

# *The Energy Savings & Performance Gains between two Conveyor Drive Designs.*

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*Presented by:*

**Alex Kanaris, President**

# Agenda

- Speaker Biography
- Introduction
- Objectives
- What is a **Drum Motor**?
- Trends in Machine Design
- Industry Challenges
- Energy & Cost Comparison
- The **Drum Motor** vs. Conventional Drive
- Why the **Drum Motor** is a **Better way to go**?
- Q&A



# Speaker Biography

- Founder Alex Kanaris, President of Van der Graaf since 1985.
- Electrical engineer specializing in electric motor designs.
- Working in electrical motor designs AC & DC up to 6,000 horsepower since 1980.
- Holds 26 patents in electrical & mechanical designs in the conveyor industry.
- Supplying and consulting OEM's for over 35 years in the bulk & material handling industries such as FedEx, UPS, Tyson, CEMEX, Walmart, American Airlines among others.



# Introduction

We are here today to talk about the ***Energy Savings & Performance Gains between two Conveyor Drive Designs.***

Van der Graaf for the past 30 years have been manufacturing the ultimate conveyor drive (**drum motor**) that addresses mechanical and electrical efficiency, operators safety, and maintenance.



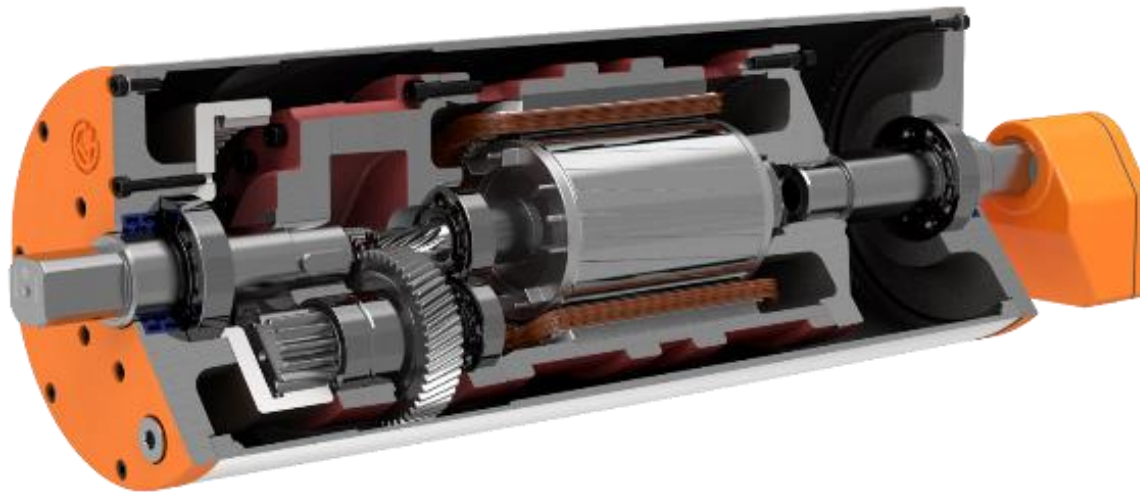
# Objectives

- **Drum Motors** have significant efficiency gains over most conventional conveyor drives.
- Mechanical losses lead to significant increase in operating cost.



