	27.7	25.7	25.7	25.6	24.5	25.9	26.9	27.9
United Arab Emirates	5.8	6.0	6.4	6.7	6.9	7.9	8.9	9.9
United Kingdom	50.0	41.0	44.2	45.2	43.1	46.1	48.4	50.8
United States	345.1	372.1	400.4	430.4	421.7	478.3	528.6	584.3
Venezuela, RB	9.6	9.1	8.9	8.9	8.0	7.8	7.7	7.7
Vietnam	5.2	5.9	6.9	7.9	8.2	9.8	11.5	13.6
GLOBAL	2,017.7	2,114.9	2,274.2	2,375.0	2,348.3	2,627.9	2,889.7	3,178.5

Source: Barnes Reports

\*2021-2023 Forecasts

# Regional Markets

## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in North America is estimated to be \$0.6 billion dollars in 2022 and is expected to change by 10.4 percent from 2021 to 2022. The market in the Asia-Pacific region for this equipment is estimated to be \$1.5 billion in 2022 and is forecast to change by 11 percent from 2022 to 2023. The European market is \$0.5 billion in 2022.

## Market Size by Year (US\$ Millions)

	2016	2017	2018	2019	2020	2021	2022	2023
North America	415.7	441.1	474.3	510.2	498.9	565.1	623.6	688.2
Latin America	52.6	51.4	43.8	45.6	40.1	41.0	41.0	41.1
Europe	393.9	376.7	411.9	419.1	405.2	446.5	480.5	517.2
Asia-Pacific	979.2	1,077.3	1,163.5	1,209.7	1,220.1	1,370.8	1,521.1	1,687.3
Middle East	27.7	25.7	25.7	25.6	24.5	25.9	26.9	27.9
Africa	14.5	12.8	14.3	17.1	15.8	17.7	19.5	21.5
GLOBAL	1,869.2	1,972.1	2,119.2	2,210.2	2,188.8	2,449.3	2,693.1	2,961.7

## Regional Distribution

	2016	2017	2018	2019	2020	2021	2022	2023
North America	22.2%	22.4%	22.4%	23.1%	22.8%	23.1%	23.2%	23.2%
Latin America	2.8%	2.6%	2.1%	2.1%	1.8%	1.7%	1.5%	1.4%
Europe	21.1%	19.1%	19.4%	19.0%	18.5%	18.2%	17.8%	17.5%
Asia-Pacific	52.4%	54.6%	54.9%	54.7%	55.7%	56.0%	56.5%	57.0%
Middle East	1.5%	1.3%	1.2%	1.2%	1.1%	1.1%	1.0%	0.9%
Africa	0.8%	0.7%	0.7%	0.8%	0.7%	0.7%	0.7%	0.7%
GLOBAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

## Year-to-Year Change

	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023
North America	6.1%	7.5%	7.6%	-2.2%	13.3%	10.4%	10.4%
Latin America	-2.4%	-14.7%	4.2%	-12.2%	2.3%	0.0%	0.2%
Europe	-4.4%	9.3%	1.8%	-3.3%	10.2%	7.6%	7.6%
Asia-Pacific	10.0%	8.0%	4.0%	0.9%	12.4%	11.0%	10.9%
Middle East	-7.4%	0.0%	-0.4%	-4.2%	5.8%	3.8%	3.8%
Africa	-11.5%	11.5%	19.7%	-7.8%	12.5%	10.1%	10.2%
GLOBAL	5.5%	7.5%	4.3%	-1.0%	11.9%	10.0%	10.0%

Source: Barnes Reports

\*2021-2023 Forecasts

# Argentina

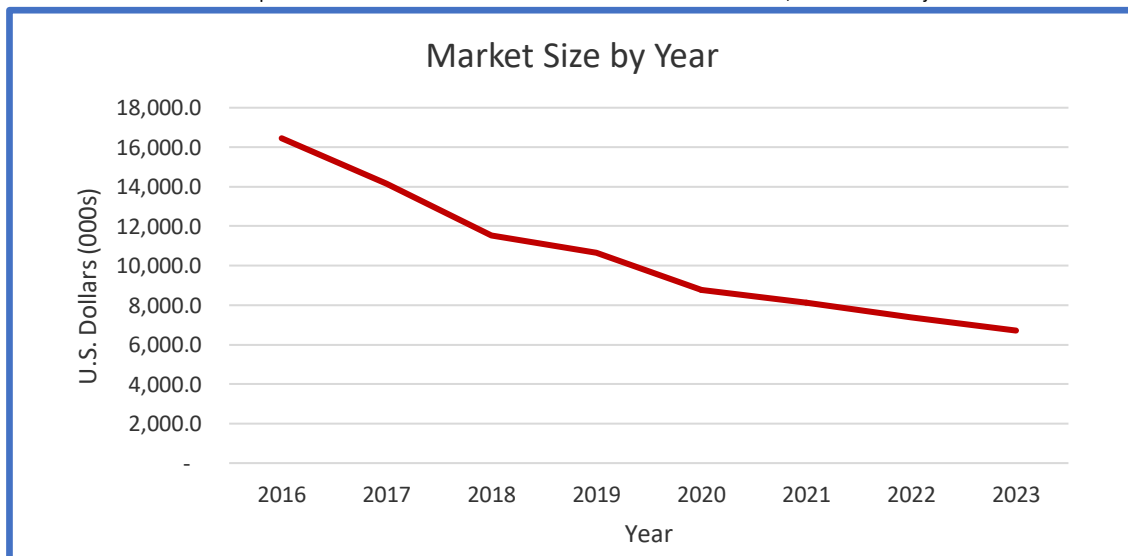
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in Argentina is estimated to be \$7.4 million dollars in 2022 and is expected to change by -9.1 percent from 2022 to 2023. The market will be 884.6 million Pesos in 2022 and is forecast to change by 27.1 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Pesos
2016	16,452.7	220,392.0
2017	14,143.3	234,251.6
2018	11,538.2	324,166.6
2019	10,645.1	512,540.5
2020	8,771.0	534,335.9
2021	8,124.6	695,935.3
2022	7,386.7	884,623.5
2023	6,713.2	1,116,445.9
2028	3,745.5	3,419,455.3
Y-to-Y Change	US Dollars	Pesos
2016-2017	-14.0%	6.3%
2017-2018	-18.4%	38.4%
2018-2019	-7.7%	58.1%
2019-2020	-17.6%	4.3%
2020-2021	-7.4%	30.2%
2021-2022	-9.1%	27.1%
2022-2023	-9.1%	26.2%
CAGR 2023-2028	-8.8%	206.3%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# Argentina

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in Argentina will be \$0.76 million dollars in 2022 and the lease and rental payments for the market will be \$0.04 million dollars. The operating expenses for this market is expected to reach \$4.37 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	761.7
Operating Expenses (\$1,000)	4,367.5
Employer Costs for Fringe Benefits (\$1,000)	235.2
Contract Labor Costs including Temporary Help (\$1,000)	69.7
Cost of Health Insurance (\$1,000)	91.9
Taxes and License Fees (\$1,000)	22.5
Lease and Rental Payments (\$1,000)	44.5

### **Cost of Services Estimates**

The cost of advertising for this market in Argentina will be \$0.02 million dollars in 2022 and the cost of professional services for the market will be \$0.04 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.06 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	8.6
Cost of Purchased Repair and Maintenance Services (\$1,000)	58.4
Cost of Purchased Communication Services (\$1,000)	6.0
Cost of Purchased Advertising and Promotional Services (\$1,000)	16.5
Cost of Purchased Professional & Technical Services (\$1,000)	38.0
Cost of Purchased Refuse & Waste Removal (\$1,000)	17.4

\*2021-2022 Forecasts

Source: Barnes Reports



# Australia

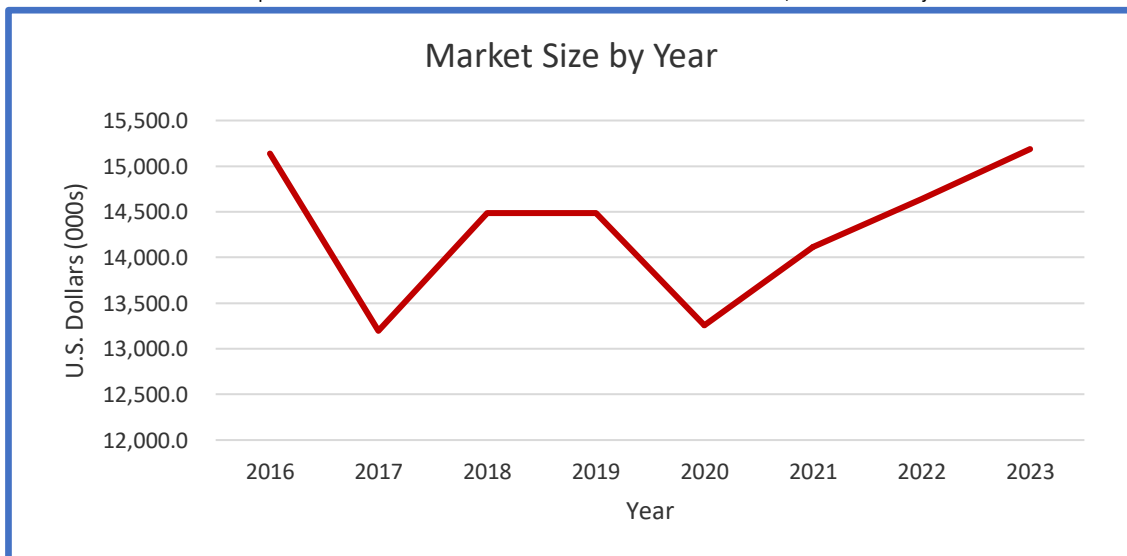
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in Australia is estimated to be \$14.6 million dollars in 2022 and is expected to change by 3.7 percent from 2022 to 2023. The market will be 23.2 million Dollars in 2022 and is forecast to change by 8.4 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Dollars
2016	15,138.4	18,117.0
2017	13,196.4	17,497.1
2018	14,484.1	18,685.9
2019	14,487.5	20,256.4
2020	13,256.4	19,244.3
2021	14,114.2	21,409.8
2022	14,640.8	23,206.0
2023	15,187.0	25,152.9
2028	18,110.0	37,362.2
Y-to-Y Change	US Dollars	Dollars
2016-2017	-12.8%	-3.4%
2017-2018	9.8%	6.8%
2018-2019	0.0%	8.4%
2019-2020	-8.5%	-5.0%
2020-2021	6.5%	11.3%
2021-2022	3.7%	8.4%
2022-2023	3.7%	8.4%
CAGR 2023-2028	3.8%	48.5%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# Australia

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in Australia will be \$1.51 million dollars in 2022 and the lease and rental payments for the market will be \$0.09 million dollars. The operating expenses for this market is expected to reach \$8.66 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	1,509.7
Operating Expenses (\$1,000)	8,656.6
Employer Costs for Fringe Benefits (\$1,000)	466.2
Contract Labor Costs including Temporary Help (\$1,000)	138.2
Cost of Health Insurance (\$1,000)	182.1
Taxes and License Fees (\$1,000)	44.6
Lease and Rental Payments (\$1,000)	88.2

### **Cost of Services Estimates**

The cost of advertising for this market in Australia will be \$0.03 million dollars in 2022 and the cost of professional services for the market will be \$0.08 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.12 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	17.0
Cost of Purchased Repair and Maintenance Services (\$1,000)	115.7
Cost of Purchased Communication Services (\$1,000)	12.0
Cost of Purchased Advertising and Promotional Services (\$1,000)	32.8
Cost of Purchased Professional & Technical Services (\$1,000)	75.4
Cost of Purchased Refuse & Waste Removal (\$1,000)	34.4

\*2021-2022 Forecasts

Source: Barnes Reports

# Austria

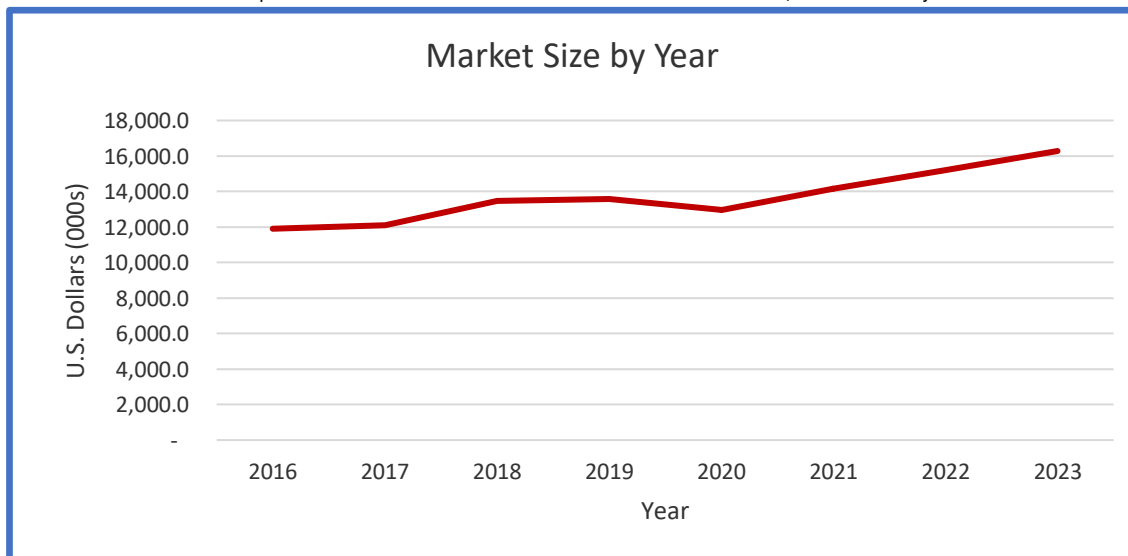
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in Austria is estimated to be \$15.2 million dollars in 2022 and is expected to change by 7.2 percent from 2022 to 2023. The market will be 14.3 million Euros in 2022 and is forecast to change by 8.9 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Euros
2016	11,904.6	10,710.4
2017	12,092.4	10,704.2
2018	13,485.6	11,419.2
2019	13,592.2	12,141.6
2020	12,953.5	11,753.9
2021	14,158.6	13,144.0
2022	15,187.3	14,320.2
2023	16,280.8	15,601.7
2028	24,183.2	23,778.7
Y-to-Y Change	US Dollars	Euros
2016-2017	1.6%	-0.1%
2017-2018	11.5%	6.7%
2018-2019	0.8%	6.3%
2019-2020	-4.7%	-3.2%
2020-2021	9.3%	11.8%
2021-2022	7.3%	8.9%
2022-2023	7.2%	8.9%
CAGR 2023-2028	9.7%	52.4%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# Austria

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in Austria will be \$1.57 million dollars in 2022 and the lease and rental payments for the market will be \$0.09 million dollars. The operating expenses for this market is expected to reach \$8.98 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	1,566.0
Operating Expenses (\$1,000)	8,979.7
Employer Costs for Fringe Benefits (\$1,000)	483.6
Contract Labor Costs including Temporary Help (\$1,000)	143.4
Cost of Health Insurance (\$1,000)	188.9
Taxes and License Fees (\$1,000)	46.3
Lease and Rental Payments (\$1,000)	91.5

### **Cost of Services Estimates**

The cost of advertising for this market in Austria will be \$0.03 million dollars in 2022 and the cost of professional services for the market will be \$0.08 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.12 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	17.6
Cost of Purchased Repair and Maintenance Services (\$1,000)	120.1
Cost of Purchased Communication Services (\$1,000)	12.4
Cost of Purchased Advertising and Promotional Services (\$1,000)	34.0
Cost of Purchased Professional & Technical Services (\$1,000)	78.2
Cost of Purchased Refuse & Waste Removal (\$1,000)	35.7

\*2021-2022 Forecasts

Source: Barnes Reports

# Bangladesh

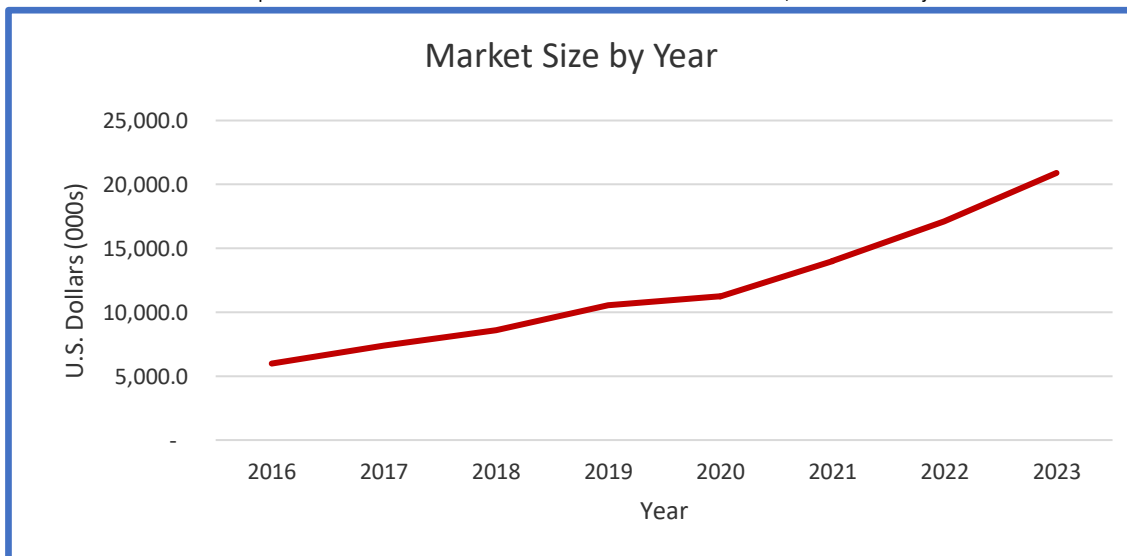
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in Bangladesh is estimated to be \$17.1 million dollars in 2022 and is expected to change by 22.2 percent from 2022 to 2023. The market will be 1388 million Takas in 2022 and is forecast to change by 21.7 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Takas
2016	5,984.6	517,231.0
2017	7,397.0	585,276.9
2018	8,606.4	706,779.7
2019	10,527.9	884,672.6
2020	11,232.8	920,103.3
2021	13,992.4	1,140,769.0
2022	17,105.2	1,387,991.3
2023	20,897.8	1,687,769.5
2028	59,677.9	4,707,568.1
Y-to-Y Change	US Dollars	Takas
2016-2017	23.6%	13.2%
2017-2018	16.4%	20.8%
2018-2019	22.3%	25.2%
2019-2020	6.7%	4.0%
2020-2021	24.6%	24.0%
2021-2022	22.2%	21.7%
2022-2023	22.2%	21.6%
CAGR 2023-2028	37.1%	178.9%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# Bangladesh

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in Bangladesh will be \$1.76 million dollars in 2022 and the lease and rental payments for the market will be \$0.10 million dollars. The operating expenses for this market is expected to reach \$10.11 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	1,763.8
Operating Expenses (\$1,000)	10,113.7
Employer Costs for Fringe Benefits (\$1,000)	544.7
Contract Labor Costs including Temporary Help (\$1,000)	161.5
Cost of Health Insurance (\$1,000)	212.8
Taxes and License Fees (\$1,000)	52.1
Lease and Rental Payments (\$1,000)	103.1

### **Cost of Services Estimates**

The cost of advertising for this market in Bangladesh will be \$0.04 million dollars in 2022 and the cost of professional services for the market will be \$0.09 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.14 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	19.9
Cost of Purchased Repair and Maintenance Services (\$1,000)	135.2
Cost of Purchased Communication Services (\$1,000)	14.0
Cost of Purchased Advertising and Promotional Services (\$1,000)	38.3
Cost of Purchased Professional & Technical Services (\$1,000)	88.1
Cost of Purchased Refuse & Waste Removal (\$1,000)	40.2

\*2021-2022 Forecasts

Source: Barnes Reports

# Belgium

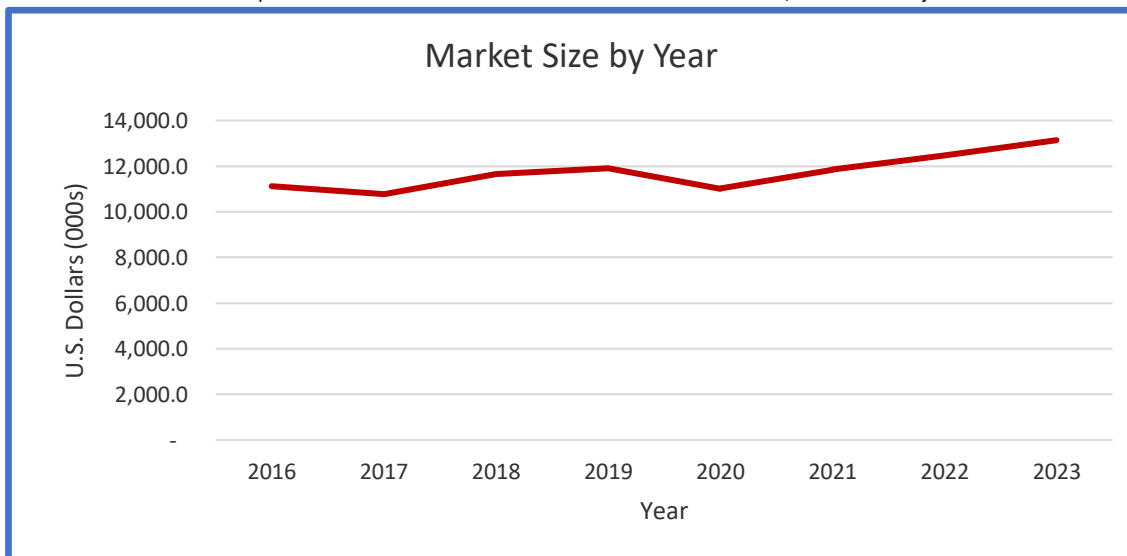
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in Belgium is estimated to be \$12.5 million dollars in 2022 and is expected to change by 5.3 percent from 2022 to 2023. The market will be 11.7 million Euros in 2022 and is forecast to change by 6.9 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Euros
2016	11,117.4	10,052.7
2017	10,772.3	9,544.4
2018	11,668.0	9,880.2
2019	11,918.2	10,646.2
2020	11,023.1	9,977.1
2021	11,837.1	10,943.7
2022	12,474.3	11,695.0
2023	13,137.8	12,497.9
2028	17,861.1	17,295.2
Y-to-Y Change	US Dollars	Euros
2016-2017	-3.1%	-5.1%
2017-2018	8.3%	3.5%
2018-2019	2.1%	7.8%
2019-2020	-7.5%	-6.3%
2020-2021	7.4%	9.7%
2021-2022	5.4%	6.9%
2022-2023	5.3%	6.9%
CAGR 2023-2028	7.2%	38.4%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# Belgium

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in Belgium will be \$1.29 million dollars in 2022 and the lease and rental payments for the market will be \$0.08 million dollars. The operating expenses for this market is expected to reach \$7.38 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	1,286.3
Operating Expenses (\$1,000)	7,375.6
Employer Costs for Fringe Benefits (\$1,000)	397.2
Contract Labor Costs including Temporary Help (\$1,000)	117.8
Cost of Health Insurance (\$1,000)	155.2
Taxes and License Fees (\$1,000)	38.0
Lease and Rental Payments (\$1,000)	75.2

### **Cost of Services Estimates**

The cost of advertising for this market in Belgium will be \$0.03 million dollars in 2022 and the cost of professional services for the market will be \$0.06 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.10 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	14.5
Cost of Purchased Repair and Maintenance Services (\$1,000)	98.6
Cost of Purchased Communication Services (\$1,000)	10.2
Cost of Purchased Advertising and Promotional Services (\$1,000)	27.9
Cost of Purchased Professional & Technical Services (\$1,000)	64.2
Cost of Purchased Refuse & Waste Removal (\$1,000)	29.3

\*2021-2022 Forecasts

Source: Barnes Reports



# Brazil

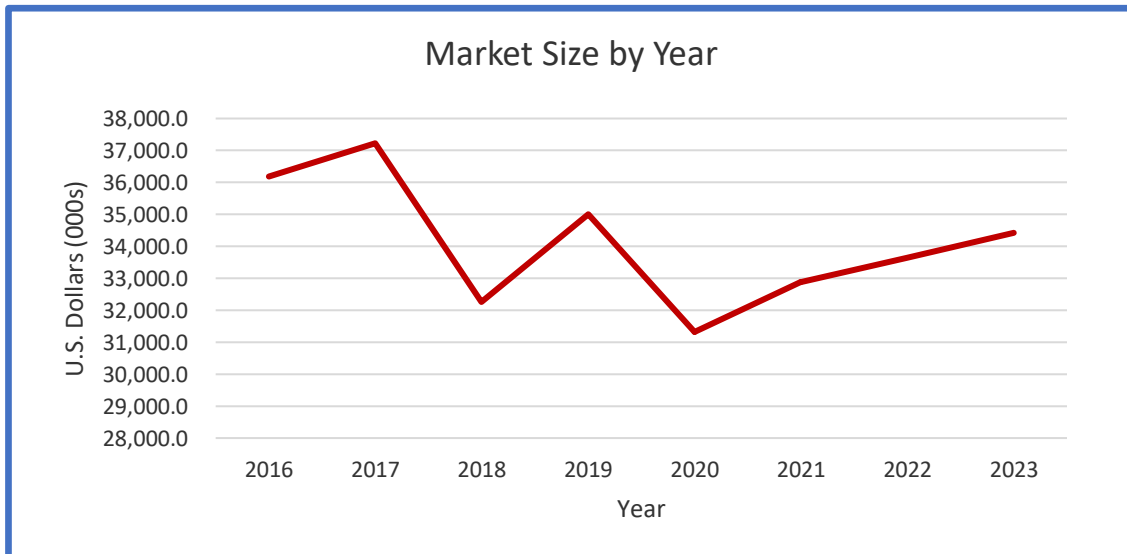
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in Brazil is estimated to be \$33.6 million dollars in 2022 and is expected to change by 2.3 percent from 2022 to 2023. The market will be 155.6 million Reals in 2022 and is forecast to change by 8.7 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Reals
2016	36,180.4	122,310.5
2017	37,224.6	118,266.7
2018	32,256.6	117,859.0
2019	34,998.2	138,050.6
2020	31,320.6	128,439.6
2021	32,888.0	143,244.4
2022	33,644.9	155,643.8
2023	34,419.3	169,116.5
2028	38,293.6	254,312.8
Y-to-Y Change	US Dollars	Reals
2016-2017	2.9%	-3.3%
2017-2018	-13.3%	-0.3%
2018-2019	8.5%	17.1%
2019-2020	-10.5%	-7.0%
2020-2021	5.0%	11.5%
2021-2022	2.3%	8.7%
2022-2023	2.3%	8.7%
CAGR 2023-2028	2.3%	50.4%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# Brazil

