

Snap-Pipes

Re-Imagining Undergrounding
Helping Mitigate Climate Risk
Reducing Time and Cost of Undergrounding



1. Re-Imagining Undergrounding

Process Simplification

Snap-Pipes

Current Method

Escalating Costs

Individual Project Planning
Individual Project Engineering
Construction Standards
Construction Management:
Trench Fill Materials
Heavy Equipment
Scheduling Skilled Labour
Long Lead Time
Complex Inventory Management

Centralized Effort

~~Individual Project Planning~~
~~Individual Project Engineering~~
New Construction Standards
Construction Management:
~~Trench Fill Materials~~
~~Heavy Equipment~~
Plentiful Non-Skilled Labour
~~Long Lead Time~~
Simple Inventory Management

Field Empowerment

Declining Costs

Snap Pipes

All Terrain

Asphalt
Concrete
Rock
Clay
Loam
Sand
Marsh
Forest
Woods
Water
Snow
Ice

Backfill

Snap-Pipe

Snap-Pipes

Paid from Construction Savings



2. Re-Imagining Undergrounding

Improving Efficiency & Effectiveness in cabling



All Terrain

Asphalt
Concrete
Rock
Clay
Loam
Sand
Marsh
Forest
Woods
Water
Snow
Ice

Backfill

Snap-Pipe

Snap-Pipes

All Weather
All Terrain

- Single Solution
- Less Inventory
- Land + Water
- Global Use

No Heavy
Machinery

- Rental Savings
- Fuel Savings
- Job flexibility
- Use Hand tools

Env. Benefits
(CO2 tons/mile)

- Snap-Pipes->2.8
- Machines-> +++
- Fuel-> ++++
- Vegetation-> ++

Little or No
Excavation

- Surface Run
- Shallow Trench
- Time Saving
- Labour Saving

Eliminate "Fill"
Materials

- Sand
- Flagstone/Brick
Cover

Other Savings

- No Vegetation
Management
- Un-armoured
Cable

Snap-Pipes

Paid from Construction Savings

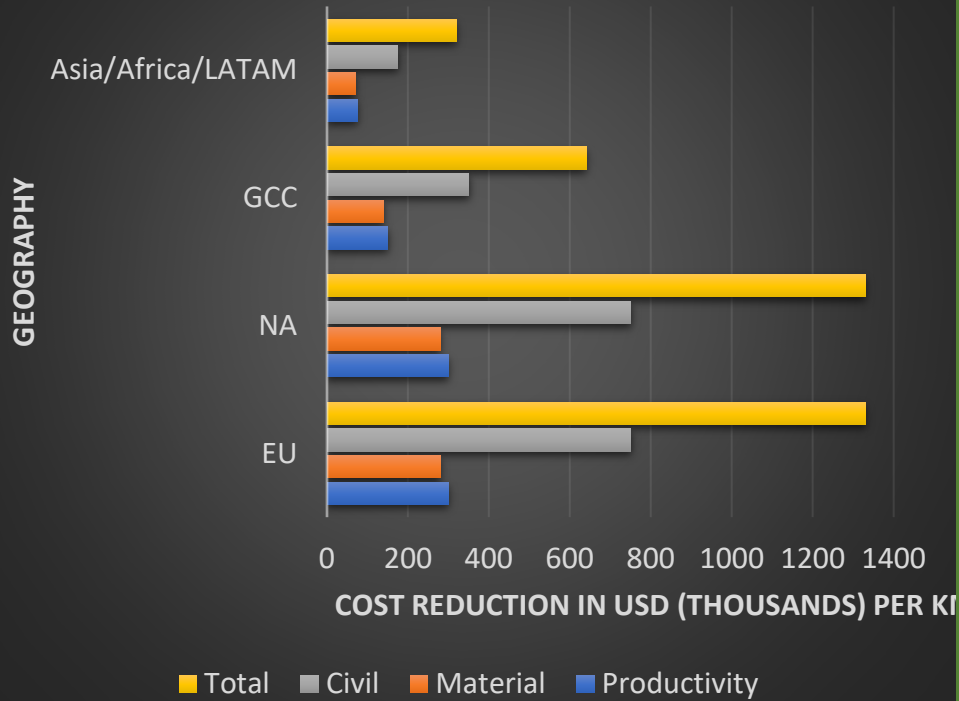


3. Re-Imagining Cost Reduction

Drastic Reduction in Civil Construction & Trenching Costs

Snap-Pipes

Potential Cost Reduction
Global Comparison (*)