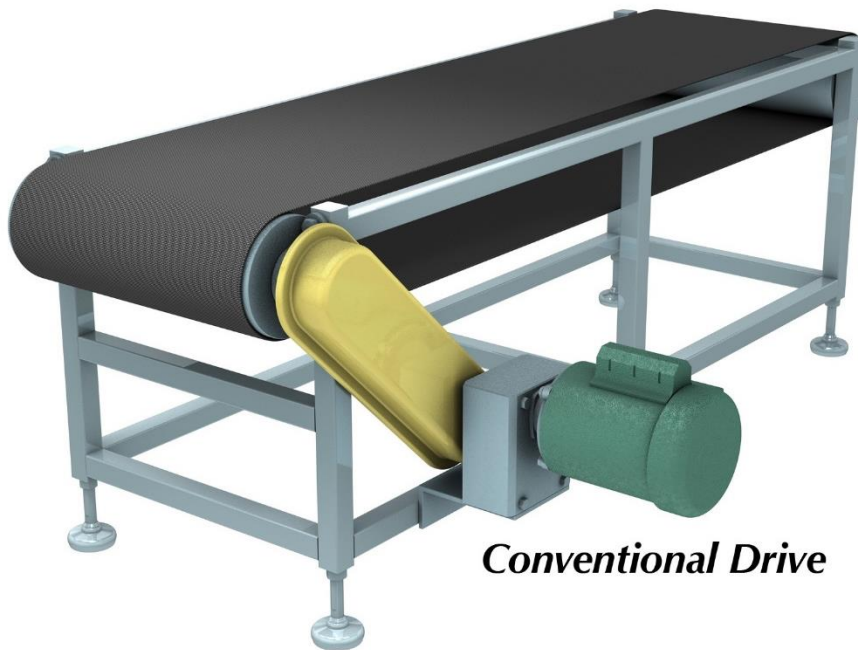
# What is a Drum Motor?

The **drum motor** features an inline parallel gear reducer, couple to a high efficiency electric motor, enclosed in the drum, bathed in oil, not requiring scheduled maintenance, boasting 96% mechanical efficiency.

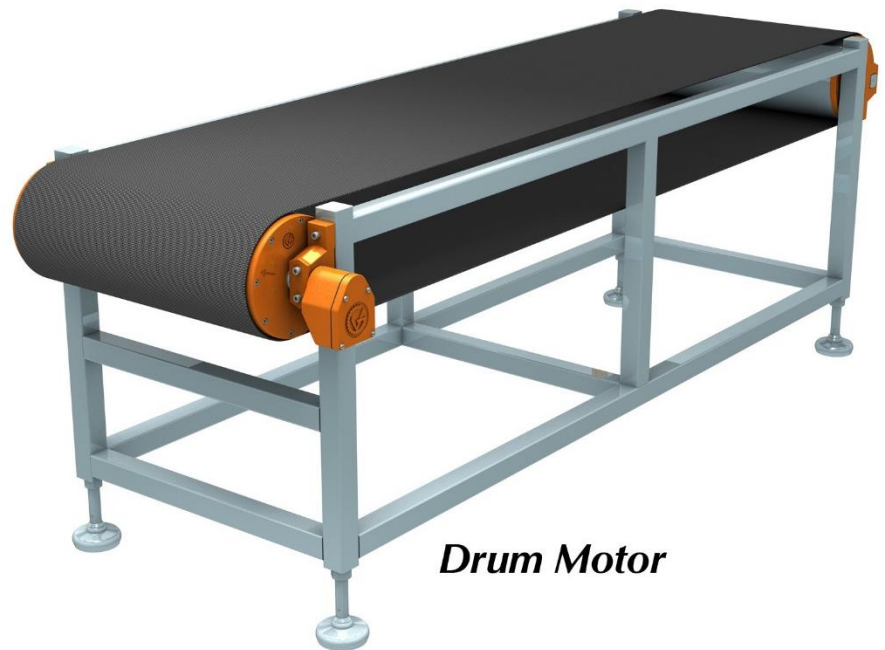


# Trends in Machine Design

- Trends in machine design: high-performance, low energy consumption.
- Trend moving towards **high efficiency electric motors**.