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in Brazil will be \$3.47 million dollars in 2022 and the lease and rental payments for the market will be \$0.20 million dollars. The operating expenses for this market is expected to reach \$19.89 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	3,469.2
Operating Expenses (\$1,000)	19,893.0
Employer Costs for Fringe Benefits (\$1,000)	1,071.4
Contract Labor Costs including Temporary Help (\$1,000)	317.6
Cost of Health Insurance (\$1,000)	418.5
Taxes and License Fees (\$1,000)	102.5
Lease and Rental Payments (\$1,000)	202.7

### **Cost of Services Estimates**

The cost of advertising for this market in Brazil will be \$0.08 million dollars in 2022 and the cost of professional services for the market will be \$0.17 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.27 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	39.1
Cost of Purchased Repair and Maintenance Services (\$1,000)	266.0
Cost of Purchased Communication Services (\$1,000)	27.5
Cost of Purchased Advertising and Promotional Services (\$1,000)	75.3
Cost of Purchased Professional & Technical Services (\$1,000)	173.3
Cost of Purchased Refuse & Waste Removal (\$1,000)	79.0

\*2021-2022 Forecasts

Source: Barnes Reports

# Canada

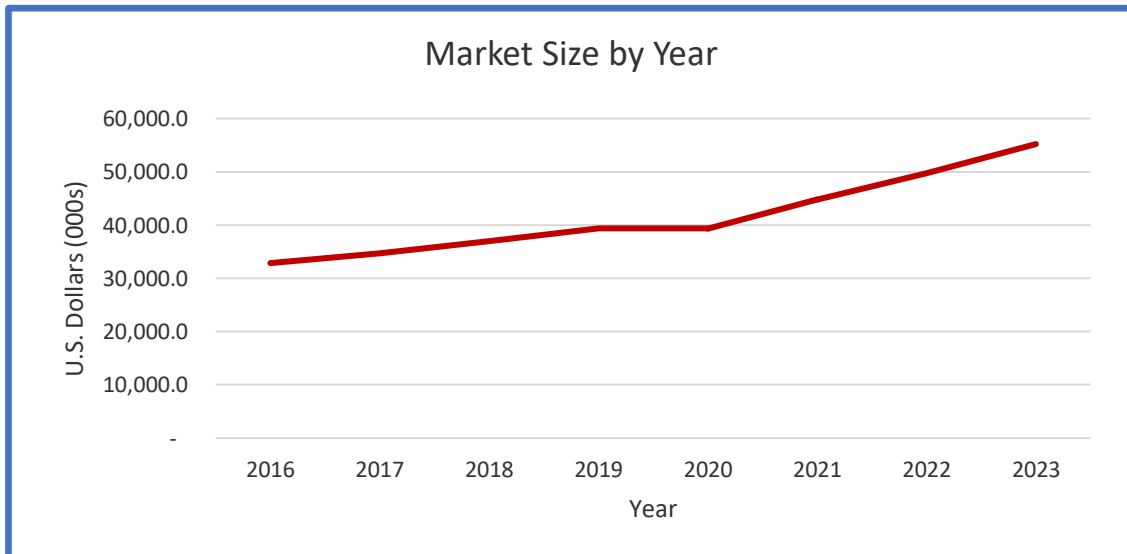
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in Canada is estimated to be \$49.7 million dollars in 2022 and is expected to change by 11 percent from 2022 to 2023. The market will be 68.4 million Dollars in 2022 and is forecast to change by 12.5 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Dollars
2016	32,848.8	41,712.3
2017	34,744.5	45,013.8
2018	36,915.8	47,833.8
2019	39,367.4	52,232.4
2020	39,316.3	52,694.5
2021	44,795.6	60,834.8
2022	49,724.9	68,425.0
2023	55,196.6	76,962.2
2028	92,367.0	137,563.3
Y-to-Y Change	US Dollars	Dollars
2016-2017	5.8%	7.9%
2017-2018	6.2%	6.3%
2018-2019	6.6%	9.2%
2019-2020	-0.1%	0.9%
2020-2021	13.9%	15.4%
2021-2022	11.0%	12.5%
2022-2023	11.0%	12.5%
CAGR 2023-2028	13.5%	78.7%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# Canada

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in Canada will be \$5.13 million dollars in 2022 and the lease and rental payments for the market will be \$0.30 million dollars. The operating expenses for this market is expected to reach \$29.40 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	5,127.3
Operating Expenses (\$1,000)	29,400.5
Employer Costs for Fringe Benefits (\$1,000)	1,583.4
Contract Labor Costs including Temporary Help (\$1,000)	469.4
Cost of Health Insurance (\$1,000)	618.5
Taxes and License Fees (\$1,000)	151.5
Lease and Rental Payments (\$1,000)	299.6

### **Cost of Services Estimates**

The cost of advertising for this market in Canada will be \$0.11 million dollars in 2022 and the cost of professional services for the market will be \$0.26 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.39 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	57.7
Cost of Purchased Repair and Maintenance Services (\$1,000)	393.1
Cost of Purchased Communication Services (\$1,000)	40.7
Cost of Purchased Advertising and Promotional Services (\$1,000)	111.4
Cost of Purchased Professional & Technical Services (\$1,000)	256.1
Cost of Purchased Refuse & Waste Removal (\$1,000)	116.8

\*2021-2022 Forecasts

Source: Barnes Reports

# Chile

## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in Chile is estimated to be \$5.9 million dollars in 2022 and is expected to change by 6.4 percent from 2022 to 2023. The market will be 4176.9 million Pesos in 2022 and is forecast to change by 7.8 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Pesos
2016	4,985.8	3,344,936.4
2017	4,973.6	3,235,200.9
2018	5,491.5	3,521,548.0
2019	5,206.5	3,659,611.1
2020	5,099.3	3,504,251.5
2021	5,569.9	3,876,028.7
2022	5,927.4	4,176,901.9
2023	6,307.8	4,501,130.1
2028	8,548.0	6,494,852.7
Y-to-Y Change	US Dollars	Pesos
2016-2017	-0.2%	-3.3%
2017-2018	10.4%	8.9%
2018-2019	-5.2%	3.9%
2019-2020	-2.1%	-4.2%
2020-2021	9.2%	10.6%
2021-2022	6.4%	7.8%
2022-2023	6.4%	7.8%
CAGR 2023-2028	7.1%	44.3%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# Chile

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in Chile will be \$0.61 million dollars in 2022 and the lease and rental payments for the market will be \$0.04 million dollars. The operating expenses for this market is expected to reach \$3.50 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	611.2
Operating Expenses (\$1,000)	3,504.6
Employer Costs for Fringe Benefits (\$1,000)	188.7
Contract Labor Costs including Temporary Help (\$1,000)	56.0
Cost of Health Insurance (\$1,000)	73.7
Taxes and License Fees (\$1,000)	18.1
Lease and Rental Payments (\$1,000)	35.7

### **Cost of Services Estimates**

The cost of advertising for this market in Chile will be \$0.01 million dollars in 2022 and the cost of professional services for the market will be \$0.03 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.05 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	6.9
Cost of Purchased Repair and Maintenance Services (\$1,000)	46.9
Cost of Purchased Communication Services (\$1,000)	4.8
Cost of Purchased Advertising and Promotional Services (\$1,000)	13.3
Cost of Purchased Professional & Technical Services (\$1,000)	30.5
Cost of Purchased Refuse & Waste Removal (\$1,000)	13.9

\*2021-2022 Forecasts

Source: Barnes Reports

# China

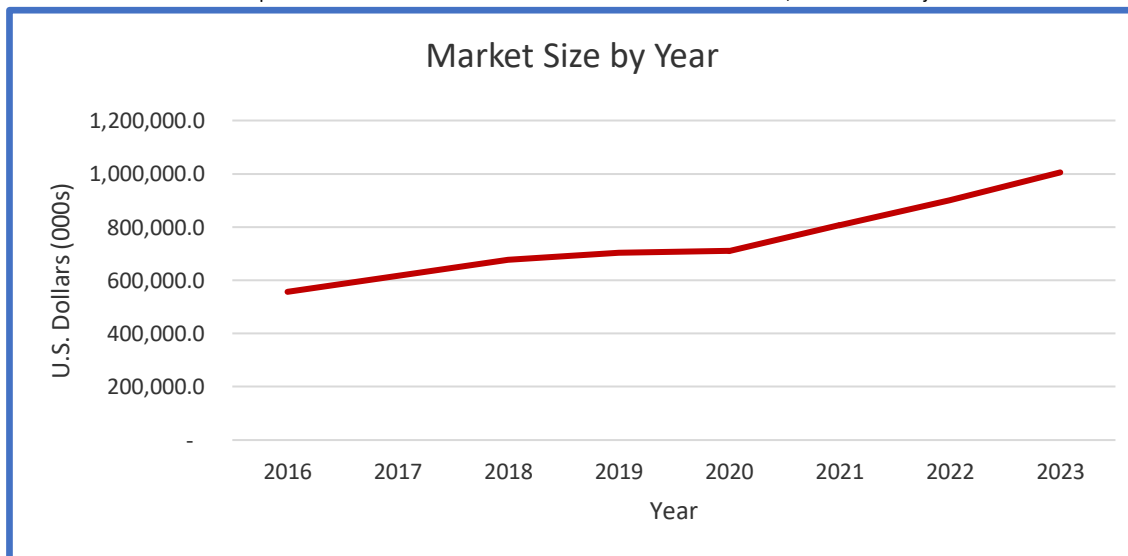
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in China is estimated to be \$901.0 million dollars in 2022 and is expected to change by 11.6 percent from 2022 to 2023. The market will be 6456.2 million Yuans in 2022 and is forecast to change by 13.4 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Yuans
2016	556,620.4	3,642,162.1
2017	617,642.3	4,117,918.1
2018	676,527.6	4,475,906.5
2019	702,691.7	4,854,475.6
2020	709,714.2	4,930,133.4
2021	807,216.7	5,695,134.2
2022	900,999.7	6,456,203.3
2023	1,005,070.5	7,314,552.4
2028	1,821,409.0	14,324,917.4
Y-to-Y Change	US Dollars	Yuans
2016-2017	11.0%	13.1%
2017-2018	9.5%	8.7%
2018-2019	3.9%	8.5%
2019-2020	1.0%	1.6%
2020-2021	13.7%	15.5%
2021-2022	11.6%	13.4%
2022-2023	11.6%	13.3%
CAGR 2023-2028	16.2%	95.8%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# China

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in China will be \$92.90 million dollars in 2022 and the lease and rental payments for the market will be \$5.43 million dollars. The operating expenses for this market is expected to reach \$532.73 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	92,904.8
Operating Expenses (\$1,000)	532,728.7
Employer Costs for Fringe Benefits (\$1,000)	28,690.4
Contract Labor Costs including Temporary Help (\$1,000)	8,505.2
Cost of Health Insurance (\$1,000)	11,207.3
Taxes and License Fees (\$1,000)	2,745.0
Lease and Rental Payments (\$1,000)	5,429.2

### **Cost of Services Estimates**

The cost of advertising for this market in China will be \$2.02 million dollars in 2022 and the cost of professional services for the market will be \$4.64 million dollars. The cost of repair and maintenance for this market is expected to reach \$7.12 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	1,046.4
Cost of Purchased Repair and Maintenance Services (\$1,000)	7,122.3
Cost of Purchased Communication Services (\$1,000)	736.8
Cost of Purchased Advertising and Promotional Services (\$1,000)	2,017.7
Cost of Purchased Professional & Technical Services (\$1,000)	4,640.4
Cost of Purchased Refuse & Waste Removal (\$1,000)	2,116.8

\*2021-2022 Forecasts

Source: Barnes Reports



# Czech Republic

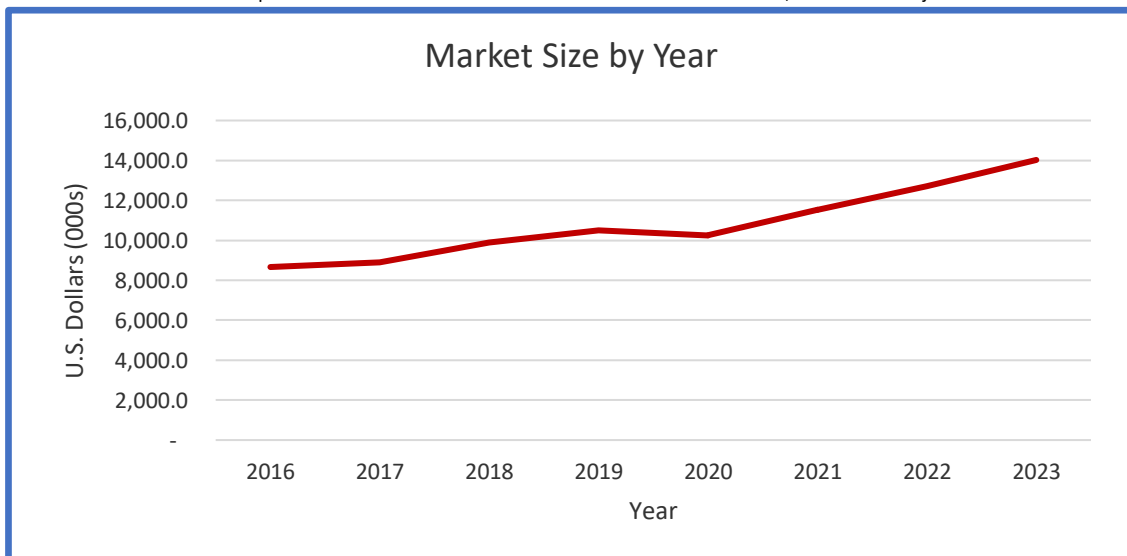
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in Czech Republic is estimated to be \$12.7 million dollars in 2022 and is expected to change by 10.3 percent from 2022 to 2023. The market will be 282.3 million Korunas in 2022 and is forecast to change by 9.3 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Korunas
2016	8,664.0	215,365.7
2017	8,895.3	207,939.2
2018	9,889.1	214,889.8
2019	10,497.7	240,736.0
2020	10,257.0	230,269.3
2021	11,530.4	258,322.2
2022	12,720.4	282,333.8
2023	14,024.7	308,577.3
2028	23,972.1	477,838.6
Y-to-Y Change	US Dollars	Korunas
2016-2017	2.7%	-3.4%
2017-2018	11.2%	3.3%
2018-2019	6.2%	12.0%
2019-2020	-2.3%	-4.3%
2020-2021	12.4%	12.2%
2021-2022	10.3%	9.3%
2022-2023	10.3%	9.3%
CAGR 2023-2028	14.2%	54.9%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# Czech Republic

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in Czech Republic will be \$1.31 million dollars in 2022 and the lease and rental payments for the market will be \$0.08 million dollars. The operating expenses for this market is expected to reach \$7.52 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	1,311.6
Operating Expenses (\$1,000)	7,521.1
Employer Costs for Fringe Benefits (\$1,000)	405.1
Contract Labor Costs including Temporary Help (\$1,000)	120.1
Cost of Health Insurance (\$1,000)	158.2
Taxes and License Fees (\$1,000)	38.8
Lease and Rental Payments (\$1,000)	76.6

### **Cost of Services Estimates**

The cost of advertising for this market in Czech Republic will be \$0.03 million dollars in 2022 and the cost of professional services for the market will be \$0.07 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.10 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	14.8
Cost of Purchased Repair and Maintenance Services (\$1,000)	100.6
Cost of Purchased Communication Services (\$1,000)	10.4
Cost of Purchased Advertising and Promotional Services (\$1,000)	28.5
Cost of Purchased Professional & Technical Services (\$1,000)	65.5
Cost of Purchased Refuse & Waste Removal (\$1,000)	29.9

\*2021-2022 Forecasts

Source: Barnes Reports

# Denmark

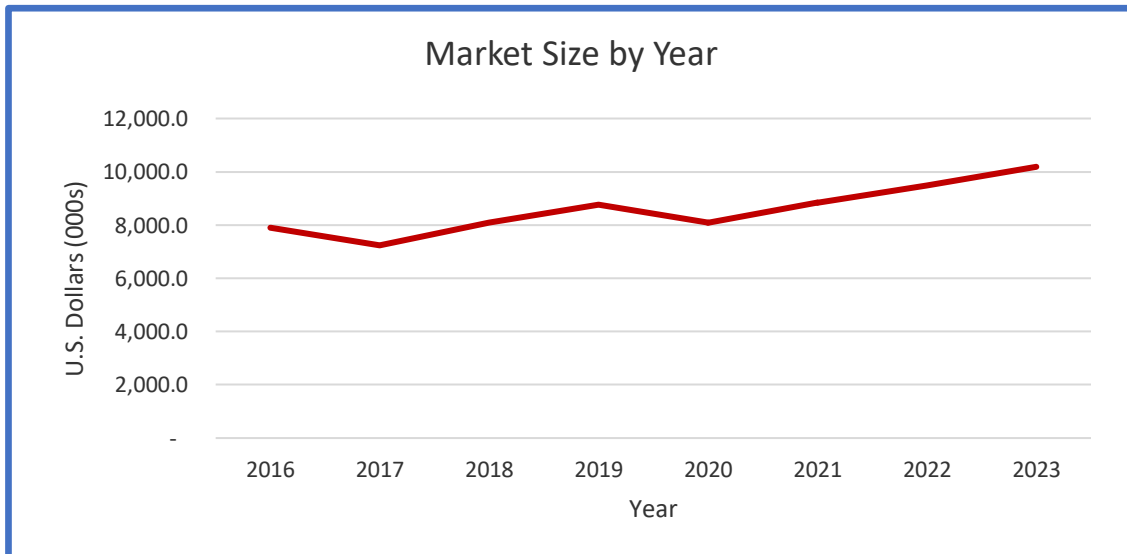
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in Denmark is estimated to be \$9.5 million dollars in 2022 and is expected to change by 7.3 percent from 2022 to 2023. The market will be 67.3 million Kroner in 2022 and is forecast to change by 9.3 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Kroner
2016	7,905.2	52,738.7
2017	7,237.4	47,787.8
2018	8,089.1	51,079.7
2019	8,756.7	58,402.4
2020	8,085.6	54,933.6
2021	8,844.5	61,602.2
2022	9,494.3	67,302.3
2023	10,185.6	73,529.8
2028	15,187.0	113,643.1
Y-to-Y Change	US Dollars	Kroner
2016-2017	-8.4%	-9.4%
2017-2018	11.8%	6.9%
2018-2019	8.3%	14.3%
2019-2020	-7.7%	-5.9%
2020-2021	9.4%	12.1%
2021-2022	7.3%	9.3%
2022-2023	7.3%	9.3%
CAGR 2023-2028	9.8%	54.6%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# Denmark

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in Denmark will be \$0.98 million dollars in 2022 and the lease and rental payments for the market will be \$0.06 million dollars. The operating expenses for this market is expected to reach \$5.61 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	979.0
Operating Expenses (\$1,000)	5,613.6
Employer Costs for Fringe Benefits (\$1,000)	302.3
Contract Labor Costs including Temporary Help (\$1,000)	89.6
Cost of Health Insurance (\$1,000)	118.1
Taxes and License Fees (\$1,000)	28.9
Lease and Rental Payments (\$1,000)	57.2

### **Cost of Services Estimates**

The cost of advertising for this market in Denmark will be \$0.02 million dollars in 2022 and the cost of professional services for the market will be \$0.05 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.08 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	11.0
Cost of Purchased Repair and Maintenance Services (\$1,000)	75.1
Cost of Purchased Communication Services (\$1,000)	7.8
Cost of Purchased Advertising and Promotional Services (\$1,000)	21.3
Cost of Purchased Professional & Technical Services (\$1,000)	48.9
Cost of Purchased Refuse & Waste Removal (\$1,000)	22.3

\*2021-2022 Forecasts

Source: Barnes Reports

# Egypt

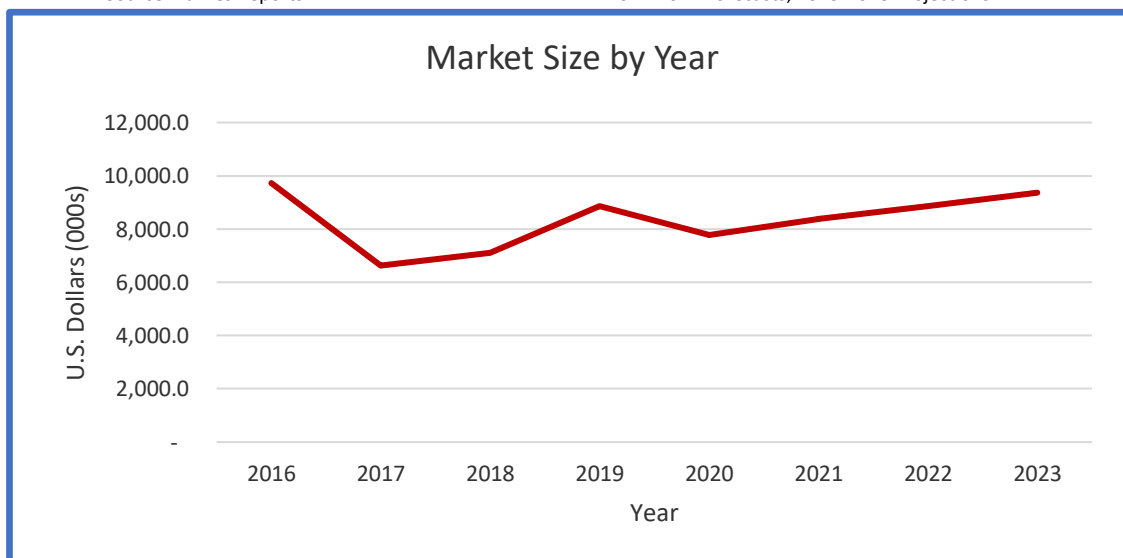
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in Egypt is estimated to be \$8.9 million dollars in 2022 and is expected to change by 5.7 percent from 2022 to 2023. The market will be 278.7 million Pounds in 2022 and is forecast to change by 23.5 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Pounds
2016	9,724.6	77,021.0
2017	6,626.7	97,696.0
2018	7,105.3	125,665.7
2019	8,863.7	155,646.9
2020	7,773.7	178,219.7
2021	8,375.4	225,601.0
2022	8,856.9	278,715.7
2023	9,362.3	341,878.3
2028	11,119.6	908,123.6
Y-to-Y Change	US Dollars	Pounds
2016-2017	-31.9%	26.8%
2017-2018	7.2%	28.6%
2018-2019	24.7%	23.9%
2019-2020	-12.3%	14.5%
2020-2021	7.7%	26.6%
2021-2022	5.7%	23.5%
2022-2023	5.7%	22.7%
CAGR 2023-2028	3.8%	165.6%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# Egypt

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in Egypt will be \$0.91 million dollars in 2022 and the lease and rental payments for the market will be \$0.05 million dollars. The operating expenses for this market is expected to reach \$5.24 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	913.3
Operating Expenses (\$1,000)	5,236.8
Employer Costs for Fringe Benefits (\$1,000)	282.0
Contract Labor Costs including Temporary Help (\$1,000)	83.6
Cost of Health Insurance (\$1,000)	110.2
Taxes and License Fees (\$1,000)	27.0
Lease and Rental Payments (\$1,000)	53.4

### **Cost of Services Estimates**

The cost of advertising for this market in Egypt will be \$0.02 million dollars in 2022 and the cost of professional services for the market will be \$0.05 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.07 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	10.3
Cost of Purchased Repair and Maintenance Services (\$1,000)	70.0
Cost of Purchased Communication Services (\$1,000)	7.2
Cost of Purchased Advertising and Promotional Services (\$1,000)	19.8
Cost of Purchased Professional & Technical Services (\$1,000)	45.6
Cost of Purchased Refuse & Waste Removal (\$1,000)	20.8

\*2021-2022 Forecasts

Source: Barnes Reports

# Finland

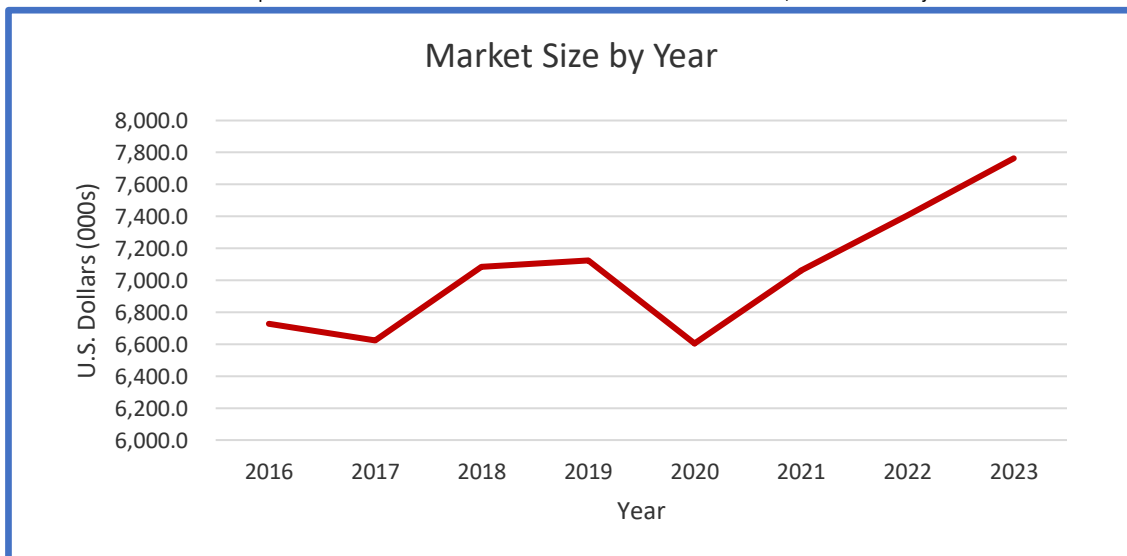
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in Finland is estimated to be \$7.4 million dollars in 2022 and is expected to change by 4.8 percent from 2022 to 2023. The market will be 7 million Euros in 2022 and is forecast to change by 6.4 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Euros
2016	6,725.8	6,074.0
2017	6,623.1	5,861.5
2018	7,085.8	6,000.1
2019	7,124.1	6,363.8
2020	6,604.6	5,981.6
2021	7,059.6	6,534.1
2022	7,405.4	6,954.0
2023	7,763.3	7,400.8
2028	10,313.6	10,032.6
Y-to-Y Change	US Dollars	Euros
2016-2017	-1.5%	-3.5%
2017-2018	7.0%	2.4%
2018-2019	0.5%	6.1%
2019-2020	-7.3%	-6.0%
2020-2021	6.9%	9.2%
2021-2022	4.9%	6.4%
2022-2023	4.8%	6.4%
CAGR 2023-2028	6.6%	35.6%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# Finland