Savings

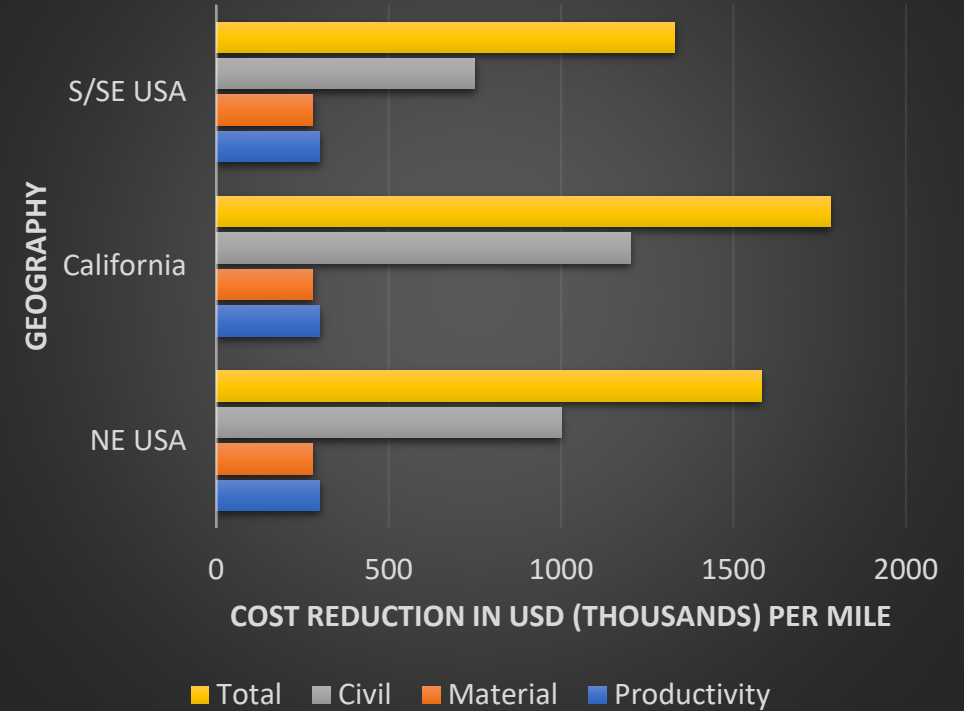
Planning
Material
Process
Labour
Equipment
Time

Other Savings

No Vegetation
Management

Easy cable
repair - open
at fault
location only

Potential Cost Reduction USA (*)
Base 3.8M\$/mile (2023)



(*) individual project cost reduction will depend on material and labour costs in each jurisdiction

(*) individual project cost reduction will depend on material and labour costs in each jurisdiction



Snap-Pipes

Paid from Construction Savings



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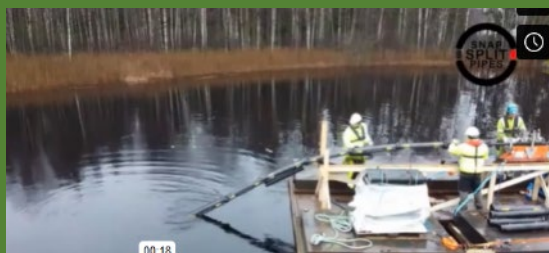
All-terrain - Single Solution

- **Flexible Split Pipe Interlocking System:**

- Recycled (PP-EPDM) Automotive Plastic (~2.8 t CO2-eq/mile)
- Ambient -40 to +55 ° C (-40° F to 135° F)
- UV & Impact Resistant
- Collar Flex 22/15/7 degrees (x-y-z planes)
- *Same Tests as Other Underground Electrical Pipes (EN 61386-24)*
- *Fire Resistance Coating available upon request*

- **Single System – Multiple Installation:**

- HV / MV / LV Cables (1C and 3C)
- Open only select fault location sections – Rest undisturbed
- *All-Topology - Above-Grade, Shallow Below-Grade; Underwater*
- *All Soils – Rocky, Clay, Sand. Forest, Marsh, Snow, Permafrost*
- *No Power Tools, Simple & Fast Operation*



Click View Button OR Click "Trust Document" in PDF to activate video



Cable Protection System | Biosirus Inc.