*Conventional Drive*

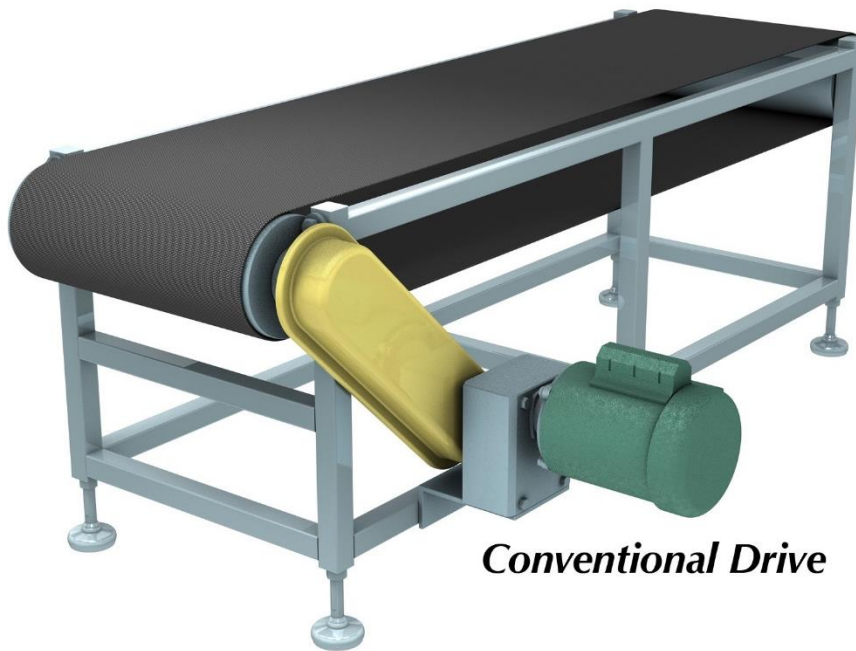


*Drum Motor*

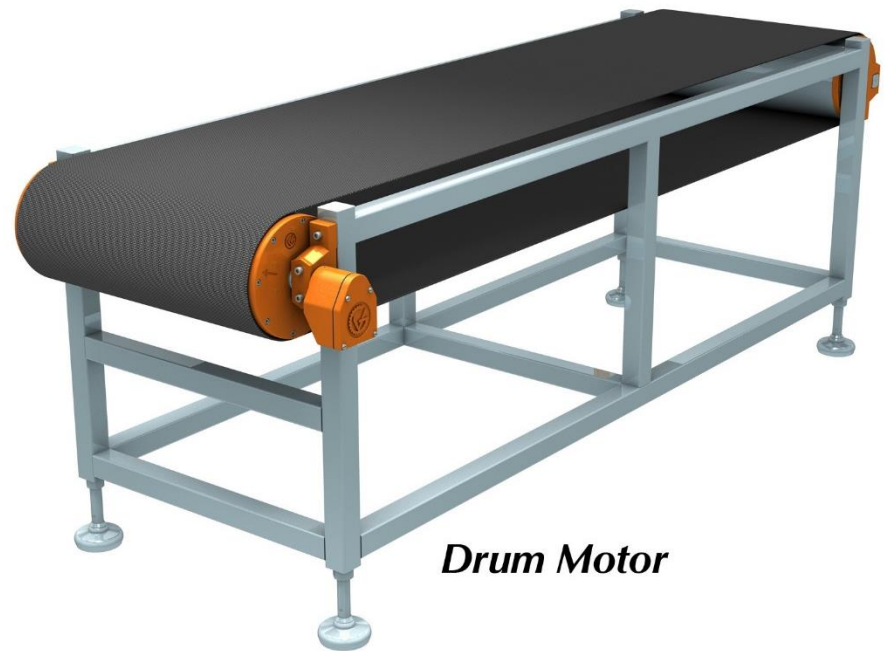


# Trends in Machine Design

- Standard electric motor efficiency is typically 86%.
- High efficiency electric motors can be efficient up to 92%.
- Most of the gains to be had are not in the electric motor.