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in Finland will be \$0.76 million dollars in 2022 and the lease and rental payments for the market will be \$0.04 million dollars. The operating expenses for this market is expected to reach \$4.38 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	763.6
Operating Expenses (\$1,000)	4,378.5
Employer Costs for Fringe Benefits (\$1,000)	235.8
Contract Labor Costs including Temporary Help (\$1,000)	69.9
Cost of Health Insurance (\$1,000)	92.1
Taxes and License Fees (\$1,000)	22.6
Lease and Rental Payments (\$1,000)	44.6

### **Cost of Services Estimates**

The cost of advertising for this market in Finland will be \$0.02 million dollars in 2022 and the cost of professional services for the market will be \$0.04 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.06 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	8.6
Cost of Purchased Repair and Maintenance Services (\$1,000)	58.5
Cost of Purchased Communication Services (\$1,000)	6.1
Cost of Purchased Advertising and Promotional Services (\$1,000)	16.6
Cost of Purchased Professional & Technical Services (\$1,000)	38.1
Cost of Purchased Refuse & Waste Removal (\$1,000)	17.4

\*2021-2022 Forecasts

Source: Barnes Reports



# France

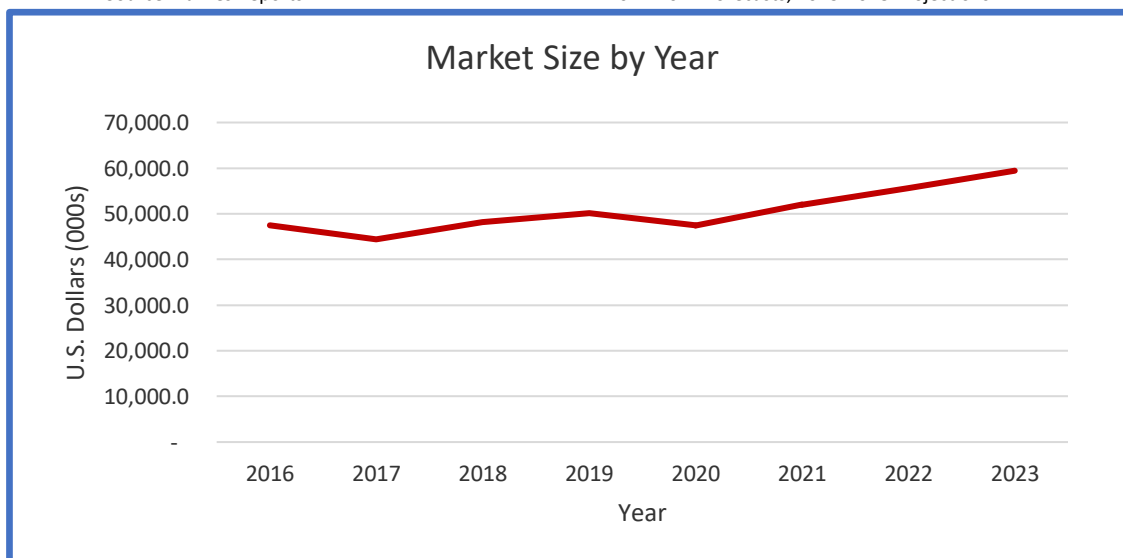
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in France is estimated to be \$55.6 million dollars in 2022 and is expected to change by 6.9 percent from 2022 to 2023. The market will be 48.1 million Euros in 2022 and is forecast to change by 6.5 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Euros
2016	47,426.3	42,262.1
2017	44,406.9	39,271.9
2018	48,225.1	40,835.7
2019	50,192.1	44,835.4
2020	47,425.1	41,296.4
2021	52,029.5	45,142.2
2022	55,611.6	48,076.1
2023	59,440.5	51,200.7
2028	82,333.3	69,649.5
Y-to-Y Change	US Dollars	Euros
2016-2017	-6.4%	-7.1%
2017-2018	8.6%	4.0%
2018-2019	4.1%	9.8%
2019-2020	-5.5%	-7.9%
2020-2021	9.7%	9.3%
2021-2022	6.9%	6.5%
2022-2023	6.9%	6.5%
CAGR 2023-2028	7.7%	36.0%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# France

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in France will be \$5.73 million dollars in 2022 and the lease and rental payments for the market will be \$0.34 million dollars. The operating expenses for this market is expected to reach \$32.88 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	5,734.3
Operating Expenses (\$1,000)	32,881.2
Employer Costs for Fringe Benefits (\$1,000)	1,770.8
Contract Labor Costs including Temporary Help (\$1,000)	525.0
Cost of Health Insurance (\$1,000)	691.7
Taxes and License Fees (\$1,000)	169.4
Lease and Rental Payments (\$1,000)	335.1

### **Cost of Services Estimates**

The cost of advertising for this market in France will be \$0.12 million dollars in 2022 and the cost of professional services for the market will be \$0.29 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.44 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	64.6
Cost of Purchased Repair and Maintenance Services (\$1,000)	439.6
Cost of Purchased Communication Services (\$1,000)	45.5
Cost of Purchased Advertising and Promotional Services (\$1,000)	124.5
Cost of Purchased Professional & Technical Services (\$1,000)	286.4
Cost of Purchased Refuse & Waste Removal (\$1,000)	130.7

\*2021-2022 Forecasts

Source: Barnes Reports

# Germany

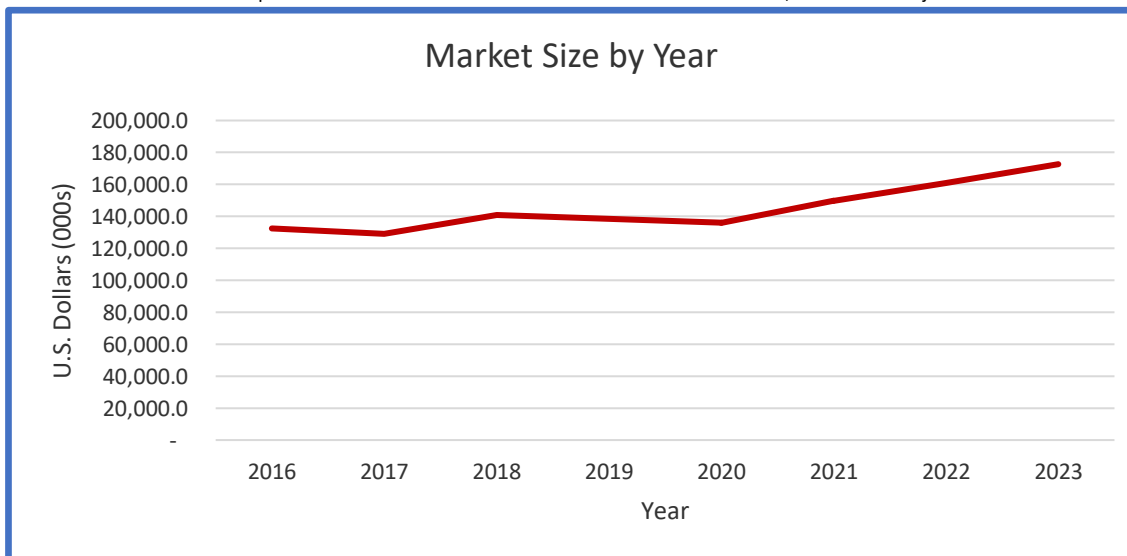
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in Germany is estimated to be \$160.8 million dollars in 2022 and is expected to change by 7.4 percent from 2022 to 2023. The market will be 136.5 million Euros in 2022 and is forecast to change by 6.4 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Euros
2016	132,431.1	120,010.3
2017	129,059.6	114,244.3
2018	140,929.7	119,335.4
2019	138,611.2	123,818.1
2020	135,928.5	117,372.3
2021	149,788.4	128,213.2
2022	160,813.0	136,450.5
2023	172,649.0	145,217.1
2028	244,506.4	196,852.7
Y-to-Y Change	US Dollars	Euros
2016-2017	-2.5%	-4.8%
2017-2018	9.2%	4.5%
2018-2019	-1.6%	3.8%
2019-2020	-1.9%	-5.2%
2020-2021	10.2%	9.2%
2021-2022	7.4%	6.4%
2022-2023	7.4%	6.4%
CAGR 2023-2028	8.3%	35.6%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# Germany

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in Germany will be \$16.58 million dollars in 2022 and the lease and rental payments for the market will be \$0.97 million dollars. The operating expenses for this market is expected to reach \$95.08 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	16,581.9
Operating Expenses (\$1,000)	95,082.9
Employer Costs for Fringe Benefits (\$1,000)	5,120.7
Contract Labor Costs including Temporary Help (\$1,000)	1,518.0
Cost of Health Insurance (\$1,000)	2,000.3
Taxes and License Fees (\$1,000)	489.9
Lease and Rental Payments (\$1,000)	969.0

### **Cost of Services Estimates**

The cost of advertising for this market in Germany will be \$0.36 million dollars in 2022 and the cost of professional services for the market will be \$0.83 million dollars. The cost of repair and maintenance for this market is expected to reach \$1.27 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	186.8
Cost of Purchased Repair and Maintenance Services (\$1,000)	1,271.2
Cost of Purchased Communication Services (\$1,000)	131.5
Cost of Purchased Advertising and Promotional Services (\$1,000)	360.1
Cost of Purchased Professional & Technical Services (\$1,000)	828.2
Cost of Purchased Refuse & Waste Removal (\$1,000)	377.8

\*2021-2022 Forecasts

Source: Barnes Reports

# Hungary

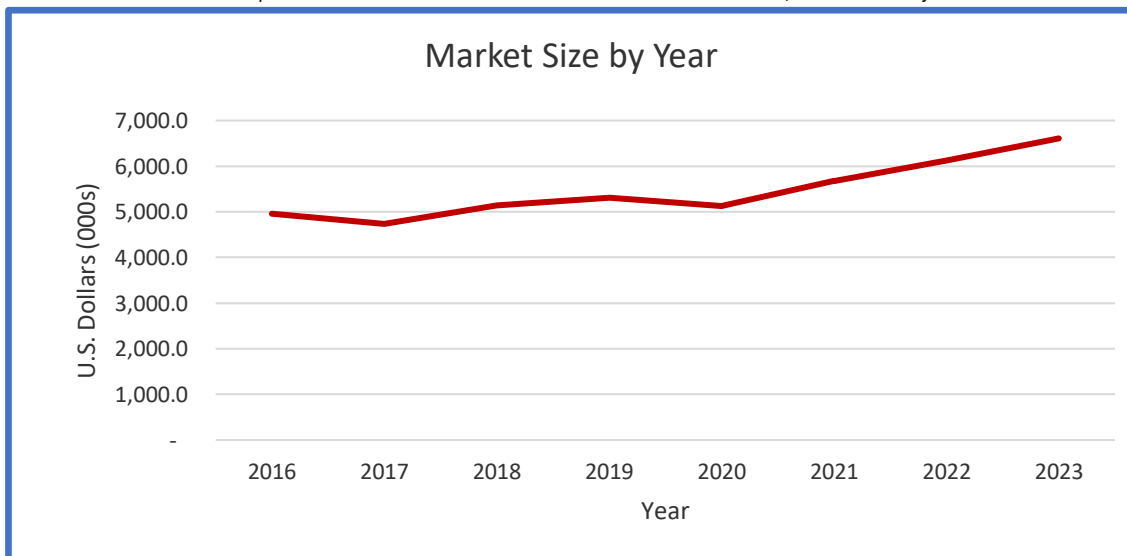
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in Hungary is estimated to be \$6.1 million dollars in 2022 and is expected to change by 7.9 percent from 2022 to 2023. The market will be 1779.9 million Forints in 2022 and is forecast to change by 8.9 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Forints
2016	4,954.3	1,389,479.5
2017	4,735.1	1,299,467.6
2018	5,146.9	1,390,762.3
2019	5,312.8	1,544,226.6
2020	5,127.5	1,462,874.1
2021	5,677.7	1,634,789.3
2022	6,125.2	1,779,885.9
2023	6,608.0	1,937,860.7
2028	9,587.8	2,943,647.4
Y-to-Y Change	US Dollars	Forints
2016-2017	-4.4%	-6.5%
2017-2018	8.7%	7.0%
2018-2019	3.2%	11.0%
2019-2020	-3.5%	-5.3%
2020-2021	10.7%	11.8%
2021-2022	7.9%	8.9%
2022-2023	7.9%	8.9%
CAGR 2023-2028	9.0%	51.9%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# Hungary

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in Hungary will be \$0.63 million dollars in 2022 and the lease and rental payments for the market will be \$0.04 million dollars. The operating expenses for this market is expected to reach \$3.62 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	631.6
Operating Expenses (\$1,000)	3,621.6
Employer Costs for Fringe Benefits (\$1,000)	195.0
Contract Labor Costs including Temporary Help (\$1,000)	57.8
Cost of Health Insurance (\$1,000)	76.2
Taxes and License Fees (\$1,000)	18.7
Lease and Rental Payments (\$1,000)	36.9

### **Cost of Services Estimates**

The cost of advertising for this market in Hungary will be \$0.01 million dollars in 2022 and the cost of professional services for the market will be \$0.03 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.05 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	7.1
Cost of Purchased Repair and Maintenance Services (\$1,000)	48.4
Cost of Purchased Communication Services (\$1,000)	5.0
Cost of Purchased Advertising and Promotional Services (\$1,000)	13.7
Cost of Purchased Professional & Technical Services (\$1,000)	31.5
Cost of Purchased Refuse & Waste Removal (\$1,000)	14.4

\*2021-2022 Forecasts

Source: Barnes Reports

# India

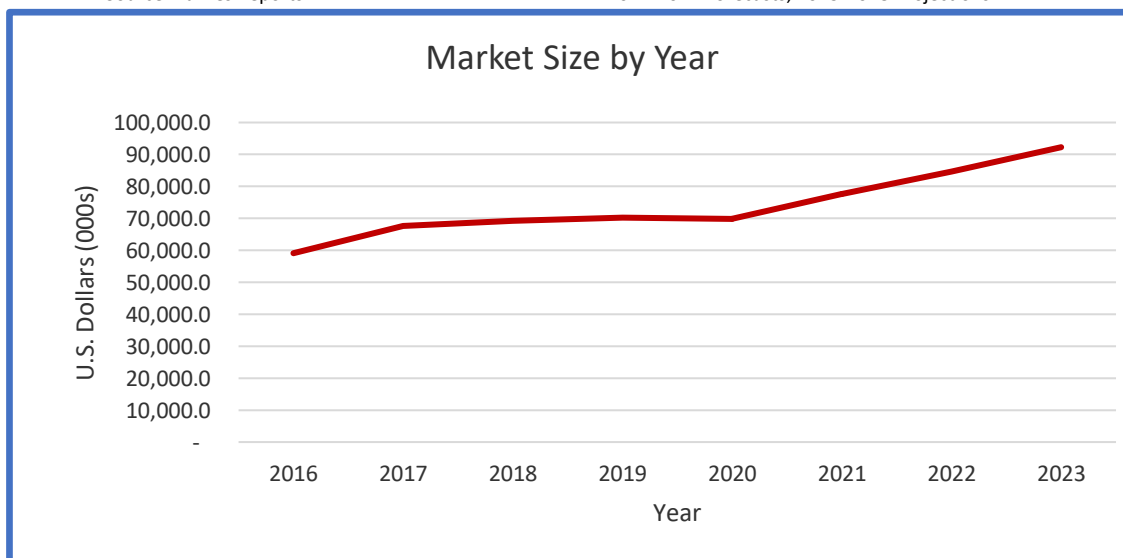
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in India is estimated to be \$84.7 million dollars in 2022 and is expected to change by 9 percent from 2022 to 2023. The market will be 6078.9 million Rupees in 2022 and is forecast to change by 10 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Rupees
2016	59,099.4	4,177,665.0
2017	67,541.6	4,352,548.4
2018	69,199.1	4,838,605.1
2019	70,310.2	4,984,784.7
2020	69,868.9	4,926,588.6
2021	77,639.6	5,524,251.1
2022	84,666.3	6,078,948.4
2023	92,273.1	6,685,298.9
2028	148,850.2	11,283,251.9
Y-to-Y Change	US Dollars	Rupees
2016-2017	14.3%	4.2%
2017-2018	2.5%	11.2%
2018-2019	1.6%	3.0%
2019-2020	-0.6%	-1.2%
2020-2021	11.1%	12.1%
2021-2022	9.1%	10.0%
2022-2023	9.0%	10.0%
CAGR 2023-2028	12.3%	68.8%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# India

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in India will be \$8.73 million dollars in 2022 and the lease and rental payments for the market will be \$0.51 million dollars. The operating expenses for this market is expected to reach \$50.06 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	8,730.2
Operating Expenses (\$1,000)	50,060.1
Employer Costs for Fringe Benefits (\$1,000)	2,696.0
Contract Labor Costs including Temporary Help (\$1,000)	799.2
Cost of Health Insurance (\$1,000)	1,053.1
Taxes and License Fees (\$1,000)	257.9
Lease and Rental Payments (\$1,000)	510.2

### **Cost of Services Estimates**

The cost of advertising for this market in India will be \$0.19 million dollars in 2022 and the cost of professional services for the market will be \$0.44 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.67 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	98.3
Cost of Purchased Repair and Maintenance Services (\$1,000)	669.3
Cost of Purchased Communication Services (\$1,000)	69.2
Cost of Purchased Advertising and Promotional Services (\$1,000)	189.6
Cost of Purchased Professional & Technical Services (\$1,000)	436.1
Cost of Purchased Refuse & Waste Removal (\$1,000)	198.9

\*2021-2022 Forecasts

Source: Barnes Reports



# Indonesia

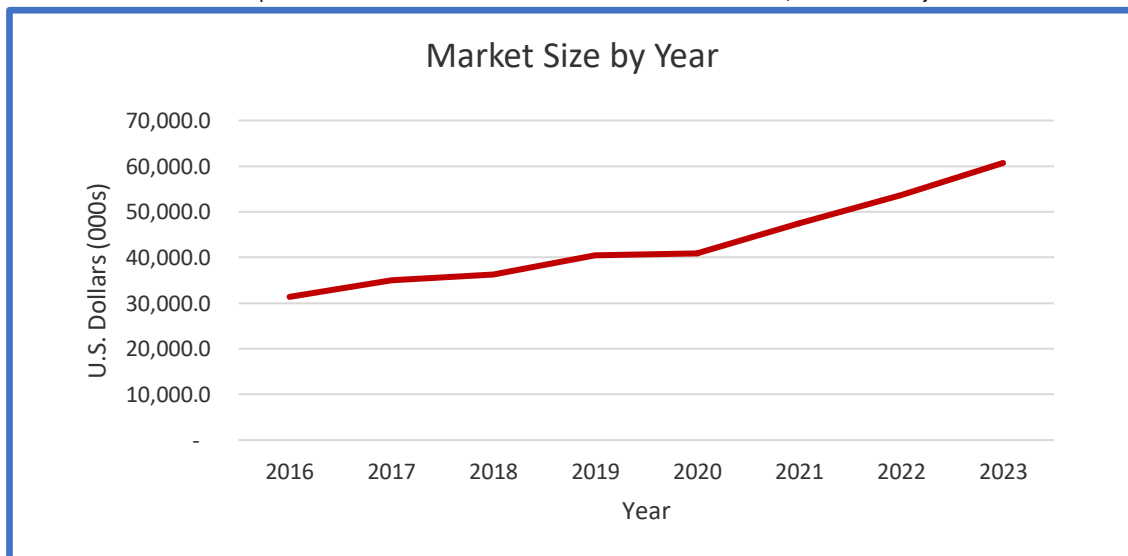
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in Indonesia is estimated to be \$53.7 million dollars in 2022 and is expected to change by 13.1 percent from 2022 to 2023. The market will be 779431.1 million Rupiahs in 2022 and is forecast to change by 14.1 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Rupiahs
2016	31,368.9	439,660,841.3
2017	35,063.7	469,091,764.4
2018	36,205.7	515,459,036.1
2019	40,525.3	573,339,187.6
2020	40,912.9	583,369,296.8
2021	47,480.7	683,160,676.3
2022	53,684.8	779,431,098.4
2023	60,699.4	889,267,866.5
2028	111,368.5	1,706,939,915.3
Y-to-Y Change	US Dollars	Rupiahs
2016-2017	11.8%	6.7%
2017-2018	3.3%	9.9%
2018-2019	11.9%	11.2%
2019-2020	1.0%	1.7%
2020-2021	16.1%	17.1%
2021-2022	13.1%	14.1%
2022-2023	13.1%	14.1%
CAGR 2023-2028	16.7%	91.9%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# Indonesia

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in Indonesia will be \$5.54 million dollars in 2022 and the lease and rental payments for the market will be \$0.32 million dollars. The operating expenses for this market is expected to reach \$31.74 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	5,535.6
Operating Expenses (\$1,000)	31,741.9
Employer Costs for Fringe Benefits (\$1,000)	1,709.5
Contract Labor Costs including Temporary Help (\$1,000)	506.8
Cost of Health Insurance (\$1,000)	667.8
Taxes and License Fees (\$1,000)	163.6
Lease and Rental Payments (\$1,000)	323.5

### **Cost of Services Estimates**

The cost of advertising for this market in Indonesia will be \$0.12 million dollars in 2022 and the cost of professional services for the market will be \$0.28 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.42 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	62.3
Cost of Purchased Repair and Maintenance Services (\$1,000)	424.4
Cost of Purchased Communication Services (\$1,000)	43.9
Cost of Purchased Advertising and Promotional Services (\$1,000)	120.2
Cost of Purchased Professional & Technical Services (\$1,000)	276.5
Cost of Purchased Refuse & Waste Removal (\$1,000)	126.1

\*2021-2022 Forecasts

Source: Barnes Reports

# Ireland

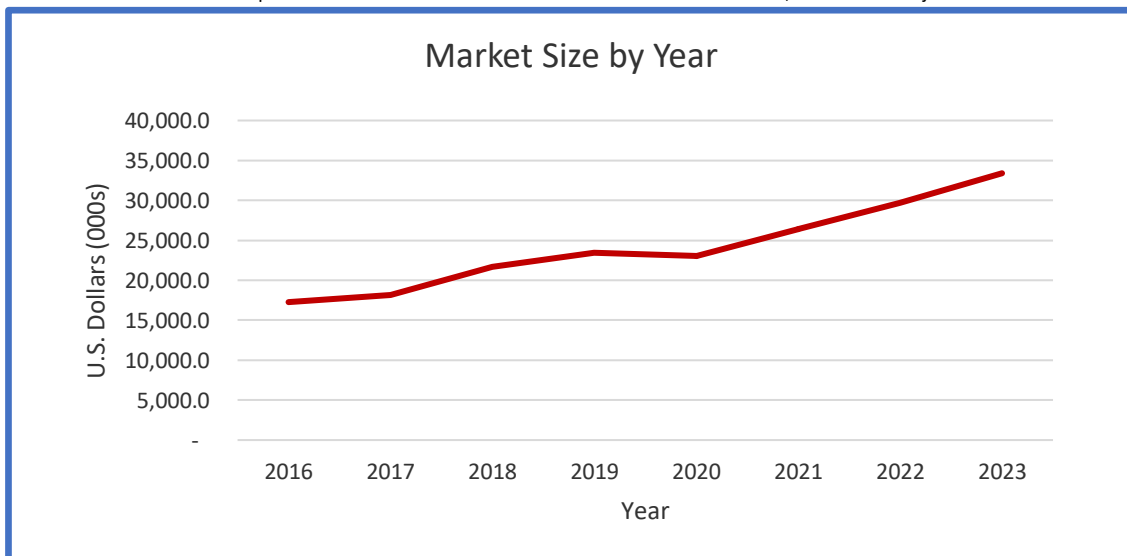
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in Ireland is estimated to be \$29.7 million dollars in 2022 and is expected to change by 12.4 percent from 2022 to 2023. The market will be 24.7 million Euros in 2022 and is forecast to change by 10.9 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Euros
2016	17,266.6	15,929.6
2017	18,194.2	16,105.6
2018	21,676.8	18,355.3
2019	23,480.8	20,974.8
2020	23,028.6	19,707.8
2021	26,400.9	22,277.1
2022	29,702.8	24,711.9
2023	33,397.5	27,396.2
2028	62,971.8	48,135.6
Y-to-Y Change	US Dollars	Euros
2016-2017	5.4%	1.1%
2017-2018	19.1%	14.0%
2018-2019	8.3%	14.3%
2019-2020	-1.9%	-6.0%
2020-2021	14.6%	13.0%
2021-2022	12.5%	10.9%
2022-2023	12.4%	10.9%
CAGR 2023-2028	17.7%	75.7%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# Ireland

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in Ireland will be \$3.06 million dollars in 2022 and the lease and rental payments for the market will be \$0.18 million dollars. The operating expenses for this market is expected to reach \$17.56 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	3,062.8
Operating Expenses (\$1,000)	17,562.2
Employer Costs for Fringe Benefits (\$1,000)	945.8
Contract Labor Costs including Temporary Help (\$1,000)	280.4
Cost of Health Insurance (\$1,000)	369.5
Taxes and License Fees (\$1,000)	90.5
Lease and Rental Payments (\$1,000)	179.0

