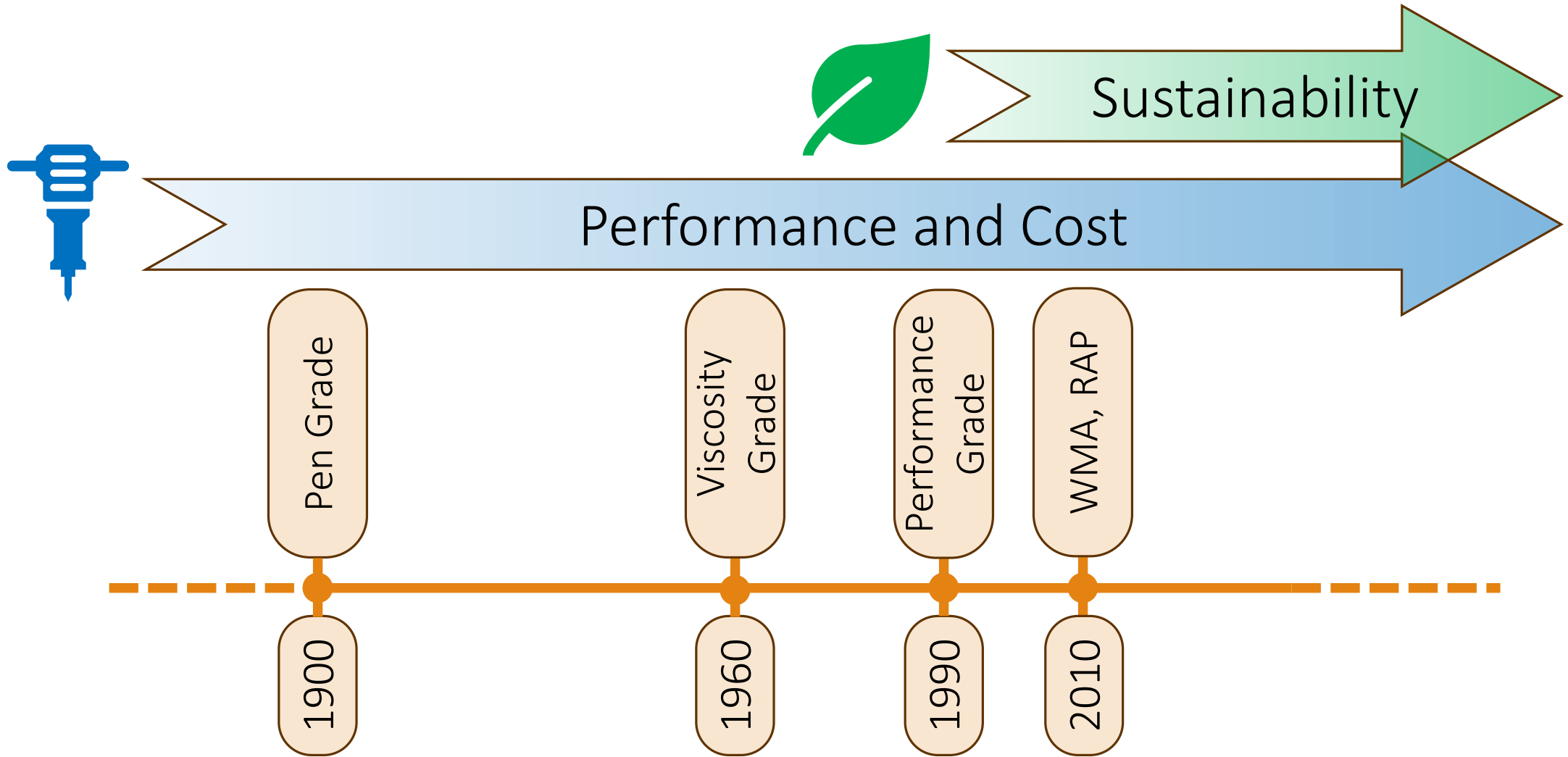


History of binder innovation in road building

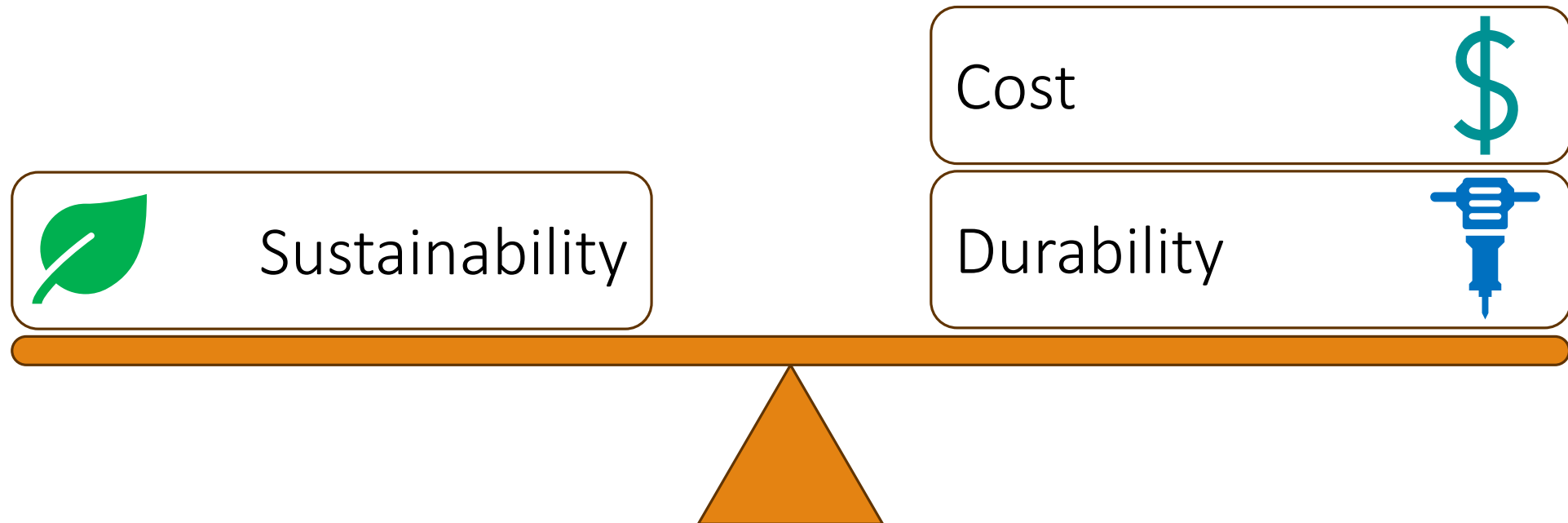
AMIT BHASIN



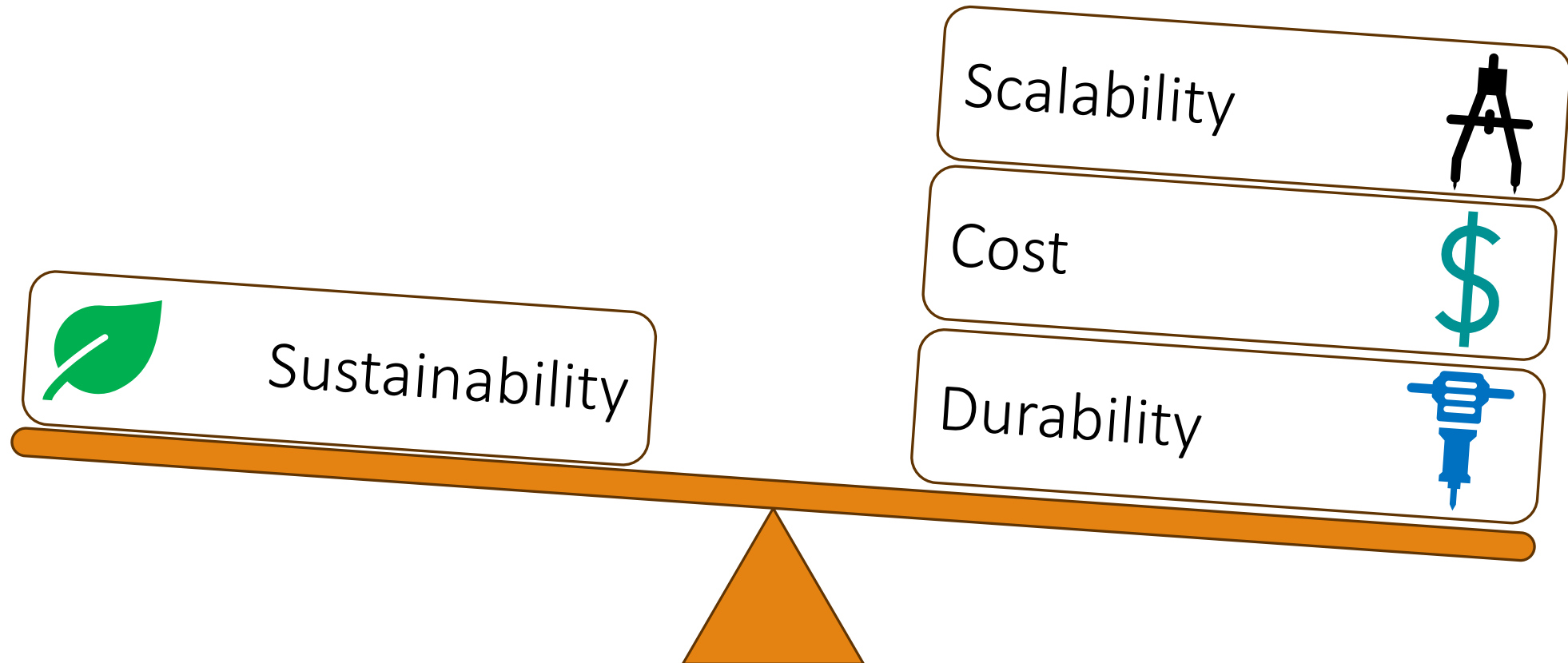
Innovation Drivers



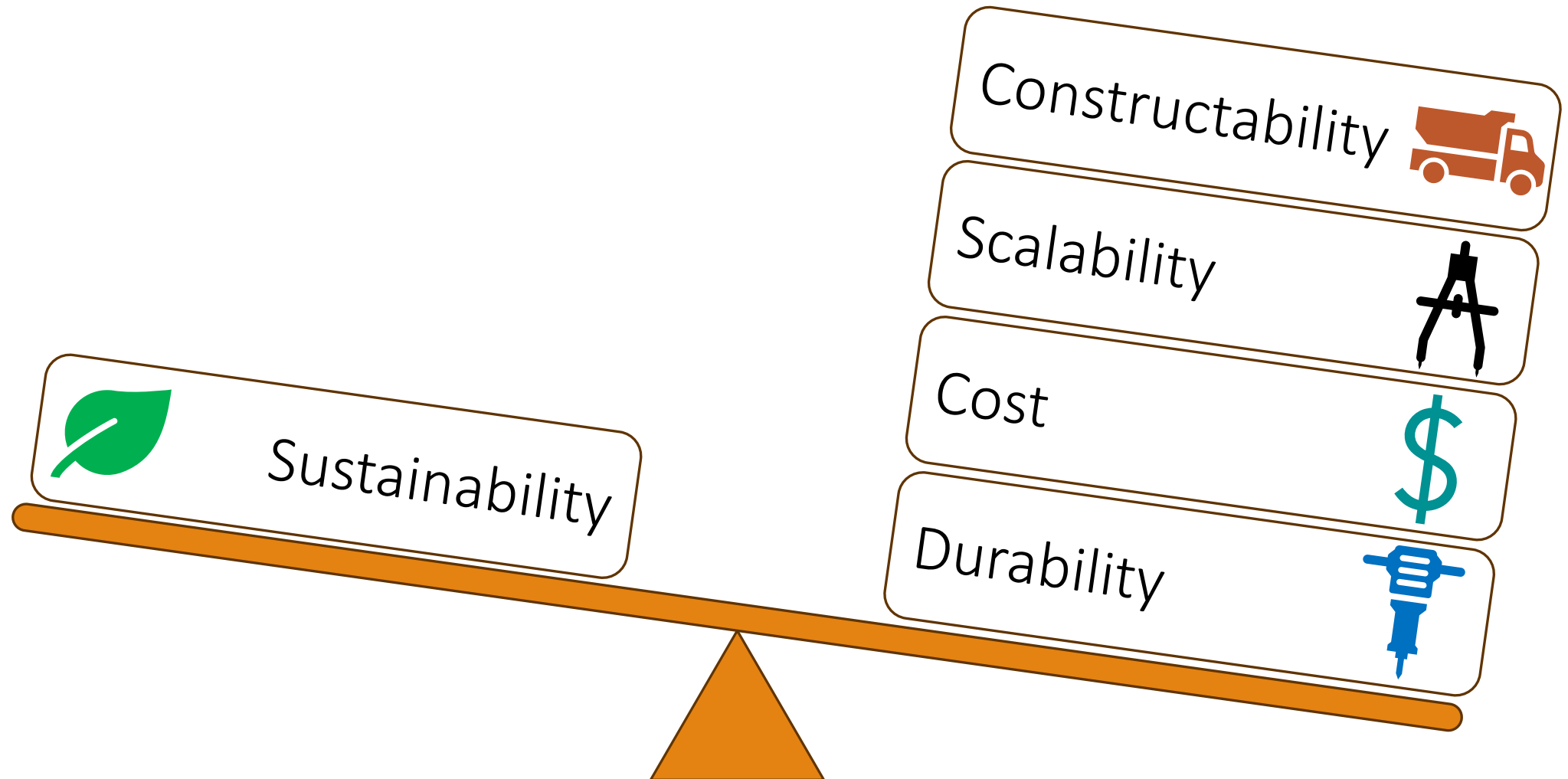
Innovation to promote sustainability



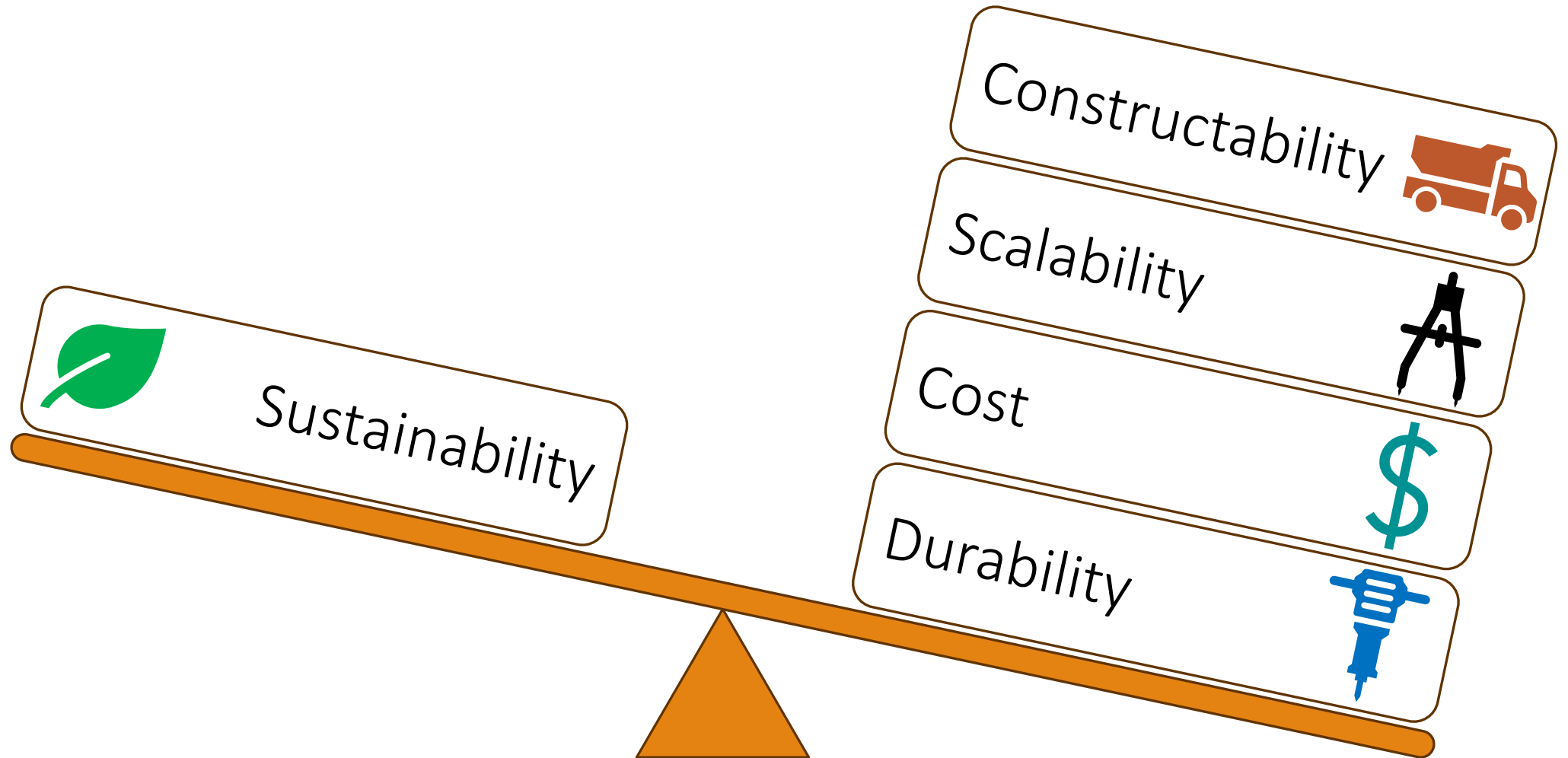
Innovation to promote sustainability