*Conventional Drive*

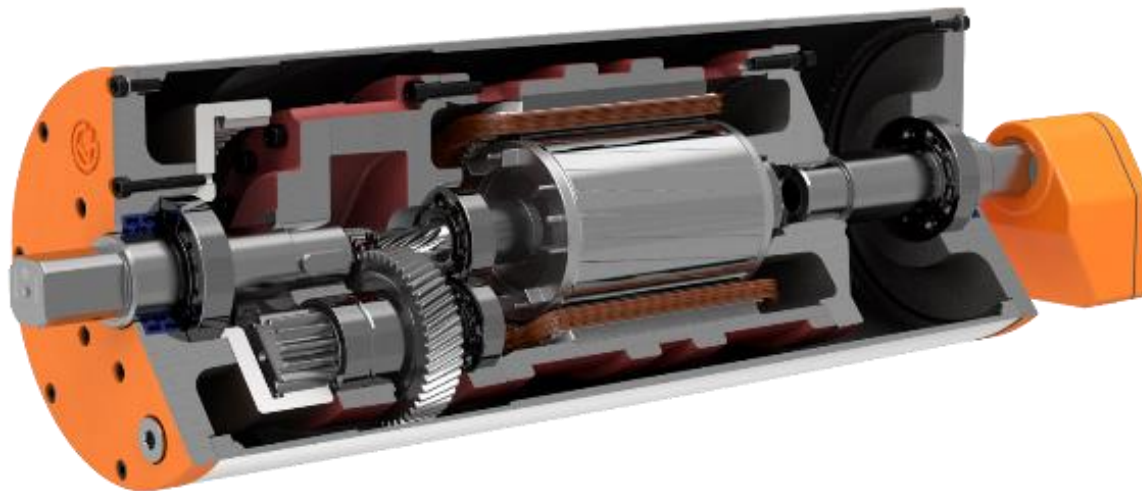


*Drum Motor*



# Industry Challenges

- Decrease energy cost, increase performance.
- The most efficient gear reducer design: inline gear reduction (2% per stage).
- Most commonly used gear reducer is the worm gear reducer.