### **Cost of Services Estimates**

The cost of advertising for this market in Ireland will be \$0.07 million dollars in 2022 and the cost of professional services for the market will be \$0.15 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.23 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	34.5
Cost of Purchased Repair and Maintenance Services (\$1,000)	234.8
Cost of Purchased Communication Services (\$1,000)	24.3
Cost of Purchased Advertising and Promotional Services (\$1,000)	66.5
Cost of Purchased Professional & Technical Services (\$1,000)	153.0
Cost of Purchased Refuse & Waste Removal (\$1,000)	69.8

\*2021-2022 Forecasts

Source: Barnes Reports

# Israel

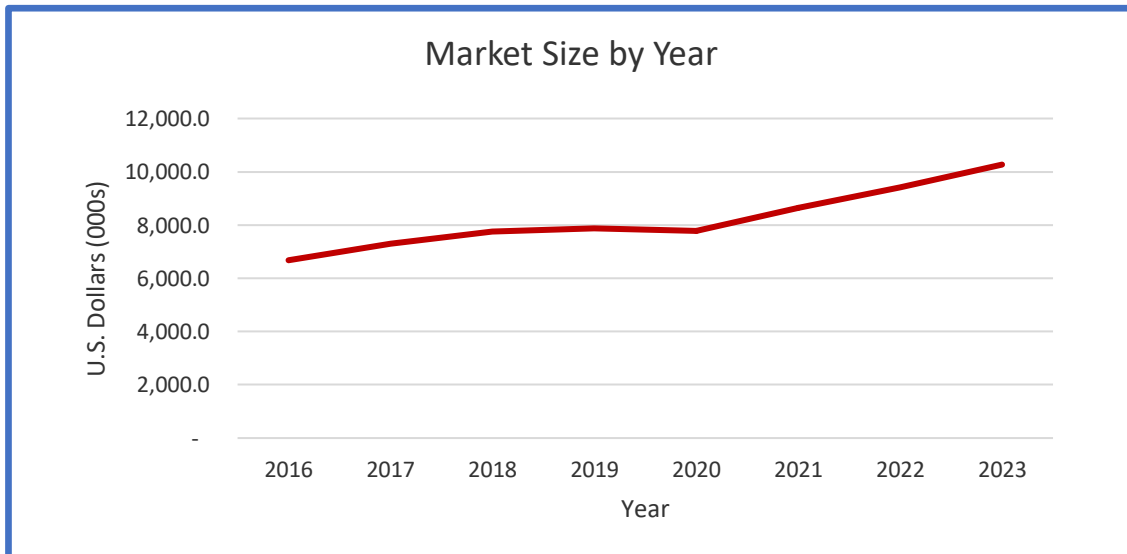
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in Israel is estimated to be \$9.4 million dollars in 2022 and is expected to change by 9 percent from 2022 to 2023. The market will be 33 million New Shekels in 2022 and is forecast to change by 7.9 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	New Shekels
2016	6,676.9	26,505.2
2017	7,300.7	26,279.4
2018	7,749.9	27,826.5
2019	7,885.6	28,108.4
2020	7,778.7	27,611.0
2021	8,642.6	30,581.6
2022	9,423.5	33,000.0
2023	10,268.8	35,609.6
2028	16,553.6	51,730.3
Y-to-Y Change	US Dollars	New Shekels
2016-2017	9.3%	-0.9%
2017-2018	6.2%	5.9%
2018-2019	1.8%	1.0%
2019-2020	-1.4%	-1.8%
2020-2021	11.1%	10.8%
2021-2022	9.0%	7.9%
2022-2023	9.0%	7.9%
CAGR 2023-2028	12.2%	45.3%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# Israel

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in Israel will be \$0.97 million dollars in 2022 and the lease and rental payments for the market will be \$0.06 million dollars. The operating expenses for this market is expected to reach \$5.57 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	971.7
Operating Expenses (\$1,000)	5,571.8
Employer Costs for Fringe Benefits (\$1,000)	300.1
Contract Labor Costs including Temporary Help (\$1,000)	89.0
Cost of Health Insurance (\$1,000)	117.2
Taxes and License Fees (\$1,000)	28.7
Lease and Rental Payments (\$1,000)	56.8

### **Cost of Services Estimates**

The cost of advertising for this market in Israel will be \$0.02 million dollars in 2022 and the cost of professional services for the market will be \$0.05 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.07 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	10.9
Cost of Purchased Repair and Maintenance Services (\$1,000)	74.5
Cost of Purchased Communication Services (\$1,000)	7.7
Cost of Purchased Advertising and Promotional Services (\$1,000)	21.1
Cost of Purchased Professional & Technical Services (\$1,000)	48.5
Cost of Purchased Refuse & Waste Removal (\$1,000)	22.1

\*2021-2022 Forecasts

Source: Barnes Reports

# Italy

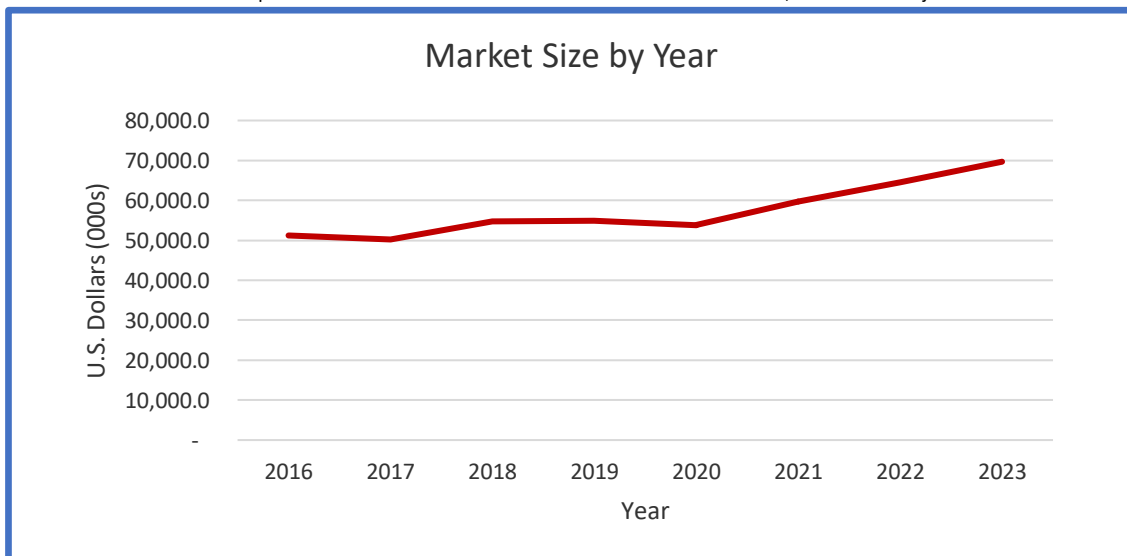
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in Italy is estimated to be \$64.5 million dollars in 2022 and is expected to change by 8 percent from 2022 to 2023. The market will be 55.7 million Euros in 2022 and is forecast to change by 7.6 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Euros
2016	51,253.9	45,734.2
2017	50,217.7	44,453.2
2018	54,712.0	46,328.6
2019	54,846.8	48,993.3
2020	53,847.3	46,857.2
2021	59,708.0	51,743.8
2022	64,502.5	55,669.3
2023	69,681.9	59,892.5
2028	101,800.6	85,717.7
Y-to-Y Change	US Dollars	Euros
2016-2017	-2.0%	-2.8%
2017-2018	8.9%	4.2%
2018-2019	0.2%	5.8%
2019-2020	-1.8%	-4.4%
2020-2021	10.9%	10.4%
2021-2022	8.0%	7.6%
2022-2023	8.0%	7.6%
CAGR 2023-2028	9.2%	43.1%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# Italy

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in Italy will be \$6.65 million dollars in 2022 and the lease and rental payments for the market will be \$0.39 million dollars. The operating expenses for this market is expected to reach \$38.14 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	6,651.0
Operating Expenses (\$1,000)	38,138.0
Employer Costs for Fringe Benefits (\$1,000)	2,053.9
Contract Labor Costs including Temporary Help (\$1,000)	608.9
Cost of Health Insurance (\$1,000)	802.3
Taxes and License Fees (\$1,000)	196.5
Lease and Rental Payments (\$1,000)	388.7

### **Cost of Services Estimates**

The cost of advertising for this market in Italy will be \$0.14 million dollars in 2022 and the cost of professional services for the market will be \$0.33 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.51 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	74.9
Cost of Purchased Repair and Maintenance Services (\$1,000)	509.9
Cost of Purchased Communication Services (\$1,000)	52.7
Cost of Purchased Advertising and Promotional Services (\$1,000)	144.4
Cost of Purchased Professional & Technical Services (\$1,000)	332.2
Cost of Purchased Refuse & Waste Removal (\$1,000)	151.5

\*2021-2022 Forecasts

Source: Barnes Reports



# Japan

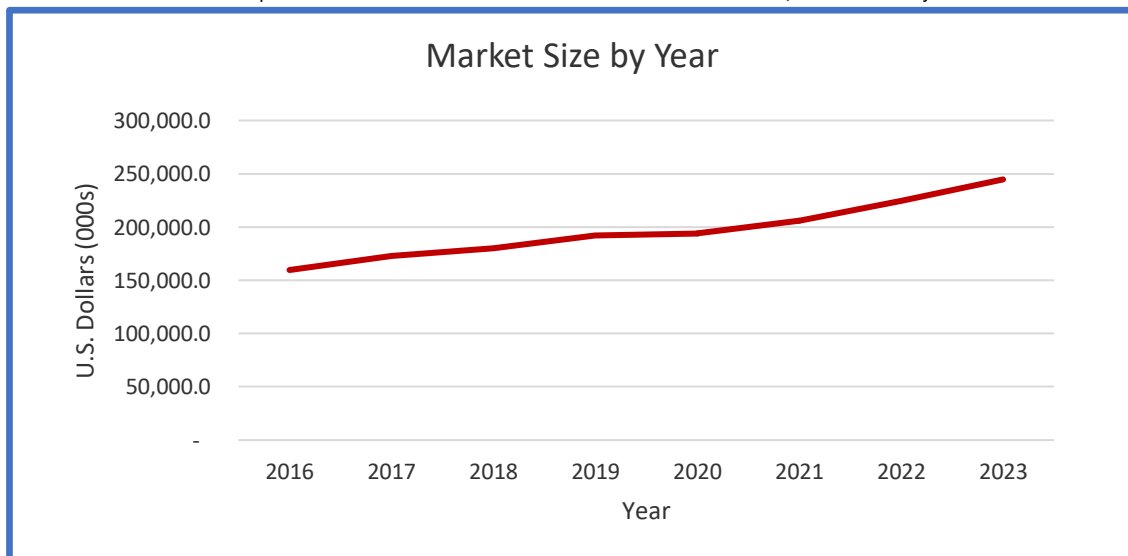
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in Japan is estimated to be \$224.5 million dollars in 2022 and is expected to change by 9 percent from 2022 to 2023. The market will be 24546.5 million Yens in 2022 and is forecast to change by 8.4 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Yens
2016	159,650.3	19,030,326.2
2017	172,719.9	19,345,802.6
2018	179,774.0	19,851,214.1
2019	192,157.5	20,947,028.2
2020	194,054.1	20,360,089.7
2021	205,923.9	22,648,874.6
2022	224,537.9	24,546,475.6
2023	244,686.4	26,603,064.2
2028	394,514.2	39,496,220.3
Y-to-Y Change	US Dollars	Yens
2016-2017	8.2%	1.7%
2017-2018	4.1%	2.6%
2018-2019	6.9%	5.5%
2019-2020	1.0%	-2.8%
2020-2021	6.1%	11.2%
2021-2022	9.0%	8.4%
2022-2023	9.0%	8.4%
CAGR 2023-2028	12.2%	48.5%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# Japan

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in Japan will be \$23.15 million dollars in 2022 and the lease and rental payments for the market will be \$1.35 million dollars. The operating expenses for this market is expected to reach \$132.76 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	23,152.8
Operating Expenses (\$1,000)	132,761.2
Employer Costs for Fringe Benefits (\$1,000)	7,149.9
Contract Labor Costs including Temporary Help (\$1,000)	2,119.6
Cost of Health Insurance (\$1,000)	2,793.0
Taxes and License Fees (\$1,000)	684.1
Lease and Rental Payments (\$1,000)	1,353.0

### **Cost of Services Estimates**

The cost of advertising for this market in Japan will be \$0.50 million dollars in 2022 and the cost of professional services for the market will be \$1.16 million dollars. The cost of repair and maintenance for this market is expected to reach \$1.77 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	260.8
Cost of Purchased Repair and Maintenance Services (\$1,000)	1,774.9
Cost of Purchased Communication Services (\$1,000)	183.6
Cost of Purchased Advertising and Promotional Services (\$1,000)	502.8
Cost of Purchased Professional & Technical Services (\$1,000)	1,156.4
Cost of Purchased Refuse & Waste Removal (\$1,000)	527.5

\*2021-2022 Forecasts

Source: Barnes Reports

# South Korea

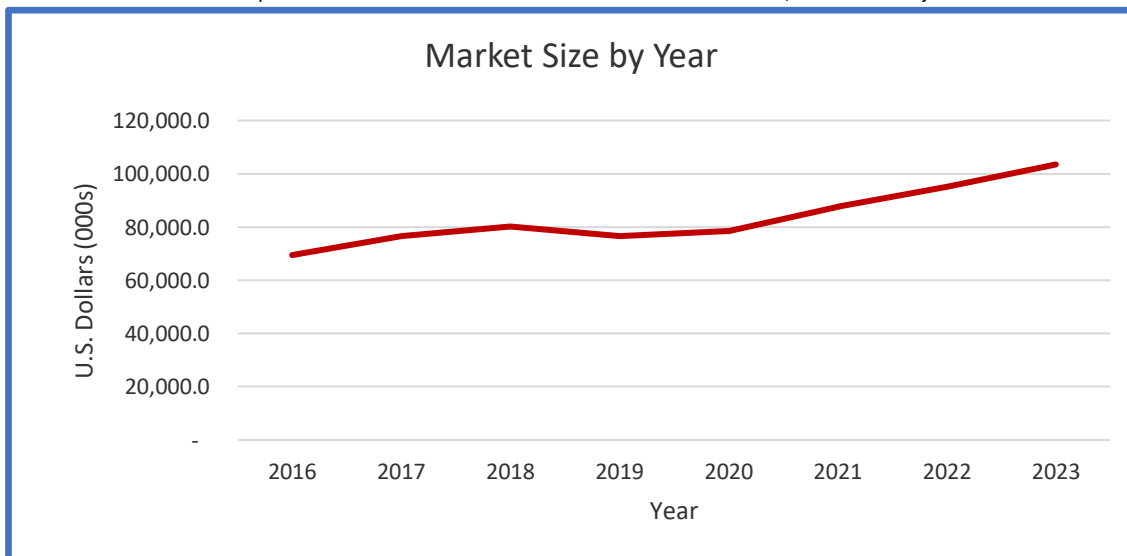
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in South Korea is estimated to be \$95.2 million dollars in 2022 and is expected to change by 8.7 percent from 2022 to 2023. The market will be 109867.1 million Wons in 2022 and is forecast to change by 9.4 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Wons
2016	69,470.7	80,039,699.6
2017	76,663.2	81,690,826.1
2018	80,188.3	88,247,185.6
2019	76,637.6	89,310,235.0
2020	78,453.3	89,353,886.5
2021	87,551.4	100,381,301.1
2022	95,190.0	109,867,127.9
2023	103,494.9	120,249,346.0
2028	156,124.0	187,529,141.2
Y-to-Y Change	US Dollars	Wons
2016-2017	10.4%	2.1%
2017-2018	4.6%	8.0%
2018-2019	-4.4%	1.2%
2019-2020	2.4%	0.0%
2020-2021	11.6%	12.3%
2021-2022	8.7%	9.4%
2022-2023	8.7%	9.4%
CAGR 2023-2028	10.2%	56.0%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# South Korea

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in South Korea will be \$9.82 million dollars in 2022 and the lease and rental payments for the market will be \$0.57 million dollars. The operating expenses for this market is expected to reach \$56.28 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	9,815.3
Operating Expenses (\$1,000)	56,282.4
Employer Costs for Fringe Benefits (\$1,000)	3,031.1
Contract Labor Costs including Temporary Help (\$1,000)	898.6
Cost of Health Insurance (\$1,000)	1,184.0
Taxes and License Fees (\$1,000)	290.0
Lease and Rental Payments (\$1,000)	573.6

### **Cost of Services Estimates**

The cost of advertising for this market in South Korea will be \$0.21 million dollars in 2022 and the cost of professional services for the market will be \$0.49 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.75 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	110.5
Cost of Purchased Repair and Maintenance Services (\$1,000)	752.5
Cost of Purchased Communication Services (\$1,000)	77.8
Cost of Purchased Advertising and Promotional Services (\$1,000)	213.2
Cost of Purchased Professional & Technical Services (\$1,000)	490.3
Cost of Purchased Refuse & Waste Removal (\$1,000)	223.6

\*2021-2022 Forecasts

Source: Barnes Reports

# Malaysia

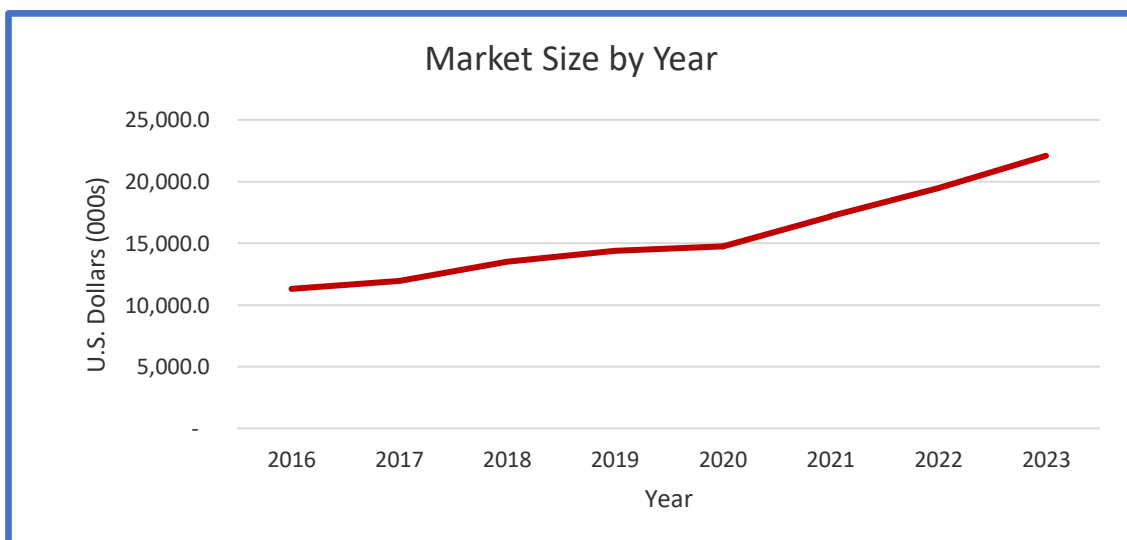
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in Malaysia is estimated to be \$19.5 million dollars in 2022 and is expected to change by 13.4 percent from 2022 to 2023. The market will be 80.9 million Ringgits in 2022 and is forecast to change by 13.6 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Ringgits
2016	11,303.0	45,635.5
2017	11,936.1	51,330.2
2018	13,522.7	54,565.6
2019	14,371.7	59,534.7
2020	14,739.0	61,038.4
2021	17,163.1	71,172.3
2022	19,471.5	80,852.6
2023	22,090.4	91,849.6
2028	41,222.1	172,546.2
Y-to-Y Change	US Dollars	Ringgits
2016-2017	5.6%	12.5%
2017-2018	13.3%	6.3%
2018-2019	6.3%	9.1%
2019-2020	2.6%	2.5%
2020-2021	16.4%	16.6%
2021-2022	13.4%	13.6%
2022-2023	13.4%	13.6%
CAGR 2023-2028	17.3%	87.9%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# Malaysia

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in Malaysia will be \$2.01 million dollars in 2022 and the lease and rental payments for the market will be \$0.12 million dollars. The operating expenses for this market is expected to reach \$11.51 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	2,007.8
Operating Expenses (\$1,000)	11,512.8
Employer Costs for Fringe Benefits (\$1,000)	620.0
Contract Labor Costs including Temporary Help (\$1,000)	183.8
Cost of Health Insurance (\$1,000)	242.2
Taxes and License Fees (\$1,000)	59.3
Lease and Rental Payments (\$1,000)	117.3

### **Cost of Services Estimates**

The cost of advertising for this market in Malaysia will be \$0.04 million dollars in 2022 and the cost of professional services for the market will be \$0.10 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.15 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	22.6
Cost of Purchased Repair and Maintenance Services (\$1,000)	153.9
Cost of Purchased Communication Services (\$1,000)	15.9
Cost of Purchased Advertising and Promotional Services (\$1,000)	43.6
Cost of Purchased Professional & Technical Services (\$1,000)	100.3
Cost of Purchased Refuse & Waste Removal (\$1,000)	45.7

\*2021-2022 Forecasts

Source: Barnes Reports

# Mexico

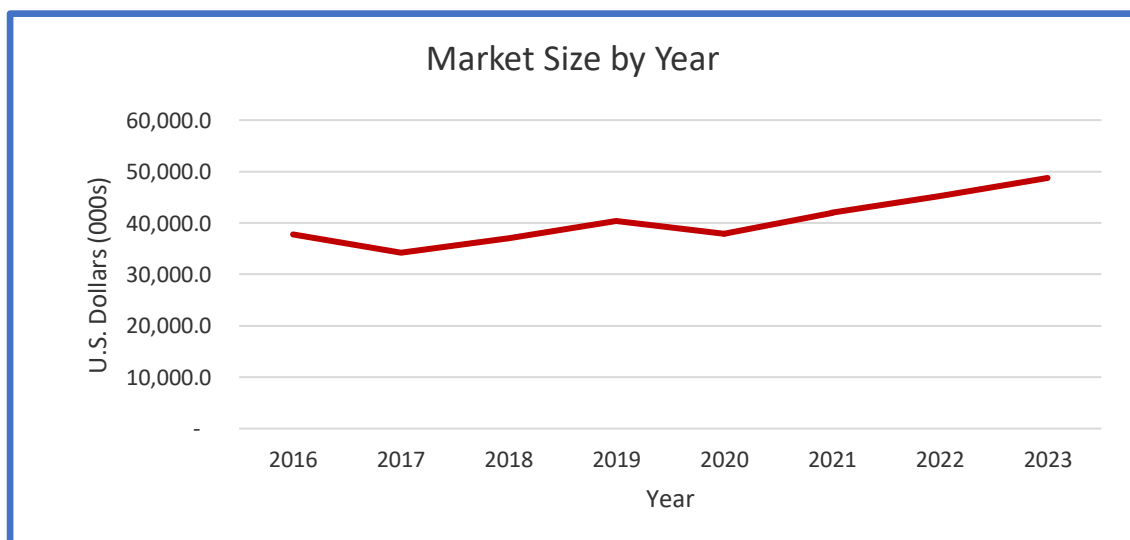
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in Mexico is estimated to be \$45.2 million dollars in 2022 and is expected to change by 7.8 percent from 2022 to 2023. The market will be 1035.7 million Pesos in 2022 and is forecast to change by 13.1 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Pesos
2016	37,707.7	622,144.0
2017	34,211.6	647,505.1
2018	36,979.7	711,648.7
2019	40,411.0	778,461.6
2020	37,898.8	788,466.9
2021	41,937.8	915,523.9
2022	45,212.8	1,035,694.0
2023	48,743.5	1,171,637.5
2028	70,486.6	2,155,328.5
Y-to-Y Change	US Dollars	Pesos
2016-2017	-9.3%	4.1%
2017-2018	8.1%	9.9%
2018-2019	9.3%	9.4%
2019-2020	-6.2%	1.3%
2020-2021	10.7%	16.1%
2021-2022	7.8%	13.1%
2022-2023	7.8%	13.1%
CAGR 2023-2028	8.9%	84.0%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# Mexico

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in Mexico will be \$4.66 million dollars in 2022 and the lease and rental payments for the market will be \$0.27 million dollars. The operating expenses for this market is expected to reach \$26.73 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	4,662.0
Operating Expenses (\$1,000)	26,732.7
Employer Costs for Fringe Benefits (\$1,000)	1,439.7
Contract Labor Costs including Temporary Help (\$1,000)	426.8
Cost of Health Insurance (\$1,000)	562.4
Taxes and License Fees (\$1,000)	137.7
Lease and Rental Payments (\$1,000)	272.4

### **Cost of Services Estimates**

The cost of advertising for this market in Mexico will be \$0.10 million dollars in 2022 and the cost of professional services for the market will be \$0.23 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.36 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	52.5
Cost of Purchased Repair and Maintenance Services (\$1,000)	357.4
Cost of Purchased Communication Services (\$1,000)	37.0
Cost of Purchased Advertising and Promotional Services (\$1,000)	101.2
Cost of Purchased Professional & Technical Services (\$1,000)	232.9
Cost of Purchased Refuse & Waste Removal (\$1,000)	106.2