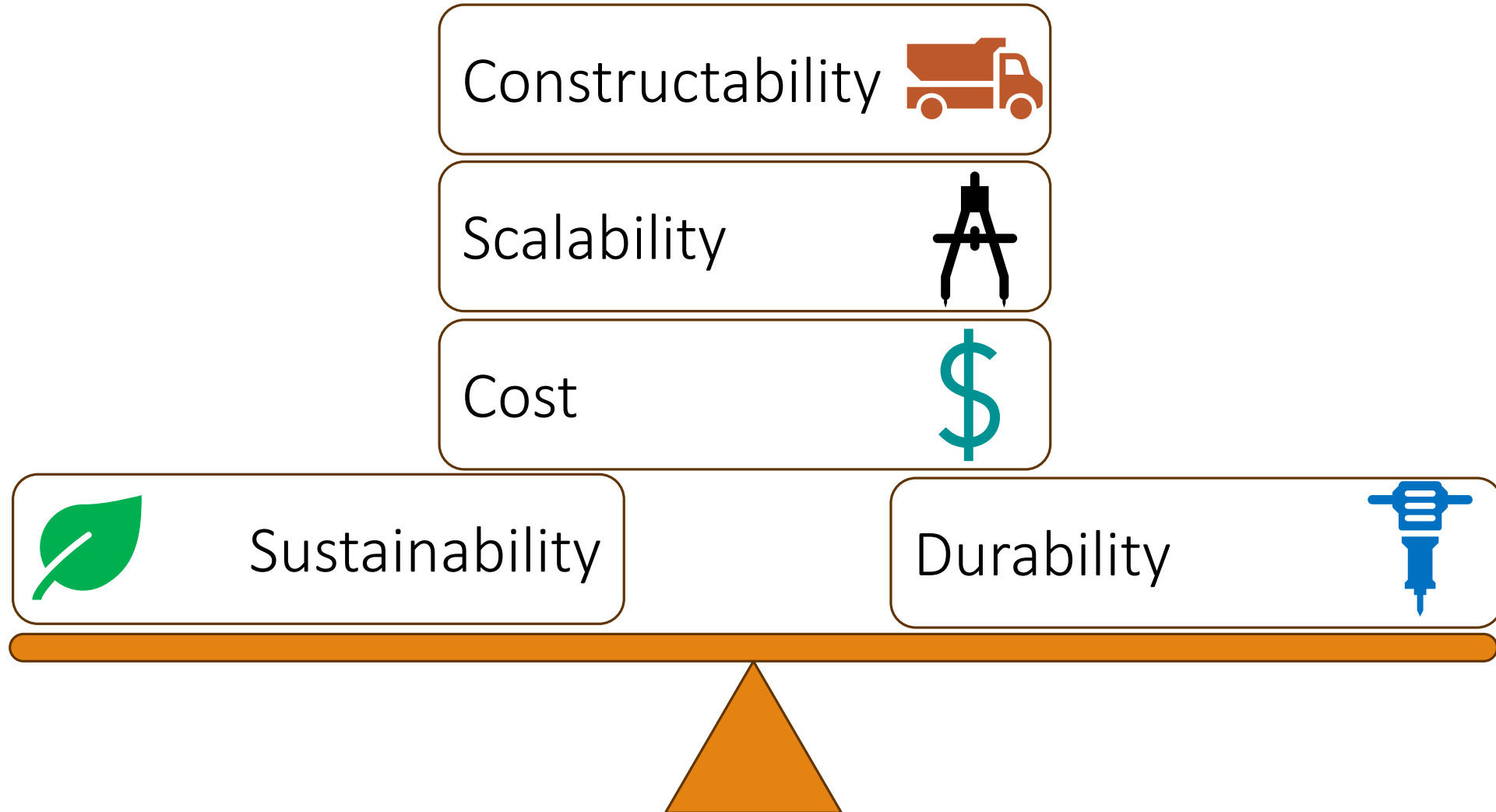
Innovation to promote sustainability




Innovation to promote sustainability




Innovation to promote sustainability




Innovation to promote sustainability – Example 1

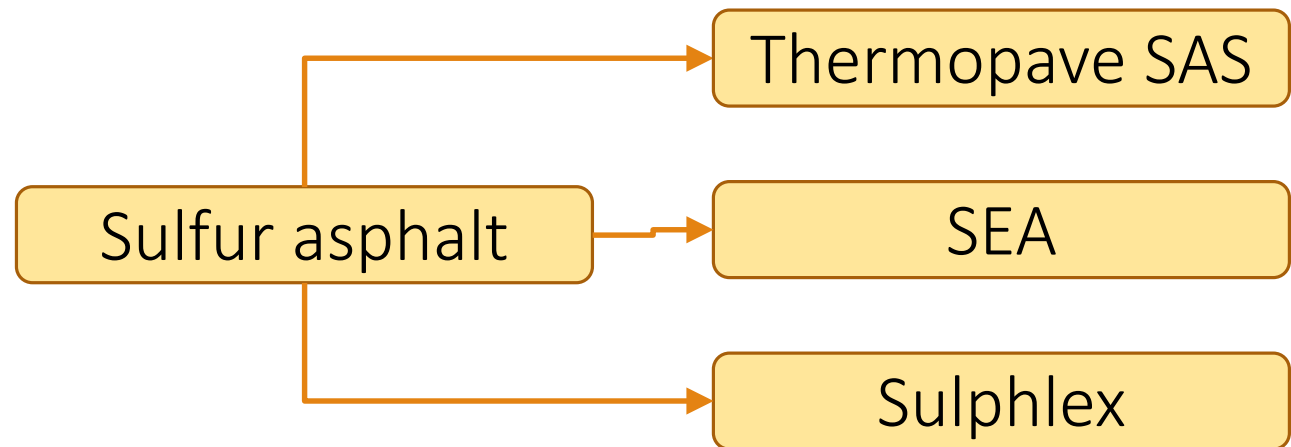
Constructability 

Scalability 

Cost 

 Sustainability


Durability 




Innovation to promote sustainability – Example 1