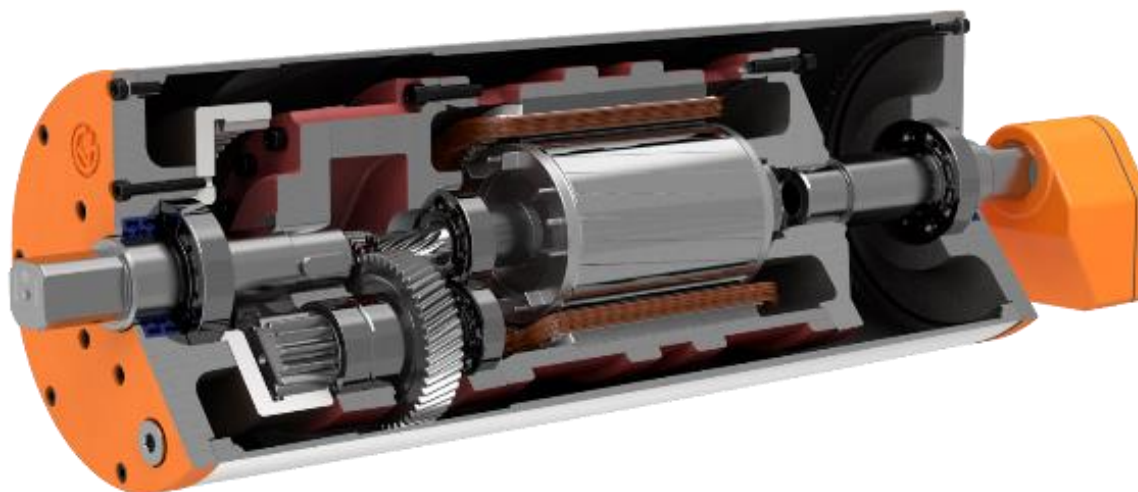


# Industry Challenges

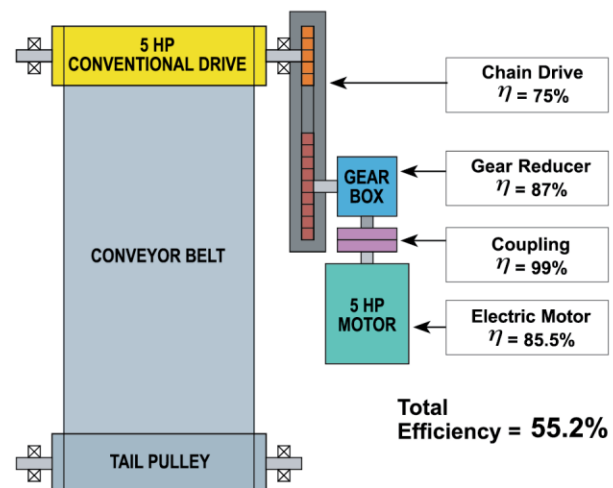
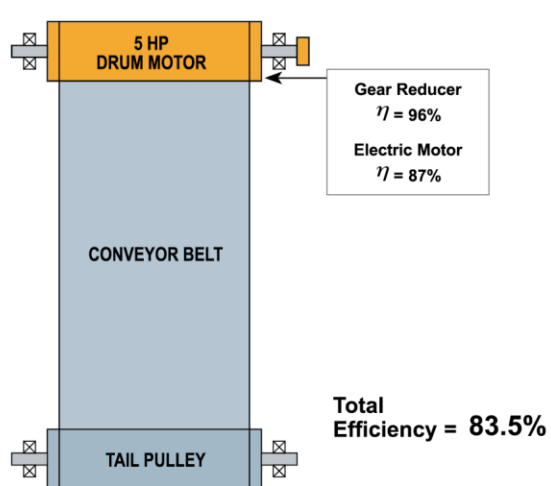
- This is the least efficient configuration

## Worm-Gear Reducer vs. All Other Conventional Solutions

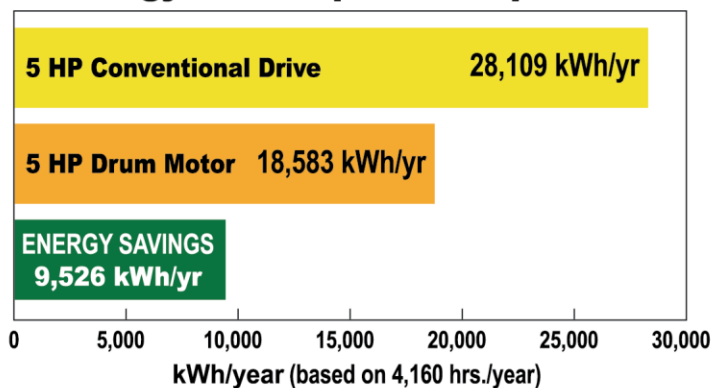
Advantages	Disadvantages
Low Cost	Low efficiency
Compact	High energy cost