Cable Protection System | Biosirus Inc.



Cable Protection System | Biosirus Inc.

Best Value

Snap-Pipes

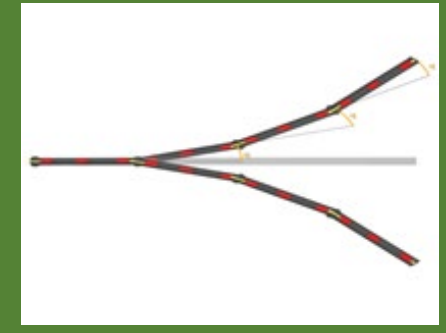


- High Fuel Costs
- Remote Distances
- Expensive Rentals
- Easy Scheduling

- Trade Special Labour
- High Labour Rates
- Project Delays
- Low Productivity

- Few Sizes
- All Terrain Application
- Outdoor/Site Storage

- Forest, Thicket
- Rock, Clay, Sand
- No Shoring
- Water Bodies



North America:

Snap-Pipes



Canada



Manitoba Hydro

- Little Grand Rapids, Family Lake, Manitoba
- 0.5 km (1640 ft) – Lake Crossing/Onshore



Hydro One

- Bancroft Lake Area. Ontario
- 1.2 km (0.75 miles); multiple shorelines



USA



PG&E

- Innovation Pitch Fest 2023 Winner
- Underground Category



Select Utilities

- Discussions
- HV/MV/LV Undergrounding of O/H lines



**Channel/Service
Partners**



European Union:

Snap-Pipes



Sweden



Wind Farms

- Aland (4.4 Km), Blakliden, Fäbodberget
- Stigshöjden – Above ground (4.4 Km)



Urban

- Tingsryd Town (just 0.35 m under asphalt)
- Above ground temporary construction cables (1.6 Km)



Above Ground

- Archipelago, Stockholm (0.8 Km)
- Lustån, Dalarna county - alongside railway tracks (2.3 Km)
- Jönköping – alongside railway tracks (700 m)



Sub-Sea / River / Under Water

- "Möcklö-Senoren" island, archipelago Karlskrona (850 m)
- "Alsterån" River Crossing, Kalmar County (50 m)
- Snäckö, east coast archipelago (1.65 Km)



Railway

- Above ground along railway tracks



Belgium



Floating Solar

- Port Oostende



France



Nuclear Plant

- Above Ground - Temporary Cable (2.5 Km)

Asia and Australia:

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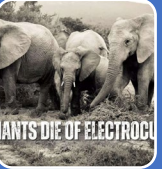


India



Tata Power

- Bend Restrictor - urban direct buried cables
- New Delhi and Mumbai (80m/263 ft)



Indian Utility Discussions

- Elephant electrocution prevention
- U/G of forest O/H line sections
- U/G of urban O/H line sections



Australia



Railways - Above Ground

- Perth Area – along railway tracks
- 5.5 km



**Channel/Service
Partners**



Middle East/GCC



Discussions:

HV/MV/LV & Solar PV Cable
Protection

Wide Product Range



Outer Dia.	Inner Dia.	Length(s)	Joint Angle	Weight
110 mm 4.33 in	102 mm 4.02 in	1200 mm 47.2 in	22.5 deg	1.7 Kg 3.75 lb
120 mm 4.73 in	110 mm 4.33 in	1200 mm 47.2 in	22.5 deg	2.7 Kg 5.95 lb
160 mm 6.3 in	150 mm 5.91 in	1200 mm 47.2 in	22.5 deg	3.1 Kg 6.83 lb