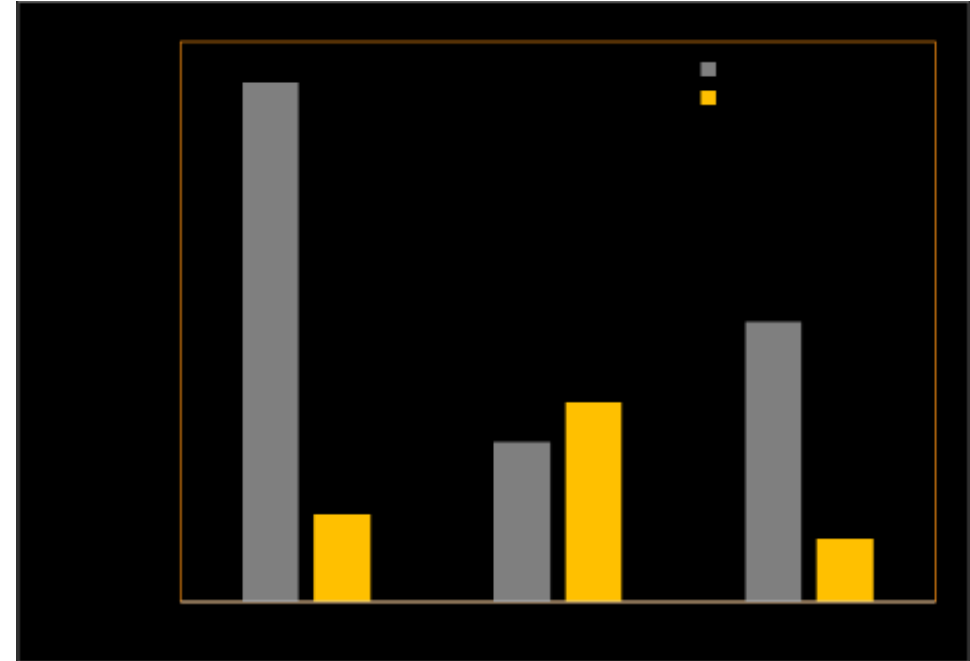
Constructability 

Scalability 

Cost 

 Sustainability

Durability 



Sulfur asphalt

SEA

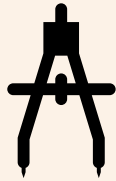


Innovation to promote sustainability – Example 1

Constructability



Scalability



Cost



Sustainability

Durability



Sulfur asphalt



SEA

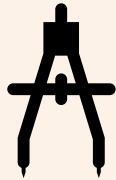