\*2021-2022 Forecasts

Source: Barnes Reports



# Netherlands

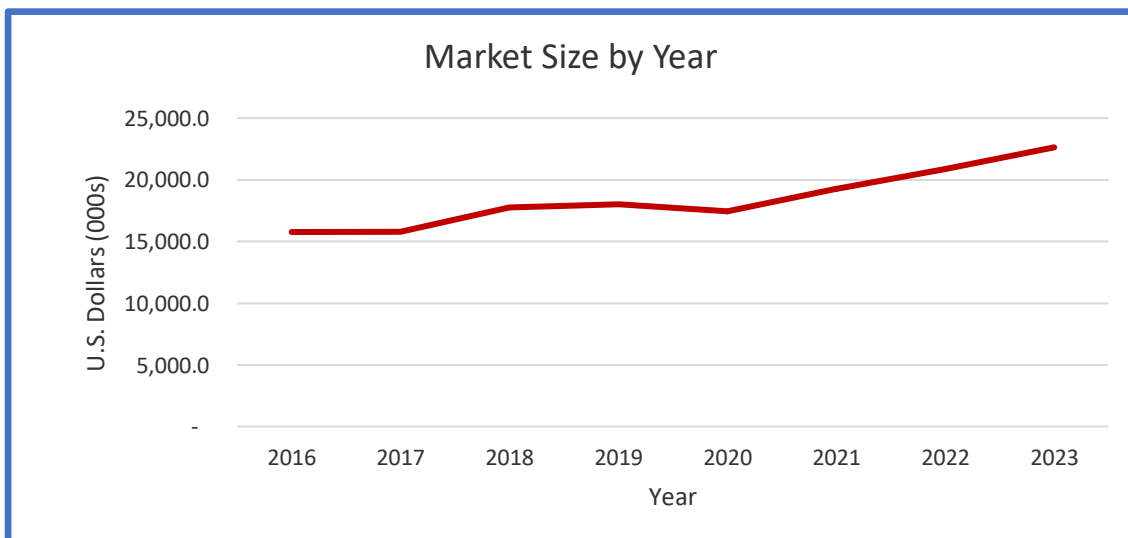
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in Netherlands is estimated to be \$20.9 million dollars in 2022 and is expected to change by 8.3 percent from 2022 to 2023. The market will be 19.6 million Euros in 2022 and is forecast to change by 10 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Euros
2016	15,766.6	14,219.8
2017	15,780.1	13,968.6
2018	17,755.5	15,034.9
2019	18,023.6	16,100.1
2020	17,446.4	15,811.3
2021	19,271.0	17,855.1
2022	20,889.7	19,644.1
2023	22,630.6	21,612.3
2028	35,429.8	34,590.8
Y-to-Y Change	US Dollars	Euros
2016-2017	0.1%	-1.8%
2017-2018	12.5%	7.6%
2018-2019	1.5%	7.1%
2019-2020	-3.2%	-1.8%
2020-2021	10.5%	12.9%
2021-2022	8.4%	10.0%
2022-2023	8.3%	10.0%
CAGR 2023-2028	11.3%	60.1%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# Netherlands

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in Netherlands will be \$2.15 million dollars in 2022 and the lease and rental payments for the market will be \$0.13 million dollars. The operating expenses for this market is expected to reach \$12.35 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	2,154.0
Operating Expenses (\$1,000)	12,351.3
Employer Costs for Fringe Benefits (\$1,000)	665.2
Contract Labor Costs including Temporary Help (\$1,000)	197.2
Cost of Health Insurance (\$1,000)	259.8
Taxes and License Fees (\$1,000)	63.6
Lease and Rental Payments (\$1,000)	125.9

### **Cost of Services Estimates**

The cost of advertising for this market in Netherlands will be \$0.05 million dollars in 2022 and the cost of professional services for the market will be \$0.11 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.17 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	24.3
Cost of Purchased Repair and Maintenance Services (\$1,000)	165.1
Cost of Purchased Communication Services (\$1,000)	17.1
Cost of Purchased Advertising and Promotional Services (\$1,000)	46.8
Cost of Purchased Professional & Technical Services (\$1,000)	107.6
Cost of Purchased Refuse & Waste Removal (\$1,000)	49.1

\*2021-2022 Forecasts

Source: Barnes Reports

# Nigeria

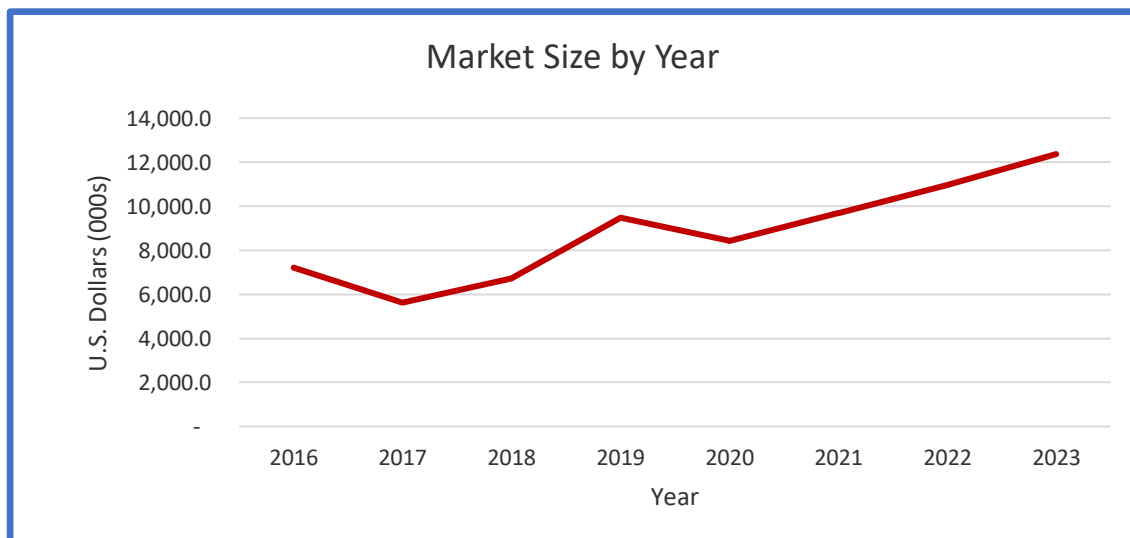
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in Nigeria is estimated to be \$11.0 million dollars in 2022 and is expected to change by 12.9 percent from 2022 to 2023. The market will be 4821.7 million Nairas in 2022 and is forecast to change by 24.3 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Nairas
2016	7,226.9	1,499,272.7
2017	5,624.2	1,719,810.3
2018	6,718.7	2,178,260.1
2019	9,489.6	3,084,132.8
2020	8,422.3	3,061,675.1
2021	9,694.0	3,878,517.9
2022	10,951.4	4,821,702.8
2023	12,366.8	5,990,628.8
2028	20,437.1	18,607,319.3
Y-to-Y Change	US Dollars	Nairas
2016-2017	-22.2%	14.7%
2017-2018	19.5%	26.7%
2018-2019	41.2%	41.6%
2019-2020	-11.2%	-0.7%
2020-2021	15.1%	26.7%
2021-2022	13.0%	24.3%
2022-2023	12.9%	24.2%
CAGR 2023-2028	13.1%	210.6%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# Nigeria

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in Nigeria will be \$1.13 million dollars in 2022 and the lease and rental payments for the market will be \$0.07 million dollars. The operating expenses for this market is expected to reach \$6.48 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	1,129.2
Operating Expenses (\$1,000)	6,475.1
Employer Costs for Fringe Benefits (\$1,000)	348.7
Contract Labor Costs including Temporary Help (\$1,000)	103.4
Cost of Health Insurance (\$1,000)	136.2
Taxes and License Fees (\$1,000)	33.4
Lease and Rental Payments (\$1,000)	66.0

### **Cost of Services Estimates**

The cost of advertising for this market in Nigeria will be \$0.02 million dollars in 2022 and the cost of professional services for the market will be \$0.06 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.09 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	12.7
Cost of Purchased Repair and Maintenance Services (\$1,000)	86.6
Cost of Purchased Communication Services (\$1,000)	9.0
Cost of Purchased Advertising and Promotional Services (\$1,000)	24.5
Cost of Purchased Professional & Technical Services (\$1,000)	56.4
Cost of Purchased Refuse & Waste Removal (\$1,000)	25.7

\*2021-2022 Forecasts

Source: Barnes Reports

# Norway

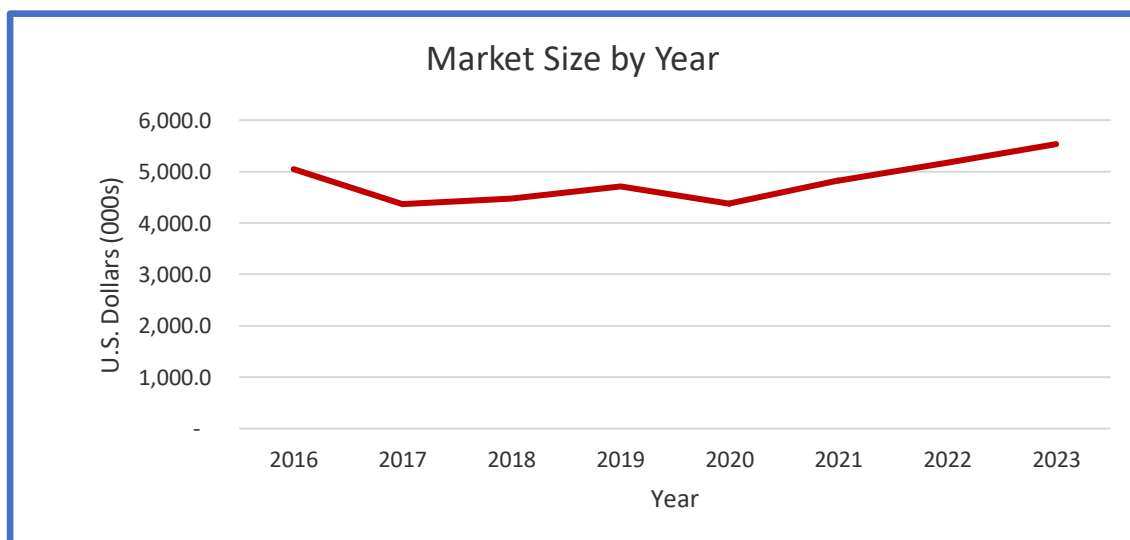
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in Norway is estimated to be \$5.2 million dollars in 2022 and is expected to change by 7 percent from 2022 to 2023. The market will be 49.5 million Kroner in 2022 and is forecast to change by 10.8 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Kroner
2016	5,042.6	39,550.8
2017	4,365.9	36,113.1
2018	4,479.0	36,425.3
2019	4,705.4	41,407.3
2020	4,378.1	39,231.5
2021	4,826.2	44,690.1
2022	5,172.5	49,495.4
2023	5,533.2	54,713.8
2028	6,479.9	75,505.8
Y-to-Y Change	US Dollars	Kroner
2016-2017	-13.4%	-8.7%
2017-2018	2.6%	0.9%
2018-2019	5.1%	13.7%
2019-2020	-7.0%	-5.3%
2020-2021	10.2%	13.9%
2021-2022	7.2%	10.8%
2022-2023	7.0%	10.5%
CAGR 2023-2028	3.4%	38.0%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# Norway

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in Norway will be \$0.53 million dollars in 2022 and the lease and rental payments for the market will be \$0.03 million dollars. The operating expenses for this market is expected to reach \$3.06 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	533.4
Operating Expenses (\$1,000)	3,058.3
Employer Costs for Fringe Benefits (\$1,000)	164.7
Contract Labor Costs including Temporary Help (\$1,000)	48.8
Cost of Health Insurance (\$1,000)	64.3
Taxes and License Fees (\$1,000)	15.8
Lease and Rental Payments (\$1,000)	31.2

### **Cost of Services Estimates**

The cost of advertising for this market in Norway will be \$0.01 million dollars in 2022 and the cost of professional services for the market will be \$0.03 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.04 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	6.0
Cost of Purchased Repair and Maintenance Services (\$1,000)	40.9
Cost of Purchased Communication Services (\$1,000)	4.2
Cost of Purchased Advertising and Promotional Services (\$1,000)	11.6
Cost of Purchased Professional & Technical Services (\$1,000)	26.6
Cost of Purchased Refuse & Waste Removal (\$1,000)	12.2

\*2021-2022 Forecasts

Source: Barnes Reports

# Pakistan

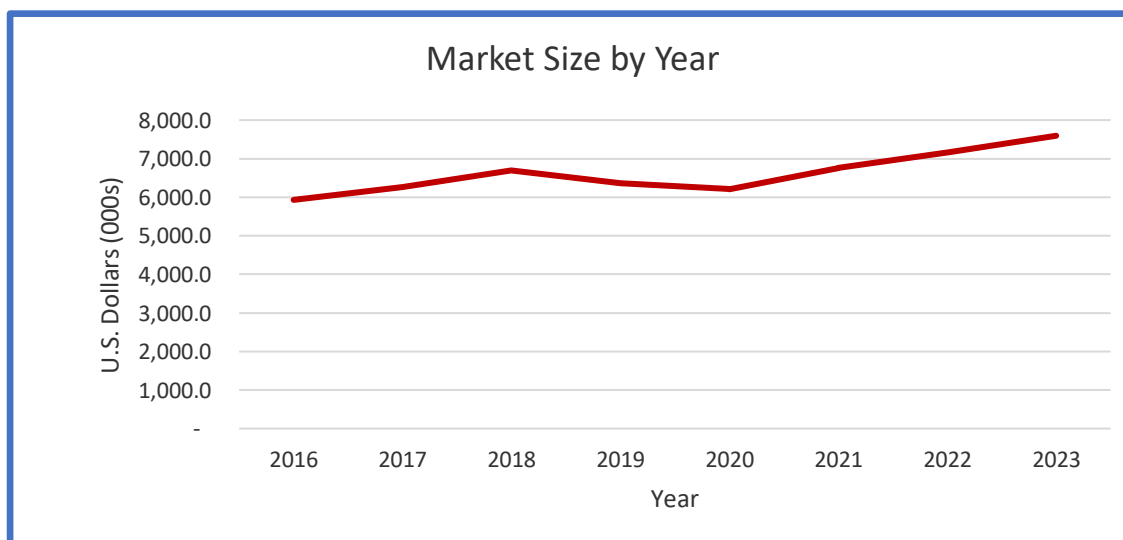
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in Pakistan is estimated to be \$7.2 million dollars in 2022 and is expected to change by 6 percent from 2022 to 2023. The market will be 1187 million Rupees in 2022 and is forecast to change by 15.4 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Rupees
2016	5,931.5	620,768.9
2017	6,257.0	655,806.2
2018	6,702.8	737,601.4
2019	6,369.7	869,353.1
2020	6,206.6	868,614.3
2021	6,754.9	1,028,737.3
2022	7,162.5	1,187,018.9
2023	7,594.7	1,369,653.7
2028	10,107.5	2,781,555.2
Y-to-Y Change	US Dollars	Rupees
2016-2017	5.5%	5.6%
2017-2018	7.1%	12.5%
2018-2019	-5.0%	17.9%
2019-2020	-2.6%	-0.1%
2020-2021	8.8%	18.4%
2021-2022	6.0%	15.4%
2022-2023	6.0%	15.4%
CAGR 2023-2028	6.6%	103.1%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# Pakistan

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in Pakistan will be \$0.74 million dollars in 2022 and the lease and rental payments for the market will be \$0.04 million dollars. The operating expenses for this market is expected to reach \$4.23 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	738.5
Operating Expenses (\$1,000)	4,234.9
Employer Costs for Fringe Benefits (\$1,000)	228.1
Contract Labor Costs including Temporary Help (\$1,000)	67.6
Cost of Health Insurance (\$1,000)	89.1
Taxes and License Fees (\$1,000)	21.8
Lease and Rental Payments (\$1,000)	43.2

### **Cost of Services Estimates**

The cost of advertising for this market in Pakistan will be \$0.02 million dollars in 2022 and the cost of professional services for the market will be \$0.04 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.06 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	8.3
Cost of Purchased Repair and Maintenance Services (\$1,000)	56.6
Cost of Purchased Communication Services (\$1,000)	5.9
Cost of Purchased Advertising and Promotional Services (\$1,000)	16.0
Cost of Purchased Professional & Technical Services (\$1,000)	36.9
Cost of Purchased Refuse & Waste Removal (\$1,000)	16.8

\*2021-2022 Forecasts

Source: Barnes Reports



# Philippines

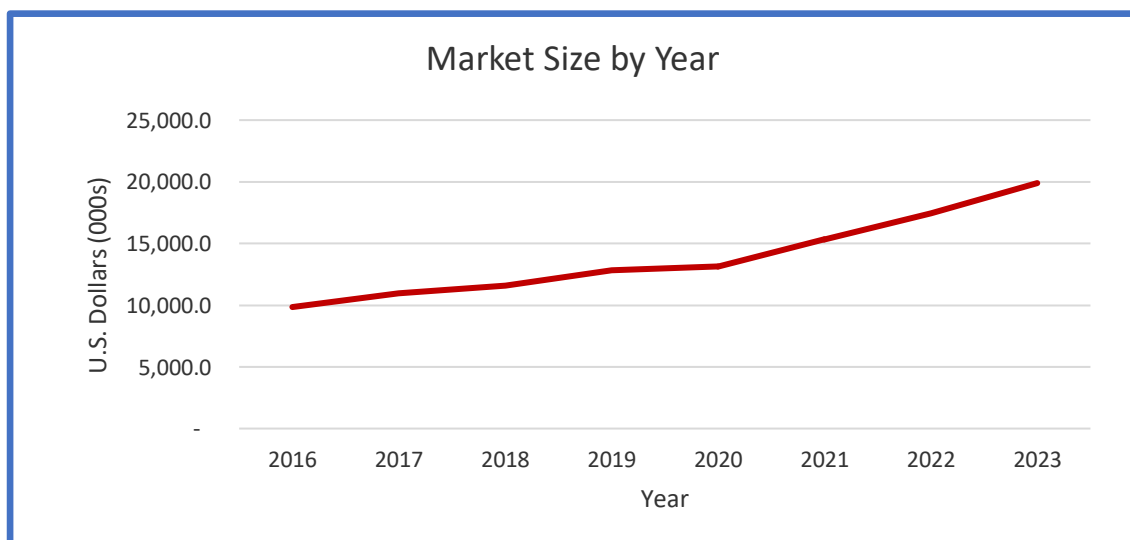
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in Philippines is estimated to be \$17.5 million dollars in 2022 and is expected to change by 13.9 percent from 2022 to 2023. The market will be 1007.4 million Pesos in 2022 and is forecast to change by 17.5 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Pesos
2016	9,849.9	474,003.6
2017	10,942.0	526,563.6
2018	11,584.4	610,049.8
2019	12,823.6	664,207.4
2020	13,128.0	711,322.3
2021	15,343.9	857,631.2
2022	17,472.3	1,007,419.4
2023	19,895.8	1,183,368.6
2028	37,821.1	2,627,725.2
Y-to-Y Change	US Dollars	Pesos
2016-2017	11.1%	11.1%
2017-2018	5.9%	15.9%
2018-2019	10.7%	8.9%
2019-2020	2.4%	7.1%
2020-2021	16.9%	20.6%
2021-2022	13.9%	17.5%
2022-2023	13.9%	17.5%
CAGR 2023-2028	18.0%	122.1%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# Philippines

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in Philippines will be \$1.80 million dollars in 2022 and the lease and rental payments for the market will be \$0.11 million dollars. The operating expenses for this market is expected to reach \$10.33 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	1,801.6
Operating Expenses (\$1,000)	10,330.7
Employer Costs for Fringe Benefits (\$1,000)	556.4
Contract Labor Costs including Temporary Help (\$1,000)	164.9
Cost of Health Insurance (\$1,000)	217.3
Taxes and License Fees (\$1,000)	53.2
Lease and Rental Payments (\$1,000)	105.3

### **Cost of Services Estimates**

The cost of advertising for this market in Philippines will be \$0.04 million dollars in 2022 and the cost of professional services for the market will be \$0.09 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.14 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	20.3
Cost of Purchased Repair and Maintenance Services (\$1,000)	138.1
Cost of Purchased Communication Services (\$1,000)	14.3
Cost of Purchased Advertising and Promotional Services (\$1,000)	39.1
Cost of Purchased Professional & Technical Services (\$1,000)	90.0
Cost of Purchased Refuse & Waste Removal (\$1,000)	41.0

\*2021-2022 Forecasts

Source: Barnes Reports

# Poland

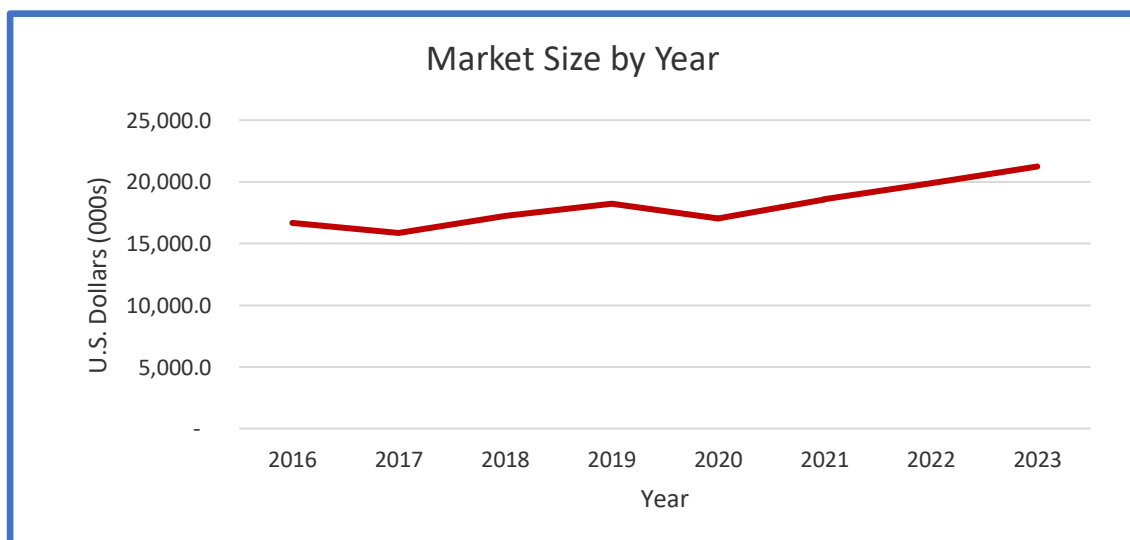
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in Poland is estimated to be \$19.9 million dollars in 2022 and is expected to change by 6.9 percent from 2022 to 2023. The market will be 82 million Zlotys in 2022 and is forecast to change by 9.3 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Zlotys
2016	16,692.7	63,246.8
2017	15,853.2	59,895.4
2018	17,234.0	62,244.2
2019	18,221.7	69,959.8
2020	17,030.0	66,841.4
2021	18,566.1	75,005.6
2022	19,863.5	82,000.6
2023	21,238.6	89,647.9
2028	31,141.1	139,017.0
Y-to-Y Change	US Dollars	Zlotys
2016-2017	-5.0%	-5.3%
2017-2018	8.7%	3.9%
2018-2019	5.7%	12.4%
2019-2020	-6.5%	-4.5%
2020-2021	9.0%	12.2%
2021-2022	7.0%	9.3%
2022-2023	6.9%	9.3%
CAGR 2023-2028	9.3%	55.1%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# Poland

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in Poland will be \$2.05 million dollars in 2022 and the lease and rental payments for the market will be \$0.12 million dollars. The operating expenses for this market is expected to reach \$11.74 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	2,048.2
Operating Expenses (\$1,000)	11,744.5
Employer Costs for Fringe Benefits (\$1,000)	632.5
Contract Labor Costs including Temporary Help (\$1,000)	187.5
Cost of Health Insurance (\$1,000)	247.1
Taxes and License Fees (\$1,000)	60.5
Lease and Rental Payments (\$1,000)	119.7

### **Cost of Services Estimates**

The cost of advertising for this market in Poland will be \$0.04 million dollars in 2022 and the cost of professional services for the market will be \$0.10 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.16 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	23.1
Cost of Purchased Repair and Maintenance Services (\$1,000)	157.0
Cost of Purchased Communication Services (\$1,000)	16.2
Cost of Purchased Advertising and Promotional Services (\$1,000)	44.5
Cost of Purchased Professional & Technical Services (\$1,000)	102.3
Cost of Purchased Refuse & Waste Removal (\$1,000)	46.7

\*2021-2022 Forecasts

Source: Barnes Reports

# Puerto Rico

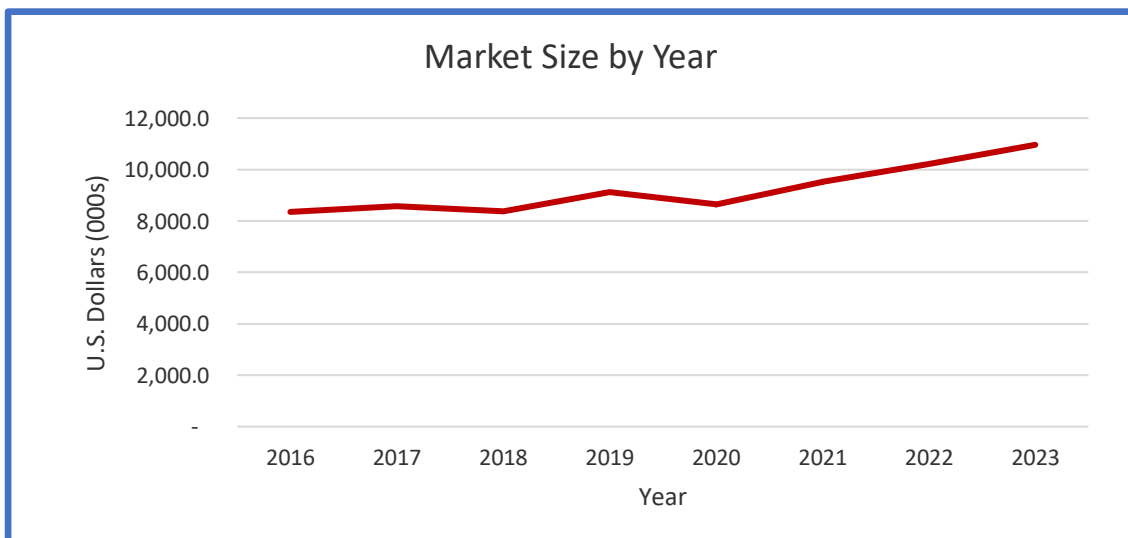
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in Puerto Rico is estimated to be \$10.2 million dollars in 2022 and is expected to change by 7.3 percent from 2022 to 2023. The market will be 10.3 million Dollars in 2022 and is forecast to change by 7.5 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Dollars
2016	8,351.7	8,274.7
2017	8,566.9	8,633.5
2018	8,365.5	8,365.5
2019	9,112.3	9,112.3
2020	8,640.3	8,680.4
2021	9,517.5	9,580.8
2022	10,213.9	10,302.4
2023	10,961.3	11,078.5
2028	15,492.6	15,815.6
Y-to-Y Change	US Dollars	Dollars
2016-2017	2.6%	4.3%
2017-2018	-2.4%	-3.1%
2018-2019	8.9%	8.9%
2019-2020	-5.2%	-4.7%
2020-2021	10.2%	10.4%
2021-2022	7.3%	7.5%
2022-2023	7.3%	7.5%
CAGR 2023-2028	8.3%	42.8%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# Puerto Rico