Outer Dia.	Inner Dia.	Length(s)	Joint Angle	Weight
60 mm 2.36 in	50 mm 1.97 in	1000 mm 39.4 in	15 deg	1.2 Kg 2.65 lb
110 mm 4.73 in	99 mm 3.89 in	1000 mm 39.4 in	15 deg	2.7 Kg 5.95 lb
160 mm 6.3 in	144 mm 5.67 in	1000 mm 39.4 in	15 deg	4.3 Kg 9.48 lb
220 mm 8.66 in	200 mm 7.87 in	1000 mm 39.4 in	15 deg	8.0 Kg 17.64 lb
110 mm 4.73 in	99 mm 3.89 in	220 mm 8.66 in	Straight Adaptor	0.3 Kg 0.66 lb
160 mm 6.3 in	144 mm 6.67 in	240 mm 9.45 in	Straight Adaptor	0.8 Kg 1.76 lb
110 mm 4.73 in	94 mm 3.7 in	1000 mm 39.4 in	15 deg	3.4 Kg 7.5 lb



Uni-Weights (Marine/Shore)



Ring Stiffness	Compression	Impact Test	Heat & UV Resistance	Material Evaluation
ISO 9969-2016	EN 61386-24	EN 61386-24	ISO 4892-3/527	ISO 14044
✓	✓	✓	✓	✓

Pipe Nom. Dia.	Length	Weight	Tie Down	
76 mm 3 in	890 mm 36 in	10-12+ kg 22-27+ lb.	2 straps	
101 mm 4 in	890 mm 36 in	18-20+ kg 40-45+ lb.	2 straps	

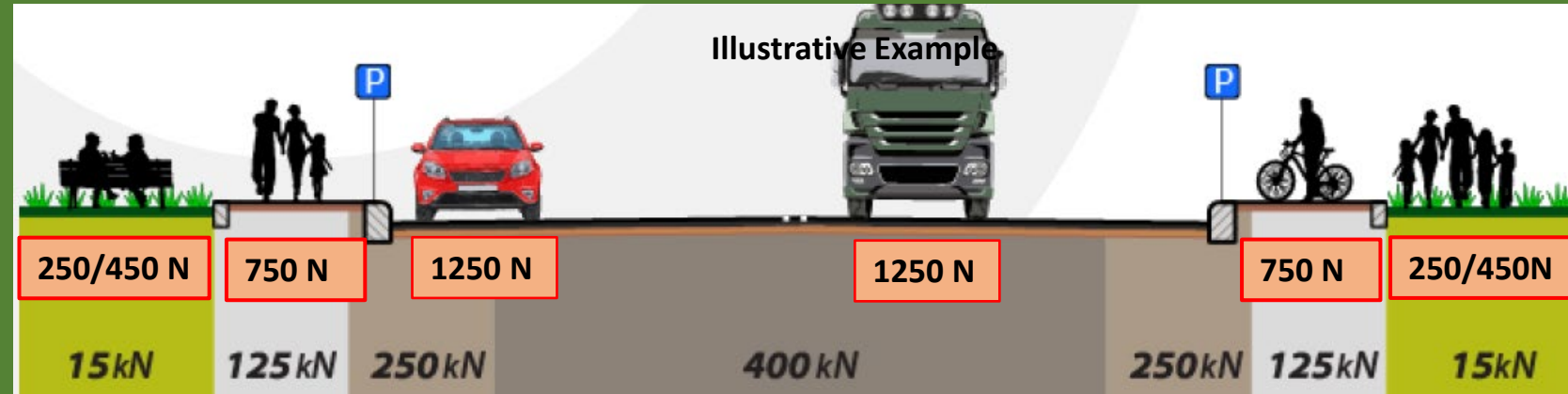
Outer Dia.	Inner Dia.	Length(s)	Joint Angle	Weight
70 mm 2.36 in	50 mm 1.97 in	300 mm 11.8 in	7 deg	1.0 Kg 2.20 lb
70 mm 2.36 in	50 mm 1.97 in	1000 mm 39.4 in	7 deg	3.4 Kg 7.5 lb
110 mm 4.73 in	90 mm 3.54 in	300 mm 11.8 in	7 deg	1.7 Kg 3.75 lb
110 mm 4.73 in	90 mm 3.54 in	1000 mm 39.4 in	7 deg	4.7 Kg 10.36 lb
160 mm 6.3 in	140 mm 5.51 in	300 mm 11.8 in	7 deg	2.1 Kg 4.63 lb
160 mm 6.3 in	140 mm 5.51 in	1000 mm 39.4 in	7 deg	6.0 Kg 13.23 lb