Innovation to promote sustainability – Example 1

Constructability



Scalability



Cost



Sustainability

Durability



Sulfur asphalt



SEA



Innovation to promote sustainability – Example 1

Constructability



Scalability



Cost



Sustainability

Durability



Sulfur asphalt



SEA



Innovation to promote sustainability – Example 1

Constructability



Scalability



Cost



Sustainability

Durability



Sulfur asphalt



SEA



Innovation to promote sustainability – Example 2

Constructability



Scalability



Cost



Sustainability

Durability



Philosophy today:

- Simulate oxidation
- Model oxidation
- Predict cracking due to oxidation

New paradigm:

- Stop oxidation!



Innovation to promote sustainability – Example 2

Constructability



Scalability

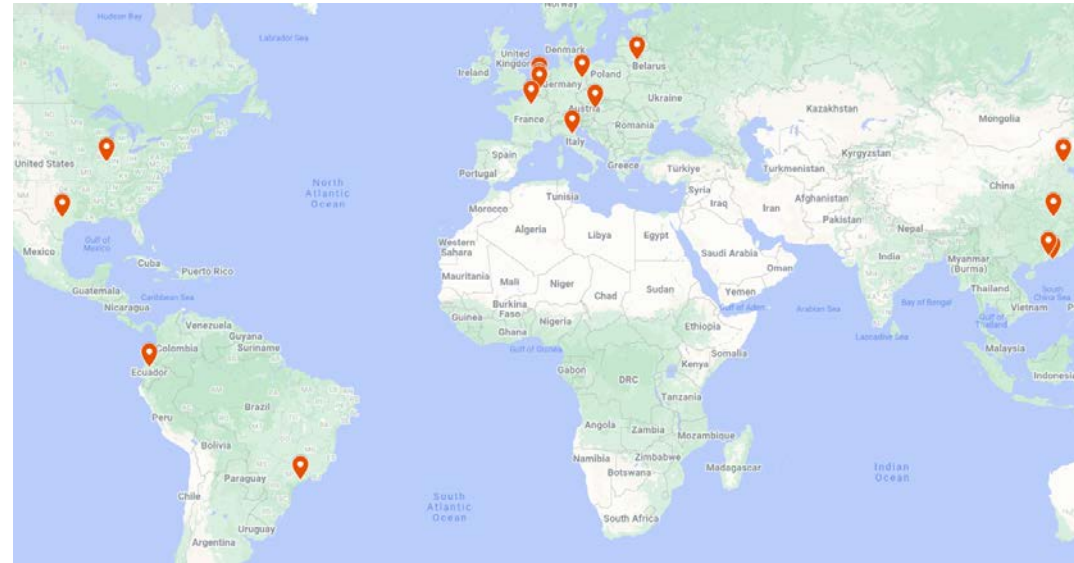


Cost



Sustainability

Durability

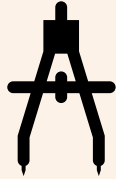


Innovation to promote sustainability – Example 1

Constructability



Scalability



Cost



Sustainability

Durability



- No change to base material
- Process similar to other additives currently being used with asphalt
- Costs are similar to other additives being used with asphalt



Innovation to promote sustainability – Example 1

Constructability



Scalability



Cost



Sustainability

Durability



Oxidation

→ Loss in Ductility

→ Cracking

Loss in ductility...

Conventional binders = 42%

Anti-oxidant = 1%



Balancing Innovation to Promote Sustainability