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in Puerto Rico will be \$1.05 million dollars in 2022 and the lease and rental payments for the market will be \$0.06 million dollars. The operating expenses for this market is expected to reach \$6.04 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	1,053.2
Operating Expenses (\$1,000)	6,039.1
Employer Costs for Fringe Benefits (\$1,000)	325.2
Contract Labor Costs including Temporary Help (\$1,000)	96.4
Cost of Health Insurance (\$1,000)	127.0
Taxes and License Fees (\$1,000)	31.1
Lease and Rental Payments (\$1,000)	61.5

### **Cost of Services Estimates**

The cost of advertising for this market in Puerto Rico will be \$0.02 million dollars in 2022 and the cost of professional services for the market will be \$0.05 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.08 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	11.9
Cost of Purchased Repair and Maintenance Services (\$1,000)	80.7
Cost of Purchased Communication Services (\$1,000)	8.4
Cost of Purchased Advertising and Promotional Services (\$1,000)	22.9
Cost of Purchased Professional & Technical Services (\$1,000)	52.6
Cost of Purchased Refuse & Waste Removal (\$1,000)	24.0

\*2021-2022 Forecasts

Source: Barnes Reports

# Romania

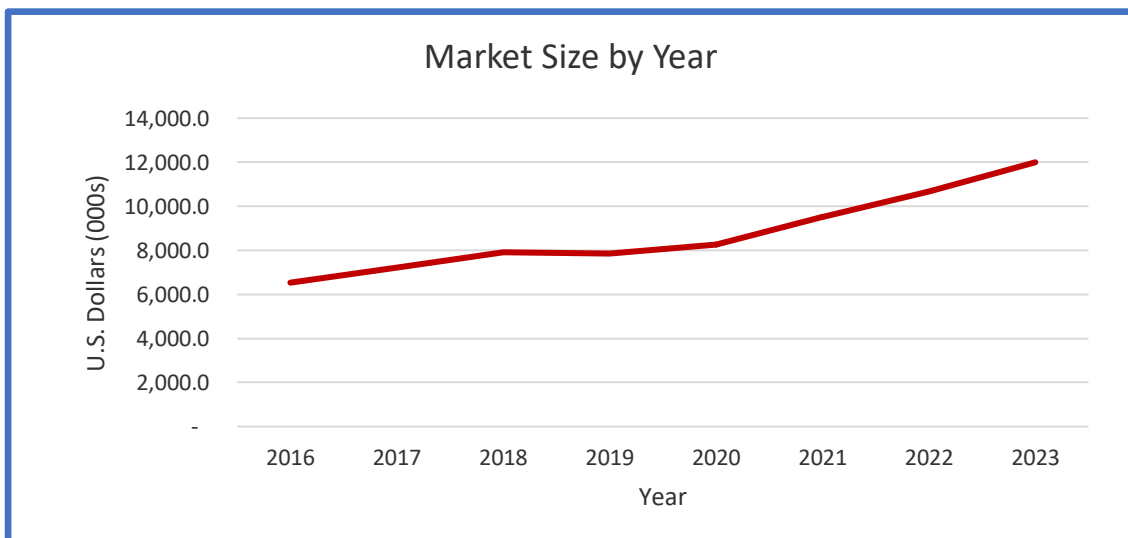
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in Romania is estimated to be \$10.7 million dollars in 2022 and is expected to change by 12.3 percent from 2022 to 2023. The market will be 44.3 million Leus in 2022 and is forecast to change by 12.5 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Leus
2016	6,532.1	27,201.7
2017	7,226.3	29,284.5
2018	7,905.4	31,159.9
2019	7,845.8	33,249.7
2020	8,258.2	34,048.7
2021	9,516.3	39,333.4
2022	10,683.9	44,268.8
2023	11,994.6	49,823.5
2028	21,241.8	89,335.8
Y-to-Y Change	US Dollars	Leus
2016-2017	10.6%	7.7%
2017-2018	9.4%	6.4%
2018-2019	-0.8%	6.7%
2019-2020	5.3%	2.4%
2020-2021	15.2%	15.5%
2021-2022	12.3%	12.5%
2022-2023	12.3%	12.5%
CAGR 2023-2028	15.4%	79.3%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# Romania

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in Romania will be \$1.10 million dollars in 2022 and the lease and rental payments for the market will be \$0.06 million dollars. The operating expenses for this market is expected to reach \$6.32 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	1,101.6
Operating Expenses (\$1,000)	6,317.0
Employer Costs for Fringe Benefits (\$1,000)	340.2
Contract Labor Costs including Temporary Help (\$1,000)	100.9
Cost of Health Insurance (\$1,000)	132.9
Taxes and License Fees (\$1,000)	32.5
Lease and Rental Payments (\$1,000)	64.4

### **Cost of Services Estimates**

The cost of advertising for this market in Romania will be \$0.02 million dollars in 2022 and the cost of professional services for the market will be \$0.06 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.08 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	12.4
Cost of Purchased Repair and Maintenance Services (\$1,000)	84.5
Cost of Purchased Communication Services (\$1,000)	8.7
Cost of Purchased Advertising and Promotional Services (\$1,000)	23.9
Cost of Purchased Professional & Technical Services (\$1,000)	55.0
Cost of Purchased Refuse & Waste Removal (\$1,000)	25.1

\*2021-2022 Forecasts

Source: Barnes Reports



# Russia

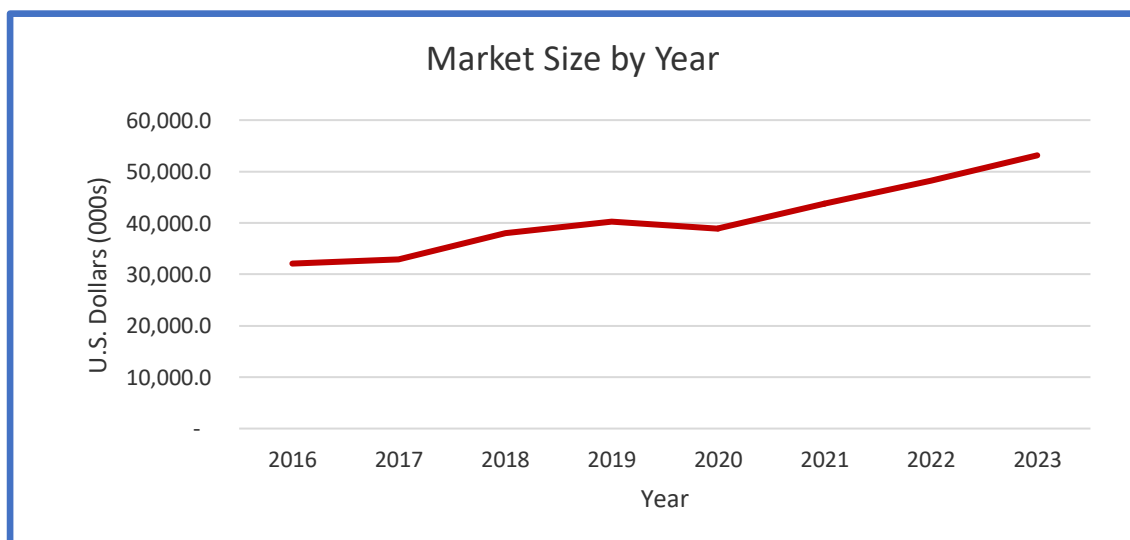
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in Russia is estimated to be \$48.2 million dollars in 2022 and is expected to change by 10.2 percent from 2022 to 2023. The market will be 3307.7 million Rubles in 2022 and is forecast to change by 12.9 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Rubles
2016	32,095.7	1,967,203.3
2017	32,930.6	1,926,661.9
2018	38,041.2	2,383,967.3
2019	40,290.1	2,608,285.5
2020	38,931.0	2,548,442.6
2021	43,741.7	2,930,795.4
2022	48,230.7	3,307,684.6
2023	53,148.3	3,730,783.2
2028	90,608.4	7,145,476.5
Y-to-Y Change	US Dollars	Rubles
2016-2017	2.6%	-2.1%
2017-2018	15.5%	23.7%
2018-2019	5.9%	9.4%
2019-2020	-3.4%	-2.3%
2020-2021	12.4%	15.0%
2021-2022	10.3%	12.9%
2022-2023	10.2%	12.8%
CAGR 2023-2028	14.1%	91.5%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# Russia

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in Russia will be \$4.97 million dollars in 2022 and the lease and rental payments for the market will be \$0.29 million dollars. The operating expenses for this market is expected to reach \$28.52 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	4,973.2
Operating Expenses (\$1,000)	28,517.1
Employer Costs for Fringe Benefits (\$1,000)	1,535.8
Contract Labor Costs including Temporary Help (\$1,000)	455.3
Cost of Health Insurance (\$1,000)	599.9
Taxes and License Fees (\$1,000)	146.9
Lease and Rental Payments (\$1,000)	290.6

### **Cost of Services Estimates**

The cost of advertising for this market in Russia will be \$0.11 million dollars in 2022 and the cost of professional services for the market will be \$0.25 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.38 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	56.0
Cost of Purchased Repair and Maintenance Services (\$1,000)	381.3
Cost of Purchased Communication Services (\$1,000)	39.4
Cost of Purchased Advertising and Promotional Services (\$1,000)	108.0
Cost of Purchased Professional & Technical Services (\$1,000)	248.4
Cost of Purchased Refuse & Waste Removal (\$1,000)	113.3

\*2021-2022 Forecasts

Source: Barnes Reports

# Saudi Arabia

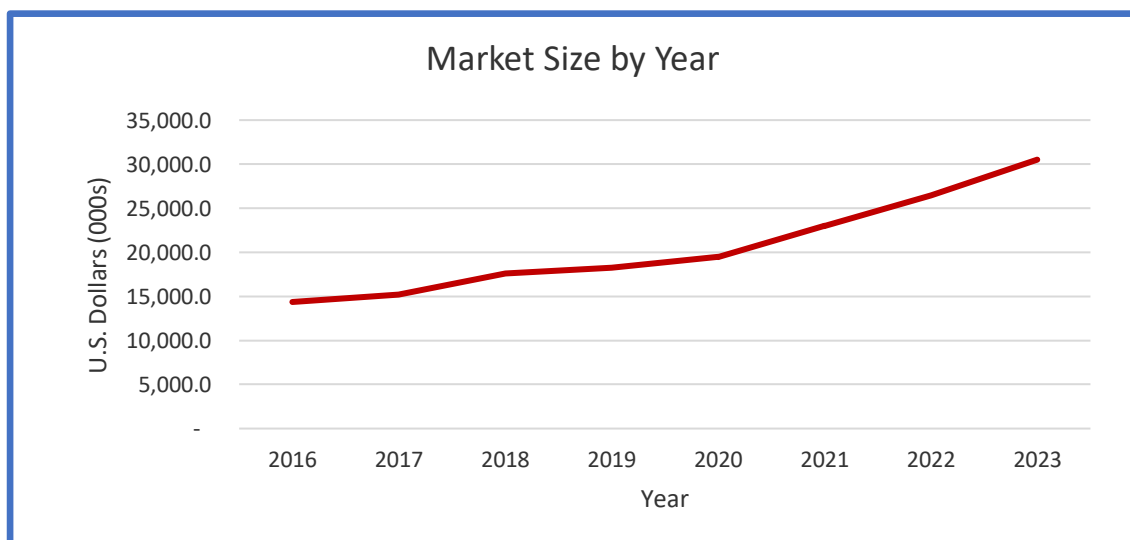
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in Saudi Arabia is estimated to be \$26.5 million dollars in 2022 and is expected to change by 15.2 percent from 2022 to 2023. The market will be 103.3 million Riyals in 2022 and is forecast to change by 16.4 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Riyals
2016	14,363.0	51,976.6
2017	15,199.8	56,999.2
2018	17,619.2	66,071.9
2019	18,275.4	68,532.8
2020	19,460.4	74,287.8
2021	23,004.5	88,760.0
2022	26,494.0	103,322.1
2023	30,512.8	120,273.1
2028	61,386.2	255,245.2
Y-to-Y Change	US Dollars	Riyals
2016-2017	5.8%	9.7%
2017-2018	15.9%	15.9%
2018-2019	3.7%	3.7%
2019-2020	6.5%	8.4%
2020-2021	18.2%	19.5%
2021-2022	15.2%	16.4%
2022-2023	15.2%	16.4%
CAGR 2023-2028	20.2%	112.2%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# Saudi Arabia

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in Saudi Arabia will be \$2.73 million dollars in 2022 and the lease and rental payments for the market will be \$0.16 million dollars. The operating expenses for this market is expected to reach \$15.66 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	2,731.9
Operating Expenses (\$1,000)	15,664.9
Employer Costs for Fringe Benefits (\$1,000)	843.6
Contract Labor Costs including Temporary Help (\$1,000)	250.1
Cost of Health Insurance (\$1,000)	329.6
Taxes and License Fees (\$1,000)	80.7
Lease and Rental Payments (\$1,000)	159.6

### **Cost of Services Estimates**

The cost of advertising for this market in Saudi Arabia will be \$0.06 million dollars in 2022 and the cost of professional services for the market will be \$0.14 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.21 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	30.8
Cost of Purchased Repair and Maintenance Services (\$1,000)	209.4
Cost of Purchased Communication Services (\$1,000)	21.7
Cost of Purchased Advertising and Promotional Services (\$1,000)	59.3
Cost of Purchased Professional & Technical Services (\$1,000)	136.5
Cost of Purchased Refuse & Waste Removal (\$1,000)	62.2

\*2021-2022 Forecasts

Source: Barnes Reports

# Singapore

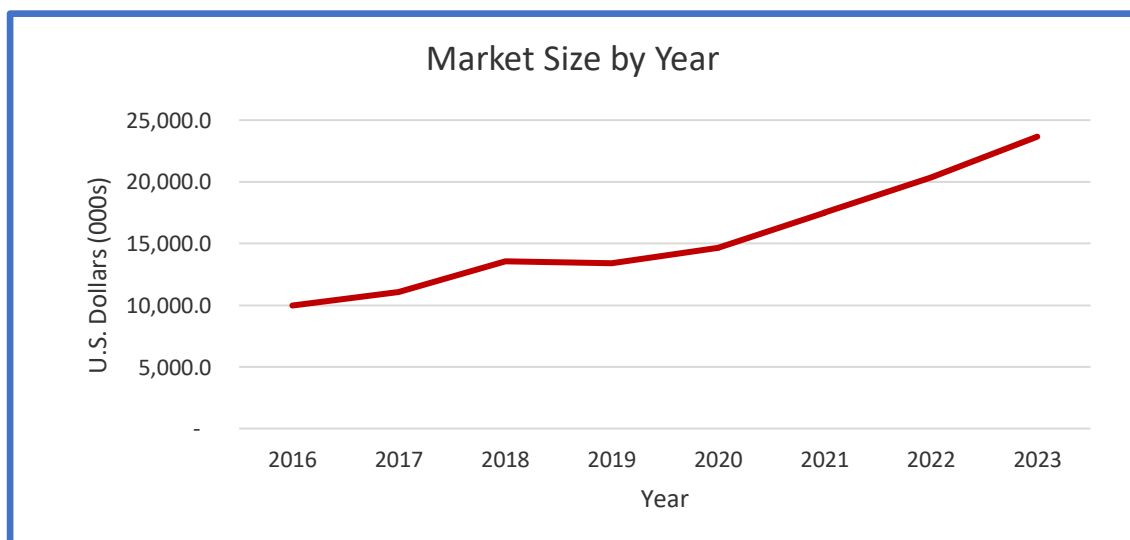
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in Singapore is estimated to be \$20.3 million dollars in 2022 and is expected to change by 16.3 percent from 2022 to 2023. The market will be 28 million Dollars in 2022 and is forecast to change by 16.7 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Dollars
2016	9,971.6	13,409.3
2017	11,045.8	15,099.0
2018	13,537.8	18,259.8
2019	13,386.0	18,261.2
2020	14,647.0	20,011.5
2021	17,486.5	23,962.1
2022	20,339.1	27,954.2
2023	23,657.1	32,611.3
2028	50,005.9	69,965.6
Y-to-Y Change	US Dollars	Dollars
2016-2017	10.8%	12.6%
2017-2018	22.6%	20.9%
2018-2019	-1.1%	0.0%
2019-2020	9.4%	9.6%
2020-2021	19.4%	19.7%
2021-2022	16.3%	16.7%
2022-2023	16.3%	16.7%
CAGR 2023-2028	22.3%	114.5%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# Singapore

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in Singapore will be \$2.10 million dollars in 2022 and the lease and rental payments for the market will be \$0.12 million dollars. The operating expenses for this market is expected to reach \$12.03 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	2,097.2
Operating Expenses (\$1,000)	12,025.8
Employer Costs for Fringe Benefits (\$1,000)	647.7
Contract Labor Costs including Temporary Help (\$1,000)	192.0
Cost of Health Insurance (\$1,000)	253.0
Taxes and License Fees (\$1,000)	62.0
Lease and Rental Payments (\$1,000)	122.6

### **Cost of Services Estimates**

The cost of advertising for this market in Singapore will be \$0.05 million dollars in 2022 and the cost of professional services for the market will be \$0.10 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.16 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	23.6
Cost of Purchased Repair and Maintenance Services (\$1,000)	160.8
Cost of Purchased Communication Services (\$1,000)	16.6
Cost of Purchased Advertising and Promotional Services (\$1,000)	45.5
Cost of Purchased Professional & Technical Services (\$1,000)	104.8
Cost of Purchased Refuse & Waste Removal (\$1,000)	47.8

\*2021-2022 Forecasts

Source: Barnes Reports

# South Africa

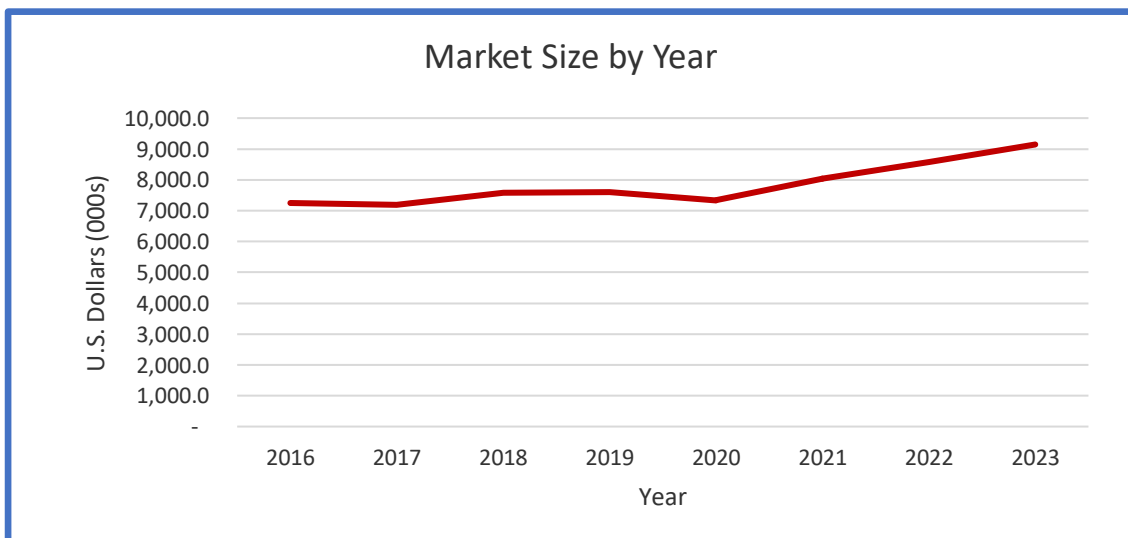
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in South Africa is estimated to be \$8.6 million dollars in 2022 and is expected to change by 6.7 percent from 2022 to 2023. The market will be 129.6 million Rands in 2022 and is forecast to change by 9.3 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Rands
2016	7,256.8	96,608.0
2017	7,188.8	95,704.3
2018	7,571.2	100,196.6
2019	7,608.9	109,935.7
2020	7,339.5	105,730.3
2021	8,036.4	118,576.9
2022	8,573.0	129,561.7
2023	9,145.3	141,564.0
2028	12,544.6	218,900.1
Y-to-Y Change	US Dollars	Rands
2016-2017	-0.9%	-0.9%
2017-2018	5.3%	4.7%
2018-2019	0.5%	9.7%
2019-2020	-3.5%	-3.8%
2020-2021	9.5%	12.2%
2021-2022	6.7%	9.3%
2022-2023	6.7%	9.3%
CAGR 2023-2028	7.4%	54.6%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# South Africa

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in South Africa will be \$0.88 million dollars in 2022 and the lease and rental payments for the market will be \$0.05 million dollars. The operating expenses for this market is expected to reach \$5.07 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	884.0
Operating Expenses (\$1,000)	5,068.9
Employer Costs for Fringe Benefits (\$1,000)	273.0
Contract Labor Costs including Temporary Help (\$1,000)	80.9
Cost of Health Insurance (\$1,000)	106.6
Taxes and License Fees (\$1,000)	26.1
Lease and Rental Payments (\$1,000)	51.7

### **Cost of Services Estimates**

The cost of advertising for this market in South Africa will be \$0.02 million dollars in 2022 and the cost of professional services for the market will be \$0.04 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.07 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	10.0
Cost of Purchased Repair and Maintenance Services (\$1,000)	67.8
Cost of Purchased Communication Services (\$1,000)	7.0
Cost of Purchased Advertising and Promotional Services (\$1,000)	19.2
Cost of Purchased Professional & Technical Services (\$1,000)	44.2
Cost of Purchased Refuse & Waste Removal (\$1,000)	20.1

\*2021-2022 Forecasts

Source: Barnes Reports



# Spain

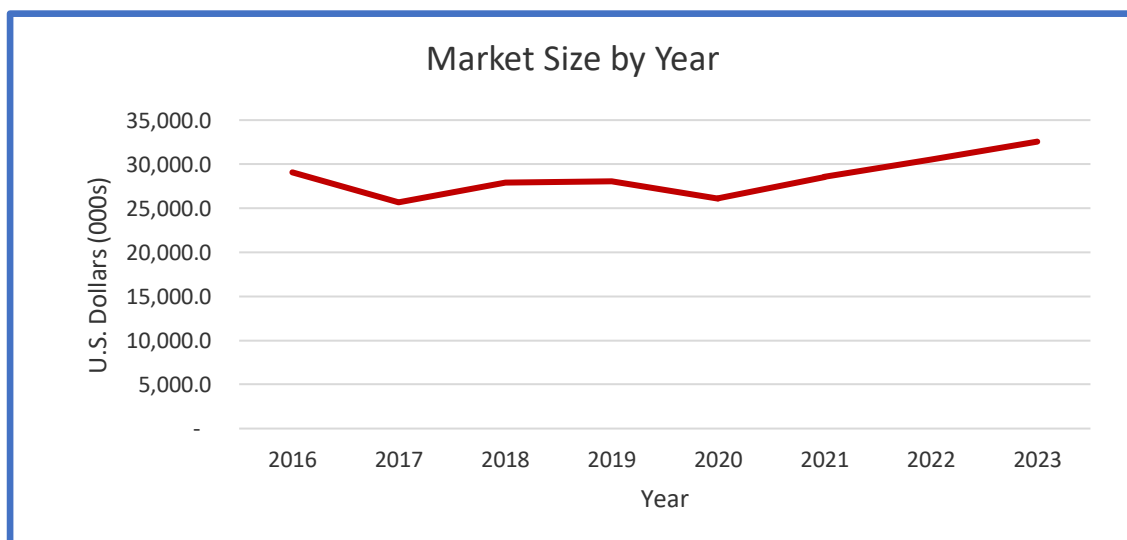
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in Spain is estimated to be \$30.5 million dollars in 2022 and is expected to change by 6.7 percent from 2022 to 2023. The market will be 28.5 million Euros in 2022 and is forecast to change by 8.3 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Euros
2016	29,108.2	26,446.7
2017	25,671.1	22,724.2
2018	27,889.9	23,616.4
2019	28,034.9	25,042.9
2020	26,126.9	23,591.2
2021	28,533.2	26,281.4
2022	30,517.0	28,465.8
2023	32,557.4	30,773.5
2028	39,751.4	37,989.8
Y-to-Y Change	US Dollars	Euros
2016-2017	-11.8%	-14.1%
2017-2018	8.6%	3.9%
2018-2019	0.5%	6.0%
2019-2020	-6.8%	-5.8%
2020-2021	9.2%	11.4%
2021-2022	7.0%	8.3%
2022-2023	6.7%	8.1%
CAGR 2023-2028	4.4%	23.4%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# Spain

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in Spain will be \$3.15 million dollars in 2022 and the lease and rental payments for the market will be \$0.18 million dollars. The operating expenses for this market is expected to reach \$18.04 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	3,146.7
Operating Expenses (\$1,000)	18,043.6
Employer Costs for Fringe Benefits (\$1,000)	971.7
Contract Labor Costs including Temporary Help (\$1,000)	288.1
Cost of Health Insurance (\$1,000)	379.6
Taxes and License Fees (\$1,000)	93.0
Lease and Rental Payments (\$1,000)	183.9

### **Cost of Services Estimates**

The cost of advertising for this market in Spain will be \$0.07 million dollars in 2022 and the cost of professional services for the market will be \$0.16 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.24 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	35.4
Cost of Purchased Repair and Maintenance Services (\$1,000)	241.2
Cost of Purchased Communication Services (\$1,000)	25.0
Cost of Purchased Advertising and Promotional Services (\$1,000)	68.3
Cost of Purchased Professional & Technical Services (\$1,000)	157.2
Cost of Purchased Refuse & Waste Removal (\$1,000)	71.7