Typical Application Notes

Snap-Pipes

Notes:

- Generic guidelines per EN 61386 (5% limit)
 - Compression Strength Class: 250/450/ 750/ 1250
 - Impact Resistance: N
 - Deeper depths for higher loads, larger pipe dia.
- National Codes may differ
- Results may differ for non-typical loading
- (*) Quicklock 110mm is 250N rated
- (#) Quicklock 120mm is 750N rated
- (**) Hardlock 60mm is 450N rated
- (@) Panzar 160mm is 750N rated



EN 61386-24: Load should not cause internal pipe diameter deformation by more than 5% (limit)

Quicklock (Class 250 N*/450 N/750N#) [Good]

(Depth per EN: 61386-24)

Outer Dia.	15 kN	125 kN	250 kN	400 kN
110 mm* 4.33 in	0.3 m 11.8 in	0.5 m 19.7 in	0.7 m 27.6 in	0.8 m 31.5 in
120 mm# 4.73 in	0.3 m 11.8 in	0.5 m 19.7 in	0.7 m 27.6 in	0.8 m 31.5 in
160 mm 6.3 in	0.3 m 11.8 in	0.6 m 23.6 in	0.7 m 27.6 in	0.8 m 31.5 in

Hardlock (Class 450 N**/750 N) [Better]

(Depth per EN: 61386-24)

Outer Dia.	15 kN	125 kN	250 kN	400 kN
60 mm** 2.36 in	0.3 m 11.8 in	0.4 m 15.7 in	0.5 m 19.7 in	0.5 m 19.7 in
110 mm 4.73 in	0.3 m 11.8 in	0.5 m 19.7 in	0.6 m 23.6 in	0.7 m 27.6 in
160 mm 6.3 in	0.3 m 11.8 in	0.5 m 19.7 in	0.6 m 23.6 in	0.7 m 27.6 in
220 mm 8.66 in	0.3 m 11.8 in	0.5 m 19.7 in	0.7 m 27.6 in	0.8 m 31.5 in

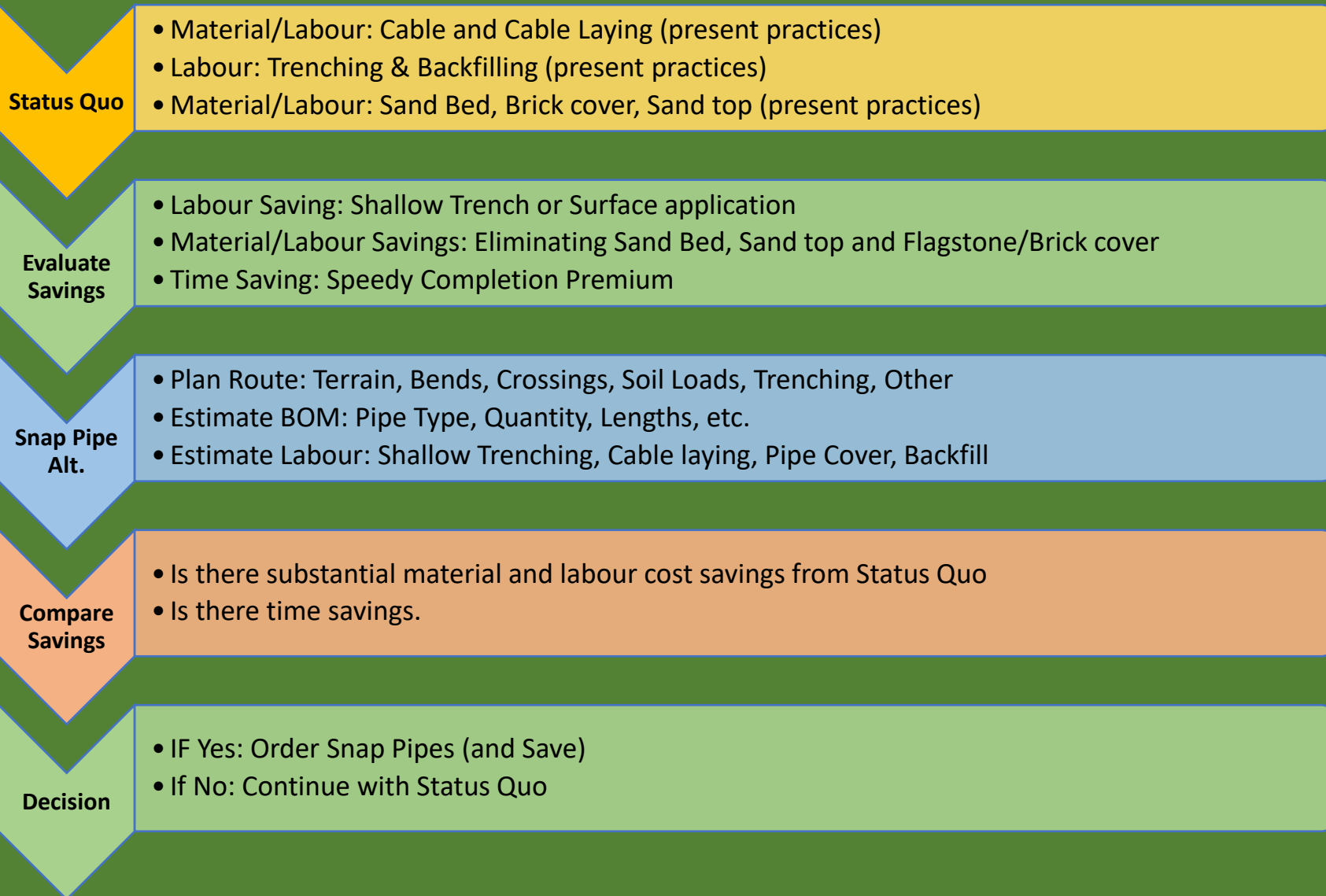
Panzar (Class 750N@ / 1250 N) [Best]