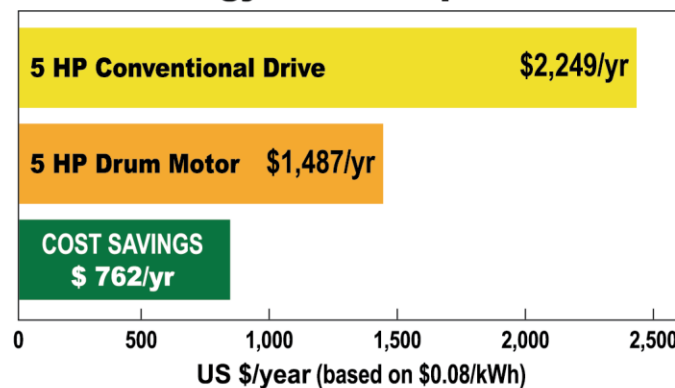
# Energy & Cost Comparison



## Energy Consumption Comparison



## Energy Cost Comparison



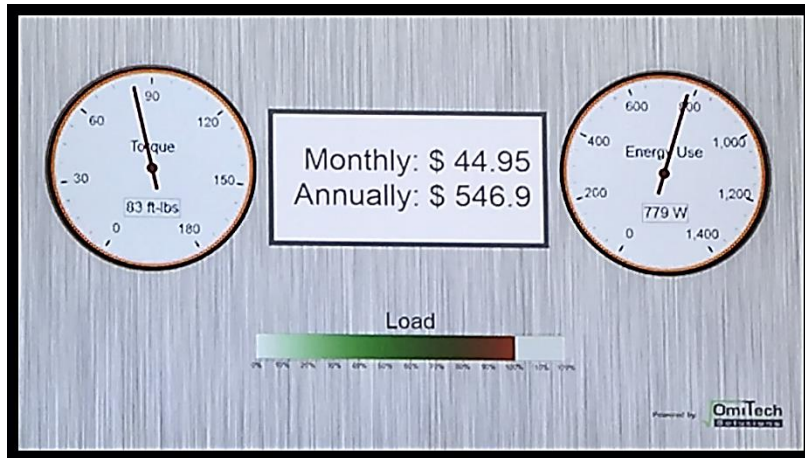
# The Drum Motor vs. Conventional Drive

An efficiency demonstration unit has been designed to demonstrate the energy savings operating a belt conveyor with a **drum motor** verses a belt conveyor that is running with a conventional 90 degree gear reducer.

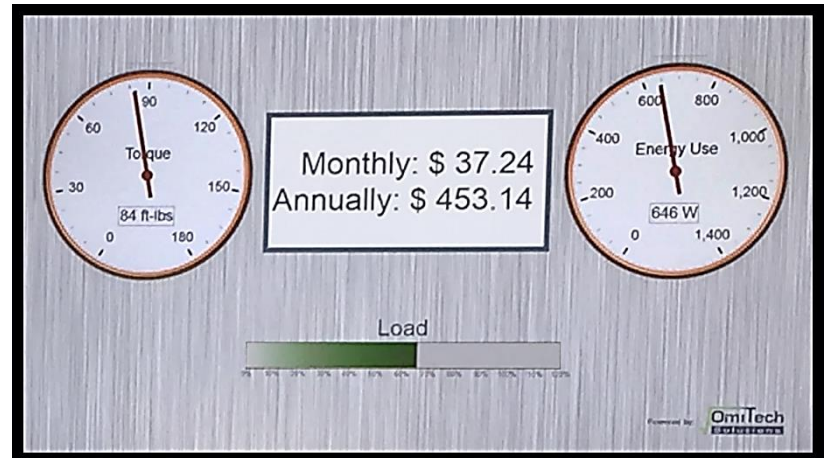


# The Drum Motor vs. Conventional Drive

To simulate the load in both conveyors we provide loading by using two dynamometers, one for each conveyor. In order to achieve accurate readings, the possibility of conveyor belt slippage had to be eliminated.