\*2021-2022 Forecasts

Source: Barnes Reports

# Sweden

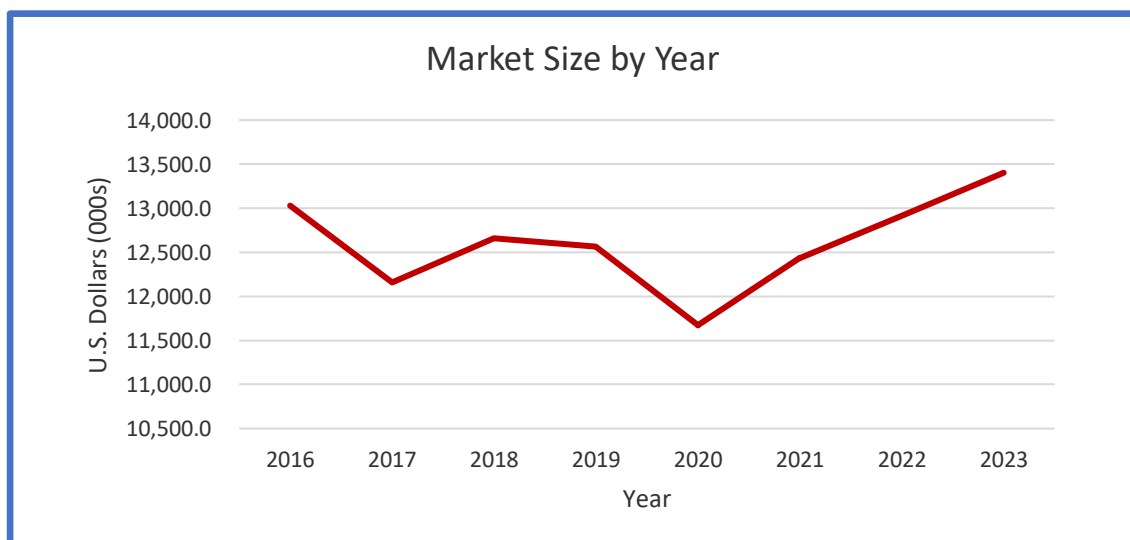
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in Sweden is estimated to be \$12.9 million dollars in 2022 and is expected to change by 3.8 percent from 2022 to 2023. The market will be 130.3 million Kronas in 2022 and is forecast to change by 7 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Kronas
2016	13,030.1	112,152.2
2017	12,158.5	103,850.2
2018	12,658.7	110,036.0
2019	12,563.7	118,831.6
2020	11,672.3	110,946.4
2021	12,437.0	121,821.2
2022	12,910.8	130,319.1
2023	13,402.6	139,409.7
2028	16,042.9	193,923.3
Y-to-Y Change	US Dollars	Kronas
2016-2017	-6.7%	-7.4%
2017-2018	4.1%	6.0%
2018-2019	-0.8%	8.0%
2019-2020	-7.1%	-6.6%
2020-2021	6.6%	9.8%
2021-2022	3.8%	7.0%
2022-2023	3.8%	7.0%
CAGR 2023-2028	3.9%	39.1%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# Sweden

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in Sweden will be \$1.33 million dollars in 2022 and the lease and rental payments for the market will be \$0.08 million dollars. The operating expenses for this market is expected to reach \$7.63 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	1,331.3
Operating Expenses (\$1,000)	7,633.7
Employer Costs for Fringe Benefits (\$1,000)	411.1
Contract Labor Costs including Temporary Help (\$1,000)	121.9
Cost of Health Insurance (\$1,000)	160.6
Taxes and License Fees (\$1,000)	39.3
Lease and Rental Payments (\$1,000)	77.8

### **Cost of Services Estimates**

The cost of advertising for this market in Sweden will be \$0.03 million dollars in 2022 and the cost of professional services for the market will be \$0.07 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.10 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	15.0
Cost of Purchased Repair and Maintenance Services (\$1,000)	102.1
Cost of Purchased Communication Services (\$1,000)	10.6
Cost of Purchased Advertising and Promotional Services (\$1,000)	28.9
Cost of Purchased Professional & Technical Services (\$1,000)	66.5
Cost of Purchased Refuse & Waste Removal (\$1,000)	30.3

\*2021-2022 Forecasts

Source: Barnes Reports

# Switzerland

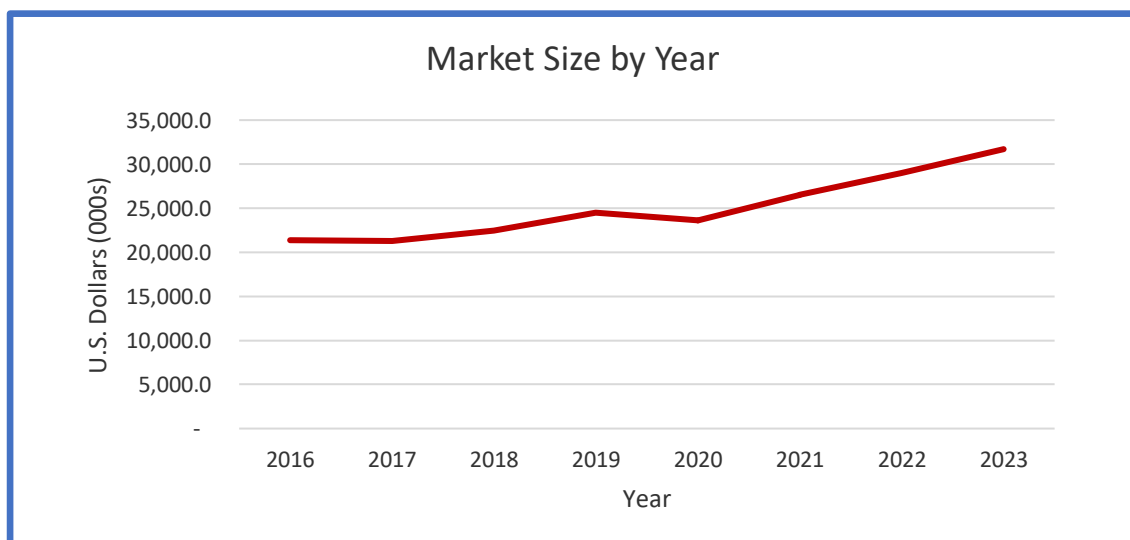
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in Switzerland is estimated to be \$29.0 million dollars in 2022 and is expected to change by 9.4 percent from 2022 to 2023. The market will be 30.2 million Francs in 2022 and is forecast to change by 11 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Francs
2016	21,354.9	20,156.0
2017	21,285.0	20,959.1
2018	22,440.4	21,944.1
2019	24,510.4	24,357.8
2020	23,615.5	23,887.8
2021	26,508.8	27,213.3
2022	28,990.7	30,203.9
2023	31,705.0	33,523.1
2028	49,247.1	56,061.0
Y-to-Y Change	US Dollars	Francs
2016-2017	-0.3%	4.0%
2017-2018	5.4%	4.7%
2018-2019	9.2%	11.0%
2019-2020	-3.7%	-1.9%
2020-2021	12.3%	13.9%
2021-2022	9.4%	11.0%
2022-2023	9.4%	11.0%
CAGR 2023-2028	11.1%	67.2%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# Switzerland

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in Switzerland will be \$2.99 million dollars in 2022 and the lease and rental payments for the market will be \$0.17 million dollars. The operating expenses for this market is expected to reach \$17.14 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	2,989.3
Operating Expenses (\$1,000)	17,141.2
Employer Costs for Fringe Benefits (\$1,000)	923.1
Contract Labor Costs including Temporary Help (\$1,000)	273.7
Cost of Health Insurance (\$1,000)	360.6
Taxes and License Fees (\$1,000)	88.3
Lease and Rental Payments (\$1,000)	174.7

### **Cost of Services Estimates**

The cost of advertising for this market in Switzerland will be \$0.06 million dollars in 2022 and the cost of professional services for the market will be \$0.15 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.23 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	33.7
Cost of Purchased Repair and Maintenance Services (\$1,000)	229.2
Cost of Purchased Communication Services (\$1,000)	23.7
Cost of Purchased Advertising and Promotional Services (\$1,000)	64.9
Cost of Purchased Professional & Technical Services (\$1,000)	149.3
Cost of Purchased Refuse & Waste Removal (\$1,000)	68.1

\*2021-2022 Forecasts

Source: Barnes Reports

# Thailand

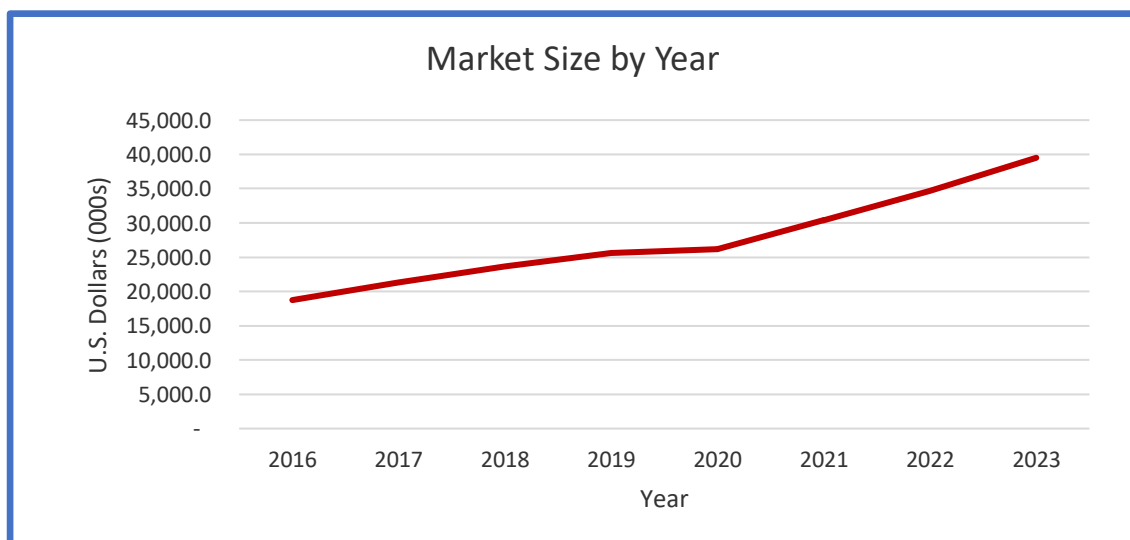
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in Thailand is estimated to be \$34.7 million dollars in 2022 and is expected to change by 13.9 percent from 2022 to 2023. The market will be 1050.9 million Bahts in 2022 and is forecast to change by 11.9 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Bahts
2016	18,745.4	656,311.7
2017	21,344.5	722,808.4
2018	23,684.0	765,233.4
2019	25,635.5	795,921.2
2020	26,180.7	817,603.8
2021	30,414.1	939,104.8
2022	34,673.4	1,050,898.6
2023	39,505.3	1,176,000.5
2028	79,579.4	2,049,049.5
Y-to-Y Change	US Dollars	Bahts
2016-2017	13.9%	10.1%
2017-2018	11.0%	5.9%
2018-2019	8.2%	4.0%
2019-2020	2.1%	2.7%
2020-2021	16.2%	14.9%
2021-2022	14.0%	11.9%
2022-2023	13.9%	11.9%
CAGR 2023-2028	20.3%	74.2%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# Thailand

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in Thailand will be \$3.58 million dollars in 2022 and the lease and rental payments for the market will be \$0.21 million dollars. The operating expenses for this market is expected to reach \$20.50 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	3,575.3
Operating Expenses (\$1,000)	20,501.1
Employer Costs for Fringe Benefits (\$1,000)	1,104.1
Contract Labor Costs including Temporary Help (\$1,000)	327.3
Cost of Health Insurance (\$1,000)	431.3
Taxes and License Fees (\$1,000)	105.6
Lease and Rental Payments (\$1,000)	208.9

### **Cost of Services Estimates**

The cost of advertising for this market in Thailand will be \$0.08 million dollars in 2022 and the cost of professional services for the market will be \$0.18 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.27 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	40.3
Cost of Purchased Repair and Maintenance Services (\$1,000)	274.1
Cost of Purchased Communication Services (\$1,000)	28.4
Cost of Purchased Advertising and Promotional Services (\$1,000)	77.6
Cost of Purchased Professional & Technical Services (\$1,000)	178.6
Cost of Purchased Refuse & Waste Removal (\$1,000)	81.5

\*2021-2022 Forecasts

Source: Barnes Reports



# Turkey

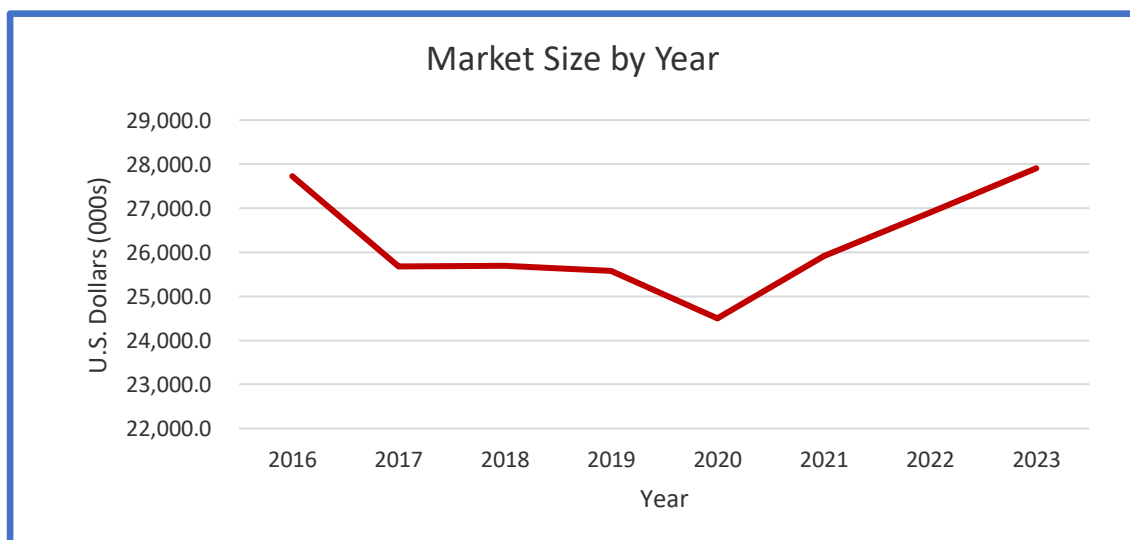
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in Turkey is estimated to be \$26.9 million dollars in 2022 and is expected to change by 3.8 percent from 2022 to 2023. The market will be 219.1 million Liras in 2022 and is forecast to change by 17.3 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Liras
2016	27,730.8	81,856.6
2017	25,681.2	93,687.6
2018	25,693.3	124,057.6
2019	25,579.3	145,131.6
2020	24,502.7	155,345.2
2021	25,912.5	186,752.4
2022	26,896.8	219,113.8
2023	27,907.2	255,248.3
2028	30,200.1	523,782.9
Y-to-Y Change	US Dollars	Liras
2016-2017	-7.4%	14.5%
2017-2018	0.0%	32.4%
2018-2019	-0.4%	17.0%
2019-2020	-4.2%	7.0%
2020-2021	5.8%	20.2%
2021-2022	3.8%	17.3%
2022-2023	3.8%	16.5%
CAGR 2023-2028	1.6%	105.2%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# Turkey

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in Turkey will be \$2.77 million dollars in 2022 and the lease and rental payments for the market will be \$0.16 million dollars. The operating expenses for this market is expected to reach \$15.90 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	2,773.4
Operating Expenses (\$1,000)	15,903.1
Employer Costs for Fringe Benefits (\$1,000)	856.5
Contract Labor Costs including Temporary Help (\$1,000)	253.9
Cost of Health Insurance (\$1,000)	334.6
Taxes and License Fees (\$1,000)	81.9
Lease and Rental Payments (\$1,000)	162.1

### **Cost of Services Estimates**

The cost of advertising for this market in Turkey will be \$0.06 million dollars in 2022 and the cost of professional services for the market will be \$0.14 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.21 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	31.2
Cost of Purchased Repair and Maintenance Services (\$1,000)	212.6
Cost of Purchased Communication Services (\$1,000)	22.0
Cost of Purchased Advertising and Promotional Services (\$1,000)	60.2
Cost of Purchased Professional & Technical Services (\$1,000)	138.5
Cost of Purchased Refuse & Waste Removal (\$1,000)	63.2

\*2021-2022 Forecasts

Source: Barnes Reports

# United Arab Emirates

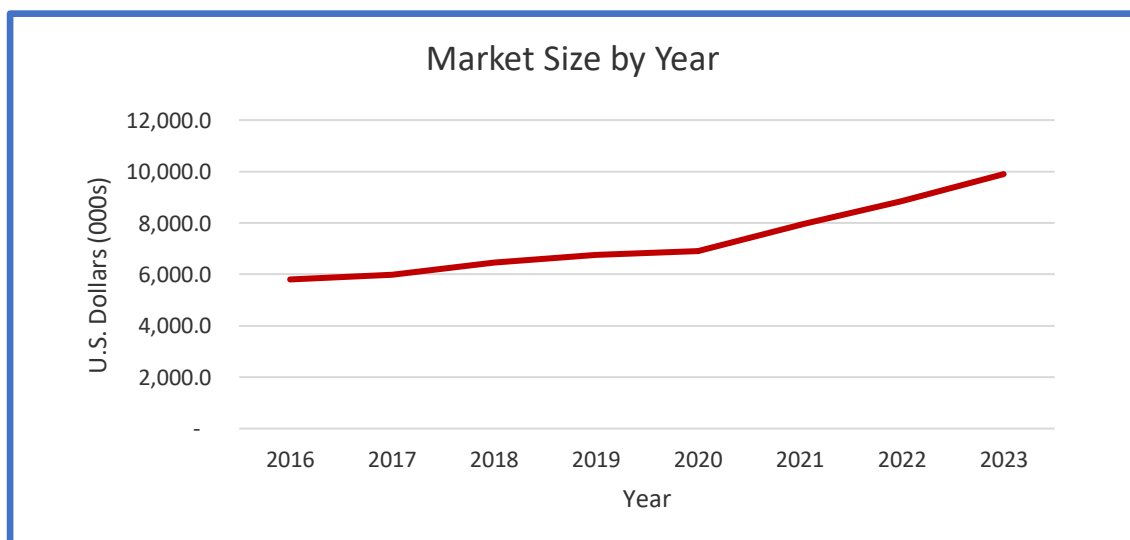
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in United Arab Emirates is estimated to be \$8.9 million dollars in 2022 and is expected to change by 11.8 percent from 2022 to 2023. The market will be 34.6 million Dirhams in 2022 and is forecast to change by 13.8 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Dirhams
2016	5,801.7	20,197.3
2017	5,989.1	21,544.1
2018	6,448.7	23,682.7
2019	6,749.9	24,789.2
2020	6,903.1	26,038.8
2021	7,920.9	30,424.0
2022	8,854.8	34,632.9
2023	9,898.9	39,424.0
2028	17,160.2	74,822.2
Y-to-Y Change	US Dollars	Dirhams
2016-2017	3.2%	6.7%
2017-2018	7.7%	9.9%
2018-2019	4.7%	4.7%
2019-2020	2.3%	5.0%
2020-2021	14.7%	16.8%
2021-2022	11.8%	13.8%
2022-2023	11.8%	13.8%
CAGR 2023-2028	14.7%	89.8%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# United Arab Emirates

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in United Arab Emirates will be \$0.91 million dollars in 2022 and the lease and rental payments for the market will be \$0.05 million dollars. The operating expenses for this market is expected to reach \$5.24 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	913.1
Operating Expenses (\$1,000)	5,235.6
Employer Costs for Fringe Benefits (\$1,000)	282.0
Contract Labor Costs including Temporary Help (\$1,000)	83.6
Cost of Health Insurance (\$1,000)	110.1
Taxes and License Fees (\$1,000)	27.0
Lease and Rental Payments (\$1,000)	53.4

### **Cost of Services Estimates**

The cost of advertising for this market in United Arab Emirates will be \$0.02 million dollars in 2022 and the cost of professional services for the market will be \$0.05 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.07 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	10.3
Cost of Purchased Repair and Maintenance Services (\$1,000)	70.0
Cost of Purchased Communication Services (\$1,000)	7.2
Cost of Purchased Advertising and Promotional Services (\$1,000)	19.8
Cost of Purchased Professional & Technical Services (\$1,000)	45.6
Cost of Purchased Refuse & Waste Removal (\$1,000)	20.8

\*2021-2022 Forecasts

Source: Barnes Reports

# United Kingdom

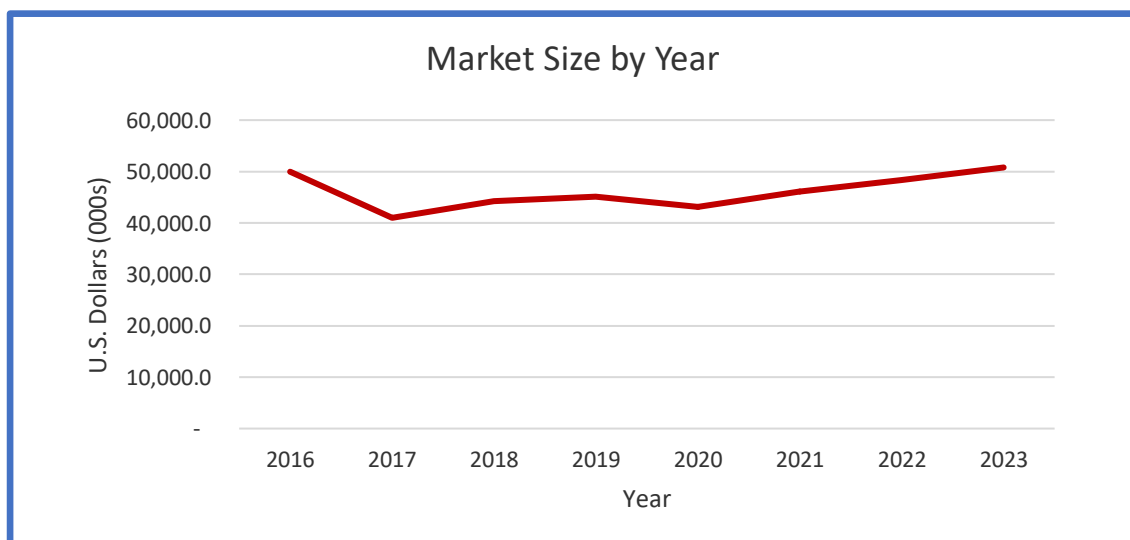
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in United Kingdom is estimated to be \$48.4 million dollars in 2022 and is expected to change by 4.9 percent from 2022 to 2023. The market will be 40 million Pounds in 2022 and is forecast to change by 7.5 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Pounds
2016	49,981.8	33,087.3
2017	40,995.6	31,853.7
2018	44,222.0	33,148.0
2019	45,166.1	35,385.1
2020	43,119.3	33,676.9
2021	46,114.1	37,176.3
2022	48,405.1	39,983.1
2023	50,789.5	43,001.8
2028	58,129.9	61,439.8
Y-to-Y Change	US Dollars	Pounds
2016-2017	-18.0%	-3.7%
2017-2018	7.9%	4.1%
2018-2019	2.1%	6.7%
2019-2020	-4.5%	-4.8%
2020-2021	6.9%	10.4%
2021-2022	5.0%	7.5%
2022-2023	4.9%	7.5%
CAGR 2023-2028	2.9%	42.9%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# United Kingdom

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in United Kingdom will be \$4.99 million dollars in 2022 and the lease and rental payments for the market will be \$0.29 million dollars. The operating expenses for this market is expected to reach \$28.62 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	4,991.2
Operating Expenses (\$1,000)	28,620.2
Employer Costs for Fringe Benefits (\$1,000)	1,541.4
Contract Labor Costs including Temporary Help (\$1,000)	456.9
Cost of Health Insurance (\$1,000)	602.1
Taxes and License Fees (\$1,000)	147.5
Lease and Rental Payments (\$1,000)	291.7

### **Cost of Services Estimates**

The cost of advertising for this market in United Kingdom will be \$0.11 million dollars in 2022 and the cost of professional services for the market will be \$0.25 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.38 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	56.2
Cost of Purchased Repair and Maintenance Services (\$1,000)	382.6
Cost of Purchased Communication Services (\$1,000)	39.6
Cost of Purchased Advertising and Promotional Services (\$1,000)	108.4
Cost of Purchased Professional & Technical Services (\$1,000)	249.3
Cost of Purchased Refuse & Waste Removal (\$1,000)	113.7

\*2021-2022 Forecasts

Source: Barnes Reports

# United States

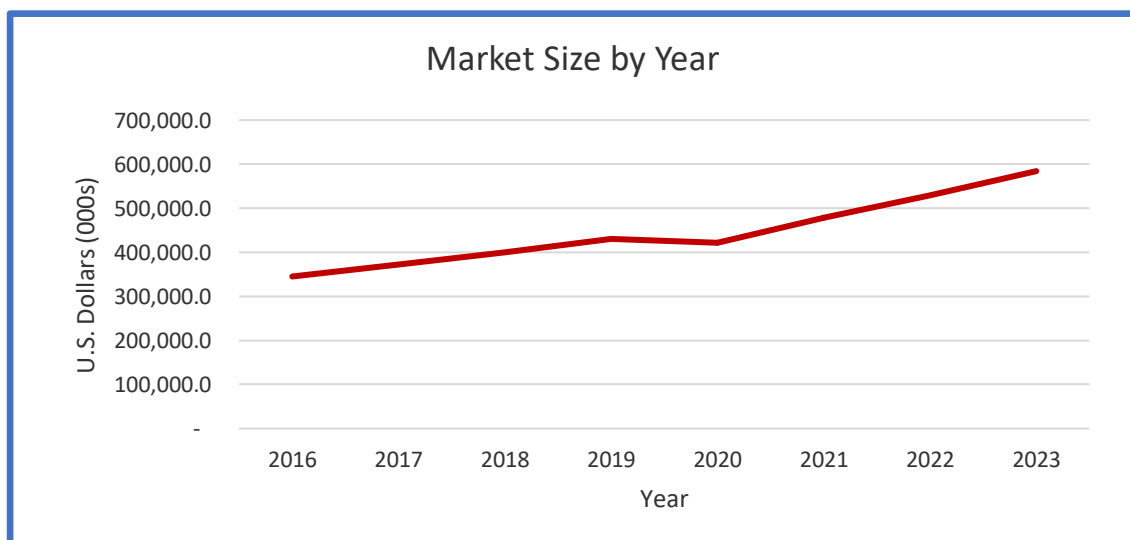
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in United States is estimated to be \$528.6 million dollars in 2022 and is expected to change by 10.5 percent from 2022 to 2023. The market will be 528.6 million Dollars in 2022 and is forecast to change by 10.5 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Dollars
2016	345,133.6	345,133.6
2017	372,114.3	372,114.3
2018	400,433.8	400,433.8
2019	430,399.9	430,399.9
2020	421,661.8	421,661.8
2021	478,328.2	478,328.2
2022	528,644.0	528,644.0
2023	584,252.6	584,252.6
2028	956,529.7	956,529.7
Y-to-Y Change	US Dollars	Dollars
2016-2017	7.8%	7.8%
2017-2018	7.6%	7.6%
2018-2019	7.5%	7.5%
2019-2020	-2.0%	-2.0%
2020-2021	13.4%	13.4%
2021-2022	10.5%	10.5%
2022-2023	10.5%	10.5%
CAGR 2023-2028	12.7%	63.7%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# United States

