Pressure Vessel Cost Calculator - Desktop App Setup

📋 Prerequisites

1. **Python 3.8 or higher** installed on your system
2. **pip** package manager (comes with Python)

🚀 Quick Setup & Run

Option 1: Run from Source (Recommended for Development)

1. **Download the files:**
   - Save `pressure_vessel_app.py` (main application file)
   - Save `requirements.txt` (dependencies)

2. **Install dependencies:**

   bash

   ```bash
   pip install -r requirements.txt
   ```

3. **Run the application:**

   bash

   ```bash
   python pressure_vessel_app.py
   ```

Option 2: Create Executable (For Distribution)

1. **Install PyInstaller:**

   bash

   ```bash
   pip install pyinstaller
   ```

2. **Create the executable: For Windows:**

   bash

   ```bash
   pyinstaller --onefile --windowed --name "PressureVesselCalculator" --icon=app.ico p
   ```

   For macOS/Linux:

   bash

   ```bash
   pyinstaller --onefile --windowed --name "PressureVesselCalculator" pressure_vessel_
   ```

3. **Find your executable:**

- Windows: `dist/PressureVesselCalculator.exe`
- macOS: `dist/PressureVesselCalculator.app`
- Linux: `dist/PressureVesselCalculator`

🎯 App Features

✅ What the App Does:

- **Modern UI** with CustomTkinter for professional appearance
- **Cross-platform** compatibility (Windows, macOS, Linux)
- **File upload** via browse dialog
- **AI-powered cost estimation** using OpenAI API
- **Automatic Excel generation** with detailed cost breakdown
- **Progress tracking** with real-time status updates
- **Settings persistence** (remembers your API key and preferences)

🤖 AI Modes:

- **Budget Mode** (~$0.10/analysis) - Cost-optimized AI processing
- **Full Mode** (~$0.25/analysis) - Comprehensive AI analysis

📊 Output:

- Professional Excel cost calculator
- Material cost breakdown
- AI-estimated service costs
- Market analysis and recommendations
- Data validation with confidence scores

🗂 File Structure

```
project/
├── pressure_vessel_app.py    # Main application
├── requirements.txt          # Python dependencies
├── README.md                 # This file
└── dist/                     # Built executables (after building)
    ├── PressureVesselCalculator.exe    # Windows
    ├── PressureVesselCalculator.app    # macOS
    └── PressureVesselCalculator        # Linux
```

🔧 Build Script (Advanced)

Create `build.py` for automated building:

```python
import subprocess
import sys
import os

def build_app():
    """Build the application for current platform"""
    try:
        # Install dependencies
        print("Installing dependencies...")
        subprocess.run([sys.executable, "-m", "pip", "install", "-r", "requirements.tx

        # Install PyInstaller
        subprocess.run([sys.executable, "-m", "pip", "install", "pyinstaller"], check=

        # Build command
        cmd = [
            "pyinstaller",
            "--onefile",
            "--windowed",
            "--name", "PressureVesselCalculator",
            "pressure_vessel_app.py"
        ]

        # Add icon if exists
        if os.path.exists("app.ico"):
            cmd.extend(["--icon", "app.ico"])

        print("Building executable...")
        subprocess.run(cmd, check=True)

        print("✅ Build completed! Check the 'dist' folder.")

    except subprocess.CalledProcessError as e:
        print(f"❌ Build failed: {e}")

if __name__ == "__main__":
    build_app()
```

Run with: `python build.py`

🎨 Customization Options

Change App Appearance:

```python
# In pressure_vessel_app.py, modify these lines:
ctk.set_appearance_mode("Dark")     # "System", "Dark", "Light"
ctk.set_default_color_theme("green") # "blue", "green", "dark-blue"
```

Add App Icon:

1. Create an `app.ico` file (Windows) or `app.png` (macOS/Linux)

2. Modify the PyInstaller command to include `--icon=app.ico`

Modify Window Size:

```python
# In the __init__ method:
self.root.geometry("1000x800")  # width x height
```

🔑 Getting OpenAI API Key

1. Visit: https://platform.openai.com/api-keys

2. Sign up/login to OpenAI

3. Create a new API key

4. Copy and paste into the app

Cost estimates:

- Budget Mode: ~$0.10 per vessel analysis

- Full Mode: ~$0.25 per vessel analysis

- Monthly budget for 20 vessels: $2-5

🚨 Troubleshooting

Common Issues:

1. "Module not found" errors:

```bash
pip install --upgrade pip
pip install -r requirements.txt
```

2. PyInstaller build fails:

```bash
pip install --upgrade pyinstaller
# Try building without --windowed flag first
pyinstaller --onefile pressure_vessel_app.py
```

3. App crashes on startup:

- Check Python version (3.8+ required)
- Verify all dependencies are installed
- Run from terminal/command prompt to see error messages

4. OpenAI API errors:

- Verify API key is correct
- Check account has sufficient credits
- Ensure internet connection is stable

Windows-specific:

- If antivirus blocks the executable, add an exception
- Run as administrator if file access issues occur

macOS-specific:

- Allow app in System Preferences > Security & Privacy
- Install Python from python.org (not system Python)

Linux-specific:

- Install tkinter: `sudo apt-get install python3-tk`
- Install development headers: `sudo apt-get install python3-dev`

📞 Support

For issues:

1. Check that all files are in the same directory
2. Verify Python version: `python --version`
3. Check installed packages: `pip list`
4. Run from terminal to see detailed error messages

🎯 Next Steps

1. **Test the app** with a sample PDF
2. **Customize appearance** if desired
3. **Build executable** for distribution
4. **Share with team** - no Python installation required for end users!

The executable file can be distributed to users without requiring them to install Python or any dependencies.