*Conventional Drive*

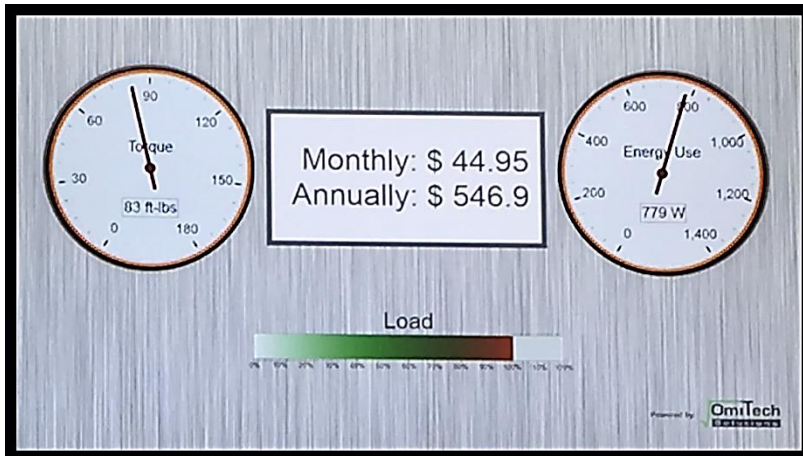


*Drum Motor*

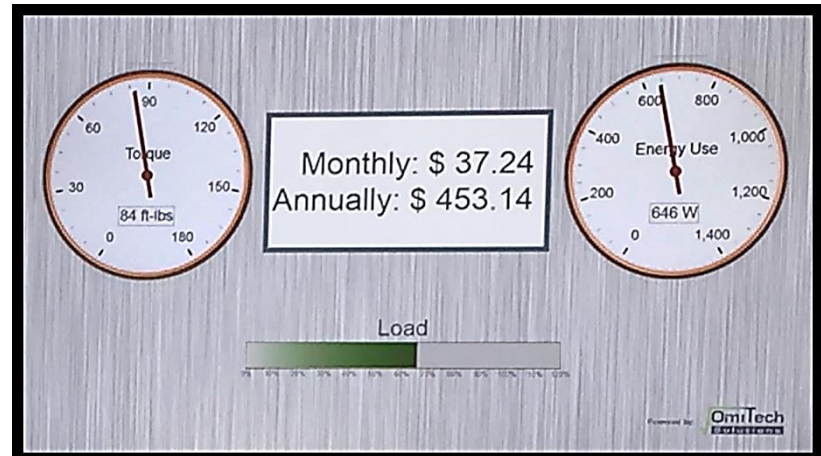


# Why the Drum Motor is a Better way to go?

For that reason cleated belts along with the flat belts, are used to positive lock the drive rollers with the dynamometers. Adjusting the load on the conveyors is achieved by increasing or reducing the D.C voltage to the dynamometers.



*Conventional Drive*

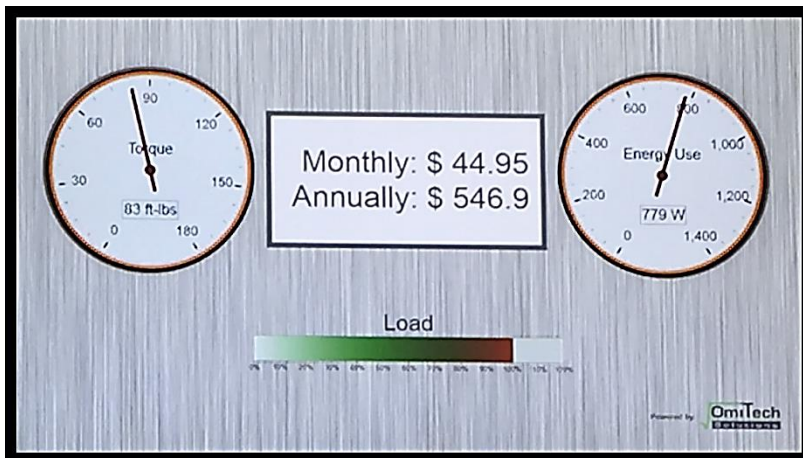


*Drum Motor*

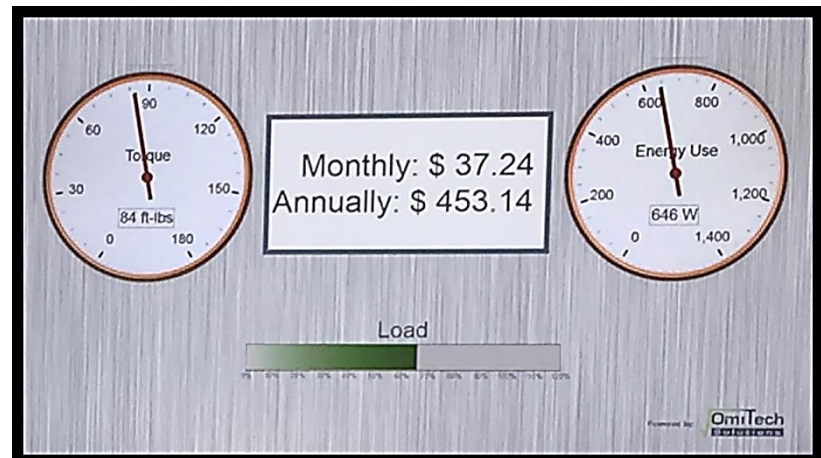


# Why the Drum Motor is a Better way to go?

As the conveyor load increases the load cells were the drive rollers are mounted on will record the amount of energy each drive is using to move the respective loads.



*Conventional Drive*



*Drum Motor*

# Q&A



## ***For More Information:***

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