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in United States will be \$54.51 million dollars in 2022 and the lease and rental payments for the market will be \$3.19 million dollars. The operating expenses for this market is expected to reach \$312.57 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	54,510.1
Operating Expenses (\$1,000)	312,568.2
Employer Costs for Fringe Benefits (\$1,000)	16,833.6
Contract Labor Costs including Temporary Help (\$1,000)	4,990.2
Cost of Health Insurance (\$1,000)	6,575.7
Taxes and License Fees (\$1,000)	1,610.6
Lease and Rental Payments (\$1,000)	3,185.5

### **Cost of Services Estimates**

The cost of advertising for this market in United States will be \$1.18 million dollars in 2022 and the cost of professional services for the market will be \$2.72 million dollars. The cost of repair and maintenance for this market is expected to reach \$4.18 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	613.9
Cost of Purchased Repair and Maintenance Services (\$1,000)	4,178.8
Cost of Purchased Communication Services (\$1,000)	432.3
Cost of Purchased Advertising and Promotional Services (\$1,000)	1,183.8
Cost of Purchased Professional & Technical Services (\$1,000)	2,722.6
Cost of Purchased Refuse & Waste Removal (\$1,000)	1,242.0

\*2021-2022 Forecasts

Source: Barnes Reports



# Venezuela

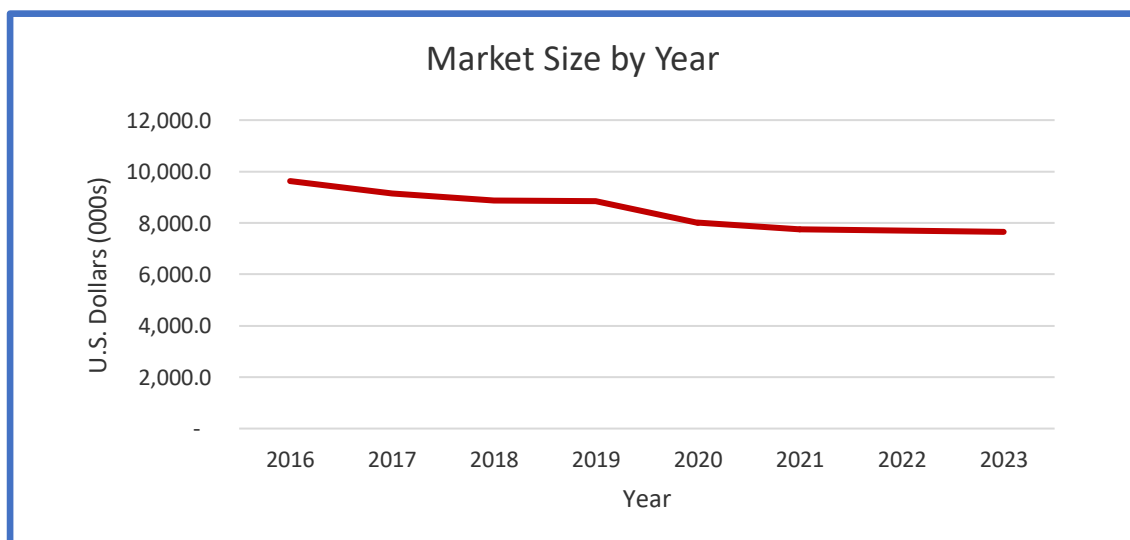
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in Venezuela is estimated to be \$7.7 million dollars in 2022 and is expected to change by -0.7 percent from 2022 to 2023. The market will be 96.9 million Bolivars in 2022 and is forecast to change by 11.1 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Bolivars
2016	9,628.3	63,827.1
2017	9,145.5	67,559.2
2018	8,874.1	71,074.9
2019	8,859.6	76,934.2
2020	8,012.9	76,482.9
2021	7,750.8	87,206.2
2022	7,703.6	96,873.7
2023	7,652.1	107,612.9
2028	7,763.8	180,745.6
Y-to-Y Change	US Dollars	Bolivars
2016-2017	-5.0%	5.8%
2017-2018	-3.0%	5.2%
2018-2019	-0.2%	8.2%
2019-2020	-9.6%	-0.6%
2020-2021	-3.3%	14.0%
2021-2022	-0.6%	11.1%
2022-2023	-0.7%	11.1%
CAGR 2023-2028	0.3%	68.0%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# Venezuela

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in Venezuela will be \$0.79 million dollars in 2022 and the lease and rental payments for the market will be \$0.05 million dollars. The operating expenses for this market is expected to reach \$4.55 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	794.3
Operating Expenses (\$1,000)	4,554.9
Employer Costs for Fringe Benefits (\$1,000)	245.3
Contract Labor Costs including Temporary Help (\$1,000)	72.7
Cost of Health Insurance (\$1,000)	95.8
Taxes and License Fees (\$1,000)	23.5
Lease and Rental Payments (\$1,000)	46.4

### **Cost of Services Estimates**

The cost of advertising for this market in Venezuela will be \$0.02 million dollars in 2022 and the cost of professional services for the market will be \$0.04 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.06 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	8.9
Cost of Purchased Repair and Maintenance Services (\$1,000)	60.9
Cost of Purchased Communication Services (\$1,000)	6.3
Cost of Purchased Advertising and Promotional Services (\$1,000)	17.3
Cost of Purchased Professional & Technical Services (\$1,000)	39.7
Cost of Purchased Refuse & Waste Removal (\$1,000)	18.1

\*2021-2022 Forecasts

Source: Barnes Reports

# Vietnam

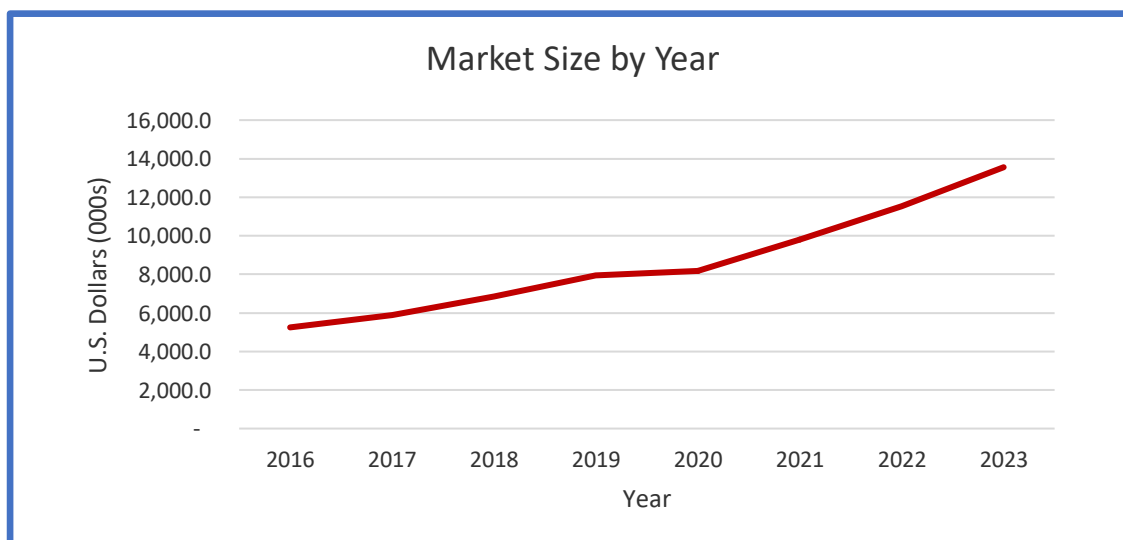
## Product/Service Type: 1,3-Propanediol (PDO)

The market for this equipment in Vietnam is estimated to be \$11.5 million dollars in 2022 and is expected to change by 17.6 percent from 2022 to 2023. The market will be 268594.4 million Dongs in 2022 and is forecast to change by 18.3 percent from 2022 to 2023.

Market Sales (000s)		
Year	US Dollars	Dongs
2016	5,247.6	118,967,339.0
2017	5,874.4	131,410,023.3
2018	6,859.9	155,047,769.5
2019	7,934.4	182,890,712.4
2020	8,178.0	188,219,503.9
2021	9,802.6	226,969,158.0
2022	11,530.8	268,594,435.8
2023	13,555.6	317,661,440.6
2028	31,934.2	771,176,045.1
Y-to-Y Change	US Dollars	Dongs
2016-2017	11.9%	10.5%
2017-2018	16.8%	18.0%
2018-2019	15.7%	18.0%
2019-2020	3.1%	2.9%
2020-2021	19.9%	20.6%
2021-2022	17.6%	18.3%
2022-2023	17.6%	18.3%
CAGR 2023-2028	27.1%	142.8%

Source: Barnes Reports

\*2021-2022 Forecasts; 2023-2028 Projections



# Vietnam

## **Product/Service Type: 1,3-Propanediol (PDO)**

### **Operating Costs Estimates**

The annual payroll for this market in Vietnam will be \$1.19 million dollars in 2022 and the lease and rental payments for the market will be \$0.07 million dollars. The operating expenses for this market is expected to reach \$6.82 million dollars in 2022.

<b>2022 Operating Costs</b>	<b>US Dollars (000s)</b>
Annual Payroll (\$1,000)	1,189.0
Operating Expenses (\$1,000)	6,817.8
Employer Costs for Fringe Benefits (\$1,000)	367.2
Contract Labor Costs including Temporary Help (\$1,000)	108.8
Cost of Health Insurance (\$1,000)	143.4
Taxes and License Fees (\$1,000)	35.1
Lease and Rental Payments (\$1,000)	69.5

### **Cost of Services Estimates**

The cost of advertising for this market in Vietnam will be \$0.03 million dollars in 2022 and the cost of professional services for the market will be \$0.06 million dollars. The cost of repair and maintenance for this market is expected to reach \$0.09 million dollars in 2022.

<b>2022 Cost of Services</b>	<b>US Dollars (000s)</b>
Cost of Purchased Computer Hardware & Software (\$1,000)	13.4
Cost of Purchased Repair and Maintenance Services (\$1,000)	91.1
Cost of Purchased Communication Services (\$1,000)	9.4
Cost of Purchased Advertising and Promotional Services (\$1,000)	25.8
Cost of Purchased Professional & Technical Services (\$1,000)	59.4
Cost of Purchased Refuse & Waste Removal (\$1,000)	27.1

\*2021-2022 Forecasts

Source: Barnes Reports

# Appendix

## ***Product/Service Type: 1,3-Propanediol (PDO)***

### **Number of Establishments**

#### General Definition

An establishment is a single physical location at which business is conducted and/or services are provided. It is not necessarily identical with a company or enterprise, which may consist of one establishment or more. Economic census figures represent a summary of reports for individual establishments rather than companies. For cases where a census report was received, separate information was obtained for each location where business was conducted. When administrative records of other Federal agencies were used instead of a census report, no information was available on the number of locations operated. Each economic census establishment was tabulated according to the physical location at which the business was conducted.

When two activities or more were carried on at a single location under a single ownership, all activities generally were grouped together as a single establishment. The entire establishment was classified on the basis of its major activity and all data for it were included in that classification. However, when distinct and separate economic activities (for which different industry classification codes were appropriate) were conducted at a single location under a single ownership, separate establishment reports for each of the different activities were obtained in the census.

#### Sector-Specific Information

**Construction sector.** Establishments are defined as a relatively permanent office or other place of business where the usual business activities related to construction are conducted. Establishments do not represent each project or construction site. Includes all establishments that were in business at any time during the year. It covers all full-year and part-year operations. Construction establishments which were inactive or idle for the entire year were not included. Establishments are based on a survey which included all large employers and a sample of the smaller ones.

**Information; Professional, Scientific, and Technical Services; Administrative and Support and Waste Management and Remediation Services; Educational Services; Health Care and Social Assistance; Arts, Entertainment, and Recreation; and Other Services (Except Public Administration) sectors.** An establishment is included in the census if it is an employer, the establishment has \$1,000 in payroll, and was in operation at any time during 1997. Leased service departments (separately owned businesses operated as departments or concessions of other service establishments or of retail businesses, such as a separately owned shoeshine parlor in a barber shop, or a beauty shop in a department store) are treated as separate service establishments for census purposes. Leased retail departments located in service establishments (e.g., a gift shop located in a hotel) are considered separate retail establishments.

**Manufacturing sector.** Includes all manufacturing establishments (plants) with one employee or more and establishments in operation at any time during the year.

**Mining sector.** Includes all mineral establishments with one employee or more and establishments in operation at any time during the year. Establishments in the crude petroleum and natural gas and support activities for mining represent statewide operations rather than those at a single physical location.

**Real Estate and Rental and Leasing sector.** Data for individual properties leased or managed by property lessors or property managers are not normally considered separate establishments, but rather the permanent offices from which the properties are leased or managed are considered establishments. Data for separate automotive rental offices or concessions (e.g., airport locations) in the same metropolitan area for which a common fleet of cars is maintained are merged together and not considered as separate establishments.

**Retail Trade sector.** Leased departments are treated as separate establishments and are classified according to the kind of business they conduct. For example, a leased department selling shoes within a department store would be considered a separate retail establishment under the "shoe stores" classification.

**Accommodation and Foodservices sector.** Leased departments are treated as separate establishments and are classified according to the kind of business they conduct. For example, a leased department selling gifts/souvenirs within a hotel would be considered a separate retail establishment under the "gift, novelty, and souvenir stores" classification.

**Auxiliaries sector.** In the Standard Industrial Classification (SIC) system, auxiliary establishments (i.e., those establishments primarily serving other establishments of the same enterprise) were classified in

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# Appendix

industry of the establishments served. In the North American Industry Classification System (NAICS), auxiliary establishments are classified according to the services performed rather than the industry served.

## Sales, Shipments, Receipts, Revenue, or Business Done

### General Definition

Includes the total sales, shipments, receipts, revenue, or business done by establishments within the scope of the economic census. The definition of each of these items is included in the information provided below.

### Sector-Specific Information

**Construction sector** - Includes the value of construction work and other business receipts for work done by establishments during the year. Included is new construction, additions and alterations or reconstruction, and maintenance and repair construction work. Also included is the value of any construction work done by the reporting establishments for themselves.

Speculative builders were instructed to include the value of buildings and other structures built or being built for sale in the current year but not sold. They were to include the costs of such construction plus normal profit. Also included is the cost of construction work done on buildings for rent or lease.

Establishments engaged in the sale and installation of such construction components as plumbing, heating, and central air-conditioning supplies and equipment; lumber and building materials; paint, glass, and wallpaper; electrical and wiring supplies; and elevators or escalators were instructed to include both the value for the installation and the receipts covering the price of the items installed.

Excluded was the cost of industrial and other specialized machinery and equipment, which are not an integral part of a structure.

**Finance and Insurance sector** - Includes revenue from all business activities whether or not payment was received in the census year, including commissions and fees from all sources, rents, net investment income, interest, dividends, royalties, and net insurance premiums earned. Revenue from leasing property marketed under operating leases is included, as well as interest earned from property marketed in the census year under capital, finance, or full payout leases. Revenue also includes the total value of service contracts and amounts received for work subcontracted to others.

Revenue does not include sales and other taxes collected from customers and remitted directly by the firm to a local, state, or Federal tax agency.

**Information sector** - Includes receipts from customers or clients for services rendered, from the use of facilities, and from merchandise sold, whether or not payment was received. Receipts include royalties, license fees, and other payments from the marketing of intangible products (e.g., licensing the use of or granting reproduction rights for software, musical compositions, and other intellectual property). Receipts also include the rental and leasing of vehicles, equipment, instruments, tools, etc.; total value of service contracts; market value of compensation received in lieu of cash; amounts received for work subcontracted to others; dues and assessments for members and affiliates; this establishment's share of receipts from departments, concessions, and vending and amusement machines operated by others. Receipts from services provided to foreign customers from U.S. locations, including services performed for foreign parent firms, subsidiaries, and branches are included. For public broadcast stations and libraries, include receipts from contributions, gifts, grants, and income from interest, rental of real estate, and dividends.

Receipts DO NOT include sales and other taxes collected directly from customers or clients and paid directly to a local, state, or Federal tax agency. Also excluded are gross receipts collected on behalf of others; gross receipts or departments or concessions operated by others; sales of used equipment previously rented or leased to customers; proceeds from the sale of real estate (land and buildings), investments, or other assets (except inventory held for resale); contributions, gifts, grants, and income from interest, rental of real estate, and dividends EXCEPT for public broadcast stations and libraries; domestic intracompany transfers; receipts of foreign subsidiaries; and other nonoperating income.

**Management of Companies and Enterprises sector**- For holding companies, revenue includes revenue of only the holding company establishment, including net investment income, interest, and dividends.

**Manufacturing sector** - Covers the received or receivable net selling values, f.o.b. plant (exclusive of freight and taxes), of all products shipped, both primary and secondary, as well as all miscellaneous receipts, such as receipts for contract work performed for others, installation and repair, sales of scrap, and sales of products bought and resold without further processing. Included are all items made by or for the establishments from materials owned by it, whether sold, transferred to other plants of the same company, or shipped on consignment. The net selling value of products made in one plant on a contract basis from materials owned by another was reported by the plant providing the materials.

In the case of multiunit companies, the manufacturer was requested to report the value of products

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transferred to other establishments of the same company at full economic or commercial value, including not only the direct cost of production but also a reasonable proportion of "all other costs" (including company overhead) and profit.

**Mining sector** - Includes the net selling values, f.o.b. mine or plant after discounts and allowances, excluding freight charges and excise taxes. Shipments includes all products physically shipped from the establishment during the year, including material withdrawn from stockpiles and products shipped on consignment, whether or not sold in the current year. Prepared material or concentrates includes preparation from ores mined at the same establishment, purchased, received from other operations of the same company, or received for milling on a custom or toll basis. For products transferred to other establishments of the same company or prepared on a custom basis, companies were requested to report the estimated value, not merely the cost of producing the items. Multiestablishment companies were asked to report value information for each establishment as if it were a separate economic unit. They were instructed to report the value of all products transferred to other plants of the company at their full economic value; to include, in addition to direct cost of production, a reasonable proportion of company overhead and profits. For all establishments classified in an industry, value of shipments and receipts includes (1) the value of all primary products of the industry; (2) the value of secondary products which are primary to other industries; (3) the receipts for contract work done for others, except custom milling; and (4) the value of products purchased and resold without further processing. Receipts for custom milling are not included to avoid duplication with the value of custom milled ores included in an industry's primary and secondary products. Some duplication exists in industry and industry group totals because of the inclusion of materials transferred from one establishment to another for mineral preparation or resale.

**Professional, Scientific, and Technical Services; Administrative and Support and Waste Management and Remediation Services; Educational Services; Health Care and Social Assistance; Arts, Entertainment, and Recreation; and Other Services (Except Public Administration) sectors - TAXABLE ESTABLISHMENTS:** Includes receipts from customers or clients for services rendered, from the use of facilities, and from merchandise sold whether or not payment was received. For advertising agencies, travel industries, and other service establishments operating on a commission basis, receipts include commissions, fees, and other operating income, NOT gross billings and sales. Excise taxes on gasoline, liquor, tobacco, etc., which are paid by the manufacturer or wholesaler and passed on in the cost of goods purchased by the service establishment are also included. The establishments share of receipts from departments, concessions, and vending and amusement machines operated by others are included as part of receipts. Receipts also include the total value of service contracts, market value of compensation received in lieu of cash, amounts received for work subcontracted to others, and dues and assessments from members and affiliates. Receipts from services provided to foreign customers from U.S. locations, including services preformed for foreign parent firms, subsidiaries, and branches are included.

Receipts are net after deductions for refunds and allowances for merchandise returned by customers. Receipts DO NOT include sales, occupancy, admissions, or other taxes collected from customers and remitted directly by the firm to a local, state, or Federal tax agency, nor do they include income from such sources as contributions, gifts, and grants; dividends, interest, and investments; or sale or rental of real estate. Also excluded are receipts (gross) of departments and concessions which are operated by others; sales of used equipment rented or leased to customers; domestic intracompany transfers; receipts of foreign subsidiaries; and other nonoperating income, such as royalties, franchise fees, etc. Receipts DO NOT include service receipts of manufacturers, wholesalers, retail establishments, or other businesses whose primary activity is other than service. They do, however, include receipts other than from services rendered (e.g., sale of merchandise to individuals or other businesses) by establishments primarily engaged in performing services and classified in the service industries.

**TAX EXEMPT ESTABLISHMENTS:** Includes revenue from customers or clients for services rendered and merchandise, whether or not payment was received, and gross sales of merchandise, minus returns and allowances. Also included are income from interest, dividends, gross rents (including display space rentals and share of receipts from departments operated by other companies), gross contributions, gifts, grants (whether or not restricted for use in operations), royalties, dues and assessments from members and affiliates, commissions earned from the sale of merchandise owned by others (including commissions from vending machine operators), and gross receipts from fundraising activities. Receipts from taxable business activities of firms exempt from Federal income tax (unrelated business income) are also included in revenue. Revenue DOES NOT include sales, admissions, or other taxes collected by the organization from customers or clients and paid directly to a local, state, or Federal tax agency; income from the sale of real estate, investments, or other assets (except inventory held for resale); gross receipts of departments, concessions, etc., that are operated by others; and amounts transferred to operating funds from capital or reserve funds.

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**Real Estate and Rental and Leasing sector** - Includes revenue from all business activities whether or not payment was received in the census year, including commissions and fees from all sources, rents, net investment income, interest, dividends, and royalties. Revenue from leasing property marketed under operating leases is included. Revenue also includes the total value of service contracts, amounts received for work subcontracted to others, and rents from real property sublet to others.

Revenue does not include sales and other taxes collected from customers and remitted directly by the firm to a local, state, or Federal tax agency.

**Retail Trade sector** - Includes merchandise sold for cash or credit at retail and wholesale by establishments primarily engaged in retail trade; amounts received from customers for layaway purchases; receipts from rental of vehicles, equipment, instruments, tools, etc.; receipts for delivery, installation, maintenance, repair, alteration, storage, and other services; the total value of service contracts; and gasoline, liquor, tobacco, and other excise taxes which are paid by the manufacturer or wholesaler and passed on to the retailer.

Sales are net after deductions for refunds and allowances for merchandise returned by customers. Trade-in allowances are not deducted from sales. Sales do not include carrying or other credit charges; sales (or other) taxes collected from customers and forwarded to taxing authorities; gross sales and receipts of departments or concessions operated by other companies; and commissions or receipts from the sale of government lottery tickets.

Sales do not include retail sales made by manufacturers, wholesalers, service establishments, or other businesses whose primary activity is other than retail trade. They do include receipts other than from the sale of merchandise at retail, e.g., service receipts, sales to industrial users, and sales to other retailers, by establishments primarily engaged in retail trade.

**Transportation and Warehousing sector** - Includes revenue from all business activities whether or not payment was received in the census year, including commissions and fees for arranging the transportation of freight.

Revenue does not include sales and other taxes collected from customers and remitted directly by the firm to a local, state, or Federal tax agency.

**Utilities sector** - Includes revenue from all business activities whether or not payment was received in the census year.

Revenue does not include sales and other taxes collected from customers and remitted directly by the firm to a local, state, or Federal tax agency.

**Accommodation and Foodservices sector** - Includes sales from customers for services rendered, from the use of facilities, and from merchandise sold. Also includes dues and assessments from members and affiliates.

Sales do not include carrying or other credit charges; sales (or other) taxes collected from customers and forwarded to taxing authorities; gross sales and receipts of departments or concessions operated by other companies; and commissions or receipts from the sale of government lottery tickets.

Excludes sales from civic and social organizations, amusement and recreation parks, theaters, and other recreation or entertainment facilities providing food and beverage services.

## Number of Employees

### General Definition

Paid employees consists of full-time and part-time employees, including salaried officers and executives of corporations. Included are employees on paid sick leave, paid holidays, and paid vacations; not included are proprietors and partners of unincorporated businesses. The definition of paid employees is the same as that used on IRS Form 941.

### Sector-Specific Information

**Construction and Manufacturing sectors.** Comprises all full-time and part-time employees on the payrolls of establishments who worked or received pay for any part of the pay period including the 12th of March, May, August, and November, divided by 4.

**Finance and Insurance sector.** Includes all employees who were on the payroll during the pay period including March 12. Excludes independent (nonemployee) agents.

**Information; Professional, Scientific, and Technical Services; Administrative and Support and Waste Management and Remediation Services; Educational Services; Health Care and Social Assistance; Arts, Entertainment, and Recreation; and Other Services (Except Public Administration) sectors** - Includes all employees who were on the payroll during the pay period including March 12. Includes members of a professional service organization or association which operates under state professional corporation statutes and files a corporate Federal income tax return. Excludes employees of departments or concessions operated by other companies at the establishment.

**Management of Companies and Enterprises sector.** Includes all employees who were on the payroll during the pay period including March 12.



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Mining sector. Also included are employees working for miners paid on a per ton, car, or yard basis. Excluded are employees at the mine but on the payroll of another employer (such as employees of contractors) and employees at company stores, boardinghouses, bunkhouses, and recreational centers. Also excluded are members of the Armed Forces and pensioners carried on the active rolls but not working during the period. Includes all employees who were on the payroll during the pay period including March 12.

Real Estate and Rental and Leasing sector. Includes all employees who were on the payroll during the pay period including March 12. Excludes independent (nonemployee) agents.

Retail Trade and Accommodation and Foodservices sectors. Includes all employees on the payroll during the pay period including March 12. Excludes employees of departments or concessions operated by other companies at the establishment.

Transportation and Warehousing sector. Includes all employees who were on the payroll during the pay period including March 12.

Utilities sector. Includes all employees who were on the payroll during the pay period including March 12.