(Depth per EN: 61386-24)

Outer Dia.	15 kN	125 kN	250 kN	400 kN
70 mm 4.73 in	0.3 m 11.8 in	0.3 m 11.8 in	0.5 m 19.7 in	0.5 m 19.7 in
110 mm 4.73 in	0.3 m 11.8 in	0.4 m 15.7 in	0.5 m 19.7 in	0.6 m 23.6 in
160 mm@ 6.3 in	0.3 m 11.8 in	0.4 m 15.7 in	0.6 m 23.6 in	0.6 m 23.6 in

Solution Steps

Snap-Pipes



In Closing:

Snap-Pipes

Commercialized Technology - Simple – Fast – Less Expensive

Climate Change Mitigation at a lower cost

Steps:

- **Client Meeting:**
 - Product Samples/Demo
 - Standardize Needs
- **Short Term: 1-50km Field Trials**
 - Forest/Thickets (surface run)
 - Hilly Terrain (surface run)
 - Rural (shallow-trench)
 - Water Crossing (submarine)
- **Long Term: Partnership**
 - Achieve: 1,000 miles/year
 - Bulk PO → Periodic Release
 - Work with contractors
 - Establish local inventory

Spec. Highlights



4", 5", 6"
Sch.40 (4 mm wall)
22° Collar Flex

Above-Grade

Limited Use

Shallow Below-Grade



Water-Crossing

Not Recommended

Hardlock



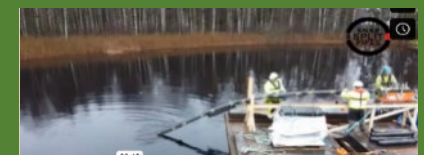
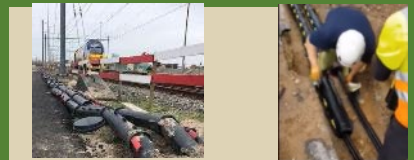
2", 4", 5", 6", 8"
Sch.40 (5 mm wall)
15° Collar Flex



Panzar



2", 4", 6"
Sch.80 (10 mm wall)
7° Collar Flex





[Downloads \(biosirus.com\)](http://Downloads(biosirus.com))



Thank You

Reducing Time and Cost of Undergrounding
(Surface / Below Grade / Underwater)

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